

# Selecting appropriate cycling facilities

## Purpose

This note assists local government planners, engineers and their consultants to select the best bicycle facilities to meet community needs.

## Types of cycling facilities

Tables 1 & 2 list the facilities available to improve conditions for bicycle riders. Off-road facilities are detailed in Cycle Note B3 and on-road facilities are detailed in Cycle Notes B4, B5, B6 and B7.

## Encouraging cycling

Providing facilities that encourage people to cycle is cost effective. Cycling is an inexpensive means of transport and brings many benefits to the community. It enhances health, fitness, the environment and community interaction. It is an important component of a sustainable transport system and actively reduces traffic congestion and pollution.

Part 14 lists the following requirements when designing facilities for bicycle riders:

- a dedicated space to ride
- a smooth surface
- speed maintenance
- network connectivity
- information (signs of destinations & distances).

**Table 1:**  
Types of off-road cycling facilities

| Off-road facilities    | Definition  | Examples in Part 14  |
|------------------------|---|--|
| Shared use path        | A shared use path is the most common type of off-road facility due to versatility of use, cost and space limitations.   | Table 6.3 (p83)<br>Figure 6.17 (p84)<br>Figure 6.18 (p84)<br>Figure 6.19 (p85)   |
| Separated path         | A separated path is a path where bicycle riders and pedestrians are required to use separate, designated areas. They are commonly used in areas of high pedestrian and bicycle traffic. This may be a two-way facility or the bicycle side can be one-way when provided on a footpath to avoid a "squeeze point" on a road. | Table 6.4 (p86)<br>Table 6.5 (p88)<br>Figure 6.21 (p87)<br>Figure 6.22 (p87)<br>Figure 6.23 (p88)<br>Figure 6.24 (p89) |
| Exclusive bicycle path | An exclusive bicycle path is a path set aside for exclusive use by bicycle riders. To establish such a facility, legally appropriate signing is required.   | Table 6.6 (p91)<br>Figure 6.26 (p90)<br>Figure 6.27 (p91)<br>Figure 6.28 (p92)   |

## Aim

This series of notes is designed to assist planners and engineers to provide for cycling in their local area.

The Cycle Notes should be read in conjunction with:

- Guide to Traffic Engineering Practice, Part 14 - Bicycles (Austroads, 1999), and
- Queensland Manual of Uniform Traffic Control Devices, Part 9 Bicycle Facilities.

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**Table 2:**  
Types of on-road cycling facilities

| On-road facilities                          | Definition   | Examples in Part 14   |
|---|--|---|
| Exclusive bicycle lane                      | An exclusive bicycle lane is a lane created by pavement markings and signs. It is the preferred treatment for bicycle riders on the road and is generally located at the left side of the road.  | Table 4.1 (p20)<br>Figure 4.2 (p20)<br>Figure 4.3 (p21)<br>Figure 4.4 (p22) |
| "Peak period" exclusive bicycle lanes       | A "peak period" exclusive bicycle lane is provided in a clearway lane. As parking is permissible in this lane outside the peak period it is important the peak period hours are clearly signed for all road users.   |   |
| Bicycle/parallel car parking lane           | An exclusive bicycle lane is marked between parallel car parking bays and the moving traffic lane. This improves safety for bicycle riders as the bicycle lane is marked a sufficient distance from opening car doors.   | Figure 4.6 (p24)<br>Table 4.2 (p24)<br>Figure 4.7 (p25)                     |
| Bicycle/angle car parking lane              | An exclusive bicycle lane provides a higher level of protection for bicycle riders. The line marking and bicycle symbols alert drivers to the potential presence of bicycle riders. This is a valuable treatment irrespective of the "reverse-in" or "reverse-out" orientation of the angle parking.   | Figure 4.8 (p26)<br>Table 4.3 (p26)<br>Figure 4.9 (p26)                     |
| Contra-flow bicycle lanes                   | This is an exclusive bicycle lane on one side of a one-way street enabling bicycle riders to travel against the legal direction of travel. This can be an extremely important link in a network and can avoid more hazardous or steep environments.  | Figure 4.10 (p28)   |
| Sealed shoulders                            | This involves sealing the shoulders of a rural road beyond the traffic lanes. Part 14 cites research showing crash rates for all traffic decrease by 20% per one metre increase in the sealed shoulder width.  | Figure 4.11 (p28)   |
| Protected two-way lanes                     | This is an exclusive two-way bicycle path on one side of the carriageway. It is best applied where there are limited driveway access requirements and no bus stops.  | Figure 4.11 (p28)   |
| Wide kerbside lane (WKL) or peak-period WKL | A traffic lane wider than standard (4.25 - 4.5m) where bicycle and motor traffic travel side-by-side.  | Figure 4.12 (p29)   |
| Bus/bicycle lanes                           | This refers to the bicycle rider's use of lanes marked as bus lanes during peak periods. This is necessary as it is unreasonable to expect bicycle riders to use normal traffic lanes when a bus lane is available unless there is another safe and convenient alternative route. To operate effectively it is best if this lane is 4.25 to 4.5m wide. | Figure 4.18 (p32)<br>Table 4.4 (p33)<br>Table 4.5 (p33)                     |

## Types of bicycle users

Designers need to account for likely use of any new cycling facility. To do this effectively, consultation with potential users is necessary. This can be achieved through local government Bicycle Advisory Committees and through liaison with local Bicycle User Groups. (These groups are discussed in Cycle Note A5.)

Bicycle riders are classified into seven categories. Table 3 shows each category of user and the bicycle riding environment preferred by each type.



## Principles of bicycle facility design

Providing bicycle riding facilities requires observing the five principles of coherence, directness, attractiveness, safety and comfort. These principles represent the qualities most sought after by bicycle riders. Several countries, including the Irish National Government, have used these principles to determine criteria to measure the suitability of cycling facilities. These criteria can measure existing or planned facilities and are shown in Table 4.

**LEFT: Figure 1**  
Exclusive bicycle lane

## Separate off-road or on-road cycling facilities?

The predominant nature of cycling trips determines the decision to install either an on- or off-road facility. For example, commuters prefer the most direct and convenient route but recreational cyclists and novices prefer off-road paths and quiet local streets. The types of off-road facilities described here can be used directly adjacent to roads or away from roads. Tables 5, 6 and 7 summarise the flowcharts presented throughout Part 14 for selecting the best cycling facility for different users in various road environments.

The decision to provide either on- or off-road bicycle facilities is influenced by:

- motor vehicle speed (determined through observation using 85th percentile speed or speed limit as a default)
- motor vehicle volume (determined through observation/automated counting/forecasting)

- type of user of the bicycle facility - determined through the planning process (see tables 4 and 5)
- available space and funding.

The type and dimensions of the bicycle facility is influenced by the expected bicycle traffic volume.



**RIGHT: Figure 2**  
Contra-flow bicycle lane

## Requirements and recommended environments for each user type

|   |   |
|---|---|
| Primary school children                         | Clearly marked bicycle lanes in quiet local streets, off-road facilities and ample signs for cyclists and the surrounding motor traffic.  |
| Secondary school children                       | On-road lane marking in local streets, advisory signs on favoured routes to school. Route should be as direct and as flat as possible.  |
| Recreational                                    | Off-road paths, paths through recreation reserves and along water courses. Shade, drinking water and picnic facilities will also enhance the use of the cycling infrastructure.   |
| Commuters (including trips to public transport) | Safe on-road environment. This requires a combination of dedicated bicycle lanes, shared bus lanes, wide kerbside lanes, intersection treatments and off-road facilities where the road environment may be unsafe for cycling. Secure parking is essential. |
| Neighbourhood/utility                           | On-road lanes in local streets, advisory signs and intersection treatments if necessary. Good quality parking facilities are also important to these users.   |
| Touring   | As for recreational family cycling PLUS sealed shoulders and advisory signs along key rural highways that may be favoured as tourist routes.  |
| Training  | Advisory signs on known rural road training circuits and sealed shoulders are of great benefit to this user group.  |

**Table 3:**  
Types of users & their preferred facilities

## Selecting appropriate cycling facilities

**Table 4:**  
Criteria for measuring facility against the five basic principles

| Principle      | Criteria  | How to measure   |
|----------------|---|--|
| Coherence      | Easy to find<br>Consistent quality<br>Freedom of route choice<br>Continuity                         | Continuity of road signs, local plans, clarity of street signs<br>Number of changes in quality per km<br>Number of alternative routes<br>Number of missing links   |
| Directness     | Actual cycling speed<br>Delay<br>Detour distance  | Design speed<br>Average waiting time lost per km (eg. at junctions)<br>Length of detour (km)   |
| Attractiveness | Theme of complaints<br>Visibility<br>Social safety  | Number of complaints<br>Type and strength of lighting<br>Number of complaints or victims recorded<br>Type of vegetation  |
| Safety         | Traffic accidents<br>Confrontation with motorised traffic<br>Complaint pattern on subjective safety | Number of accidents and influencing factors<br>Number of possible conflicts with other traffic modes<br>Number of complaints per location  |
| Comfort        | Smoothness<br>Gradient<br>Traffic obstructions<br><br>Number of stops<br>Impediment due to weather  | Texture and conditions of road surface<br>Number of hills categorised in % grade<br>Chances of encountering other traffic (eg. with parking and loading)<br>Number of times it is necessary to stop<br>Sun exposed/sheltered |

From: *Provision of Cycling Facilities: National Manual for Urban Areas, Department of the Environment and Local Government, Ireland, 2000*

**Table 5:**  
Choosing an on- or off-road treatment

| Is route part of the Strategic Bike Plan? | User type                            | MV 85th %ile speed | MV Traffic Volume (vpd)     | Recommended treatment   |
|---|--------------------------------------|--------------------|-----------------------------|---|
| Yes                                       | Recreational or school aged cyclists | > 70kph            | n/a                         | path/off-road treatment (Table 6)                             |
|   |                                      | <= 70kph           | > 3000                      | path/off-road treatment (Table 6)                             |
|   |                                      |                    | < 3000                      | on-road treatment (Table 7)                                   |
|   | Other types of cyclists              | > 80kph            | > 3000                      | Room for off-road treatment?                                  |
|   |                                      |                    |                             | Yes   |
|   |                                      | No                 | on-road treatment (Table 7) |   |
| No  | All user types                       | > 80kph            | n/a                         | on-road treatment (Table 7)                                   |
|   |                                      | <= 80kph           | > 3000                      | on-road treatment (Table 7)                                   |
|   |                                      |                    | < 3000                      | no specific treatment required - see notes below <sup>1</sup> |

**Table 7 (right):**  
On-road treatment selection

**Table 6:**  
Off-road treatment selection

| PATH/OFF-ROAD TREATMENT |                                    |            |                 |                        |                 |
|-------------------------|------------------------------------|------------|-----------------|------------------------|-----------------|
| Bike demand             | Is an alternative route available? |            |                 | User preference (*)    |                 |
| High                    | Yes                                |            |                 | exclusive bicycle path | *****           |
|                         | No                                 | Ped demand | Bike speed      |                        |                 |
| High                    |                                    |            |                 | < 20kph                | shared use path |
| Low                     | Low                                | n/a        | >= 20kph        | separated path         | ****            |
|                         |                                    |            | shared use path | *****                  |                 |

| ON-ROAD TREATMENT                              |                                |  |  |                         |   |               |
|--|--------------------------------|--|--|-------------------------|---|---------------|
| MV 85th %ile speed                             | MV traffic volume (vpd)        | Treatment selection process  |  |                         | User preference (*)                             |               |
| < 70kph for recreational or school aged users  | <= 3000 for "other users" only | No specific treatment recommended - see note at end of this table <sup>2</sup> |  |                         |   |               |
|  |                                | On-road car parking demand   | Room for bike/car parking lane?                            |                         |   |               |
|  |                                |  | High   | Yes                     | bicycle/car parking lane or edge line treatment | ***           |
|  |                                | Low  | Room for exclusive bike lane?                              | No                      | part-time exclusive bike lane or part-time WKL  | ***           |
|  |                                |  |  | Yes                     | exclusive bike lane                             | *****         |
|  |                                | No   | WKL if space available - or find alternative               | ****                    |   |               |
| >= 70kph for recreational or school aged users | <= 3000 for all users          | Room available for exclusive bike lane   |  |                         |   |               |
|  |                                | Yes  | exclusive bike lane  | *****                   |   |               |
|  |                                | No   | seal shoulders or develop alternative route                | ***                     |   |               |
|  | > 3000 for all users           | Room for off-road facility?  |  |                         |   |               |
|  |                                | No   | On-road car parking demand                                 | Room available for WKL? |   |               |
|  |                                |  |  | High                    | Yes   | part-time WKL |
| No   | No                             | mark widest lane possible and develop an alternative route                     | **   |                         |   |               |
| Yes  | Low                            | Yes  | WKL  | ****                    |   |               |
|  |                                | No   | mark widest lane possible and develop an alternative route | **                      |   |               |

### Table footnotes

<sup>1</sup>NOTE: where no specific treatment is recommended, ensure satisfactory local conditions, including:

- safety
- connectivity
- routes to and around schools and other bicycle trip generators.

A detailed review is required in the following instances:

- for routes used by inexperienced cyclists
- for strategic bicycle routes
- where high bicycle volumes exist.

Bicycle lane or path treatments may be appropriate in these circumstances.

Consideration needs to be given to the use of 'advisory' treatments for strategic bicycle routes.

<sup>2</sup>User preferences from Other Reference No 4 below (\* - least preferred; \*\*\*\*\* - most preferred)



**Figure 3**  
Integrated on-road and off-road facility

## Other factors to consider when choosing facilities for bicycles

### Space requirements/availability

The physical constraints of lateral road width can cause a stumbling block in the selection of appropriate on-road bicycle facilities. The options for providing space for exclusive bicycle lanes are discussed in Bicycle Victoria's *It Can Be Done*. These options are presented in Cycle Note B5 and form the basis of a practical assessment technique to find space on the road.

### Other references

1. *It Can Be Done*, Bicycle Victoria (1998), Melbourne, Australia
2. *Provision of Cycling Facilities: National Manual for Urban Areas*, Department of the Environment and Local Government (1999), Dublin, Ireland
3. *Traffic Advisory Leaflets 15/99: Cyclists at Road Works*, Department of the Environment, Transport and the Regions (1999), London, UK
4. *Cycle Note No. 7: On-Road Arterial Bicycle Routes, Vicroads (2000)*, Melbourne, Victoria

Information on planning schemes and cycling under the Integrated Planning Act is available at the Queensland Transport website. Go to <http://www.transport.qld.gov.au/projects> and follow the links to QT IPA Guidelines.

Information on design for disability access is available at the web site: [http://www.hreoc.gov.au/disability\\_rights/standards/Access\\_to\\_premises/premises\\_advisory.html](http://www.hreoc.gov.au/disability_rights/standards/Access_to_premises/premises_advisory.html)

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