

**NEW ZEALAND SUPPLEMENT TO THE AUSTRoadS
GUIDE TO TRAFFIC ENGINEERING PRACTICE
PART 14: BICYCLES**

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Preface

The *Guide to Traffic Engineering Practice Part 14 – Bicycles 2nd Edition (1999)*, (GTEP Part 14) published by Austroads, has been adopted as the key reference document for the design of cycling facilities in New Zealand. However, the document is based on the traffic regulations and associated traffic signing and road marking regimes of Australia, which are different in some respects to those of New Zealand. This means that some of the guidelines given in GTEP Part 14 are not appropriate to New Zealand. Therefore, this New Zealand Supplement to GTEP Part 14 (“the Supplement”) has been developed specifically for use in New Zealand.

The organisational structure and numbering system of GTEP Part 14 has been followed throughout the Supplement for ease of reference to GTEP Part 14. Where the content of GTEP Part 14 is relevant to New Zealand, then the Supplement refers the reader to GTEP Part 14 and where the content is not relevant to New Zealand, this is highlighted and replacement text is provided. In some cases, supplementary text is also provided to expand on the advice given in GTEP Part 14.

Where GTEP Part 14 refers to Australian standards, reference to the equivalent New Zealand standard or guideline has been provided in the Supplement. In most cases, the appropriate reference is the *Manual of Traffic Signs and Markings (MOTSAM)* published by Transit New Zealand (hereafter referred to as Transit) and Land Transport New Zealand

As with any guide of this nature, sound engineering judgement is required by designers when designing cycling facilities.



Cycle Lane (Auckland)



Cycle Path (Christchurch)

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Glossary of Terms

Most of the terms used in GTEP Part 14 are valid for use in New Zealand. However, some are either not recognised in New Zealand legislation, or relate to cycle facilities that are not recommended for use in New Zealand. The following terms are either not defined in GTEP Part 14 or have different meanings from those in GTEP Part 14.

Advanced Stop Box: 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.

Advanced Stop Line: 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.

Bicycle: Term used in GTEP Part 14. The word “cycle” is recognised in New Zealand legislation. A definition of “cycle” will be provided in the proposed Traffic Control Devices Rule.

Bicycle Path: See “exclusive cycle path” below.

Contra-Flow Cycle Lane: A cycle lane on a one-way street allowing cyclists to travel against the flow of other traffic

Cycle: As defined in the Traffic Control Devices Rule (once finalised). GTEP Part 14 generally uses the word “bicycle” whereas “cycle” is the term used in MOTSAM and other New Zealand traffic engineering documents. Accordingly the Supplement uses “cycle” but the terms are considered to be synonymous in this document.

Cycle Lane: A lane designated generally for the exclusive use of cyclists, except that motor vehicle drivers may use the lane in certain circumstances such as to access parking or to turn at intersections or driveways, for example. A cycle lane is as defined in the Traffic Control Devices Rule. See Supplement Section 4.4.1 Cycle Lanes.

Cycle Path: A path that is within the road reserve that is physically separated from the roadway (including cycle track formed under section 332 of the Local Government Act 1974) that is intended for the use of cyclists, but which may also be used by pedestrians. It may not be necessarily be within the road reserve (such as in a park or alongside a river, lake or railway line).

Exclusive Bicycle Lane: See “cycle lane”.

Expressway: The State Highway Geometric Design Manual defines “expressway” as “a road mainly for through traffic usually dual carriageway with full or partial control of access. Intersections are generally grade separated”.

Exclusive Cycle Path: A path or path section intended for the exclusive use of cyclists (see GTEP Part 14 Section 6.6.3 Exclusive Bicycle Paths).

Freeway: Not recommended terminology for use in New Zealand. See “motorway” below.

Motorway: As defined in Section 2 (1) of the Transit New Zealand Act 1989. A defined class of road for which certain activities or uses are restricted or prohibited by legislative provision.

State Road Authority: Term used in GTEP Part 14 (for example, Section 4.2.3 Cross Section & Clearances). In a New Zealand context, this means the road controlling authority.

Transit Lane: As defined in the Traffic Control Devices Rule and the Road User Rule. Generally a “transit lane” is a traffic lane set aside for the use of buses, cycles, motorcycles, taxis and vehicles carrying a specified minimum number of occupants. In certain circumstances (such as on motorways), cycles may be prohibited from using transit lanes

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1 Introduction

Refer to GTEP Part 14 (Page 1).

2 Planning for Cyclists

Refer to GTEP Part 14 (Page 2) Except As follows:

2.2 Bicycle Strategies and Strategic Bicycle Plans

2.2.1 Australia Cycling - The National Strategy Cycling Resource Centre

An on-line information hub on cycling has been launched by the Australian Bicycle Council covering the following topics:

- engineering and planning
- education and training
- encouragement and promotion
- enforcement and road safety
- recreation
- research.

www.cyclingresourcecentre.org.au

This section of GTEP Part 14 is replaced by the following:

New Zealand Cycling Strategies

The New Zealand Transport Strategy (NZTS) released in December 2002 supports cycling and the provision of cycling infrastructure:

“The negative social and environmental impacts of transport must be reduced. In land transport, the government is determined to see that the transport system supports access and environmental outcomes through improving public transport, reducing congestion, improving safety for all, supporting alternatives to travel (such as teleworking and local provision of services), and providing infrastructure for walking and cycling.”

The Walking and Cycling Strategy “Getting There On Foot, By Cycle” was published in February 2005. It

provides a strategic framework for walking and cycling in New Zealand. The Road Safety Strategy 2010, released by the government in October 2000, identifies the safety of cyclists as a key priority area for action.

<http://www.transport.govt.nz/assets/NewPDFs/GettingThereA4.pdf>

Initiatives that support the NZTS, and the Road Safety Strategy 2010 are:

- This Supplement to GTEP Part 14.
- Land Transport Safety Authority prepared a Cycle Network and Route Planning Guide that was released in 2004. It provides guidance on the planning of cycling facilities.
- Land Transport NZ is supporting the development of cycling strategies by requiring road controlling authorities to have a cycling strategy as a condition of its financial support for individual cycling projects.
- Road controlling authorities throughout New Zealand have or are preparing cycling strategies for their jurisdictions.

2.4 Bicycle Programs

2.4.1.2 Type of Facility Required

This section of GTEP Part 14 is replaced by the following:

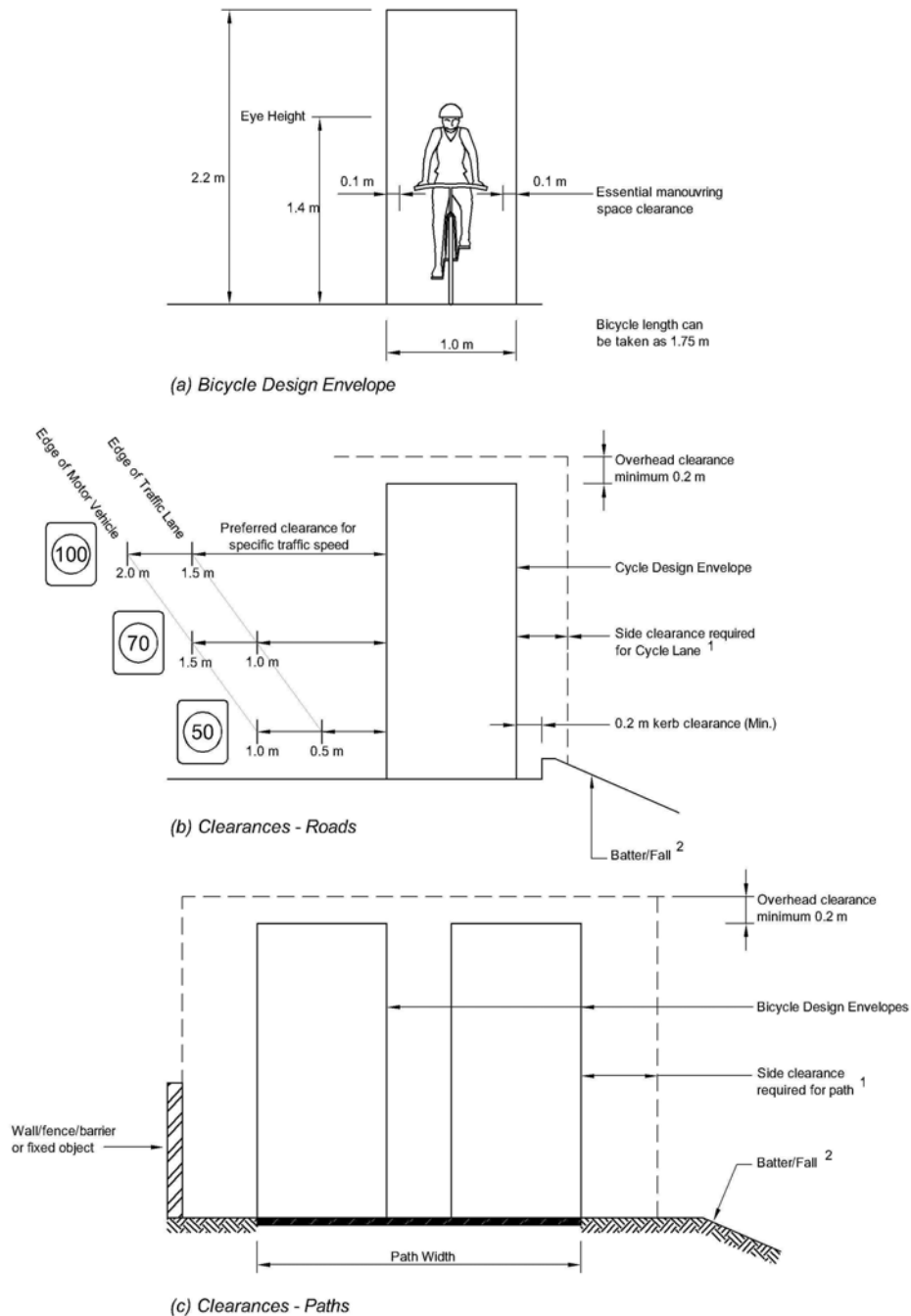
Discussion of off-road and on-road cycle facilities is provided in Section 4.2: Provision for Cyclists.

3 Bicycle Rider Requirements

Refer to GTEP Part 14 (Page 14) except as follows:

3.2 Space to Ride

GTEP Part 14 Figure 3-1 is replaced by Figure 3-1: Cycle Operating Space.



1. See GTEP Part 14 Section 6.3.5 for clearances to trees and other obstructions
2. See GTEP Part 14 Section 7.6.2 for protection measures where road/path shoulder falls away from the road

Figure 3.1: Bicycle Operating Space

4 Roads

Refer to GTEP Part 14 (Page 16) except as follows:

4.2 Road Design Criteria for Cyclists

4.2.6 Public Lighting

Refer to GTEP Part 14 but noting the following supplementary text

The appropriate lighting standard is AS/NZS 1158.

4.3 Provision for Cyclists

Refer to GTEP Part 14 except as follows:

4.3.1 General

This section of GTEP Part 14 is replaced by the following:

Urban Roads

Traffic lanes that are part of a cycle network should provide the connectivity required to enhance the convenience and safety of cycle trips.

Figure 4-1: Guide to Choice of Facility Type for Cyclists in Urban Areas is a basic guide to identifying an appropriate type of facility for different combinations of traffic speed and volume within an urban area.

Cycle facilities may be needed at lower speed/volume thresholds than shown in Figure 4-1 especially where there are high numbers of heavy vehicles and/or school children.

The Figure 4.1 relates to the more commonly used treatments. Other treatments referred to in this section may also be appropriate, for example:

- Contra-flow cycle lane (Section 4.4.3). Applicable to one-way streets only,
- Protected two-way cycle lanes (Section 4.4.5), normally used in special circumstances only.

Rural Roads

In rural areas, roads are usually of sufficient width to allow comfortable sharing of the road. However, the provision of appropriate bicycle operating space is a key issue when considering the provision of cycle facilities. Where safe and comfortable sharing of the road is not possible due to high traffic volumes and /or speed then a cycle facility in the form of a sealed shoulder, cycle lane or cycle path may be required.

On rural high-speed roads continuity of cycle facility is a key issue for cyclists. Therefore, when providing a cycle facility any lack of continuity should be identified and suitable treatment or warning provided for all road users.

For guidelines on the design of cycle facilities on expressways refer to GTEP Part section 4.6.

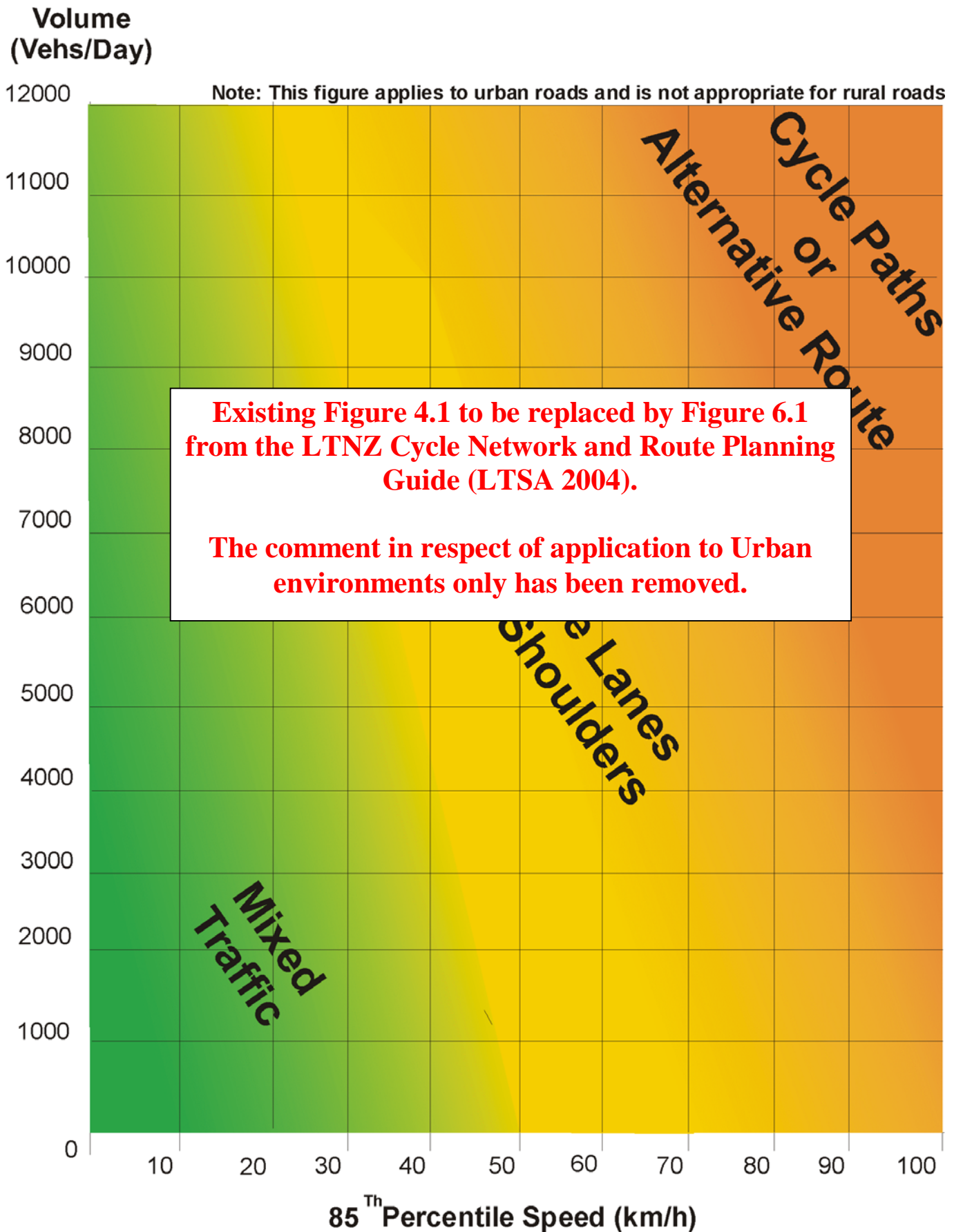


Figure 4-1: Guide to Choice of Facility Type for Cyclists in Urban Areas (Print in Colour)

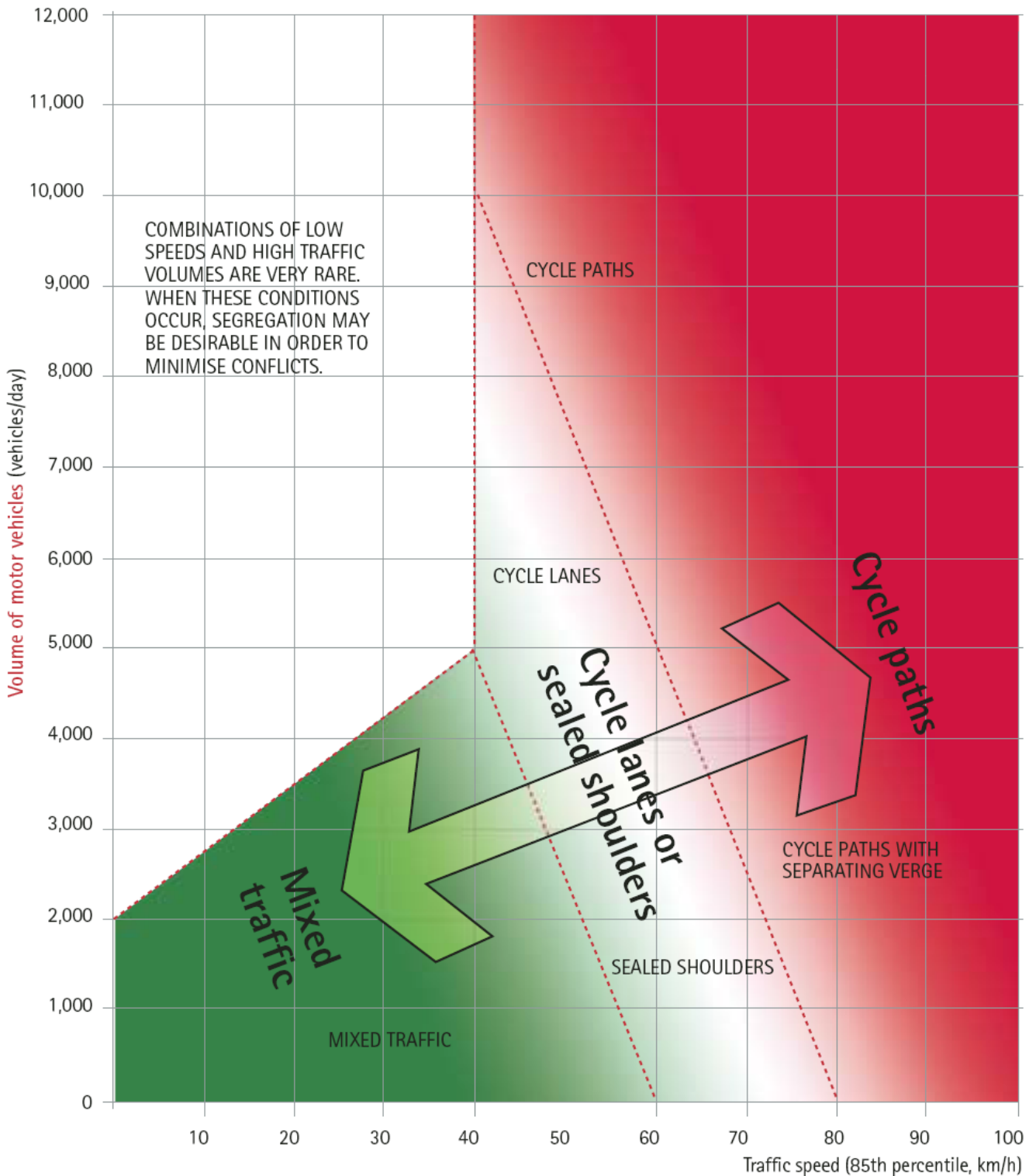


Figure 4-1: Guide to Choice of Facility Type for Cyclists (Print in Colour)

Figure 4-1: Notes

1. In general, roads with higher traffic speed and traffic volumes are more difficult for cyclists to negotiate than roads with lower speeds and volumes. The threshold for comfort and safety for cyclists is a function of both traffic speed and volume, and varies by cyclist experience and trip purpose. Facilities based on this chart will have the broadest appeal.
2. When school cyclists are numerous or the route is primarily used for recreation then path treatments may be preferable to road treatments.
3. Provision of a separated cycle path does not necessarily imply that an on-road solution would not also be useful, and vice-versa. Different kinds of cyclists have different needs. Family groups may prefer off-road cycle paths while racing or training cyclists, or commuters, tend to prefer cycle lanes or wide sealed shoulders.

Figure 4.1 is based on the following research:

1. **Roads and Traffic Authority, NSW (RTA NSW) (2003)** *NSW bicycle guidelines*, Roads and Traffic Authority NSW, Sydney, Australia
2. **DELG (1999)** *Provision of cycle facilities — National manual for urban areas*, Department of the Environment and Local Government, Dublin, Ireland.
3. **Ove Arup and Partners (1997)** *The national cycle network: Guidelines and practical details. Issue 2.* Sustrans, Bristol, United Kingdom.
4. **Centre for Research and Contract Standardization in Civil and Traffic Engineering (CROW) (1993)** *Sign up for the bike: Design manual for a cycle-friendly infrastructure*, CROW, Ede, The Netherlands.

4.4 Road Treatments for Cyclists

The following replaces GTEP Part 14 Sections 4.4.1: Exclusive Bicycle Lanes and 4.4.2: Bicycle/Car Parking Lanes – that is all of GTEP Part 14 pages 20 to 26 inclusive and part of page 27.

4.4.1 Cycle Lanes

Description and Purpose

Cycle lanes are identified by cycle pavement marking symbols, and may have other distinguishing features such as different coloured surfaces. Cycle lane signs are currently optional. Cycle lane signs and markings are illustrated and discussed in Section 9 Traffic Signs and Markings and will be fully documented in MOTSAM.

In general, cycle lanes are the preferred treatment for cyclists on urban roads. They may be achieved in some cases by reallocating road space as discussed in GTEP Part 14 Section 4.3.2 Finding Space for Treatment (Page 19). Cycle lanes may be appropriate where:

- cycle traffic is concentrated, e.g. near schools or along major routes near city or town centres;
- an existing or potential significant demand for cycle travel can be demonstrated;
- truck traffic volumes are high making cycling unsafe or very unpleasant;
- they are needed to provide continuity within a cycle route network.



Figure 4-2: Cycle lane next to parking (Dunedin)

Where required on two-way streets, cycle lanes should be provided on both sides of the road so that cyclists can use them in the same direction as motor vehicle traffic.

Cycle lanes should not be placed between the kerb and parked cars as there will be no escape for cyclists if a car door is suddenly opened. In addition, cyclists will be hidden by parked cars from the view of drivers turning across the cycle lane from other lanes on the road.

On gradients, wider cycle lanes are advantageous to cyclists since uphill they need more space to “work” their cycles and downhill where their speed can be high. However, where a cycle lane is being provided in only one direction it is desirable to install it on the uphill side. This option should only be considered after all other options have been considered for the provision of a lane in both directions.

The width of cycle lanes will vary depending on:

- presence or absence of parking;
- parking turnover;
- road gradient;
- volume of cyclists;
- speed and volume of motor traffic;
- volume of large vehicles; and/or
- ability to make road space available given the needs of other road users, and physical constraints.

The width of cycle lanes for the purposes of this Supplement is measured from the face of the adjacent left kerb or the road edge to the centre of the cycle lane line, or between the centres of lane lines.

Application Details – Cycle Lanes Next to the Kerb or Road Edge

Cycle lanes next to the kerb or road edge should be implemented in accordance with the details shown in Table 4-1 and its associated notes.

The width of road gutters/channels (comprising a different surface medium) should be less than 0.4 m. The widths of cycle lanes in Table 4-1 presume that surface conditions adjacent to the gutter or road edge are of a high standard. Where there are poor surface conditions at the road edge (see Section 8.5 Surfaces for Cycling), then the width of cycle lanes should be based on usable road space available to cyclists.

When using Table 4-1, the following key width requirements of cycle lanes where no parking exists, are:

- At least 2.0 m is desirable where the adjacent motor traffic is moving at high speed (e.g. 100 km/h) and there are few large vehicles, or where speeds are moderate (e.g. 70 km/h) and the volume of large vehicles is substantial. This is also the minimum width that will enable cyclists to overtake each other without encroaching into the adjacent traffic lane;
- 1.2 m is the absolute minimum width and should only be used in low speed environments (85th Percentile speed of 40 km/h and below) and when it is not possible to achieve a wider cycle lane
- If cycle traffic flows exceed 150 in the peak hour, then additional width to accommodate overtaking manoeuvres should be considered.

Speed Limit ¹ (km/h)	Lane Width ² (m)		
	≤50	70	100
Desirable Minimum Width	1.5	1.9	2.5
Acceptable Range	1.2-2.2	1.6-2.5 ³	2.0-2.5 ³

Table 4-1: Cycle Lane and Sealed Shoulder Widths

Notes:

1. The speed limit is used unless the 85th percentile speed is significantly higher.
2. Interpolation for different speed limits is acceptable.
3. When greater than 2.5 m of shoulder exists, chevron pavement markings should be provided to suggest a cycling area of between 1.5 m and 2.0 m in width and to separate the cycling area from the general traffic lane. In such cases, the chevron markings should be at least 1.0 m wide.

Typical cross-sections of a cycle lane next to the kerb are shown in Figure 4-4.

Application Details – Cycle Lanes Next to Parallel Parking

Cycle lanes next to parking should be installed in accordance with the details shown in Table 4-2 and its associated notes.

Speed Limit ¹ (km/h)	Cycle Lane Width ²		Parking Width
	≤50	70	
Desirable Minimum Width	1.8	2.2	2.0
Acceptable Range	1.6 ³ -2.5	2.1-2.5	1.9 -2.5

Table 4-2: Cycle Lane and Parking Space Widths

Notes:

1. The speed limit is used unless the 85th percentile speed is significantly higher.
2. Interpolation for different speed limits is acceptable
3. 1.6 m is the absolute minimum width and should only be used in low speed environments (85th Percentile speed of 40 km/h and below) and when it is not possible to achieve a wider cycle lane.

Other important aspects of cycle lanes next to parking are:

4. The absolute minimum width for a cycle lane plus parking should be 3.7 metres. This width requires cyclists to ride close to the adjacent traffic lane to avoid potential collisions with car doors. This width is only acceptable where the mean traffic speeds are no more than about 50 km/h, most parked vehicles are cars, and parking demand and turnover are low. Similarly, where mean vehicle speeds are 70 km/h, the absolute minimum combined width of cycle lane and parking should be 4.2 m.
5. Cycle lanes next to parking should not use a “buffer strip” as suggested in GTEP Part 14 (Section 9.6.1.2) to separate cyclists from parked cars. Any extra width should be provided in the cycle lane.
6. The width of cycle lane required should be considered in relation to the width of the adjoining traffic lanes and parking spaces. In urban areas it is often preferable to narrow traffic lanes to a width less than 3.5m to facilitate desired widths for cycle lanes. The extent of such narrowing depends upon the likely presence of large or heavy vehicles. *Minimum width cycle lanes adjacent to narrow traffic lanes should be avoided.*

Typical facility layouts are shown in Figure 4-6 and typical cross sections are shown in Figure 4-7.

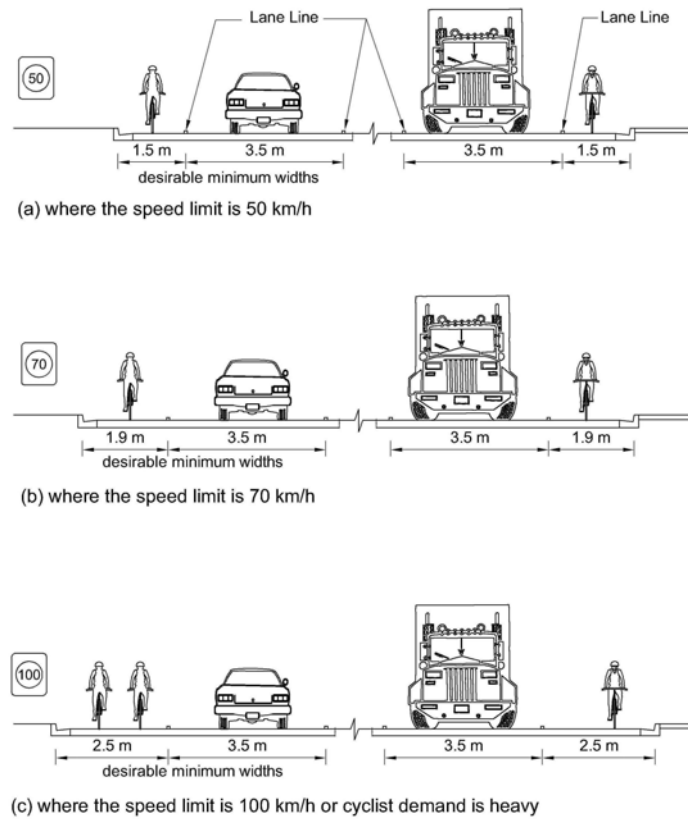


Figure 4-4: Vehicle Positions on Road Carriageway associated with Exclusive Bicycle Lanes

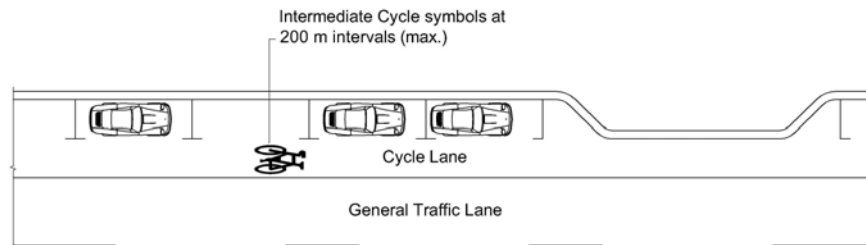


Figure 4-6: Cycle Lane next to Parking - Typical Layout

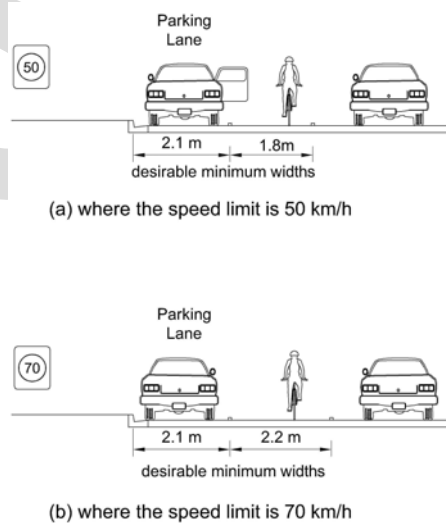


Figure 4-7: Cycle Lanes next to Parking - Typical Cross Sections

Application Details – Cycle Lanes Next to Angle Parking

Cyclists require a high level of protection when adjacent to angle parking, and therefore when implementing angle parking, the needs of cyclists should be given appropriate consideration.

Cycle lanes should be a suitable distance away from angle parking to encourage cycling in a position that aids visibility between drivers and cyclists and allows cyclists to avoid vehicles that are emerging from the car park.

Angle parking is appropriate only where the speed limit is 50 km/h or less. Cycle lanes next to angle parking assist in reminding drivers of the potential presence of cyclists.

Cycle lanes adjacent to angle parking should be installed in accordance with the clearance details shown in Table 4-3 and the associated typical facility layout shown in Figure 4-9. Lanes should be coloured green and marked with standard cycle pavement symbols to enhance their visibility.

	Clear Space between Parked Vehicles and Cycle Lane (m)		
Parking Angle	45°	60°	90° ⁴
Desirable Minimum	2.0	2.5	3.0
Minimum ³	1.5	2.0	2.5

Table 4-3: Cycle Lane Clearance from Angle Parking

Notes (Table 4-3)

1. Cycle lane width should be between 1.5 m and 2.0 m.
2. The provision of kerbed projections or other treatments including channelisation are important in locations next to parking (especially angle parking) when motor vehicle drivers might drive in a parking area when parking demand is light. They should be installed immediately to the left of the cycle lanes at the start of the facility and at frequent intervals to limit the incidence of motor vehicles travelling over, or to the left of, the cycle lane.
3. Minimum width and should only be used in low speed environments (85th Percentile speed of 40 km/h and below) and when it is not possible to achieve a wider cycle lane
4. Where 'reverse-in' parking is used, the minimum clear space should be 1.0m



Figure 4-8: Cycle Lane next to Angle Parking (Christchurch)

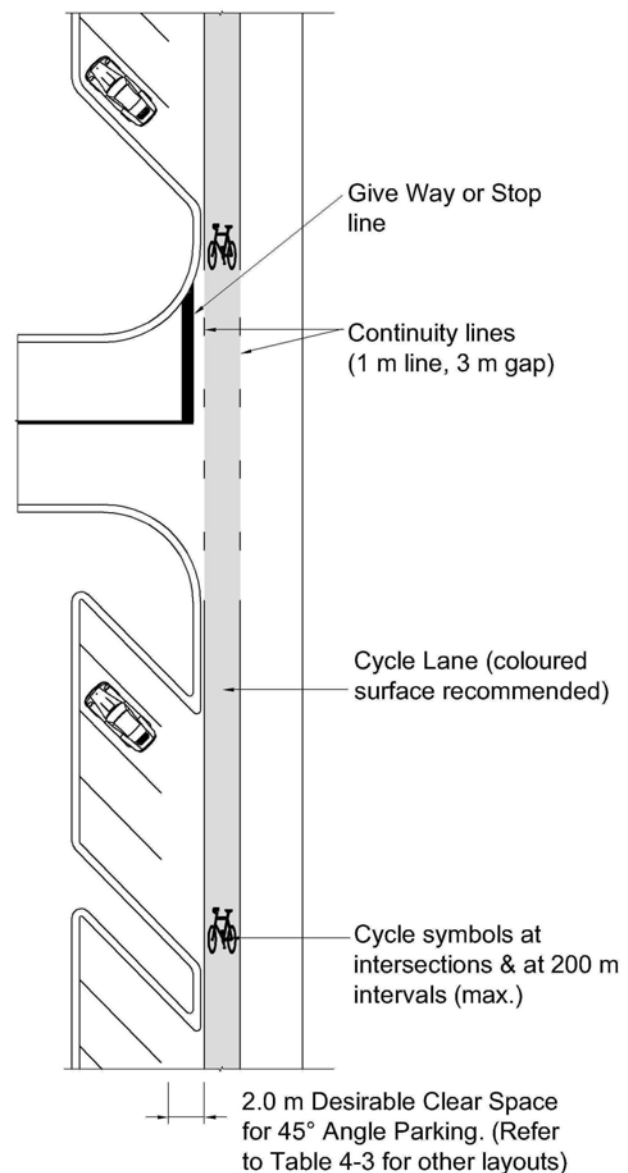


Figure 4-9: Cycle Lane next to Angle Parking - Typical Layout

4.4.2 Peak Period' Cycle Lanes

Refer to GTEP Part 14 Page 21.

4.4.3 Contra-Flow Bicycle Lanes

Refer to GTEP Part 14.

4.4.4 Sealed shoulders

Supplementary Text - insert the following three paragraphs after the sub-heading "Description and Purpose" and before the existing text as follows:

In New Zealand, cycle pavement symbols indicate the presence of a cycle lane and therefore should not be used on a road shoulder unless it is a cycle lane. Motor vehicles are prohibited from cycle lanes under the Road User and Traffic Control Devices Rules. Ensuring that cycle pavement symbols are used only in cycle lanes will help with recognition of cycle facilities by all road users, and result in better compliance with cycle lane rules by motorists. See also Section 9.6 Pavement Markings.

When cyclists use sealed shoulders care must be taken to ensure that the continuity of cycling facilities is maintained and any narrowing of the shoulder does not put cyclists at risk. Shoulder widths should be maintained along passing lanes to ensure cyclists are not put at risk by being moved closer to truck traffic and motor vehicles travelling at high speed. This is reinforced in MOTSAM which states that "sealed shoulder widths on a passing lane should be the same as the standard link sealed shoulder for that section of road".

Parking on rural road shoulders in areas of tourist interest should generally be discouraged and off-road parking provided, to maintain safety for cyclists using the shoulder.

4.4.5 Protected Two-Way Lanes

Refer to GTEP Part 14.

4.4.6 Advisory Treatments

The text of this section (page 30 and part of page 31) and Figures 4-14, 4-15, 4-16 and 4-17 are replaced by:

Advisory treatments (or "advisory cycle lanes" (ACLs) as they are more commonly called) are used to a limited extent in Europe, but are not known to exist in New Zealand. They are explained in GTEP Part 14 as "treatments to indicate or advise road users of the potential presence of cyclists and of the location where cyclists may be expected to ride on a road. They consist of pavement markings and otherwise only warning and guide signs and as such have no regulatory function."

They are not recommended for use in New Zealand at this stage for the following reasons:

- There needs to be a focus on increasing the understanding of RCAs and drivers about the proper design and use of cycle lanes.
- Adding ACLs to the options will make it harder for drivers to understand the basic rules of conventional cycle lanes, and to distinguish between the two types of facilities.

Accordingly, advisory treatments as proposed in GTEP Part 14 are not recommended for use in New Zealand at this stage. Various alternatives may be considered where it is desired to improve conditions for cyclists, such as:

- Removal of parking from one or both sides of a road to provide enough width for cycle lanes;
- Provision of wide kerbside lanes (see Section 4.4.7); or
- Traffic calming or other methods of reducing motor vehicle speeds.

4.4.7 Wide Kerbside Lanes

Refer to GTEP Part 14 except as follows:

Supplementary text - the first paragraph in GTEP Part 14 should be preceded by the followings:

On rural roads, wide lanes and narrow shoulders are less beneficial to cyclists than conventional width traffic lanes with wide shoulders. Therefore, on rural roads, wide shoulders are the preferred treatment (as opposed to wide lanes) if cycle lanes can not be provided.

Paragraph two of GTEP Part 14 stating that "the sharing of lanes cannot be legally performed (and hence facilitated) in all States" is not applicable in New Zealand where lane sharing is permissible.

GTEP Table 4-4 is replaced with the following Table 4-4 which provides the width requirements when there is parking adjacent to the wide kerbside lane.

Without Parking	Lane width ²	
Speed Limit ¹ (km/h)	≤50	70
Desirable Minimum Width	4.2	4.5
Acceptable Range	4.0 ³ -4.5	4.2 ³ -5.0 ⁴
With Parking	Lane width ²	
Speed Limit ¹ (km/h)	≤50	70
Desirable Minimum Width	4.5	4.8
Acceptable Range	4.3 ³ -4.8	4.5 ³ -5.3 ⁴

Table 4-4: Wide Kerbside Lane Dimensions

Notes (Table 4-4)

1. The speed limit is used unless 85th percentile speeds are significantly higher.
2. Interpolation for different road speeds is acceptable.
3. This width is the absolute minimum width and should only be used in low speed environments (85th Percentile speed of 40 km/h and below) and when it is not possible to achieve a wider kerbside lane,
4. Where greater width is available than identified here, consideration should be given to providing a cycle lane. If lanes are too wide, car drivers may attempt to travel two abreast.

GTEP Part 14 Figure 4-19 is replaced by Figure 4-19 as follows:

4.4.8 Bus/Bicycle Lanes

Supplementary Text

GTEP Part 14 refers to the provision of a cycle lane to the right of a bus lane in congested areas, however, in lower congested locations where bus speeds are about 50 km/h and bus stops are infrequent then a combined bus/cycle lane width of 4.2 m is more appropriate. This is to prevent cyclists being passed by free flowing traffic on both sides, buses to the left other traffic to the right.

Where bus speeds are higher than 50km/h, up to about 60 km/h, a minimum width of 4.5 m is required and over 60km/h to about 70 km/h, a minimum width of 5.0 m is required.

4.5 Supplementary Road Treatments

Refer to GTEP Part 14 (Page 34)

4.6 Provision for Cyclists on Freeways

Refer to GTEP Part 14 (Page 37)

It is noted that this section of GTEP Part 14 contains a comprehensive discussion of the advantages and disadvantages of cycling on “freeways” (“motorways” in a New Zealand context), and the relevant design considerations. This advice is appropriate for New Zealand circumstances.

Figure: 4-19 Wide Kerbside Lanes – Typical Cross Section

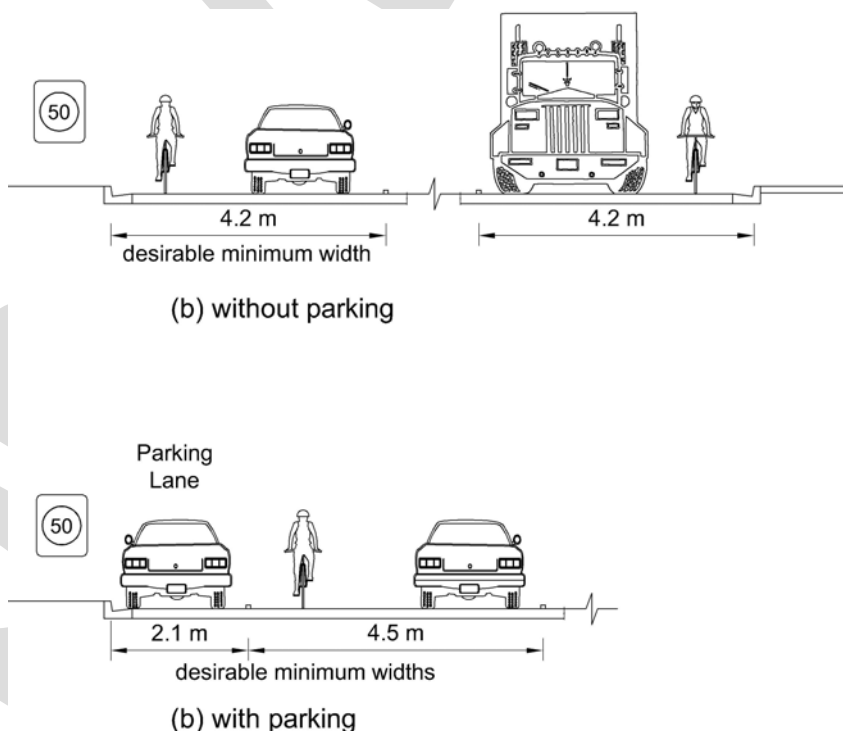


Figure 4-19: Wide Kerbside Lanes – Typical Cross Section

5 Road Intersections

Refer to GTEP Part 14 (Page 47) except as follows.

5.1 Introduction

Supplementary text - insert after first paragraph as follows:

The success of any cycling network is dependent on having appropriate intersection treatments and overall route continuity. Cumming et al identified six different sections to be considered when undertaking design of cycling facilities. Cumming's six elements are:

1. Midblock
2. Transition
3. Approach
4. Storage
5. Through
6. Departure

Five of these six elements (numbers 2 to 6 above) relate to intersections, highlighting the importance of intersections (as opposed to mid-block locations) in good facility design. They are illustrated in Figure 5-1(a) below. Note that in this figure, "kerbside" means "cycle lane next to the kerb" and "carside" means "cycle lane next to parking".

5.3 Typical Intersections Details

5.3.1 Exclusive Bicycle Lanes

Refer to GTEP Part 14 but noting change in terminology to cycle lanes next to the kerb or the road edge.

5.3.2 Bicycle/Car Parking Lanes

Refer to GTEP Part 14 but noting change in terminology to cycle lanes next to parking.

5.3.4 Contra-Flow Bicycle Lanes

Supplementary text - insert the following after existing text:

Note that the signs illustrated in GTEP Part 14 Figures 5-5 and 5-6 should be MOTSAM-approved signs, as depicted in Section 9 of this supplement and in MOTSAM.

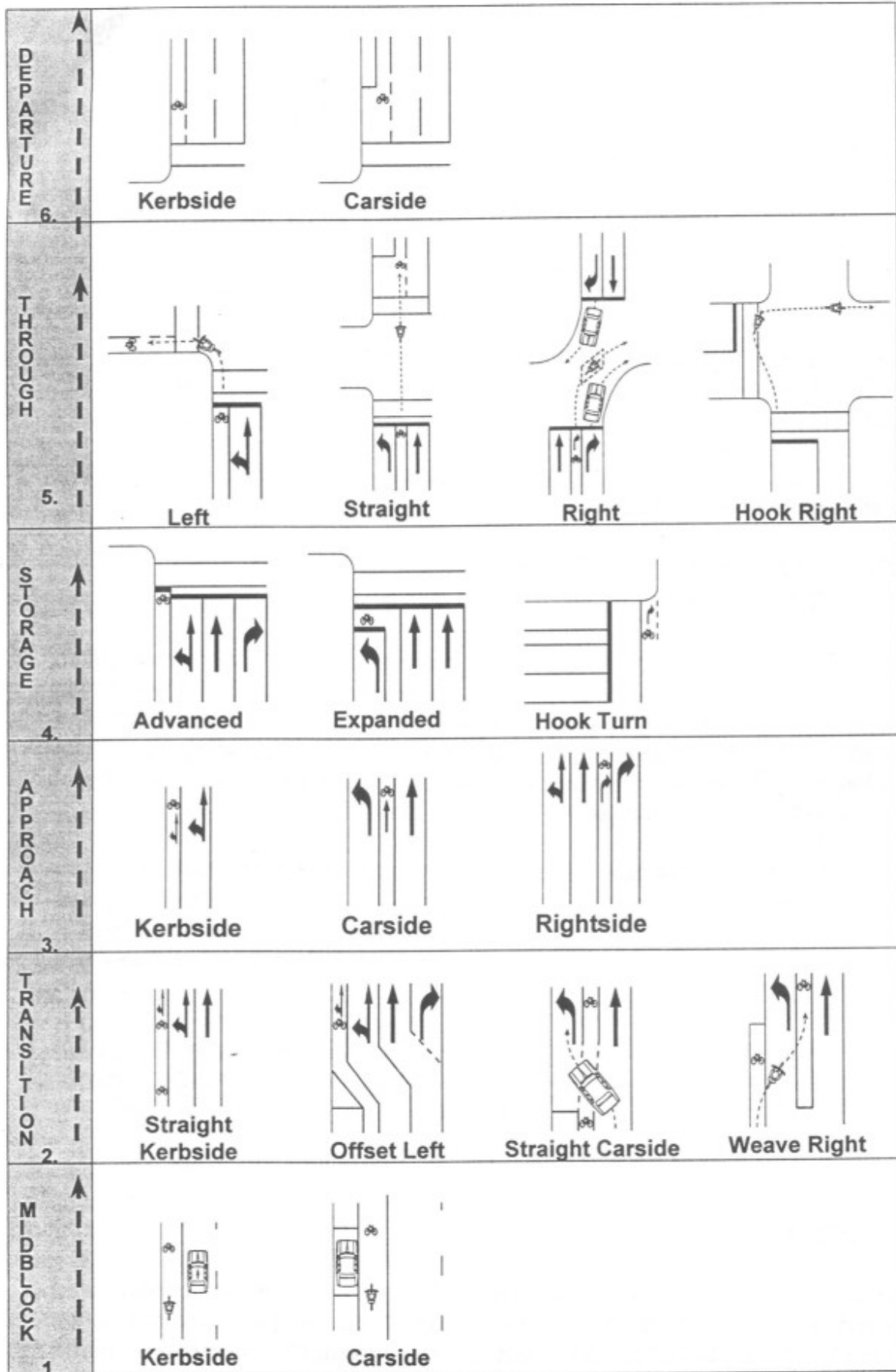


Figure 5-1(a): Cycle Facility Design Elements (from Cumming et al)

5.4 Signalised Intersections

Refer to GTEP Part 14 (Page 57) except as follows:

5.4.1 Bicycle Detection at Traffic Signals

(b) "SCOOT" Loop

Supplementary text as follows:

Bicycle detector loops are commonly square, rectangular or elongated diamond. They vary in length and width, depending on the lane(s) and movement they are intended to cover. In New Zealand a "System D" loop is commonly known as "Slanted". They may also be referred to as "Chevron" loops or simply as XYZ loops (depending on their position or location).

(c) Push Button Actuators

Replace first paragraph with the following:

Push button actuators are a widely used form of detection at traffic signals for pedestrians and are occasionally used for cyclists. While they have the advantage (when compared with conventional loop detectors) of allowing detection of cycles made of non-metallic materials, they provide a poorer level of service unless located where cyclists can easily activate them. In addition, they do not suit locations where cycle lanes are not next to the kerb.

5.4.2.2 Separate Bicycle Lanes on Approaches

Replace the first two paragraphs of the existing GTEP Part 14 text with the following four paragraphs:

Where separate cycle lanes are continued beyond the limit lines on adjacent lanes at signalised intersections, they are referred to as "advanced stop lines" in New Zealand. Where GTEP Part 14 refers to "stand up lanes", these are the equivalent of "advanced stop lines".

Where a cyclist storage area is created in front of a general traffic lane, it is referred to in New Zealand as an "advanced stop box" (ASB). In GTEP Part 14, these are known as "head start storage areas (see GTEP Part 14 Section 5.4.2.3).

It is desirable to provide an approach lane and an advanced stop line for cyclists to enable them to pass queuing motor vehicles and proceed to the stop line. The desirable minimum width for these lanes is 1.5 m. The lane should have a green coloured surface and be marked with a cycle pavement symbol (and optional arrow) to indicate the movement that can be made from the lane.

An example of approach lanes for cyclists and advanced stop lines is shown in Figure 5-11. The through lane for cycles is marked to the right of the left turn lane and enables through cycles to advance to the head of a stationary queue. In practice, without such a lane through

cyclists choose either to ride within the left turn lane in contravention of the law or ride within the through lane and are placed at greater risk because of the speed of traffic and the presence of the intersection. Because of the difficulties that cyclists experience sharing lanes of intermediate width, lanes such as this should be either 3 m wide or less, or 4.2 m wide or greater. These extremes allow cyclists to "take" the lane in the former case or easily share it in the latter.

5.4.2.3 Bicycle 'Head Start' Storage Area

Refer to GTEP Part 14 Section 5.4.2.3 Bicycle "Head Start" Storage Areas. Note that head start storage areas are commonly referred to in New Zealand as advanced stop boxes.

GTEP Part 14 Figure 5-15 is replaced by Supplement Figure 5-15 Advance Stop Line Treatment Options as follows:

5.4.2.4 'Hook' Turns

Supplementary text - insert new sentence before first paragraph as follows:

Note: Trial installations of Hook turns by the Christchurch City Council and LAND TRANSPORT NZ (see Figure 5-16 (a) below) were inconclusive. There were no operational issues, other than lower than expected usage. At this particular site, the conventional right turn manoeuvre was not difficult. Designers are encouraged to trial hook-turnmarkings, especially where conventional right turns are difficult or dangerous.(across faster, busier, multi-lane traffic). Designers should discuss proposals with Transit and Land Transport NZ in order that trials are appropriately endorsed and evaluated.



Figure 5-16 (a): Hook Turn Trial in Christchurch

Note: Green coloured surfacing is now recommended for cycle lanes in New Zealand - see Section 9.7. Historically, Christchurch uses red to delineate cycle lanes and advanced stop boxes.

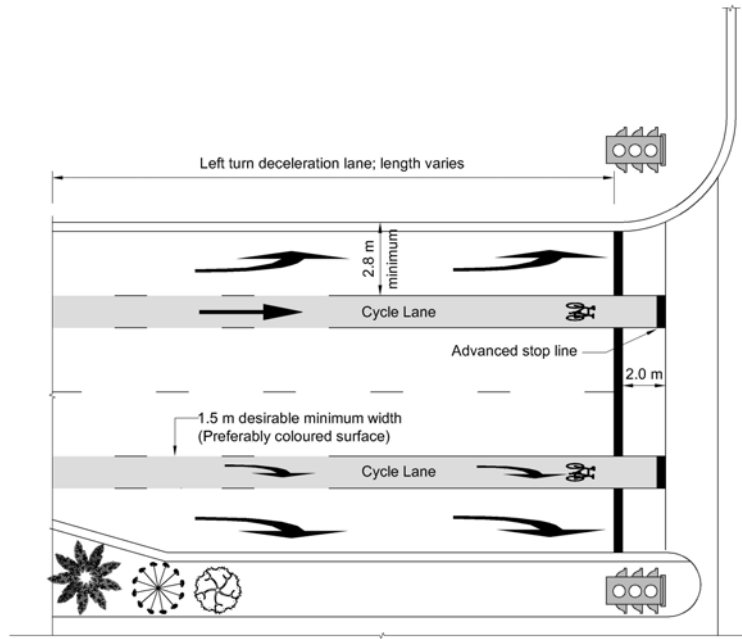


Figure 5-11: Bicycle Lanes at Signalised Intersections, also showing Advanced Stop Lines

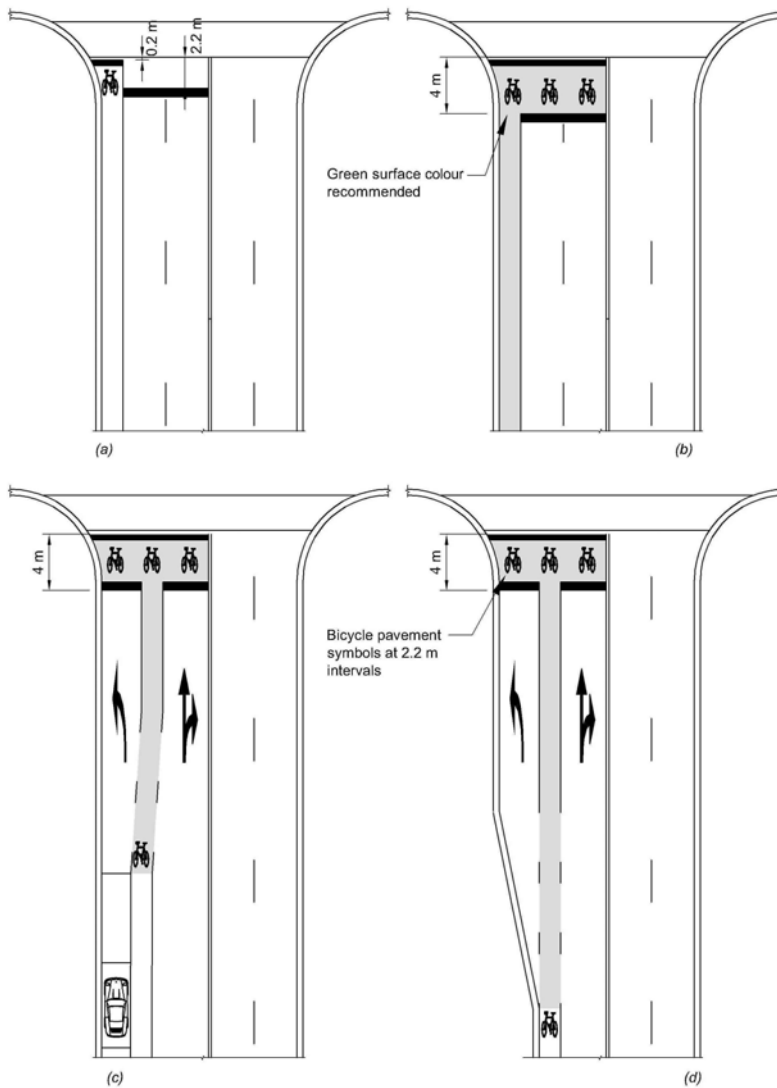


Figure 5-15: Advanced Stop Box Treatment Option

5.4.3 Phase Times

(b) Treatment Alternatives

The yellow cyclist lantern referred to in Paragraph ii) of this part of GTEP Part 14 is not permitted in New Zealand.

Insert new paragraph (iv) as follows:

To allow cyclists to 'demand' an all-red extension time, loop detection technology can be used to detect the presence of cyclists entering large intersections near the end of a phase. This allows the extension of the all-red phase to allow slower cyclists to traverse the intersection before the phases for opposing traffic commence. This treatment is under trial in Christchurch at the Ferry Road/ Fitzgerald Avenue intersection (2003). An advantage of this technology is that no publicity is necessary, as road users do not need to know how to activate the system.

5.5 Unsignalised Intersections

Refer to GTEP Part 14 (Page 61) except as follows:

5.5.1 Left Turn Slip Lanes

It should be noted that the examples illustrated in GTEP Part 14 Figures 5-24 and 5-26 have poor geometry for cyclists, with the design encouraging high-speed manoeuvres by motor vehicles. As noted in Figure 5-24, "consideration should be given to reconstructing the slip lane to intersect at a higher angle". This comment is equally applicable to Figure 5-26.

Designers are also referred to New Zealand's RTS 9 – Guidelines for the Signing and Layout of Slip Lanes (1993) for further guidance on slip lanes.

5.5.2 Roundabouts

Supplementary Text - insert new paragraph before GTEP Part 14 text as follows:

The optimal design of roundabouts to take account of the needs of cyclists is undergoing constant refinement and evolution, in New Zealand and overseas. Designers are encouraged to seek expert advice for the design of roundabouts to accommodate cyclists. The principal concerns for cyclist safety are with multi-lane roundabouts and those carrying traffic moving at high speed.

A key factor in the safety of roundabouts is motor vehicle speed. Vehicle speeds at roundabouts should be minimised, and this is especially relevant where there is a prevalence of cyclists sharing the facility.

Ideally, a 'whole network' approach leads to the integration of recreational and commuter cyclists into the intersection design. This culminates in the provision of an appropriate mixture of segregated and shared/delineated facilities.

6 Paths

Refer to GTEP Part 14 (Page 69) except as follows.

6.1 General

Refer to GTEP Part 14 (Page 69) but noting the following Supplementary Text

Supplementary Text - insert new text before first paragraph as follows:

Paths on only one side of a road that are intended for use by cyclist in two directions can mean that cyclists travelling in one direction may need to cross the road twice to access the path. This is undesirable and should be avoided where possible as it introduces a potential collision point when cyclists are crossing the road.

6.5 Location of Paths for Cycling

Refer to GTEP Part 14 (Page 77) except as follows:

6.5.2 Factors Influencing Roadside Alignment

Refer to GTEP Part 14 but noting the following supplementary text:

Supplementary Text:

GTEP Part 14 highlights the issues that need to be considered when locating a path alongside a road. However, the potential safety issues associated with locating a cycle path near a property boundary are not explicitly detailed. Where there are a number of concealed side roads and/or driveways where visibility between drivers and cyclists is restricted (for example, by hedges or fences) then it is necessary to provide sufficient clear space between the property boundary and the path, in order that cyclists are not in danger of colliding with motor vehicles emerging from concealed driveways.

In situations where visibility is restricted the desirable minimum distance of 1.5m suggested in GTEP Part 14 will be insufficient. In this circumstance at least 3m is suggested to allow a vehicle to pull clear of the driveway before crossing the cycle path.

6.6 Types of Paths for Cycling

Refer to GTEP Part 14 (Page 81) but noting GTEP Part 14 Figure 6-15 is missing yes/no labels on its arrows. Accordingly, these have been added as follows in Figure 6-15:

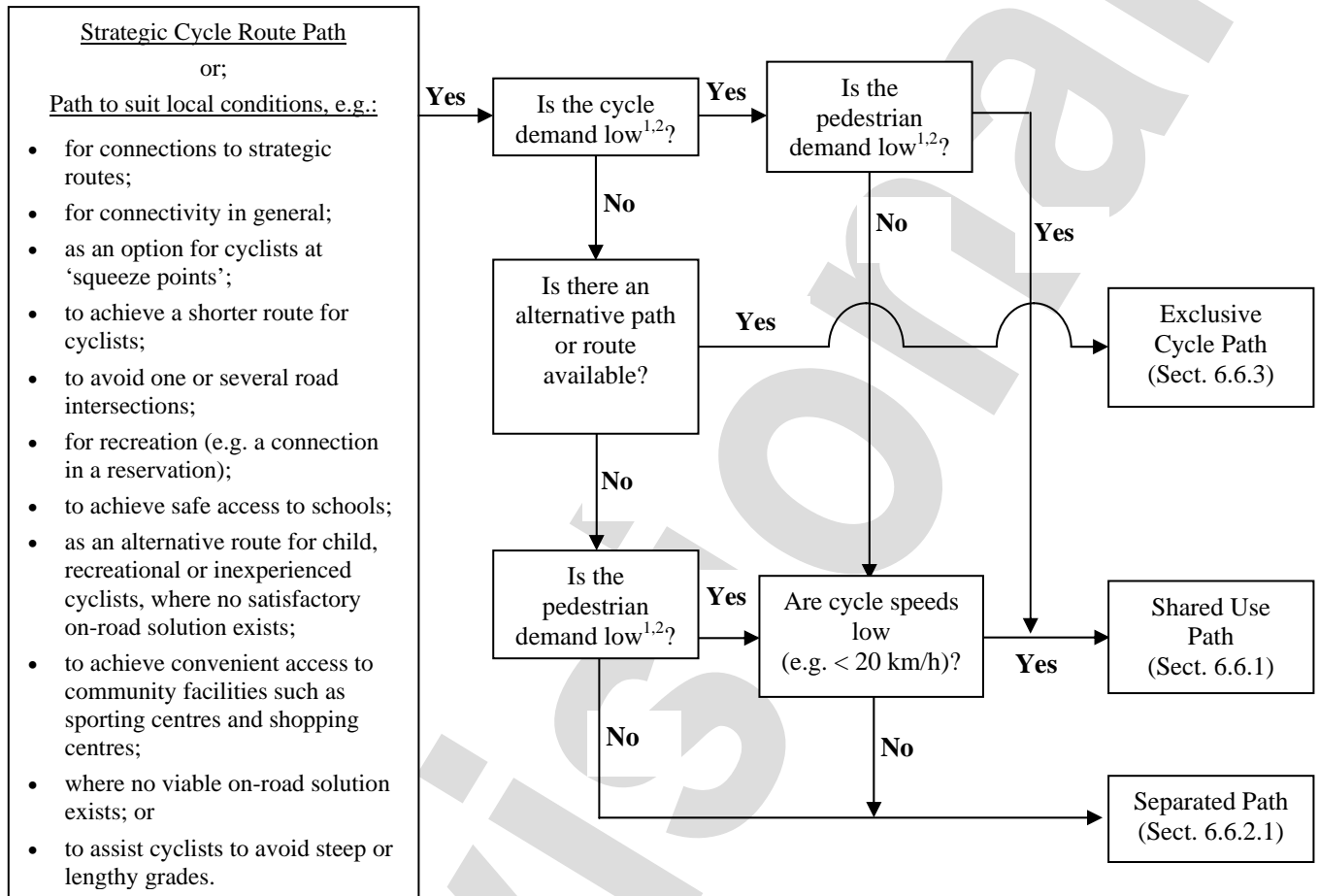


Figure 6-15: Guide to Choice of Path Treatment for Cyclists (see notes on page 81)

7 Provision at Structures

Refer to GTEP Part 14 (Page 107) except as follows:

7.1 General

Supplementary text: Insert new text after the second paragraph as follows:

However, extra width is desirable to compensate for the “shy space” that is needed by cyclists and drivers when travelling alongside the edges of bridges or tunnel walls

Where bridges have significant gradients or are subject to strong winds, extra width for cyclists will be necessary. High traffic volumes and proportions of truck traffic also increase stress levels for cyclists on bridges and in tunnels and require extra facility width. On these facilities, cyclists usually do not have an escape option to the side as is usually the case on roads.

Where insufficient width is available (typically on existing bridges and tunnels), provision of alternate facilities such as “clip-on” bridges or alternate routes for cyclists may also be required. In some situations, proportionate reductions in all lane widths (both for general traffic lanes and cycle lanes/road shoulders) should be considered to provide an appropriate level of safety for all road users.

On state highways, Transit New Zealand’s Bridge Manual should be consulted for advice on bridge designs.

7.2 Road Bridges

Refer to GTEP Part 14 (Page 107) except as follows:

7.6.2 Fences & Batters

Refer to GTEP Part 14 except as follows:

GTEP Part 14 Figures 7-14 and 7-15 give examples of barrier fence cross sections showing the barrier leaning in towards the path to provide 150mm pedal clearance. These cross section have no practical advantage, and reduce the effective width of the facility for cyclists. Accordingly, vertical or outward sloping barrier fences should be used.

8 Construction and Maintenance

Refer to GTEP Part 14 (Page 116) except as follows.

8.4 Provision at Works

Refer to GTEP Part 14 (Page 118) but noting the following Supplementary Text

Supplementary text - insert new paragraph before existing text as follows:

Those involved in road works should observe any New Zealand requirements for works of this nature, including those contained in Transit New Zealand's Code of Practice for Temporary Traffic Management (COPTTM).

8.5 Surfaces for Cycling

Refer to GTEP Part 14 (Page 119) except as follows:

8.5.3 Timber Surfaces

Replace last paragraph with the following:

Timber surfaces in New Zealand, can often remain damp for extended periods, and generally can freeze. Where this is common, any timber surface for use by cycles should be treated with a non-slip finish.

8.6.2 Bicycle Safety Audits

Supplementary text: Insert new sentence after existing text as follows:

Another resource for safety audits of cycling facilities is:

Guidelines for Cycle Audit and Cycle Review - UK Institution of Highways and Traffic Sep. 1998.

9 Traffic Control Devices General

9.1 General

Refer to GTEP Part 14 (Page122) except as follows.

Supplementary text: The following text is inserted after the existing text:

The Land Transport Rule: Traffic Control Devices 2004 and the Manual of Traffic Signs and Markings (MOTSAM) Part I (Traffic Signs) and Part II (Markings) specify all traffic sign and pavement marking requirements. MOTSAM should be used instead of the Australian Manual of Uniform Traffic Control Devices (AS 1742). Designers should refer to the Land Transport Rule and MOTSAM for all installation and dimension details.

9.2 Regulatory Signs

9.3 Warning Signs

9.4 Guide Signs

9.5 Other Useful Signs

9.6 Pavement Markings

The signs and markings shown in these sections are not applicable in New Zealand. For signs and markings that may be used in New Zealand refer to the documents noted above which may be seen at

<http://www.landtransport.govt.nz/roads/tcd/index.html> and

<http://www.transit.govt.nz/technical/manuals.jsp>

9.7 Pavement Surface Colour

In New Zealand the colour to be used where necessary on cycle lanes is green. In Christchurch red surfacing has been used historically to highlight cycle lanes and advanced stop boxes.

Typical locations where green coloured surfacing is likely to be appropriate include:

- Approach lanes to intersections (especially between traffic lanes);
- On the departure side of intersections (especially where the lane shifts laterally);
- Adjacent to areas of high parking use/ turnover;
- Advance stop boxes and hook turns;
- Across the entry and exit areas of slip lanes;
- On the inside of curves;
- Across side roads/ accesses (particularly where the adjacent traffic lane is regularly queued, blocking visibility);
- Along narrow cycle lane sections (pinch points);
- Contra-flow cycle lanes;
- Where it is useful to alert crossing pedestrians to the potential presence of cyclists;
- On cycle lanes at the transition between cycle paths and cycle lanes; and
- Shared bus/cycle lanes.

Coloured surfacing should not be used on service covers within coloured cycle lanes. They are more visible to cyclists if they are a contrasting colour to the rest of the cycle lane. Cyclists generally try to avoid riding over service covers as they provide an uneven riding surface and may present a slipping hazard.

9.8 No-Stopping Delineation

Cycle lanes marked adjacent to the kerb should not normally require no-stopping lines because stopping within a cycle lane is prohibited. However, in locations where this is not well understood by motorists, it may be desirable to continue marking no-stopping lines.

Having a mixture of some kerbside cycle lanes with, and some without no-stopping lines in the same district should be avoided.

10 End of Trip Facilities

Refer to GTEP Part 14 (Page 132).

Appendix A: Example of Bicycle Safety Audit Checklist

Refer to GTEP Part 14 (Page 143) but noting the following supplementary text.

Supplementary Text:

The safety audit checklist in GTEP Part 14 is recommended for use in New Zealand. Safety auditors should also refer to the UK "Guidelines for Cycle Audit and Cycle Review"¹ and a Transfund New Zealand Research Report entitled 'Cycle Audit and Cycle Review: A Scoping Study'².

Appendix B: Signing and Delineation of Works

Refer to GTEP Part 14 (Page 147) but noting the following supplementary text.

Supplementary text to be inserted prior to the existing GTEP Part 14 text:

New Zealand practitioners should refer to Transit New Zealand's *Code of Practice for Temporary Traffic Management (CoPTTM)*³, the standard reference for temporary traffic management on roads in New Zealand (or equivalent local practice manuals). The drawings in GTEP Part 14 show Australian signs and New Zealand practitioners should follow CoPTTM, including Drawing No. E2.15: *Temporary Traffic Lane with Two Temporary Lanes of Traffic – Level 1 Road* and Drawing F2.10, which deals with the same issue on a Level 2 road.

Appendix C: Human Powered Vehicles

Refer to GTEP Part 14 (Page 150).

¹ Guidelines for Cycle Audit and Cycle Review – UK Institution of Highways and Traffic Sep. 1998

² Cycle Audit and Cycle Review: A Scoping Study – by Francis and Cambridge, published by Transfund NZ 2000

³ Code of Practice for Temporary Traffic Management – Transit NZ, Issue 2 October 2002

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