Passenger Transport

A guide to signing cycle networks

Showing the way to more cycle trips

Moving Queensland forward

Queensland Government

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Photo 1: Cycle network signage is part of a world-wide trend towards encouraging greater community use of more sustainable modes of transport. Urban cycle network signage in Amsterdam, The Netherlands.

Introduction – using this guide

Signage is a critical component used to legitimise and assist the many and varied trips which cyclists make daily within Queensland cities and towns. Cycle network signage can indicate the legal status of a facility (bike lane signs, shared path signs), regulate safe use (Stop, Give Way and parking signs), warn of potential hazards (steep descent, slippery when wet, road ahead signs), and guide cyclists to their destinations (cycle route direction signs).

The primary focus of this Guide is the directional signing of bicycle routes. The aim is to give bicycle network providers (state government agencies and local governments) a systematic approach to signing routes for guidance and wayfinding. This will help the growing number of Queenslanders to use their bicycles more extensively and more often. For more detailed guidance on regulatory, warning and guidance signage refer to Manual of Uniform Traffic Control Devices – Part 9, Bicycle Facilities.

Signing routes is very important for cyclists in complex urban street networks. Signage can inform bicycle riders of routes which are often more direct and less heavily trafficked. Cycle network signage can help the community to become aware of the many route possibilities other than the prominently-signed main road network.

Directional and wayfinding signage is a critical element of any transport system. Every transport system needs these signs to help the users find their way around the network and to make full use of the system's infrastructure. We are all so used to the signage systems which are integrated into airports and railway stations along with the familiar large green highway signs, that we often forget how dysfunctional these transport systems would become without their accompanying signage.

Though the bicycle has been in use in our cities and towns since the end of the 19th Century, providing an urban system for bicycle travel is only a fairly recent development. This began in Australia with the development of state and local bicycle plans and strategies and was a response to growing community interest and use of bicycles for transport, fitness, recreation and tourism.

The bikeplan approach sought to create a cycling transport system based on the long term development of urban cycle networks supported by encouragement, education and enforcement programs.

The first chapter of this guide covers this cycle planning process and the principles that underpin effective signage systems. This chapter illustrates how cycle network signage supports State and local cycle strategies by making networks easier and safer to use and by encouraging the wider community use their bikes on a daily basis.

The three following chapters provide detailed technical advice on signing bicycle networks and their component parts. These chapters provide information and resources on current signage practice and guidelines, route signing methodology, sign installation, mounting and maintenance.

Photo 2: Cycle network signage is an essential factor in making cycling more assessible by making a network more cohesive. This signpost marks a turning point on the Ammer-Amper Radweg (rural cycle route) south east of Munich, Germany. The blue 'Y' plate denotes its status as a designated route in the extensive Bavarian tourist and recreational cycle network.

1 Signing principles and cycle network

The purpose of cycle network signage is to provide guidance which will enable safe and efficient travel by bicycle for a diverse range of trips around cities, towns and areas of tourist interest. This chapter begins with a look at the important principles underpinning signage, how it communicates and how it can be most effectively used.

Most cycle networks are developed from a local or regional cycle strategy or bikeplan. This process incorporates inputs from road agencies, local government officers, technical experts, bicycle users and the wider community. Typically a cycle network plan, once adopted, is programmed to be implemented over a period of time. This upgrading work is usually carried out by making selected engineering improvements to each route in the network. These improvements may involve a number of measures from major construction where off-road paths are needed along heavily trafficked road corridors to linemarking and signing where the road environment is less dominated by heavy traffic.

Each approach is valid but if we only adopt a heavy infrastructure approach, we run the risk of long delays before the community have something that they can make use of on a daily basis.

Photo 3: Cycle network guidance signage provides clear directions for riders to trip destinations and alternative routes. These RTA cycle network signs are at a major route junction on the 42km M7 Westlink Shared Path in Western Sydney.

1.1 Sign language – the principles of signage

Human cultures have used signs for centuries to visually convey information from a fixed point. In road-based transport, government authorities put up signs to warn road users of hazards, to regulate usage and behaviour, and indicate the way to destinations, facilities and points of interest.

As useful as signs may be, placing them in the road environment doesn't necessarily communicate the intended message or have the required effect on road users. People are limited by their physiology. The way our brain operates we can't process large amounts of new information quickly. There is growing evidence that too many signs competing for our attention can either distract us from the act of riding or driving or we can miss vital messages entirely.

The discussion below sets out the principles underpinning good signage and the way signs operate within the road environment.

1.1.1 How signs communicate

Signs are compact pieces of information placed in a road/cycleway environment which have to transmit their messages very quickly to the people who are using the transport facility. They are most effective due to the brevity of their messages. This is very important in the road environment when vehicles are travelling at speed and drivers/riders only have a limited time to take in the message and to respond to it in a practical way.

Signs primarily communicate through graphics and symbolism. Though much of the content of our road signs contains words, the letters which make up these words are in themselves complex graphical symbols. Unless the lettering is immediately recognised and understood, it takes more time for the human brain to process a combination of letters than to recognise and react to symbols and shapes. The human eye usually sees words as shapes rather than combinations of separate letters.

The most effective way signs communicate information is through their shape and colour. The universal Stop and Give Way signs are instantly recognisable (and from a far greater approach distance) because of their distinctive shapes and colours. A diamond shaped sign with a yellow background is used on warning signs, and the circular shape is generally used to denote crossings. The Australian road sign system only permits these shapes to be used for these types of signs.

In all aspects of sign layout, design, placement, mounting and maintenance it is important to consider the human factors. The tendency to 'solve' a traffic management or road safety problem by placing a new sign in the road/street environment can often be counter productive.

The human brain operates in two ways – conscious information processing and automatic information processing. Conscious processing is: flexible, slow, easy to change, suited to new situations, requires energy, attention and conscious thought, and is error prone.

Automatic information processing is: rigid, fast, needs less attention, unsuited for new situations, dominated by expectations, hard to change, not consciously thought about, and is less error prone.

In learning to ride and drive we consciously learn many skills that with time become automatic. We don't need to consider the Stop sign in the distance. We automatically respond to it and begin to slow down on approach and look for other vehicles or pedestrians in or near the intersection.

On the other hand an intersection fingerboard which lists two destinations requires an additional level of concentration and mental processing. Too much information in the road environment tends to overload our conscious information processing capacity which can in turn affect the ability of our automatic information processing to respond quickly.

Sign clutter, poor placement, insufficient colour contrast (particularly in low light situations) and complicated or wordy messages are all factors which can decrease the effectiveness of signage. Badly designed signage can add complexity to the road environment and can increase the possibility of operating errors by drivers and riders.

Table 1: Key issues relating to bicycle network signage

Principle	Elements	Discussion
Conspicuity	Siting	Signs should be sited so that cyclists have a clear view on approach and have time to respond. They should be mounted in locations which are consistent throughout the route. Adequate side clearance should be provided on sign supports.
	Mounting height	Signage should be kept clear of pedestrian and cyclist travel paths and mounted at a consistent height so as to be easily seen by all users. Signs should not be sited where they could be hit by vehicles or interfere with services (power, phone etc).
	Clutter-reduction	Visual clutter and sign proliferation should be avoided by grouping similar signage on the same support or combining information onto a single sign. Care should be taken when siting signs in situations where other signage systems may overwhelm or obscure cycle route signage.
	Safe operation	Signage should be sited so as not to create a hazard to cycle route users, pedestrians or other road users.
	Sightlines	Signs should be sited with clear sightlines for cycle route users.
Legibility	Clarity	Signs must be easily read by all users of the system.
	Typeface	Choice of typeface should be based on legibility. Using a mixture of upper and lower case letters increases legibility particularly in low light conditions.
	Symbols	A limited, easily recognisable and consistent palette of symbols and pictograms should be used throughout.
	Colour	Sign background and lettering colours should avoid combinations which are hard to read.
	Contrast	Maximum contrast between sign background colour and legend is desirable.
	Lettering size	A consistent lettering size for route signage should be used so that signs can be easily read by users travelling at the design speed of the route and in all lighting conditions.
	Brevity	Destinations should be designated by concise, easily understandable and unabbreviated terms. Words over 20 characters should be avoided. Use pictograms to indicate services and facilities.
	Lighting	Night time and low light operation of the route should always be considered in the design and siting of signage.
	Alignment	Route turnings and branching routes should always be accurately indicated by fingerboard type signs. Fingerboards should be fixed to prevent accidental or intentional rotation.
Coherence	Route hierarchy	Signage should reflect the type of route (ie its designation in the network route hierarchy – State, Principal or Local).
	Destinations	All listed destinations should be identified (in the Cycle Network Focal Point Map) and used consistently throughout the network. Closest destinations should be listed to the top. A branch destination, if shown, should be shown towards the bottom of the sign and separated from the main route destinations by a horizontal line.
	Distances	Distances are important to the users as a means of judging journey length, progress and arrival.
	Consistent information	Once a destination is stated it should be listed on each succeeding sign until it is reached (Rule of Continuity).
	Sign type	Sign type should indicate the importance of the route. Sign shape and type should relate to the location, ie board type signs for advance warning and reassurance and fingerboard types for intersections.
	Image/branding	Route signs should be consistently designed to reflect a consistent image or branding for the route relating to either network hierarchy, municipal style, or specific route design/designation.
	Relationship to other signs	Cycle network signage should take account of other signage systems (eg route markers could be added to existing street signs to avoid unnecessary sign clutter).
	Relationship to other networks	Cycle network signage should take account of other transport network signage systems and avoid ambiguity and unnecessary sign clutter.
Function	Decision points	All turnings of the route should be clearly signed. Advance direction signage should also be provided for difficult or inconspicuous turns. Reassurance and advance direction signs also contribute to effective system redundancy.
	Consistency	Signage has to be sited consistently and in the most obvious and logical of places to meet user expectations.
	Wayfinding complexity	A signage system should operate consistently across the bicycle network to service a complexity of wayfinding needs.
	Orientation	Signage should reflect the particular orientation of the traveller. For example, map boards located beside a path or road running south should always show the locality map with south towards the top of the panel.
	Human cognitive limitations	Human beings have limitations to the amount of information they can take in from the cycle route environment in order to safely respond.
	Unambiguity	Only one route to a destination should be displayed on a sign. Alternate or parallel routes must not be shown.
	Redundancy	A sign system should be designed to permit safe and effective use even if individual signs are removed.
	Construction and installation	Signage should be durable, non-fading, and easy to erect and maintain. Simplified mounting systems compatible with existing systems will offer ease of maintenance and replacement to the sign system owner/provider. Construction/fabrication methods to minimise damage from vandalism and extreme weather should be considered.
	Route signage plans	A well prepared signage plan should cater for all the above elements for the installation and ongoing maintenance of the route signage system.

1.1.2 Four signing principles

As every signage location or intersection is subtly different, it is essential when undertaking any signage project to have a clear understanding of the key principles of good signage and be guided by these principles when applying your signing skills to non-generalised signing situations (see Figure 1).

Conspicuity

A fundamental of good signage is that signs can be easily seen from a sufficient distance so that the traveller approaching the sign can take in its message and react to it in a timely way. A sign has to be clear and unambiguous in its message otherwise it will be missed or overlooked particularly in highly distracting urban environments. Conspicuity encompasses the siting of signs, their mounting height, clutter-reduction, safe operation, sightlines.

Legibility

It has been estimated that a driver travelling at 50km/h sees in excess of 1200 pieces of information every minute. A slower travelling cyclist can take in more but, as discussed above, humans are limited by their capacity to filter and process new information. If a sign cannot be easily read, its message will go unheeded. The clarity and brevity of sign messages are essential components of legibility. Signage guidelines are formulated to ensure good legibility. Consequently, important factors such as typeface (font), size, sign and lettering colours and sign layout are specified to ensure a consistently high legibility of signage.

Signs sometimes use symbols in the form of pictograms (often indicating facilities) and logos (sometimes referring to a branded route). It is important that these graphical symbols can be easily understood by cyclists and the use of non-standard pictograms is not recommended. See Figure 19 for standard pictograms to be used for cycle network signage.

Coherence

Good signage brings cohesion to a cycle network. Even if the provision of facilities is in its early development phase, a well-signed network of routes can provide cyclists with the ability to more easily find their way around their city or town by bike. Consistent signage helps to build user-confidence in the cycle network and cycling as a practical mode of transport.

Cohesion is further provided by the use of different sign types to indicate the function of routes within the network: principal, local or tourist/recreational routes. Popular destinations with distances will be listed on successive direction signs until that destination is reached.

A cycle network signage system should also seamlessly interface with other signage systems (main roads and pedestrian pathway systems) and clearly indicate the cycle route without adding ambiguity.

Function

Signs should work safely and efficiently in their environment. They should be carefully and consistently installed at or near all decision points along a bicycle route and work together as a system. A functional directional signage system also includes design redundancy – placement of signs at, or before or following an intersection to ensure that if one sign is accidentally or intentionally removed, sufficient signage will remain to enable the cyclist to find their destination.

Photo 4: Cycle network signage is part of a much wider system of road transport signage. Main roads and cycle network signage share common principles. This advance direction sign is near the Gold Coast.

Figure 1: Illustrated examples of signage principles.

Conspicuity

Signs need to be conspicuous. In an already cluttered urban environment they need to be distinctive, easily recognisable and easily seen on approach. The photo on the left shows sign clutter. One sign has been rotated on its mountings and is no longer fully visible. Other signs are partially hidden and not visible on approach.

The photo to the right shows signs with good conspicuity but poor legibility. The bicycle symbol is clear but the important destination lettering is too small to be read from a distance.

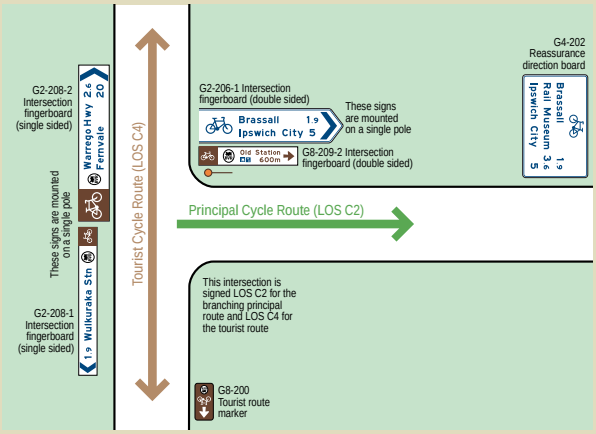
Sign legibility is critical if the information on the sign is to be quickly and accurately read by passing cyclists. Here's a simple example of legibility and lettering - the words shown below have been partially covered. The mixed capitals and lower case type is more easily read than all capitals.

Legibility

LEGIBILITY

Legibility

Coherence

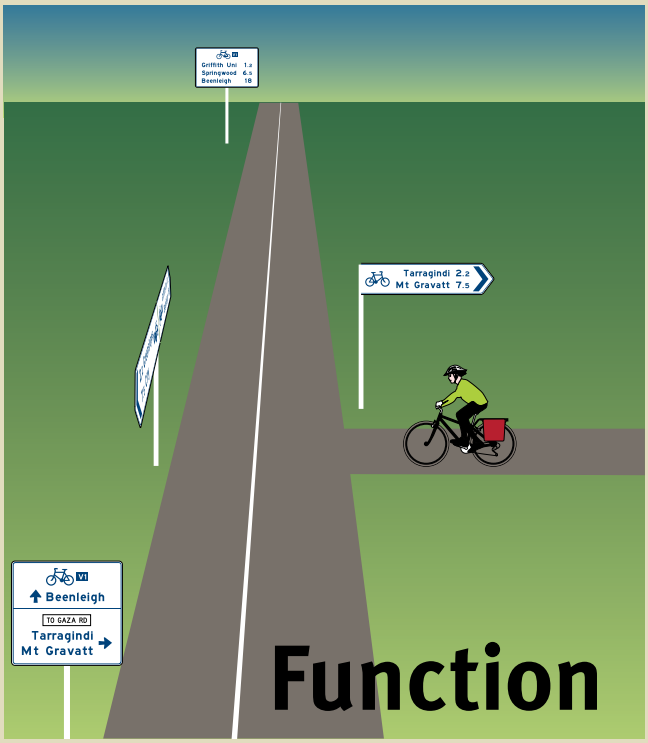


Individual letters may combine to form words but the human brain identifies the shape of the word rather than scanning each individual letter. Mixed upper and lower case words have a more distinctive shape and are more quickly recognised than words made of all capitals.

Cycle network direction signage uses the same typeface as highway direction signs around Australia. This typeface has been developed for its high legibility.

Cycle network direction signs are intended to mark different types of cycle routes which work together as a system. A well-designed system of signage gives cyclists confidence that the cycle network can work to their benefit and offer them a wide range of popular destinations. Signs are the glue which bind together all the component parts of an urban cycle network.

Signs need to work together in a functional, logical and efficient way. Signs along a route are like links in a chain. If one link snaps the system breaks down. This is why signage systems build in redundancy. In the example shown below, the numbered principal route has signs on approach, at the intersection, and on departure. If a sign is removed there are still enough signs left to provide directions.



1.2 What is a cycle network?

A cycle network is a system of interconnected cycle routes which enable people to satisfy their daily travel needs within their city or town and the surrounding region by bicycle. A cycle route is a recommended path-of-travel by which cyclists can travel efficiently from one part of town to another.

The main aims of cycle network design are to:

- Provide safe cycle transport from A to B;
- Provide links and access to important destinations;
- Reduce conflicts with crossing traffic;
- Provide defined operating space (physical, visual and mixed traffic);
- Reduce speeds at points of conflict; and,
- Provide a clear, unambiguous and easily identifiable facilities recognisable by all road users (CROW 2007).

Unlike the urban road network, which is predominately defined by its infrastructure (the main roads, regional roads and local roads which have been developed over time and interconnect our communities), a cycle network is comprised of marked routes which overlay the existing urban road/street network. It is the special system of cycle signage, markings and engineering improvements we apply to our urban streets and roads which make cycle routes and enable them to function collectively as a network.

1.2.1 Cycle routes

There are three types of cycle routes in use in Queensland each with its own network function as shown in Table 2.

Principal Cycle Routes

These routes are the spine from which the local cycle routes radiate. They provide connections between areas of high population density and major activity centres, such as public transport nodes, universities, schools, shopping or commercial centres, industrial areas and regional recreational facilities. Principal routes are high-quality, high-priority routes providing quick unhindered travel between the major centres within a city and to key centres within the surrounding region. These routes should offer the most direct route alignments and minimal delays.

Local Cycle Routes

These routes provide high quality connectivity to residential streets and localised trip-generating facilities such as schools, bus and train interchanges, pools, libraries and shops. Local routes provide for necessary circulation within a city, town or suburb. They are often shared paths constructed along linear parkways such as creek valleys or suburban foreshores.

Tourism and Recreational Cycle Routes

These are specially identified and designated routes which provide recreational and tourist cycle access within a city or town or across regions. Examples of such routes are rail trails (built along disused rail corridors), coastal trails and historical trails. Tourism and recreational routes should be developed in conjunction with Tourism Queensland and/or Regional Tourism Organisations.

1.2.2 Putting it all together

Cycle networks are usually planned as the key component of a regional or council cycle strategy. A cycle strategy provides government with a framework for coordinating the installation of cycle network infrastructure with allied promotional measures such as cycle network maps, education, new rider training, bicycle events and other practical encouragement activities.

The major aim in developing cycle networks is to satisfy the cycle network design aims as listed in Table 2 by successively introducing facilities along identified routes usually in the form of engineering treatments and signage. For cyclists these measures will improve through-access, operating safety and the general attractiveness of these routes.

Though cycle network directional signage is usually considered when cycle route infrastructure (cycle lanes, off-road paths etc) is constructed, it is often not installed or delayed until much later in the physical development of the cycle network. This approach usually results in a poor take-up on the usage of new facilities. As the cycle network is almost always applied to complex existing urban street environments, it is difficult for the community to comprehend the network and therefore make full use of it when it lacks direction signage.

Table 2: Bicycle routes and their network function

Parameter	Principal Routes	Local Routes	Tourist and Recreational Routes
Basic characteristics	High-quality, high-priority routes permitting quick unhindered travel between major urban centres and to key centres within the surrounding region	High quality routes connecting residential streets and trip generating locations to principal bicycle routes and providing circulation within the urban area.	Providing attractive and easy access to places of high tourist interest and recreational areas in a 'low stress' environment
Transport function	Movement primary, access secondary	Movement and access equal	Movement and access equal
Priority	High	Medium	Medium to low
Place connections	Regional centres and major transport nodes	Urban centres, employment, schools, entertainment, cultural, transport	Tourist attractions, points of cultural and scenic interest
Spacing of facilities	500 – 800m	300 – 500m	Route specific
Choice of route	Choice of two routes.	Choice of two routes	Route specific
Continuity of movement	High	Medium	Medium to low
Service linkage to major transport nodes	High priority. Primary linkage may be via connecting local route	High priority	High priority. Primary linkage may be via connecting local route
Operation	30 km/h or more. Dual on-road and off-road travel paths through intersections	20-30 km/h	Less than 25 km/h
Target trip length	› 3km	0 – 3km	>5km but can vary according to the attractions
User skill required	Low to high	Low to high	Low
Maintenance	Pavement maintenance similar to regional road standard	Pavement maintenance similar to local road standard	Periodic. Depends on location and traffic load

1.3 Signing the cycle network

Signage provides great cohesion for the cycle network by regulating the use of roads, streets and paths, warning of hazards and difficulties, and indicating destinations where individual trips may start and end. This section looks broadly at the processes for signing cycle networks and recommends methodologies for signing both before and after the installation of cycle route infrastructure.

1.3.1 Why sign networks?

Cycle network signage, particularly direction signage is a crucial aid to navigation and the safe operation of the system. Providing cycle route direction signage benefits the community because it:

- Expands the usage of the cycle network;
- Increases the visibility of routes both for cyclists and the wider community; and,
- Guides local people and those from further afield to destinations along the cycle network.

Without direction signage cyclists cannot easily work out where routes lead or even if the route exists as a functional entity. Engineering treatments and street linemarking on their own may not be valued by cyclists or seen only as ad hoc measures if these improvements are not seen in the broader context of cycle routes designed to help riders complete their journeys.

This process of cycle network development may take a number of years depending on the extent of the necessary route improvements and the resources of councils and government agencies. For this reason it is important to consider the installation of direction signage on a route by route basis as a first stage in developing the network as a whole.

1.3.2 Signing and infrastructure provision

It is important to consider the signing of routes as an undertaking that is critical to the network. Signage is of great benefit to the community even when done independently of major infrastructure provision. For over twenty years Australian councils have been signing cycle routes before major infrastructure can be provided. This type of signed route often utilises the residential street network, paths and local short cuts.

There are major advantages in signing cycle routes before any engineering works are installed. Direction signage can provide the necessary information to enable cyclists to more easily find their way to trip destinations. To ensure that cycle routes are suitable for signing, regardless of the level of infrastructure existing or newly installed, it is advisable to undertake a simple risk analysis route assessment before commencing the signing planning process.

Recommended signing processes are detailed in Section 2 of this Guide. Table 3 details the main issues relating to signing cycle routes according to the level of existing infrastructure.

Photo 5 -Directional signage is an essential component of any effective bicycle transport system. Network signage on the Leach Highway path south east of Perth CBD.

Table 3: Cycle route development process and signing

Infrastructure provision	Description	Suitability of use	Signage provision	Recommendations
Undeveloped	No cycle infrastructure provided	Experienced adult riders, commuters, training riders, local use	Can be signed for local use and principal route connectivity	Pre-signing route assessment. Particular attention paid to road cross sections and intersections
Mixed-traffic facilities	On-road on mostly residential streets. Crossings facilities of major roads provided	Experienced adult and teen riders, commuters, local use	Can be signed for local use and principal route connectivity	Pre-signing route assessment. Particular attention paid to intersections
Visually-separated facilities	Routes primarily on-road using linemarking. Major road crossing facilities provided	Experienced adult and teen riders, commuters, local use	Can be signed for principal and local routes	Post linemarking installation assessment. Particular attention paid to facility connectivity
Mixed visually- and physically-separated facilities	Mixture of on-road routes with linemarking and off-road paths shared with pedestrians	Experienced adult and teen riders, commuters, local use	Can be signed for principal and local routes	Post construction assessment. Particular attention paid to facility connectivity
Physically separated routes shared with pedestrians	Off-road paths shared with pedestrians. Mostly controlled or grade separated major road crossings	General adult riders, teens, supervised children, commuters, local and recreational use	Can be signed for principal, local and tourist/recreational routes	Post construction assessment. Particular attention paid to facility connectivity
Cycles-only routes physically separated	Off-road exclusive-use cycleways. Controlled or grade-separated major road crossings	Off-road exclusive-use cycleways. Controlled or grade-separated major road crossings	Post construction assessment. Particular attention paid to facility connectivity	Post construction assessment. Particular attention paid to facility connectivity

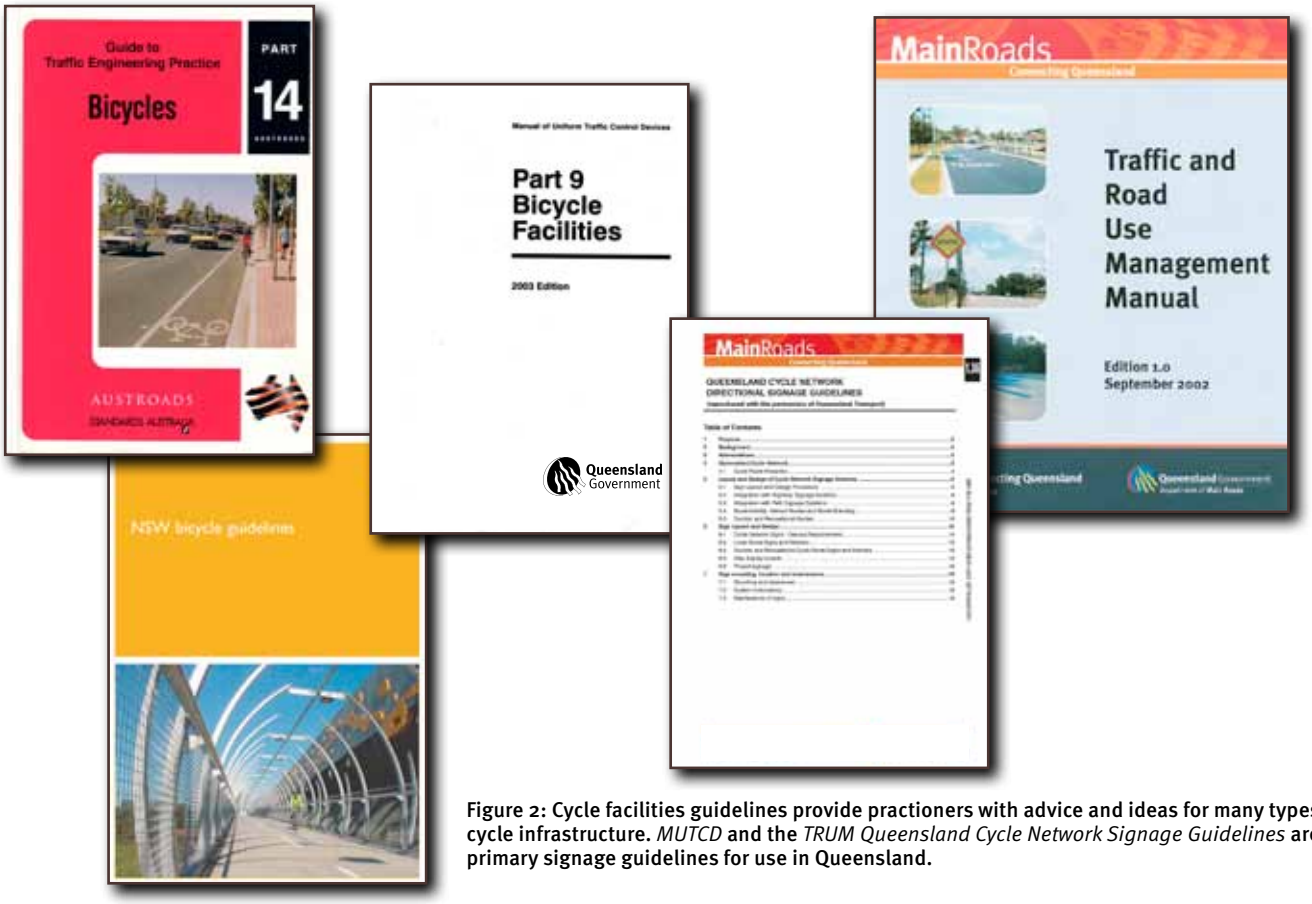


Figure 2: Cycle facilities guidelines provide practioners with advice and ideas for many types of cycle infrastructure. ***MUTCD*** **and the** ***TRUM Queensland Cycle Network Signage Guidelines*** **are the primary signage guidelines for use in Queensland.**

1.3.3 Cycle network signing guidelines

There are a number of guidelines designed specifically to assist road designers, engineers and transport planners to provide high quality, professional and consistent signage for cycling networks across Queensland cities and towns. These guidelines are listed in order of importance.

Traffic and Road Use Management Manual Section 1.36: Queensland Cycle Network Directional Signage Guidelines, (TRUM 1.36) outlines procedures for the design and layout of directional signage systems for bicycle networks in Queensland. It deals only with wayfinding or directional signage for cycle routes (both on- and off-road) within a cycle network. It does not cover the many other aspects of cycle network facilities signage and marking, such as regulatory and warning signage, linemarking, pavement symbols and advisory signage covered in guidelines listed below.

Manual of Uniform Traffic Control Devices – Part 9, Bicycle Facilities (MUTCD Part 9) sets out the traffic control devices (signs and markings) used to designate bicycle facilities in Queensland. *MUTCD Part 9* covers regulatory, warning, and guidance and direction signs for cycle facilities. *TRUM 1.36* is the preferred Queensland guideline for cycle network direction signage.

Austroads Guide to Traffic Engineering Practice, Part 14 – Bicycles (Austroads GETP 14) is the national bicycle facilities design guidelines. It covers a wide range of design issues including bicycle facilities on- and off-road, bicycle parking and provision at road works. The preferred Queensland guidelines for bicycle related regulatory, warning and guidance signage is *MUTCD Parts 2* and *9*, and for direction signage *TRUM 1.36*.

Manual of Uniform Traffic Control Devices – Part 2, Traffic Control Devices for General Use (MUTCD Part 2) is the primary reference for regulatory, warning and guidance signs for general road use in Queensland.

Guide to Pavement Markings (Main Roads Queensland) is the primary reference for linemarking for road-based transport.

NSW Bicycle Guidelines (NSWBG). This manual is approved for use in Queensland and provides additional advice on facilities design to *Austroads GETP 14*, particularly in relation to urban street/road environments. It should be read and applied in conjunction with the guidelines listed above.

Local path signing standards

Local governments are implementing wayfinding signage systems to assist people to navigate shared paths and urban greenway networks. These paths have often been developed with unique signage, distance marker systems and identity branding.

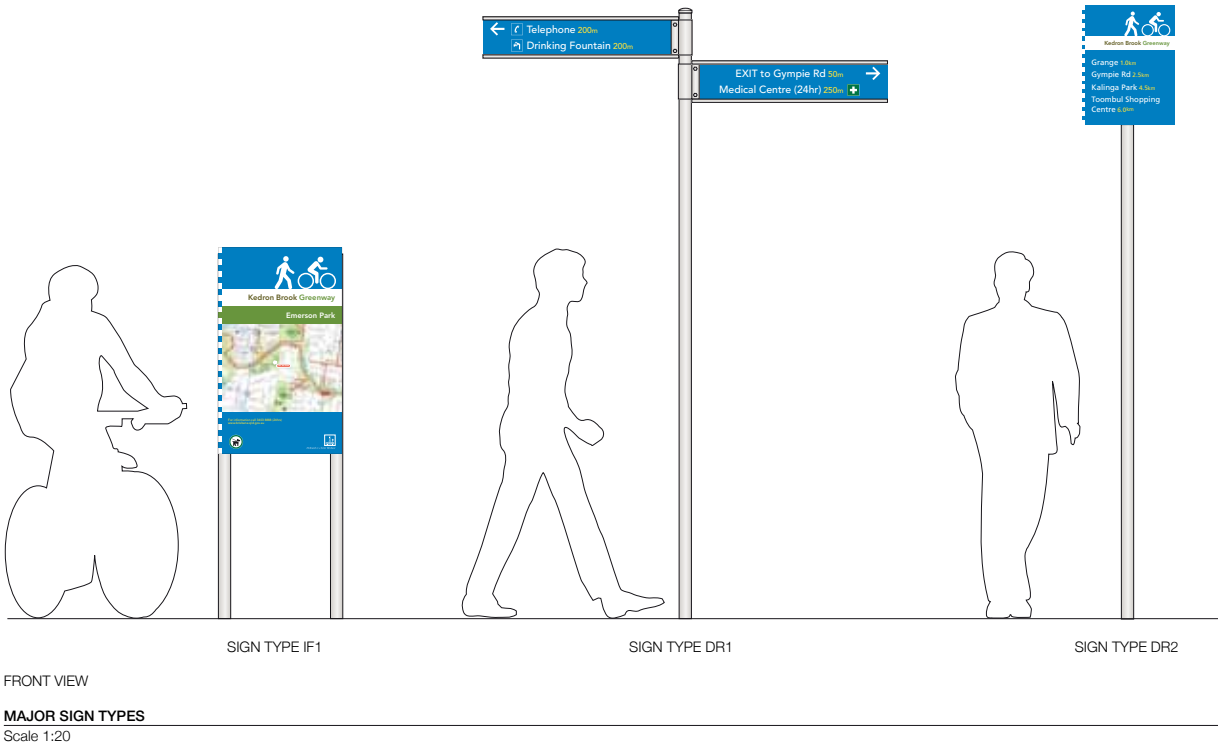


Figure 3: Councils are progressively implementing signage guidelines covering pathway use and public transport wayfinding. The 2008 Brisbane *City Bikeway and Greenway Signage Manual* provides guidelines for the city's growing network of paths and trails.

Where existing branded paths form part of a principal route, cycle network directional signs will take precedence for route navigation over any local signs, but their use should be restricted to these locations:

- Where the principal route joins the path;
- Any branching intersections of other principal routes along the path; and,
- Where the principal route exits the path.

Local path signage should provide the necessary reassurance destinations and distances, directions to facilities and side destinations, intersecting and cross street naming and map display boards.

Care should be taken to harmonise the use of standard cycle network signage with existing path signage systems through careful sign location and mounting.

Off-road paths and path junctions to other named destinations should be signed the same as on-road routes. Where no path signage system is in place, normal cycle network signage should be applied throughout the path.

On paths through parklands and reserves, consideration should be given to the installation of additional signage indicating facilities such as water points, toilets, information centres and points of interest. These destinations are important particularly to recreational cyclists and tourists and should be included in any signage plan associated with the development of tourist and recreational routes.

If facilities signage is not installed and not defined by the relevant local council's path sign system, *Manual of Uniform Traffic Control Devices – Part 5 Street Name and Community Facility Name Signs (MUTCD Part 5)* should be used.

1.3.4 Signing methodology

Consistent, accurate and unambiguous bicycle network signage uses a methodology based on the established practice of highway network signage which embodies the following key signage and wayfinding principles:

1. Ensure consistency of signage layout and quality across the networks. A consistent standard, location and quality of signage across cycle networks will assist cyclists and other road/path users to identify cycle routes, minimise the risk of confusion and build community confidence in the system.
2. Identify important departure/ destination locations and decision points. These are the only places which are to be named on signage for a particular cycle network. These locations are to be plotted onto a Network Focal Point Signage Map (see Section 2). This map provides the framework for directional signage on the cycle network and is an important tool in its ongoing development.
3. Maintain rigid consistency in naming locations. Absolute consistency in naming locations must be maintained throughout the system. Once a destination has been named it must have priority over other names and should appear on all subsequent signs until that destination has been reached.
4. In the event of alternate routes, sign the most direct route. If more than one route is possible from a departure point the most direct route should be the only one indicated on the signs. This may be varied if the alternative offers major advantages over the shorter route, but the extra distance must not amount to more than 10% of the shortest route.

5. In larger centres sign the centre (CBD or City). Routes from the edge of a built-up area to the centre should be regarded as continuous even though they may pass through other regional centres. The destination wording (City, CBD Town Centre etc) should be continued right into the town/city centre.
6. Indicate distances in kilometres. Distances to destinations provide essential wayfinding and orientation information and should be indicated on all fingerboard and reassurance signage. Where indicated distances are less than 10km, 100m increments should also be shown (eg 9.4, 4.2 etc). For greater legibility the numerals indicating 100m increments should be 75% of the height of the whole kilometre numerals.
7. Number the important routes (optional). The use of route numbering should be limited to a small number of high-speed, limited-access, principal cycle routes usually paralleling State Controlled roads or major regional roads within a city or between cities in a densely populated region such as Southeast Queensland (see Section 2).
8. Use map boards at key entry points. Network map boards provide additional navigational assistance to cyclists and can often indicate multiple route options and wayfinding possibilities (see Section 2).
9. Ensure street name signs are in place at all network intersections. Street name signs provide the fine grained information to enable riders to know precisely where they are and to efficiently find their way to their destinations (see Section 2).

Route signing design procedures

Before starting the detailed layout and design of cycle network direction signs in accordance with the *Queensland Directional Signage Guidelines (TRUM 1.36)* or local path signage guidelines, designers will need to determine:

- Named destinations to use on cycle route directional signage. This will involve the formulation of a cycle network focal point map (see Section 2.3.1);
- The current physical condition of the route via a survey and risk assessment (see Section 2.3.2); and,
- The level of signing required for the type of route to be signed (see Section 2.3.3).

This information will then be used to produce a signage schedule (see Section 2.3.4) – an essential tool for the accurate installation of cycle route signage.

Selecting destinations

Focal Point Signage Practice is used for determining all key destination and decision points within a cycle network to ensure the accurate and consistent signing of the network. Focal Point Signage Practice is commonly used to determine all place names for the State Road Network and road networks in cities and towns. These focal point maps are maintained by MR Regions for the State Road Network and by local councils for networks within cities and towns.

As bicycle networks are locally or regionally based, bicycle network focal point maps will usually be more fine-grained and urban-oriented and will often use additional or differing focal points to the MR road-based maps. Cycle network signage focal point maps will be maintained by local councils in consultation with MR and neighbouring LGAs and use destinations initially based on road network focal point mapping for that area.

Focal Point Signing Practice as it applies to cycle network signage systems is explained in detail in Section 2 of this guide. Further advice and details on Focal Point Signing Practice as it applies to road network signage systems can be found in *TRUM 1.21 Appendix B*.

Route assessment

Prior to signing a cycle route a physical risk assessment of the route should be made. This assessment will study the route and note the condition of existing street/road facilities, intersections/crossing points and any critical safety issues for cyclists using the route. Where major deficiencies occur in the permanent infrastructure (lane widths too narrow, hazardous drainage grates etc) remedial action will be recommended and carried out prior to sign installation.

The type and extent of remedial work will usually depend on the structure of the road environment and the availability of any bicycle specific treatments and infrastructure. The signing of routes with and without cycle infrastructure already installed is discussed in the next subsection of this guide. Recommendations for carrying out a physical risk assessment of a cycle route for signing are provided in Section 2 of this Guide.

Signage schedules

The signage required for the route is determined by a detailed field inspection and a route signage schedule is prepared for use by the sign manufacturer and the sign erection crew. The route signage schedule will be made up of individual intersection schedules. To ensure accurate installation of the signs it is advisable to provide detailed maps, sketches or marked up plans or aerial photography to guide the sign erection crew.

Following installation it is recommended that the route be inspected by the sign system designer or other knowledgeable cycle network specialist to ensure that the installation work has been carried out correctly and that the sign system functions safely and efficiently for the users. Details of these procedures and sign schedule samples are provided in Section 2 of this Guide.

This section provides details and recommended procedures for the practical tasks which need to be undertaken to plan and physically sign a route. This section provides information on the various types of signs and their use within the signage system and recommends a methodology for designing and implementing a signage system for a route and the wider cycle network.

2 Signing cycle routes

Photo 6: Regulatory sign denoting a bicycle lane near Freemantle, WA. This lane is located beside the kerb on a road without parking.

2.1 Using signing guidelines

There are two principal guidelines covering the use of signs which regulate, warn and guide cyclists on Queensland streets, roads and paths. Regulatory, warning and facility guidance signs, their usage and application are defined and described in *MUTCD Part 9, Bicycle Facilities* with additional signs and linemarking details in *MUTCD Part 2, Traffic Control Devices for General Use*. Route direction guidance signs for wayfinding and information signs are described in *TRUM 1.36*.

2.2 Types of signs

There are four basic types of cycle network signs:

- Regulatory signs define regulated facilities such as bicycle lanes, bicycle paths and shared paths. They have to be obeyed by all road users. Stop and Give Way signs are also regulatory signs used in conjunction with cycle facilities.
- Warning signs are the familiar yellow and black diamond shaped signs which warn of hazards in the road environment.
- Guidance signs have two broad purposes. They are used to guide road/path users through complicated or potentially hazardous locations or to provide simple behavioural messages and instructions (see Photo 7). The other purpose is to provide directional and wayfinding guidance throughout the cycle network.
- Information signs have multiple purposes, such as area-wide maps, information on construction projects, and interpretation panels for sites of interest.

2.2.1 Regulatory signs

The combination of regulatory signage and linemarking usually defines a bicycle facility. Figure 4 shows the most common cycle facility signs and optional supplementary plates used to define on-and off-road bicycle facilities.

Regulatory signage is always used to define the start of a facility. It is best practice to carry bicycle lanes and paths right up to and through intersections to provide a complete network connection. The use of the END supplementary plate is only necessary if the facility is terminated mid-block, or at some other part of the road other than an intersection. Some types of facilities, such as contra-flow bicycle lanes require other signage (R2-4 No Entry) in addition to bicycle specific regulatory signage (R9-3 Bicycles Excepted plate). These facilities require linemarking and pavement symbols supported by general regulatory and warning signs at critical locations.

Regulatory signs should be located so as to not conflict with existing road directional signage, or create ambiguity at critical turning points or crossings. The precise location for regulatory signage should be adjusted to suit the design of the intersection/road to include the bicycle facility. The positioning of signs and the need for additional signs or delineating devices may be affected by the variations in layouts, particularly where there are curves and crests on any approach.

The use of regulatory and warning signage for cycle facilities in Queensland is detailed in MUTCD Part 9.

2.2.2 Warning and guidance signs

Yellow diamond shaped warning signs are used to alert riders to changed or potentially hazardous path or road conditions. This type of sign is similarly used to alert other road users of intersecting or merging bicycle movements. Figure 4 shows warning signs, optional supplementary plates and guidance signs for both bicycle network and general road network use.

Warning and guidance signage should be located to provide advance indication of changed riding conditions or potential hazards. *MUTCD, Parts 2* and *9*, should be referred to for recommended siting distances where these are not provided in this guide. The precise location for warning and guidance signage should be adjusted to suit the overall design of the intersection/road and bicycle facility.

Shared path guidance signs

A signage system to encourage cyclists and pedestrians to behave in a predictable and co-operative manner has been developed for use on shared paths (see Figure 5).

Guidance signs to communicate four key behavioural messages to path users can be used singly or in groups to suit each shared path situation:

1. keep left when using the path;
2. warn other path users on approach and overtaking;
3. move off the path when stopped; and,
4. walkers control your dogs.

Photo 7: Cycle network warning signage on the Pacific Motorway Cycleway, South Brisbane providing advance warning of a tight curve. The W1-3L sign is a standard sign in *MUTCD* Part 2. The G9 Reduce Speed traffic instruction sign is based on other common G9 signs for cyclists.

Figure 4: Regulatory, warning and guidance signs for bicycle facilities

Figure 5: Shared path behavioural signage

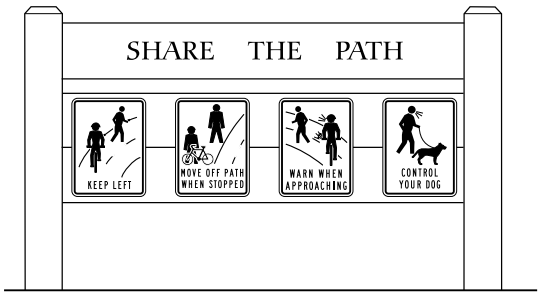
G9-259-1
(a) Keep Left sign encourages all path users to travel on the left

G9-259-2
(b) Warn When Approaching sign encourages path users to call out or use their bells

G9-259-3
(c) Move Off Path When Stopped sign encourages path users to keep the path clear

G9-259-4
(d) Control Your Dog sign reminds dog owners of their responsibilities

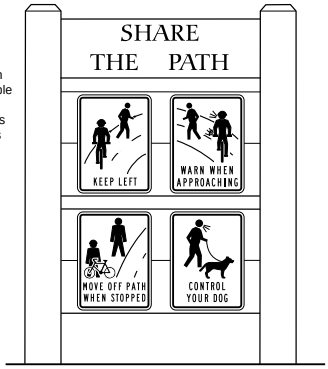
Above sign sizes: 250mm W x 330mm H



(e) Preferred group sign for path entry or major path access points. Recommended for Level 2 behavioural messages. Where space is limited, use example (g) layout below.

Sign column can be double sided to display signs facing users travelling in opposite direction

(f) Level 2 sign column installed at intermediate locations (500m intervals)



(g) Alternate layout of group sign for path entry or major path access points. Recommended for Level 2 behavioural messages.

To improve management of shared paths through the promotion of these four key messages, a three level implementation framework is recommended. Choosing the appropriate level of path signage requires an understanding of the types of path user and some information on the predominant types of conflicts and their locations. This framework (Table 4) provides recommendations from a basic Level 1 management up to high Level 3, where specific problem issues are addressed by targeted signage erected at path 'hot spots'.

It is recommended that an incremental 'bottom up' approach be used when installing the signs. Begin with Level 1 behavioural messages. These may be sufficient to significantly improve user behaviour and reduce conflicts to an acceptable level. Allow path users to get used to the Level 1 messages and, if necessary, make some observations or obtain feedback from path users. If further education of path users is required, consider introducing a Level 2 approach and then, if appropriate, site specific Level 3 messages.

Table 4: Shared path behavioural sign installation

Level	Level of usage	Recommended installation
Level 1	Basic requirement for all shared paths. Low use and few reported conflicts.	Path centreline and pavement symbols. See *MUTCD Part 9* for path linemarking recommendations.
Level 2	Moderate path use and number of reported conflicts.	As for Level 1 plus group signs (Figure 5 (e) or (g)) at key locations and sign columns (Figure 5 (f)) at min 500m spacings.
Level 3	High path use and number of reported conflicts.	As for Level 2 plus additional single or grouped behavioural signs according to the type and level of reported and observed conflicts.

2.2.3 Directional guidance signs

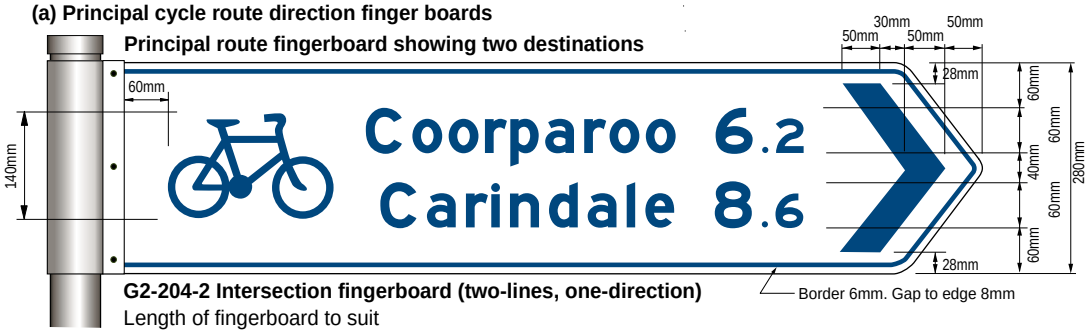
The main purpose of this type of signage is to provide directional and wayfinding guidance to cyclists using the cycle network. Directional signing reinforces system connectivity and coherence and gives high visibility and recognition to the collection of through routes which make up any network.

In the general traffic environment there are many directional signs provided for road users. This general road and highway signage is usually attuned to motorised traffic and does not adequately serve the bicycle rider, when a separate or parallel bicycle network is in existence. As an add-on system of directional signage can create ambiguity and conflict for both motorised road users and cyclists alike, a completely independent system of signing is used to mark cycle routes.

There are three categories of directional signage recommended for use on Queensland cycle networks: principal route signage; local route signage; and, tourism and recreational route signage. All cycle network directional signage should comply with the requirements and individual sign details described in *TRUM 1.36* (see Figures 6, 7 and 8 in this Guide).

(a) Principal cycle route direction finger boards

Principal route fingerboard showing two destinations



G2-204-2 Intersection fingerboard (two-lines, one-direction)
Length of fingerboard to suit

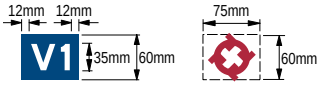
Border 6mm. Gap to edge 8mm

Principal cycle route using a branded route on a named facility (one destination only)

G2-204-2 Intersection fingerboard (two-lines, one-direction)
Length of fingerboard to suit. Arrow dimensions as per above sign

Numbered principal route direction finger board, single destination

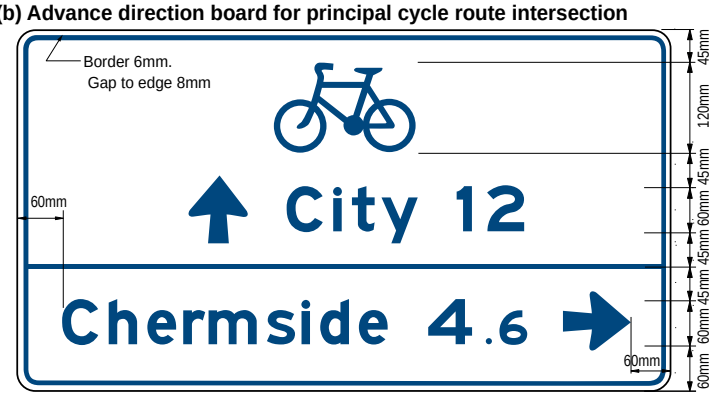
G2-204-1 Intersection fingerboard (one-line, one-direction)
Length of fingerboard to suit. Arrow dimensions as above



Numbered route indicator
Lettering AS1744 Mod E

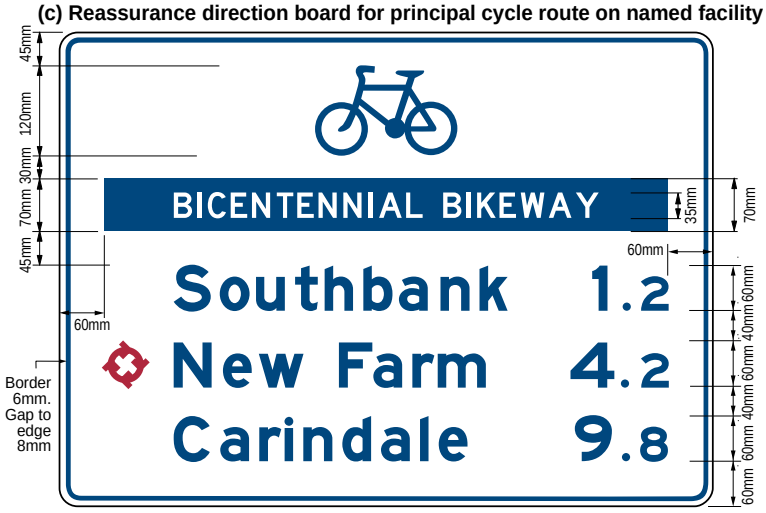
Branded route logo
Maximum size of logo

(b) Advance direction board for principal cycle route intersection



G1-205 Advance direction board - width to suit

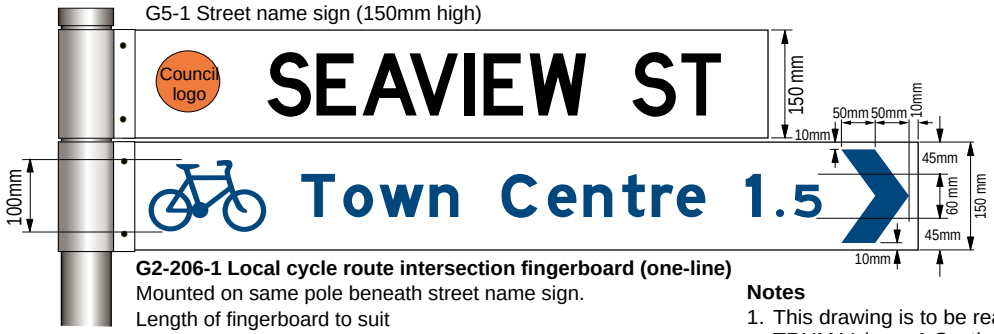
(c) Reassurance direction board for principal cycle route on named facility



G4-202 Reassurance direction board - width to suit

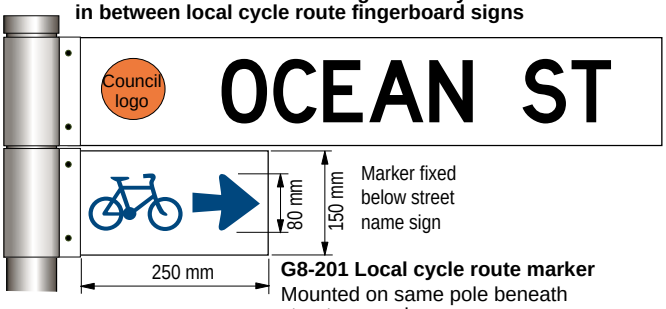
Notes

1. This drawing is to be read in conjunction with TRUM Volume 1 Section 36 .
2. See separate diagram for typical intersection sign layout and mounting methodology.
3. All signs are dark blue lettering/arrows on white retro-reflectorised background. Letter sizes as shown.
4. Typeface used for destinations/distances is AS1744 Modified E mixed capitals and lower case. Where distances are less than 10km these should be indicated to the nearest 100 metres expressed in standard decimal form with the sub kilometre numeral 75% of the height of the whole kilometre numerals.
5. On fingerboards, distance numerals are located adjacent to the direction arrow. On reassurance direction boards they are located to the right of listed destinations.
6. Typeface used for named routes is AS1744 Series D Medium capital letters.
7. Fingerboards are double sided from thick aluminium or steel plate or extrusion (height as above) and cut to length. Fingerboard signs are mounted on poles using standard pipe clamps. Clamps should be pinned to prevent accidental movement due to wind or vandalism.
8. Fingerboard sign plates can be square-ended provided that the sign border and main directional arrow are reproduced to dimensions given.
9. Direction arrows on advance and reassurance direction boards are AS1743 - short arrow.



G2-206-1 Local cycle route intersection fingerboard (one-line)
Mounted on same pole beneath street name sign.
Length of fingerboard to suit

Alternative method of marking a local cycle route in between local cycle route fingerboard signs



G8-201 Local cycle route marker
Mounted on same pole beneath street name sign

Notes

1. This drawing is to be read in conjunction with TRUM Volume 1 Section 36.
2. Local signs are dark blue on white retro-reflectorised background. Letter sizes as shown.
3. Typeface is AS1444 Modified E mixed capitals and lower case. Where distances are less than 10km these should be indicated to the nearest 100 metres expressed in standard decimal form with the sub kilometre numeral 75% of the height of the whole kilometre numerals.
4. Distance numerals are located adjacent to the direction arrow.
5. Fingerboards are double sided from thick aluminium or steel plate or extrusion (height as above) and cut to length. Fingerboards and markers are mounted on poles using standard pipe clamps. Clamps should be pinned to prevent accidental movement due to wind or vandalism.
6. Local route signs can be square ended provided that the main directional arrow is reproduced to dimensions given.

Left: Figure 6 - Cycle Network Principal Route Direction Signage (Source: *TRUM* 1.36 Figure 1). Above: Figure 7 - Cycle Network Local Route Directional Signage (Source: *TRUM* 1.36 Figure 2).

Principal cycle route signage

There are three types of direction signs used on principal cycle routes (see Figure 6):

1. Intersection fingerboards are the primary means of indicating route direction at network decision points or intersections. Primary destinations for the route, plus any intersecting routes, are shown on intersection fingerboards. Named destinations used on intersection fingerboards should be identical to those destinations used on any advance direction signs erected before the intersection. It is preferable to provide distance indication on intersection fingerboards even if reassurance direction boards (with destination distances) are used beyond each leg of the intersection.
2. Advance Direction Boards are placed in advance of an intersection to indicate destinations along each route leading away from the intersection, including the next principal destination along each route. An Advance Direction Board displays the route direction, route destinations and any turnings to other routes.
3. Reassurance Direction Boards are used beyond intersections that have been signposted with Advance Direction Boards and Intersection Fingerboards to reassure cyclists that they are travelling towards their intended destination and to indicate the distances to those destinations.

Local cycle route signage

There are two types of direction signs used on local cycle routes (see Figure 7):

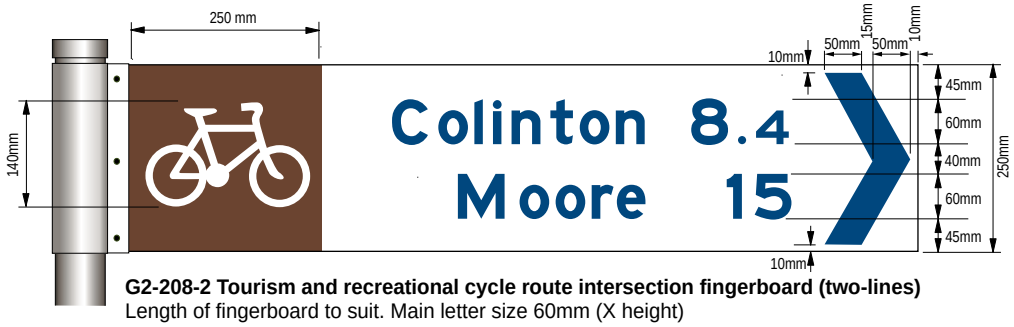
1. Intersection fingerboards are erected at local cycle route turnings as a wayfinding aid to important local destinations. These signs may indicate distances similar to principal route signage. As this type of cycle network signage is closely related to local street name signage, it may be necessary when signing local routes to install missing street signage to ensure completeness and easy navigation within the locality. Where a local route is short (maximum of three turnings from the principal route), the preferred method of marking destinations is to mount a local cycle route intersection fingerboard below the existing street name sign at each route turning. On longer routes with many turnings, it may be preferable to mark most route turnings with local cycle route markers affixed directly to street name signs or separately mounted beneath. When marked this way, Local Cycle Route Fingerboards (with destination and distance) should be used as the first and last sign in the sequence. Advance direction and reassurance direction signs are not used when marking local cycle routes.
2. Route markers are used to supplement the use of local cycle route fingerboards and are affixed to existing street name signs to indicate a route turning. As this type of cycle network signage is closely related to local street name signage, it may be necessary when signing local routes to install missing street signage to ensure completeness and easy navigation within the locality.

Tourist and recreational cycle route signage

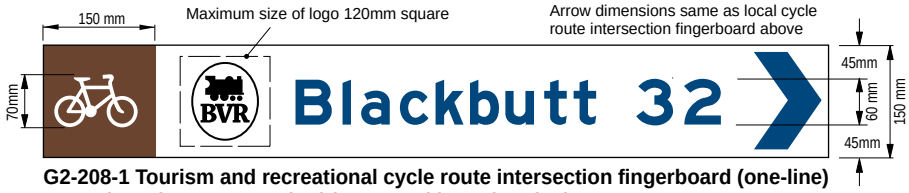
Tourist signs are intended to mark recreational and tourist routes which are usually (but not entirely) off-road and sometimes in remote locations. Tourist and recreational signs differ from normal network signage in that they use the standard brown tourist sign colour in their design. There are three types of direction signs used on tourism and recreational cycle routes (see Figure 8):

1. Intersection fingerboards are the major means of indicating tourism and recreational cycle route direction

(a) Wayfinding direction signs

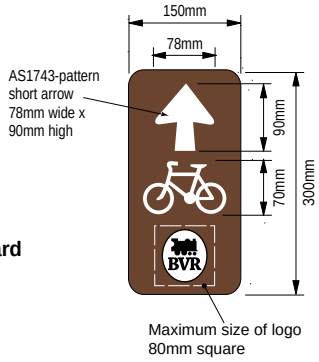


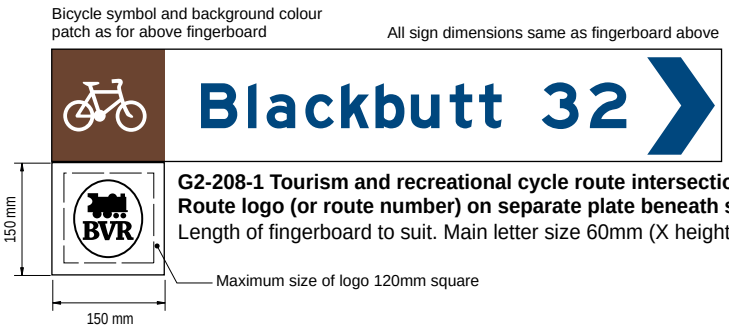
G2-208-2 Tourism and recreational cycle route intersection fingerboard (two-lines)
Length of fingerboard to suit. Main letter size 60mm (X height)



G2-208-1 Tourism and recreational cycle route intersection fingerboard (one-line)
Route logo (or route number) integrated into sign design
Length of fingerboard to suit. Main letter size 60mm (X height)

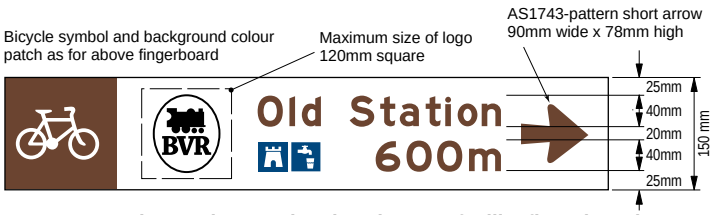
G8-200 Tourism and recreational cycle route marker



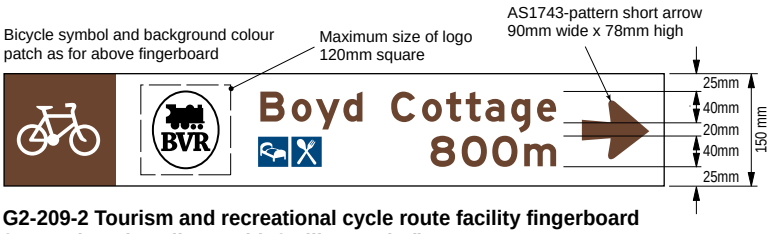


G2-208-1 Tourism and recreational cycle route intersection fingerboard
Route logo (or route number) on separate plate beneath sign
Length of fingerboard to suit. Main letter size 60mm (X height)

(b) Facilities direction signs



G2-209-2 Tourism and recreational cycle route facility fingerboard for attractions and points of interest (two-lines, no facility symbol)
Route logo integrated into sign design. Lettering and arrow tourist sign brown.
Length of fingerboard to suit. Main letter size 40mm (X height)



G2-209-2 Tourism and recreational cycle route facility fingerboard for services (two-lines, with facility symbol)
Route logo integrated into sign design. Lettering and arrow tourist sign brown.
Length of fingerboard to suit. Main letter size 40mm (X height)

Figure 8- Cycle Network Tourist and Recreational Direction Signage (Source: *TRUM* 1.36 Figure 4).

Notes

1. This drawing is to be read in conjunction with TRUM Volume 1 Section 36.
2. Tourism and recreational signs are dark blue lettering on white retro-reflectorised background with a white bicycle symbol on a square brown background at the mounting end of each sign. Brown colour is standard tourist sign brown. Letter sizes as shown.
3. Typeface used for destinations and distances is AS1744 Modified E mixed capitals and lower case. Where distances are less than 10km these should be indicated to the nearest 100 metres and expressed in standard decimal form with the sub kilometre numeral 75% of the height of the whole kilometre numerals.
4. Fingerboards are double sided from thick aluminium or steel plate or extrusion and cut to length. Fingerboard signs are mounted on poles using standard pipe clamps. Clamps should be pinned to prevent accidental movement due to wind or vandalism.
5. Fingerboard signs are square ended. The main directional arrows should be reproduced to dimensions given.

at decision points or intersections. Primary destinations for the route, plus any intersecting routes, are shown on intersection fingerboards along with distances to these destinations. If advance or reassurance direction signage is required near an intersection on tourism and recreational cycle routes to ensure adequate route wayfinding (due to complicated intersection alignments etc), tourist cycle route markers should be used.

2. Facility direction fingerboards indicating facilities and attractions relevant to the route are used at intersections or access roads adjoining the route. The name of the facility/attraction is shown on the fingerboard along with distances to these destinations. Where distances are less than 1 kilometre these shall be shown in metres. These signs are subject to approval by the route management authority as detailed in Section 3 of this guide.
3. Route Markers are an additional aid to cyclist navigation and are used to supplement direction signing on routes that have significance as through-routes. Markers, when used, are placed at 5km intervals. Markers can also be used on trails as advance direction and reassurance signs to supplement intersection fingerboards.

2.2.4 Information signs

Map boards

Street maps and cycle network maps can be very useful aids to navigation especially when placed at key entry and exit points to a town or built-up area, at the ends or entrances to linear pathways and at mid-points along bikeways/shared paths. Examples of path map boards are shown in Figure 9. Map boards should be easily accessible from the bicycle route. If maps are located on a side path, or rest area they should be indicated with additional signs.

Though it is an established mapping convention to use street maps oriented towards north, care should be taken when presenting this information to the user. Map boards should be located so as to assist orientation, with the user facing up the page and generally in a northerly direction. Alternatively, a north point located on the ground nearby and/or on the map board may assist the viewer to orient the map.

When mounting map boards and other information boards, such as tourist information, care should also be taken to provide sufficient space and clearance from the path to ensure adequate space to inspect the map without interfering with the passage of other path users (see Section 3 for clearance recommendations). Map boards should be mounted flush with their support posts and finished so that they do not present sharp edges to users or protrude into the operational space of the adjacent cycleway or pathway.

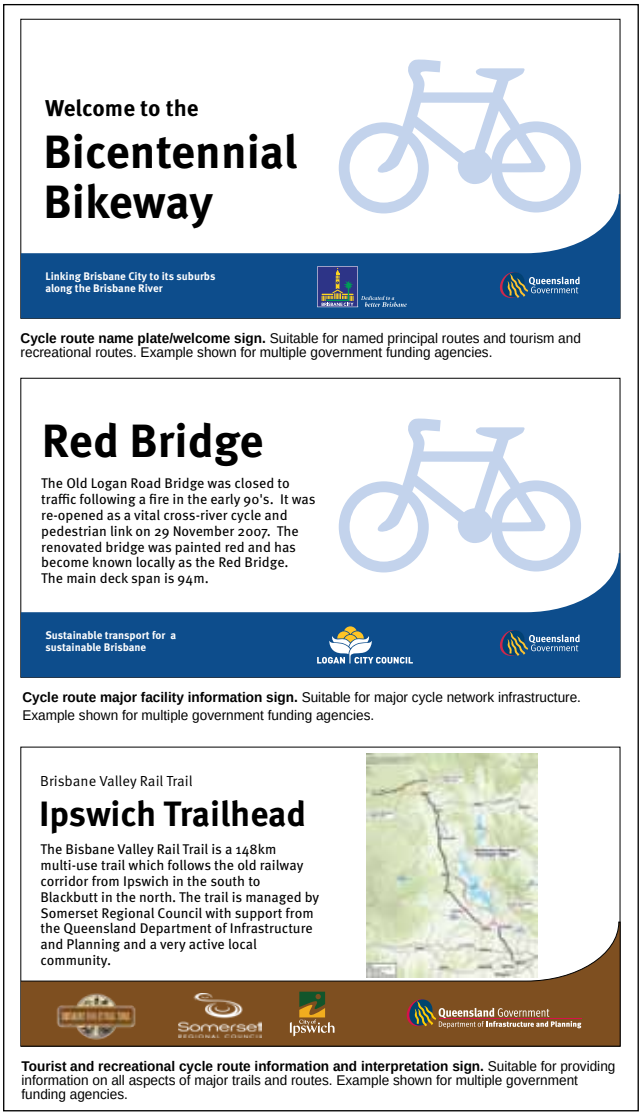
Photo 8: This map board has been located on a separate path loop to allow path users to study the map clear of the main shared path (lower left of photo). Roma Street Parkland, Brisbane.

Information and infrastructure signs

Information signs can be erected to provide technical details of cycle facilities and important network infrastructure. These signs can also be used to heighten awareness of major cycle facilities such as welcome and naming signage at major route gateways and trail heads. Figure 9 shows two examples of principal route signage and one example of information signage for tourist and recreational routes.

Information signs can incorporate maps, photographs and illustrations in addition to explanatory text. These signs should be no larger than 1,500mm x 1,200mm and should conform to the designs shown in Figure 9.

Figure 9: Information signs for providing technical details and important information about bicycle network infrastructure.

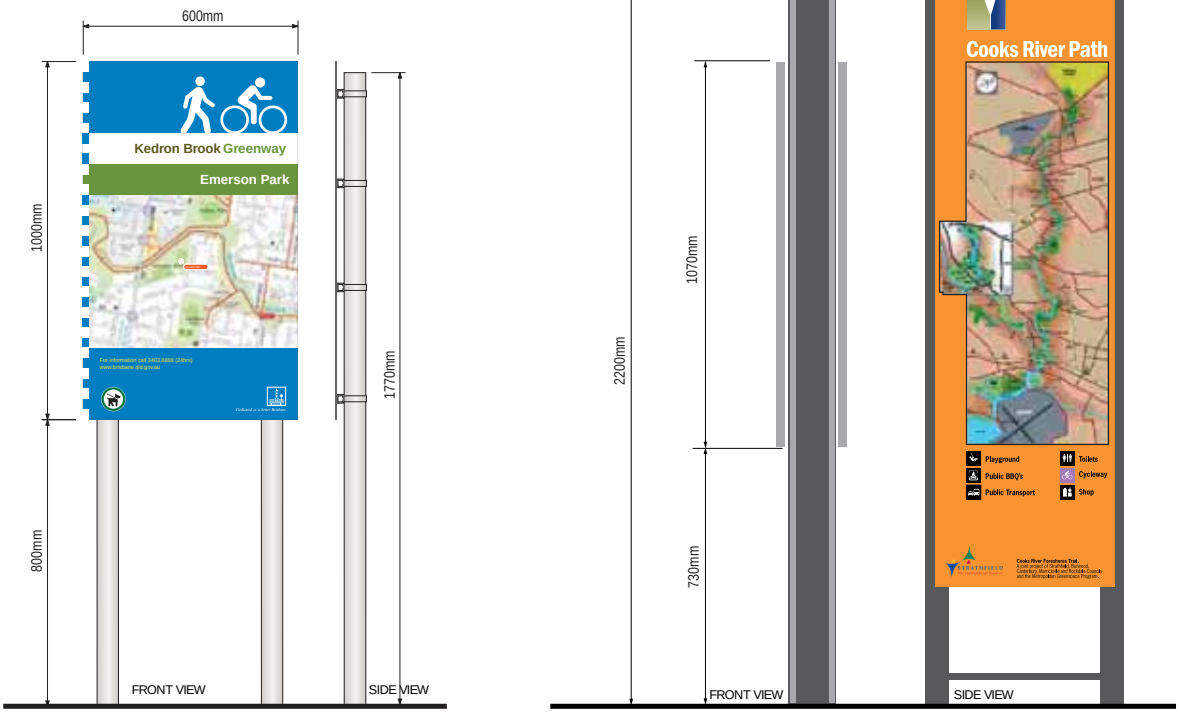


Cycle route name plate/welcome sign. Suitable for named principal routes and tourism and recreational routes. Example shown for multiple government funding agencies.

Cycle route major facility information sign. Suitable for major cycle network infrastructure. Example shown for multiple government funding agencies.

Tourist and recreational cycle route information and interpretation sign. Suitable for providing information on all aspects of major trails and routes. Example shown for multiple government funding agencies.

(a) Map display board examples



Example 1: (Top left) Brisbane City, Kedron Brook Greenway area map oriented to North.

Example 2: (Top right) Cooks River Path, Sydney. Linear park trail map oriented to direction of travel.

(b) Project construction sign examples

Example 3: (Centre right) Inter-government partnership project.

Example 4: (Bottom right) Single government agency project.

Note: Indicative sign examples only. Refer to funding agency for full sign layout, sizing and design details.

Figure 10: Cycle network map boards and project sign examples (Source: *TRUM 1.36* Figure 5).

Above left - Photo 9: Example of single government agency project sign. Toowong, Brisbane. Above right - Photo 10: Map boards, such as this example at Redcliffe on the Moreton Bay Cycleway encourage usage and increase user confidence.

Facilities signs

Fingerboard type signs indicating the location of facilities close to the route are a major aid to navigation and a service to the users. Typically, these signs indicate services such as toilets, water, rest stops and attractions such as points of local interest and historic sites. Cycle network facilities signs are shown in Figure 19 .

Project signs

Project signs are an effective means of communication between government and cycle network users to provide important information about new/changed infrastructure of cycleway and shared path projects. In addition, project signs identify the funding authorities, funding scheme (if applicable), the projected completion date and logos and website for more information.

This type of sign is usually erected with the announcement of a project and can remain in position after completion to highlight the public investment in the new infrastructure. Figure 10 shows examples of two types of project signage suitable for use on cycle network related projects.

Project signage requirements must meet the following objectives:

- Transfer of critical project information to road users;
- Identification of the funding authority of road works; and,
- Delivery date.

Project signage requirements may also indicate:

- Informing the community of planned infrastructure;
- Identification of the funding scheme (if applicable); and,
- Identification of the involvement of the funding agency in meeting community needs for supplying cycle network infrastructure.

The layout design and placement of project signage should comply with the intention of *TRUM 1.17*. Project signs for cycle network infrastructure projects should be no larger than 3,000mm x 2,400mm and should conform with the latest Queensland Government approved designs. Project signs should be removed after a period of time as indicated in Table 3 of TRUM 1.17, Council policy or, in the absence of other guidance, one year after project completion.

2.3 Directional signing a cycle network

A cycle network is usually signed route by route. However, before commencing any route directional signing project, it is essential to plan the layout of the entire network so that all interconnecting cycle routes and the destinations they serve can be identified. A cycle network plan will also identify each route type which will determine the level of signing required.

Regional principal cycle network plans have been undertaken in Southeast Queensland and Far North Queensland with others planned. These regional plans and the applicable local and regional council cycle network plans will then be combined to produce a cycle network map showing all planned cycle routes for an area. This map is the basis of the cycle network focal point map which provides the consistent framework for all future route directional signage projects.

When establishing a system of directional signage for a cycle network, Council officers should consult with bicycle network officers in the Main Roads Region Office and adjacent councils to ensure a consistent, logical and region-wide set of destinations are selected for use. This is particularly important where a number of owning or operating authorities are involved.

Signing a network is a five stage process:

1. Prepare the cycle network focal point map which identifies all destination points and key decision points for each route;
2. Assess the current physical condition of the route via a pre-signage and risk assessment survey;
3. Determine the level of signing, the route numbering or branding required for each route to be signed;
4. Prepare a signing schedule specifying all signs, their locations and mounting; and,
5. Install the signs and inspect after installation to correct any errors and omissions.

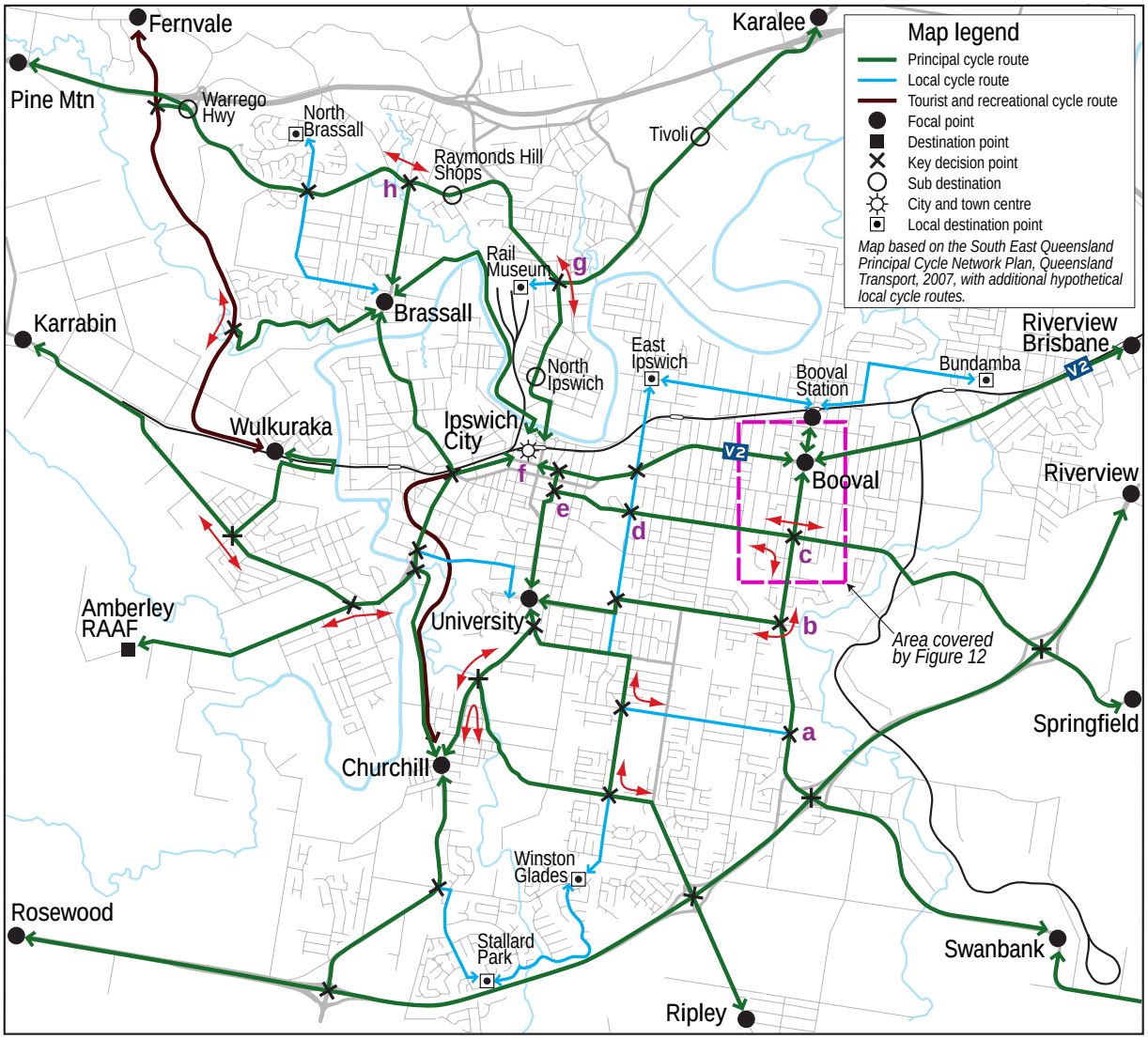


Figure 11: Example of focal point signing map for Ipswich.

2.3.1 The cycle network focal point map

A cycle network focal point map is a planning document used by the cycle network's manager to establish the destinations which will appear on directional signage for the network. A key aim of a cycle network focal point map is to achieve rigid consistency in the use of named locations so that a coherent system of signage can be developed which will enable direct and unambiguous navigation around the cycle network. Only those locations appearing on the focal point map will be used on cycle network signage.

This map is usually maintained by the government authority responsible for the regional cycle network. This will usually be the centrally located council working in consultation with MR regions and neighbouring LGAs. As bicycle networks are locally- or regionally-based and are more fine-grained and urban-oriented than the main road network, they may use different focal points to MR road-based focal point maps within the same area or region.

Figure 11 shows an example of a focal point map for an urban cycle network based on the city of Ipswich. The map shows principal cycle routes identified in the *South East Queensland Principal Cycle Network Plan*. Hypothetical local routes and tourist/recreational routes have been added to this map in order to show a more complete cycle network example. Table 5 defines the terminology used in focal point cycle network mapping.

The following guidelines apply to focal point mapping methodology for cycle networks:

- Focal points are significant localities commonly recognised within the region where routes join, cross or terminate. Focal points are indicated in the focal point map by a solid disc symbol. Arrow heads on the routes indicate the travel direction. At intersections and parts of the network where routes overlap or cross, small red arrows are provided to indicate the paths for each route.
- Terminal localities are focal points or destination points where routes terminate.
- Accepted practice is to show only one terminal locality on intersection fingerboards. Where routes overlap or branch to access separate terminal localities, it may be necessary to list two terminal localities but this practice should be avoided and limited to significant major destinations
- Sub-destinations are important local centres or intermediate focal points along a route. To keep signage uncluttered and compact, only one of these should be listed with the route's terminal locality until the sub-destination is reached. On all network signage, named localities should be listed with the closest at the top of each list and the most distant at the bottom.

- On local routes where a terminal locality (or community facility) is not immediately apparent, the designer should consult with local stakeholders (local councils, bicycle user groups, regional tourist associations etc) to determine the destination names to be included on local route direction signs.
- City and town centres are always important destinations. Principal routes leading in from the edge of a built-up area to the centre should be regarded as continuous even though they may pass through other important regional centres. The destination wording (City, CBD, Town Centre etc) should be continued right into the town/city centre.

Examples of cycle network focal point mapping practice

The letters a to h, shown in purple on Figure 11 are used in the examples below to illustrate the principles of focal point mapping.

Ipswich City to Swanbank Principal Cycle Route. When travelling towards Ipswich City this route passes through intersections a, b, c and d and e. At all these intersections the focal point for the route is Ipswich City. At intersection b (through to c) the University to Booval route shares the same street. At intersection c the Springfield to Ipswich City route shares the same streets through to their common focal point. The destination signed at intersections c, d and e is Ipswich City (see below for further details on signing the University to Booval route). Travelling in the opposite direction, the direction signs at intersections e and d should list both Springfield and Swanbank. At intersection c, separate fingerboards will list each destination (as well as Booval). At intersection a, a local route provides a useful connection through to the Ripley to University route. The focal point for this route will be University.

Booval to University Principal Cycle Route. At intersection c, this route overlaps the Ipswich City to Swanbank route through to intersection b where it turns westward towards University, its focal point. Fingerboard signage at intersection c could list both Swanbank and University as destinations but it is preferable to only sign Swanbank. University would be signed with an advance direction board on the northern approach to the intersection. For travel in the opposite direction, a similar procedure should be adopted at intersection b.

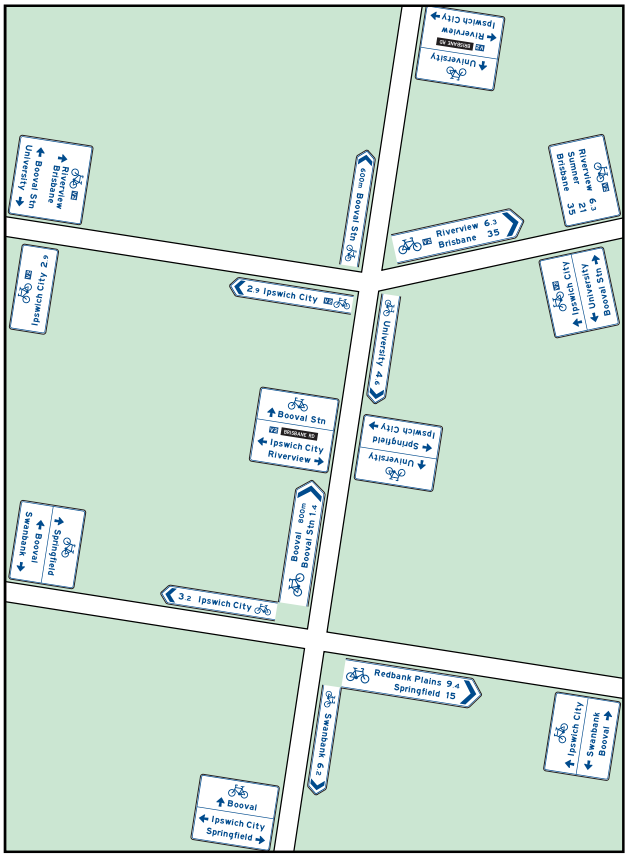


Figure 12: Detail signing for intersection c and the Booval focal point intersection. Detail from Figure 11. Ipswich City to Brisbane route is Level of Signing (LOS) C1. All other principal routes are shown LOS C2.

Ipswich City to Pine Mountain Principal Cycle Route. This route has a number of important sub-destinations. Travelling out of Ipswich City, signage would list North Ipswich, Karalee and Pine Mountain as destinations. Karalee is included because of overlapping routes. At intersection g, one fingerboard would list Tivoli (sub-destination) above Karalee while another fingerboard would list Raymonds Hill Shops (sub-destination) above Pine Mountain. At intersection h, the Pine Mountain fingerboard would list Warrego Hwy as the sub-destination.

Table 5: Destination definitions for focal point cycle network mapping

Location type	Symbol*	Definition
Focal points	●	Major cities, towns, regional centres and key localities located at the intersection of principal cycle routes. Where a focal point occurs outside a locality, the road junction (or nearest landmark) may be separately named.
Destination points	■	Cities, towns, city/town centres, regional centres, and major localities which are located at the ends of principal cycle routes but are not at a junction with other principal routes.
City and town centres	☼	The business centre of cities and towns. This area may be represented by multiple focal points depending on the size of the "CBD" or "City" precinct and the density of the cycle route network.
Terminal locality		For principal routes this may be a focal point or a destination point or a city/town centre where a route starts/finishes. For local routes it may be a facility such as a park, school, library or rail station.
Key decision points	×	Cycle network junctions which are intersections only (not focal points). These points are rarely named on cycle network signage.
Sub-destination	○	An important intermediate locality listed on the sign which will be reached in advance of the route's next focal point.
Local destinations	▣	Important local trip generators located at the termination of local routes (sporting/recreational and entertainment venues, community facilities, key local attractions and points of interest etc).

* Symbol used in Figure 11 to denote location types.

2.3.2 Assessing a route for signing

Before signing a cycle route it is recommended that a risk assessment be made so that any physical deficiencies can be corrected either immediately prior to signing, as part of regular infrastructure maintenance or as part of planned route upgrading. It is also advisable to undertake a similar assessment prior to the installation of cycle network infrastructure such as linemarking and engineering treatments.

The process outlined in this section is designed primarily for use by local councils but could be used by any government agency or private/community organisation with a management/ownership role of a cycle route.

Section 1.2 of this Guide provides information on the established processes for identifying and planning cycle networks and their component cycle routes. Once a cycle route has been identified for evaluation, the physical risk assessment should be planned, carried-out and documented as detailed below.

Physical assessment of the cycle route

A route assessment aims to identify any physical deficiencies which may present serious risks to cyclists. General issues on mid-block street-sections (between intersections or crossing points) to be assessed are:

- The availability of operating space for cyclists. This may be a wide kerbside lane or street conditions suitable for mixed traffic spacious profile or existing marked bicycle facilities;
- Potential squeeze points where traffic islands or kerb extensions may restrict bicycle operating space for short distances;
- Potential conflict points with pedestrians;
- Smooth, paved surfaces for the bicycle path of travel, with bicycle-safe drainage grates;
- Desirable sight distances (measured from expected bicycle path of travel); and,
- Consistent treatment (path of travel, warning/guidance signing, safety measures, etc.) throughout the proposed route corridor.

Specific intersection and crossing point issues to be assessed are:

- Manageable crossing opportunities at all intersection route turnings or crossings of low to moderate traffic-volume roads. Crossings of high traffic-volume major roads, highways and State Controlled Roads should preferably be at controlled or grade separated crossing points;
- Potential conflict points with pedestrians at crossing points; and,
- Connection to existing or planned bicycle routes at either end of the route or at intermediate points.

Table 6: Pre-signing cycle route assessment analysis

Issue	Description	References	Short-term remedial actions	Longer-term remedial actions
Roads/paths general	Is there adequate operating space on the road or path to accommodate cyclists?	*Austroads Part 14, Sections 4 , 6, 7 and 8 and QT Cycle Notes B3 and B4*	Signing and marking narrowings	Road realignment and engineering treatments to remove narrowings
Provision for wide range of users	Does the route provide alternative off-road routing (parallel route) on road-based cycle routes where vehicle speeds and volumes are high (› 5,000 vpd, ›60 km/h)?	*Austroads Part 14, Sections 2 and 3 and QT Cycle Notes C1 and B2*	Signing both on-road and off-road alternatives. Creating a continuous shared path along off-road alternative sections	Locating entire route off-road by constructing a separated cycleway
Sealed shoulders	Is there adequate operating space in the shoulder? Is the shoulder surface free of obstructions?	*Austroads Part 14, Section 4 and QT Cycle Note B4*	Repair surface imperfections and serious hazards	Reseal shoulder with smooth grade asphalt
Major roads ›5,000 vpd	Is there adequate operating space on the road shoulder or wide kerbside lane to adequately accommodate cyclists?	*Austroads Part 14, Section 4 and QT Cycle Note B4*	Signing and marking. Repair road imperfections and serious hazards	Develop on-and off-road routes as a parallel system
Minor roads ‹5,000 vpd	Is there adequate operating space on the road or path to accommodate cyclists?	*Austroads Part 14, Section 4 and QT Cycle Note B4*	Repair road imperfections and serious hazards	Install intersection treatments where needed
Physical hazards in the road or path environment	Are there physical deficiencies or hazards on the road or path (drainage grates, large cracks, blind driveways or hidden entrances, bollards and poles on paths etc)?	*Austroads Part 14, Section 8*	Signing and marking of hazard	Complete removal of hazard
Sight lines and clearances	Are sight lines applicable to cyclists obscured by obstacles such as signs, trees, pedestrian fences and parked cars?	*Austroads Part 14, Sections 4 , 6, 7 and 8*	Signing and marking	Complete removal of hazard
Intersections, general	Is there adequate operating space in the intersection to accommodate cyclists needs?	*Austroads Part 14, Section 5 and QT Cycle Note B6 and B7*	Signing and marking. Repair road imperfections and hazards	Develop on-and off-road routes as a parallel system
Intersections at route turning points	Can cyclists easily negotiate turns on-road? Is an off-road alternative available?	*Austroads Part 14, Section 5 and QT Cycle Note B6 and B7*	Signing and marking. Repair road imperfections and serious hazards	Redesign and reconstruction of intersection to include provision for cyclists
Signalised intersections	Can cyclists comfortably negotiate the intersection? Is an off-road crossing possible for young, elderly and traffic-shy cyclists?	*Austroads Part 14, Section 5 and QT Cycle Note B6 and B7*	Signing and marking. Repair road and path imperfections and serious hazards	Install bicycle lanes and holding boxes at intersection. Include cyclists needs in signal phasing
On-road to off-road transitions	Can cyclists comfortably negotiate transitions? Are sightlines preserved at transitions by signed parking restrictions?	*Austroads Part 14, Section 4.5.3*	Signing and marking. Repair imperfections and serious hazards	Install protected transition (see *Austroads Part 14 Section 4.5.3*)
Shared paths and footpaths	Is the design of the shared path adequate to accommodate the estimated volumes of cyclists and pedestrians? Are good sightlines maintained, and blind driveways and building entrances minimised?	*Austroads Part 14, Section 5 and QT Cycle Note C1 and C2*	Signing and marking. Repair path imperfections and serious hazards. Signing or marking blind entrances or driveways.	Rebuild path along clearer alignment. Locate path away from property boundary. Relocate obstructions such as power poles, trees, signage.
Path crossings of roadways	Are provisions for car parking near the path satisfactory in relation to the operation and safety of path users, e.g. cars cannot encroach onto path?	*Austroads Part 14, Section 6*	Ensure correct parking set-backs are marked by regulatory signage	Installation of refuge crossing or other engineering treatment (see *Austroads Part 14 Section 6.7.2.3*)

Photo 11: Assessing a route for signing aims to identify any physical deficiencies in a route that may present a serious risk to cyclists.

Signing routes with and without cycle infrastructure

Bicycles are legally defined as vehicles and can use public roads unless specifically prohibited for operational safety reasons (eg: urban motorways). The lack of bicycle infrastructure along a route, such as cycle lane markings, regulatory and warning signage and bicycle pavement symbols, does not necessarily mean that the route is unsuitable for cycling. Cyclists have differing levels of competency and sensitivity to traffic. Experienced cyclists often will prefer unmarked wide kerb-side traffic lanes to marked bicycle/car parking lanes due to the close proximity in the latter to opening car doors. Others (such as children and the elderly) may prefer to avoid trafficked roads altogether and ride off-road.

Fitting a route with a system of directional signage provides all cyclists with important wayfinding information which helps them to more effectively use their bicycles for a wide range of local and regional trips. Without this signage it is difficult for them to take full advantage of the road system and to use their bicycles as an efficient means of transport.

A pre-signing assessment of a route with or without cycle infrastructure should aim to identify any specific road hazards which would cause unacceptable operating risks for cyclists using these streets and roads. These may be road narrowings where cyclists are 'squeezed' into risky situations, hazardous drainage grates and difficult turns on busy multi-laned roads.

Table 6 shows recommended issues analysis for a cycle route pre-signing assessment where various types of potential hazards have been identified and remedial action taken on a short- or long-term basis if potential hazards and deficiencies exist. Guidance is provided for optimal cycling operating conditions on streets and roads in *Austroads GTEP Part 14*. In particular *Austroads Part 14* contains technical details for the provision of cycling on all streets and roads such as recommended lane widths for safe sharing with motor vehicles.

The aim of the route assessment is to document road, street and path conditions and from that formulate a program of remedial actions with a defined time frame. High risk items will require immediate attention. Remedial actions may range from short-term signing and marking of hazards to longer-term engineering works to physically remove the hazard by major road works.

2.3.3 Level of signing, numbering and branding

Level of signing for bicycle networks is set out in *TRUM 1.36* and uses a methodology for the signing of route intersections and decision points based on the importance of the route and its place in the cycle network route hierarchy. Level of signing for cycle routes is expressed in descending order of signing hierarchy (ie Level C1 is the highest level of signing). Different levels of signing may be required at each signed intersection along a route depending on intersecting cycle route types. Table 7 lists the signing requirements for each level. Figures 13 to 16 on the following pages provide graphical examples of the methodology for the four levels of signing.

This level of signing allows for a degree of redundancy in the signage system. A signage system with only one sign at each change of direction risks a breakdown in the provision of important wayfinding information to the user. If one sign is removed the system fails. Only local routes pointing directly to destinations have one sign per intersection (see Table 7).

Table 7: Level of signing for cycle network routes

Level of signing	C1	C2	C3	C4
Type of route	High-speed, limited-access, principal routes usually paralleling State Controlled Roads or major regional roads	All other principal cycle routes	Local routes	Off-road, shared path and tourist/ recreational routes
Advance direction signs	Yes, before route junctions with other C1 or C2 routes	Yes, at junctions where the route changes direction	No	No
Fingerboards at intersection	Yes, at route junctions with other C1 or C2 routes	Yes	Yes, integrated with street signage	Yes
Reassurance signs with distances	Yes, after route junctions with other C1 or C2 routes	Only if advance direction signs are not used	No	Route markers only
Route markers	No	No	Yes	Yes
Route numbering	Yes	No	No	No
Branding logos	Yes	Yes	No	Yes
Street signs	Yes, if none exist	Yes, if none exist	Yes, if none exist	Yes, if none exist

Figure 13: Example of Cycle Network Level of Signing C1

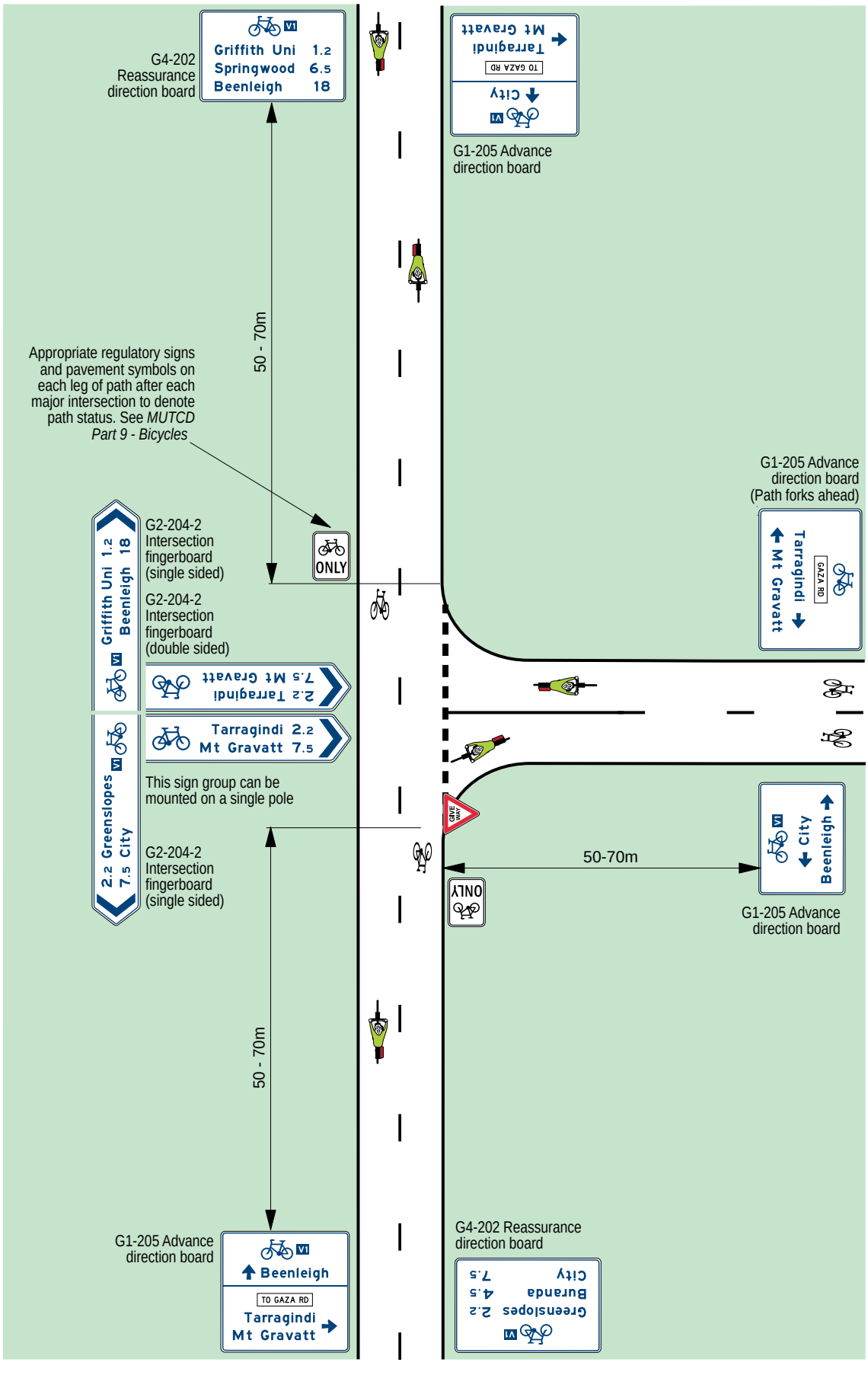


Figure 14: Example of Cycle Network Level of Signing C2

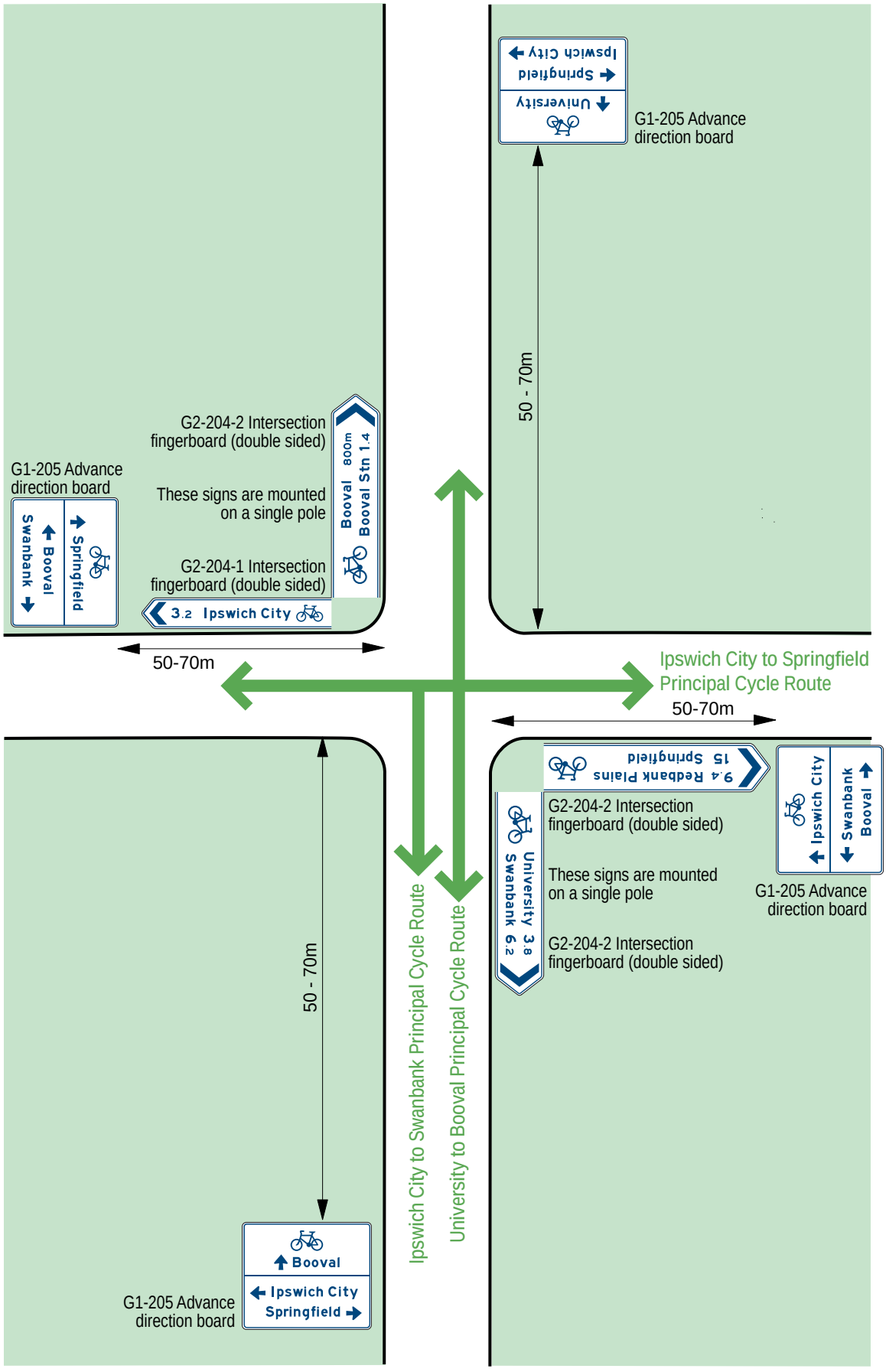


Figure 15: Example of Cycle Network Level of Signing C3

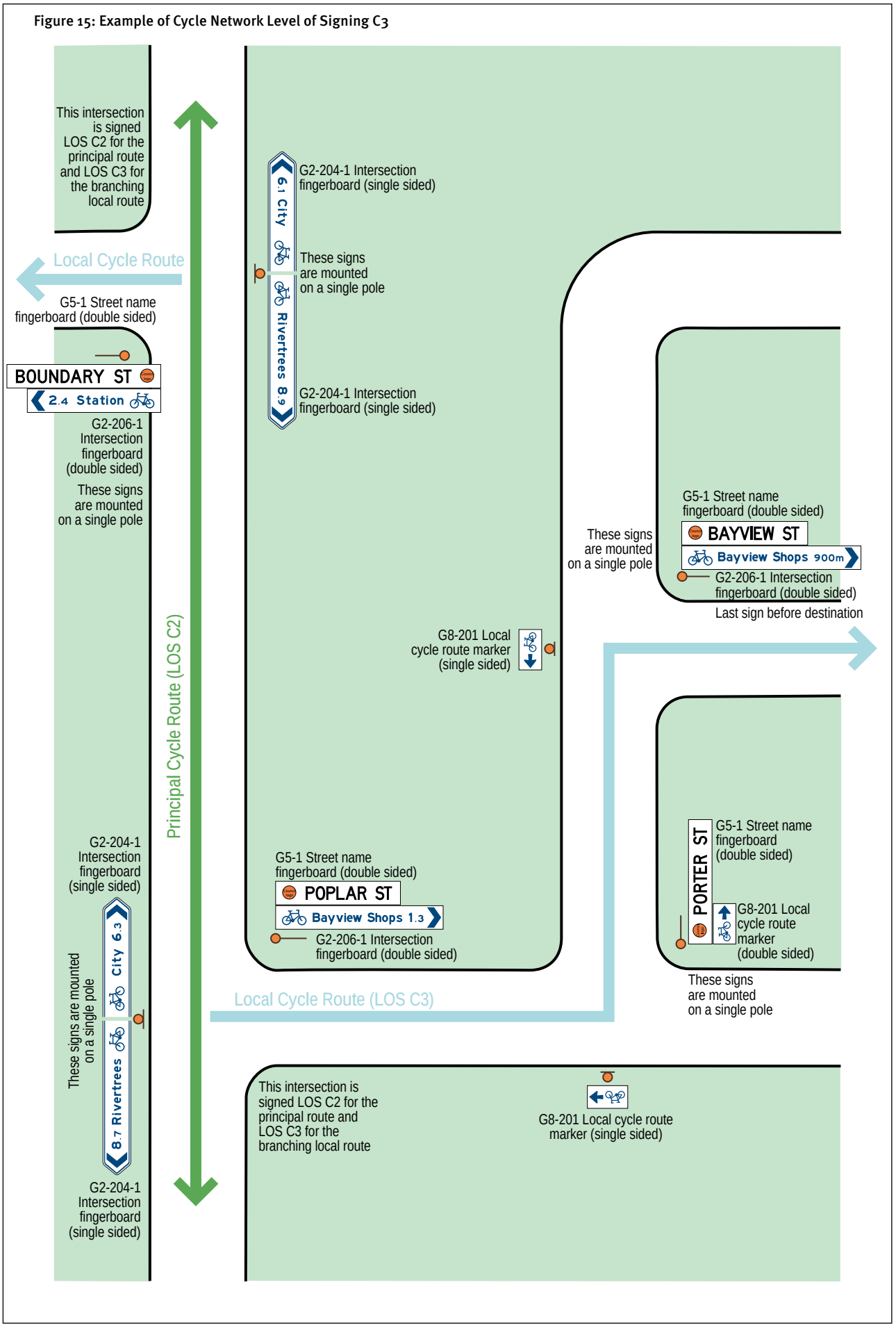


Figure 16: Example of Cycle Network Level of Signing C4

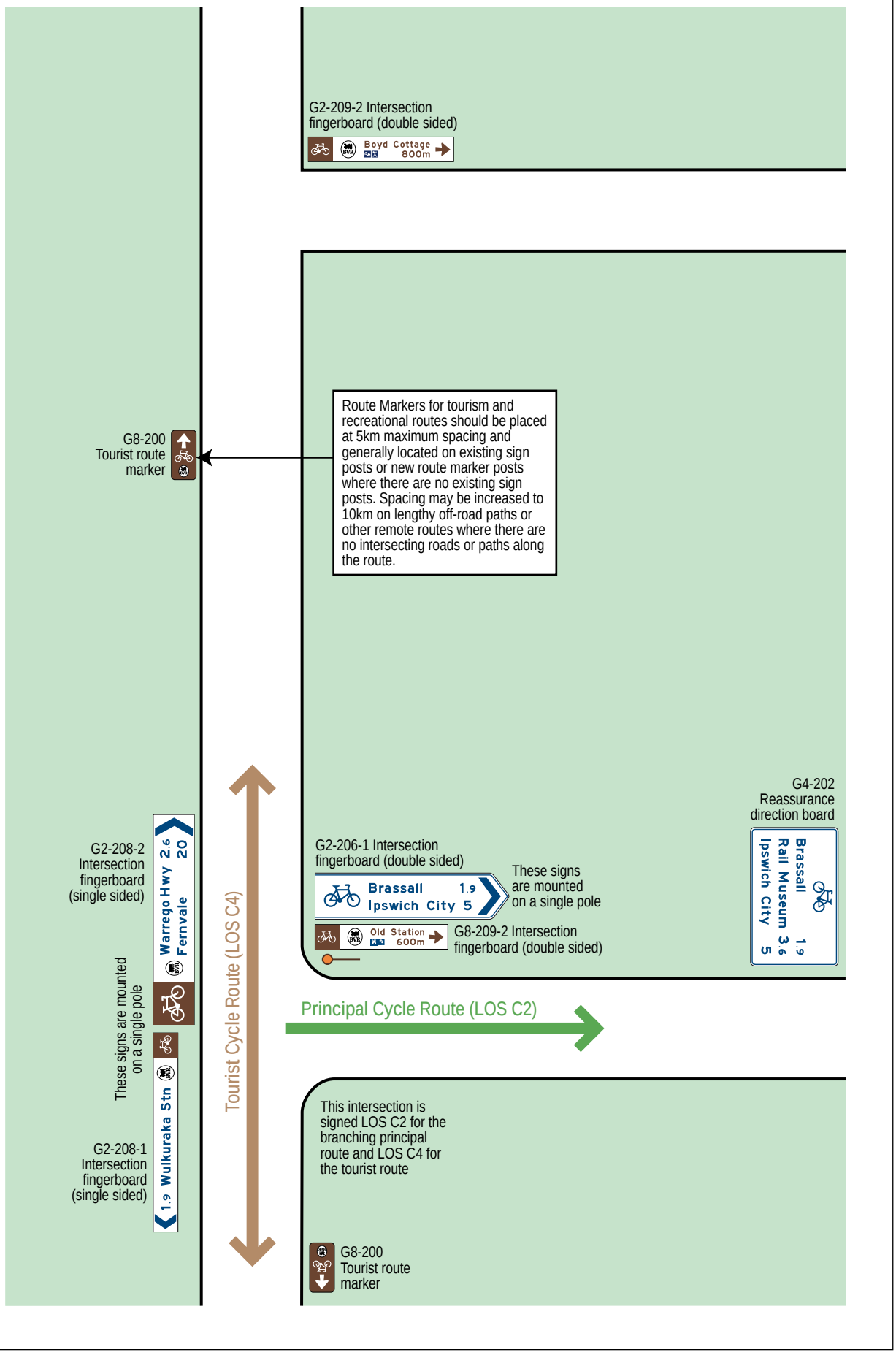


Figure 17: Example of route numbering used on principal cycle route signage. The V1 is Queensland's first numbered cycle route and is a high speed limited access route linking Brisbane to the Gold Coast.

Route numbering

In densely populated cities where there are far more route options than in smaller centres, route numbering may make it considerably easier for users to navigate around the network. Route numbering may also be appropriate on longer distance (inter-city) routes and may reflect existing road system route numbering where appropriate.

Route numbering, used for C1 routes only, should be based on an alphanumeric code comprising the letter 'V' (for veloway) followed by the route number in the series. The use of route numbering should be limited to a small number of high-speed, limited-access, principal cycle routes usually paralleling State Controlled Roads or major regional roads within a city or between cities and within a densely populated region (such as southeast Queensland).

Maintenance of the system of cycle route numbering within a city or region is the additional responsibility of the organisation which maintains the Focal Point Signing Map for cycle network signage within that city/region.

Route branding for principal, tourism and recreational cycle routes

The principal cycle route signage system makes provision for the naming of cycle routes where these already exist (see Figure 6). Naming routes is, however, cumbersome. Naming routes does not necessarily improve wayfinding and can place heavy demands on available sign space and can consequently increase the size of signs.

Photo 12: The lower sign in this example shows branded routes in Munich, Germany. The lower sign indicates a 200m connection to a riverside path which carries three branded routes - the Inner Ring Route and the River Isar Route which carries the national cycle route D-11 through the city. This route runs from Upper Bavaria to the Baltic Sea and is part of a twelve route 11,700km cycle tourism network.

Lengthy route names should be avoided. Where the length of a route name exceeds the available sign length (usually determined by the length of the longest listed destination) an abbreviated form or a smaller letter size may need to be used. When used, named route indication should be limited to signs at the start and finish of the named route and to important junctions where other major routes enter.

Longer recreational and tourist routes are being developed throughout Queensland for a variety of purposes ranging from local recreational paths to long distance rail trails. These routes often pass through a number of local government areas. To give the route its own identity, local governments could cooperate to give the route a distinctive branding and a promotional identity which encompasses design elements such as path logo, specialist wayfinding and facilities signage designs.

The preferred way to identify tourism and recreational routes, along with more easily identifiable urban routes, is by branding – using an easily recognisable logo or symbol to mark the route. Humans respond quicker to symbols and graphical shapes and can read them from far greater distances than lettering or words. Logos are very compact and so require very little precious sign space.

Where a cycle route uses part or all of a route with a branded identity, the logo for this route may be integrated into the sign design (for new tourism and recreational cycle route signage installations) or affixed to existing signage as shown in Figure 8. Principal cycle route signage branding should be integrated into the sign design as shown in Figure 6. Local routes do not use branding logos.

Route branding logos can be used to indicate different routes by locating them on the same line as the relevant destination (see Photo 12). Where route identity branding logos are used for individual destinations, they should be located on the same line as the related destination name and placed at the opposite end of the text line to the distance indication numerals. Where branding logos are primarily associated with the route (ie all listed destinations), they should be located at the top of the sign adjacent to the bicycle symbol as for numbered routes (see Figure 6). Logos, when used in conjunction with individual destinations should always match the height of the associated destination lettering.

Facilities and services signage and symbols

An important additional role for cycle network signage is to direct cyclists and other users to the services, attractions and tourist support facilities along a cycle route or nearby. Examples of recommended facilities and services signage for principal and local routes within urban areas are detailed in Figure 19. Further guidance on local services signage can be obtained from the *MUTCD – Part 5,* or from Council signage guidelines for pathway systems, parks and the public domain wherever applicable.

Effective facilities and services signage is an essential element in making tourism and recreational routes more accessible and attractive to the public. Fingerboard signage for tourist and recreational cycle routes (see Figures 8 and 19) can indicate facilities of use to cyclists along the route such as toilets, food (shops), water, accommodation, transport terminals, points of interest and heritage sites etc.

Figure 18: Recommended logos for use on cycle network facilities and services signage. See Figure 18 for examples of use. Logos are white on a dark blue (standard services colour) background. Logos shown are relevant to signing cycle routes. For additional logos refer to *MUTCD* and *Australian Standard AS1742*.

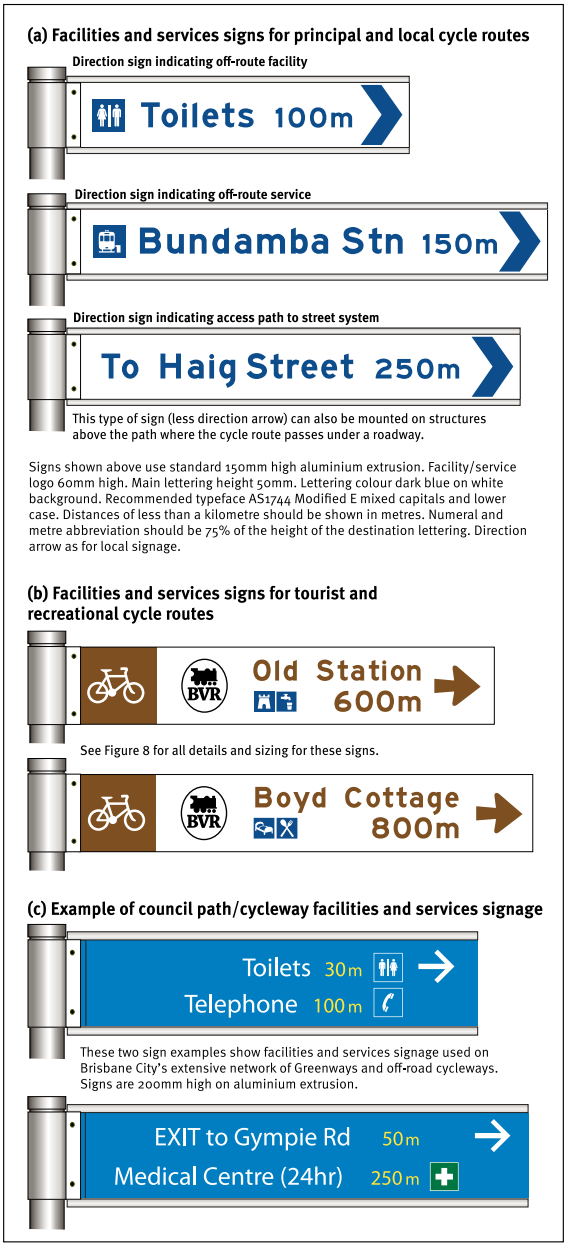


Figure 19: Facilities and services signage examples. This type of signage greatly increases the usefulness of a cycle route. Facilities and services signage can also be used to mark entry/exit paths which connect off-road cycle routes to the local street system. This further improves navigation and reduces the perceived isolation of paths.

An important part of the long term development of any tourist or recreational route is the formulation of a signage strategy to guide the design and installation of facilities and services signage as well as the essential route directional signage. This signage strategy will also document procedures for introducing new signage along the route as public and privately operated services and facilities become available.

The determination of facilities and services signage will be determined by the route's management on an ongoing basis. When new public facilities become available, direction signage will be added as part of regular route maintenance programs. When privately owned and operated facilities servicing a tourist or recreational route become available, the owners/managers of these facilities will be required to apply for approval to the route management authority before any new signage is erected.

In determining approvals for new route facilities and services signage route managers will be guided by *TRUM 1.12 Service and Tourist Signing Guide* - with additional consideration made for the different patronage levels and visitation rates expected for the cycle route.

3 Cycle route signing schedules

Once the decision has been taken to sign a cycle route following a positive pre-signing risk assessment, the next task is to prepare the signing schedules which will provide detailed information for the sign maker and installation crew or contractor.

3.1 Route signing summary

The first stage in the formulation of a signing schedule is to prepare a signing summary for the route. The signing summary is a preliminary list of signs based on the cycle network focal point map and level of signing required for the signed route and any interconnecting routes. The signing summary provides the necessary documentation to take into the field to assist the collection of additional information needed to complete the signing schedule.

The signing summary lists the directional signs needed along the route, their general siting and focal points, destination points and sub-destinations to be used on signage at each route decision point. Figure 20 shows a sample route signing summary for intersection 'c' (see Figure 11) of the Ipswich City to Swanbank Principal Cycle Route. This intersection, which has three principal routes passing through it, is also shown in Figure 14: Example of Cycle Network Level of Signing C2.

It is important when signing each intersection along a route to include other routes which may cross or overlap the route being signed. This will make the future task of signing these other routes easier and avoid the costly need to redo signage to add additional destinations.

Each row of the sample signing summary, Figure 20, lists information for a single sign. A complete signing summary would include all intersections for the route being signed. For the Ipswich City to Swanbank Route this would involve intersections 'a' through to 'f' as shown on the Figure 10 Focal Point Signing Map plus the additional intersections between intersection 'a' and Swanbank (not notated).

Photo 13: A signing schedule provides the detailed specification for the sign maker and installation crew or contractor to accurately install cycle route signage on streets, roads and paths. M7 Community Path, Western Sydney.

When determining the focal points, destination points and sub-destinations to be listed on directional signage, it is important to note that a directional signage system should be closed. Once a destination has been used on a sign, it should appear on all subsequent signs, until that particular destination has been reached. Destinations mentioned on previous signs are therefore given priority and should appear in strict order with the closest appearing at the top of any sequence listing.

All listed distances should be calculated in advance (from mapping or GIS systems) and checked via accurate field measurement either during site assessment or separately.

Figure 20: Sample signing summary for Intersection 'c' (See Figure 11) of the Ipswich City to Swanbank Principal Cycle Route

Ref no.	Km from start	Sign type	Reference No.	Direction*	Focal points & Sub-destinations etc	Level of signing	Remarks and requirements
4a	3.2	Advance direction	G1-205	O	↑ Springfield ← Booval Swanbank →	C2	Site assessment to determine precise location
4b		Fingerboard	G2-204-2	O	Swanbank 6.2	C2	Site assessment to determine precise location
4c		Fingerboard	G2-204-2	I	Ipswich City 3.2	C2	Site assessment to determine precise location
4d		Fingerboard	G2-204-2	S	Redbank Plains 9.4 Springfield 15	C2	Site assessment to determine precise location
4e		Fingerboard	G2-204-2	B	Booval 800m Booval Stn 1.4	C2	Site assessment to determine precise location
4f		Advance direction	G1-205	I	↑ Booval Ipswich City Springfield →	C2	Site assessment to determine precise location
4g		Advance direction	G1-205	I	↑ Ipswich City ← Swanbank Booval →	C2	Site assessment to determine precise location
4h		Advance direction	G1-205	O	↑ University ← Springfield Ipswich City →	C2	Site assessment to determine precise location

* Direction codes: I = Inbound – facing cyclists travelling in the direction of Ipswich City; O = Outbound – facing cyclists travelling in the direction of Swanbank; S = Springfield – facing cyclists travelling in the direction of Springfield; B = Booval – facing cyclists travelling in the direction of Booval.

3.2 Site assessment and operational issues

As part of the preparation of the signing schedule, a site inspection should be carried out to research and assess the precise locations for route signage. An important part of this process is to physically assess the safety issues relating to sign placement and to compensate for sites with poor safety.

3.2.1 Sign location and placement

The placement of cycle network directional signage should adhere to the general principles of signage as detailed in *MUTCD – Part 5*, for local roads and residential type streets and *MUTCD – Part 2* in relation to major roads and State Controlled Roads. Specific considerations relating to the installation of directional signage for cyclists are detailed below.

Sign clearances

Figure 21 shows vertical and horizontal clearances applying to cycle network signage. It is important to assess correct clearances, taking into account the actual site conditions. For example, a roadway with an excessive crossfall may require signs to be mounted further back to avoid damage from turning heavy vehicles.

Pedestrian desire lines should be taken into account. Sign placement at intersections should be clear of existing pedestrian paths and kerb ramps.

Sight distances and sign visibility

At cycle route intersections/decision points, directional signage should be positioned so that cyclists can safely and comfortably follow their chosen route. Stopping distance and the sight distance to the intersection are also of importance.

When placing advance direction signage it is essential to take into account all local variables such as slope and sight distances so that signs are located to provide adequate warning of a change of direction. Table 8 lists recommended mounting distances for advance directional signage. The greater distance should be applied where there is a downhill grade towards the intersection or where the approach visibility is restricted. For grades steeper than 8% it is recommended that additional warning signage be used in advance of the intersection.

Further advice on cycle stopping distances and sight distances on curves can be found in *Austroads GTEP Part 14* Section 6. Intersection fingerboard signage should be mounted in a highly visible location so that it can be clearly read by cyclists at a minimum of 15 metres from the intersection.

Table 8: Advance direction sign mounting distances from intersections

Level of signing	Design speed	Route type	Recommended mounting distance from intersection
C1	Above 30 km/h	Numbered principal route	50-70 metres
C2	30km/h	Principal route	35-50 metres
C3	Below 30 km/h	Local route	30 metres
C4	Below 25 km/h	Tourism and recreational route	30 metres

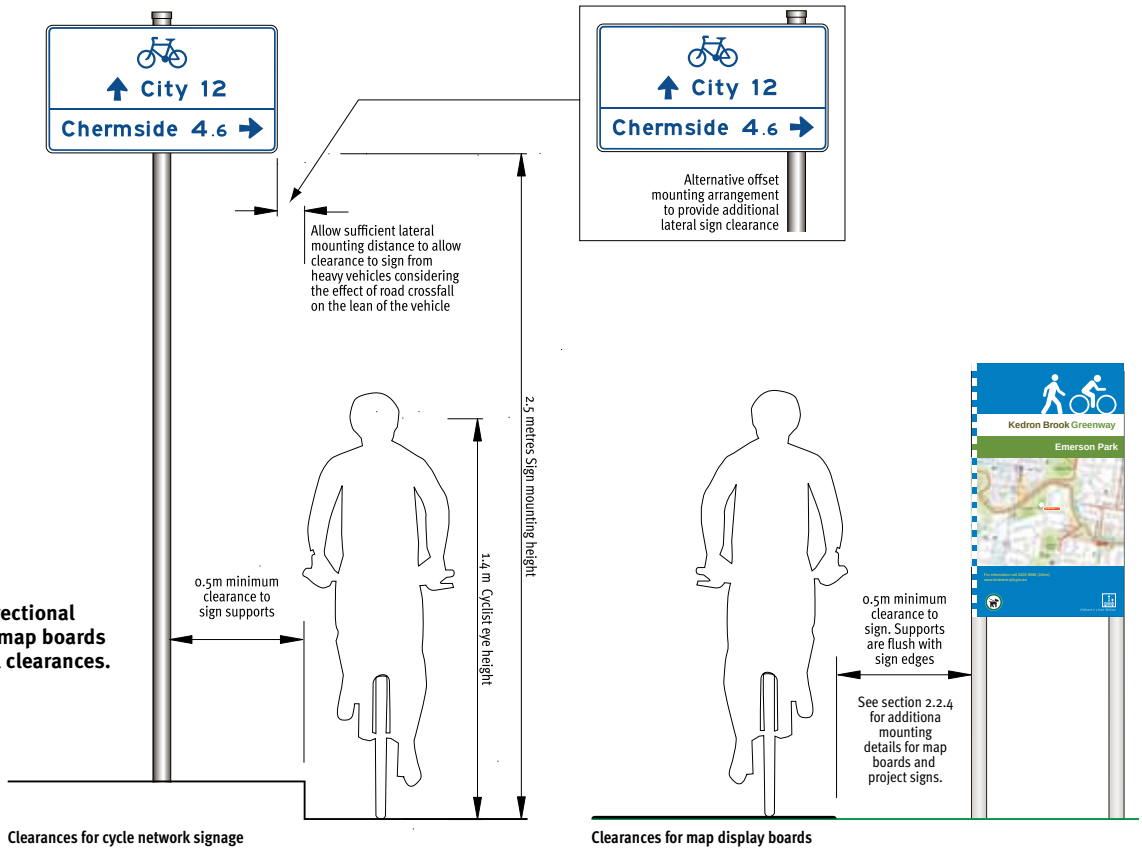


Figure 21: Directional signage and map boards side/ vertical clearances.

Clearances for cycle network signage

Clearances for map display boards

Signs should be placed consistently as indicated in Figure 22. If site conditions prevent two signs indicating separate directions from being mounted on the same pole on one corner of the intersection, consideration should be given to separately mounting these signs. Consideration should also be given to mounting signage on existing sign poles or power poles (where an agreement exists between the road/street/path owning authority and the power supply company) provided that such mounting offers superior sight lines and visibility for the sign(s).

Sign legibility and lighting

Direction signage should be easily readable in either day or night conditions. Signs located in a normal urban environment will usually have adequate ambient lighting. For this reason it is advisable to locate signage under, or adjacent to, overhead lighting where present.

3.2.2 Cycle network signs with other sign systems

The presence of cycle network signage should not detract from the effectiveness of other existing road or path signs. Cycle route directional signs should be located so as to not conflict with existing road directional signage, or create ambiguity at critical turning points or crossings. New signage should not add to existing clutter. Existing signage may need to be relocated at the time cycle network signage is installed to improve the overall intersection sign layout.

Cycle route signage and road signage

Cycle network signage, like highway signage, is a discrete system designed to guide cyclists through often complex road environments. Combining cycle network signage by

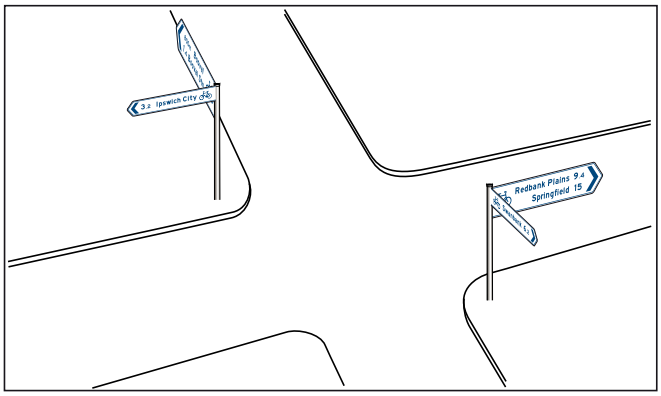


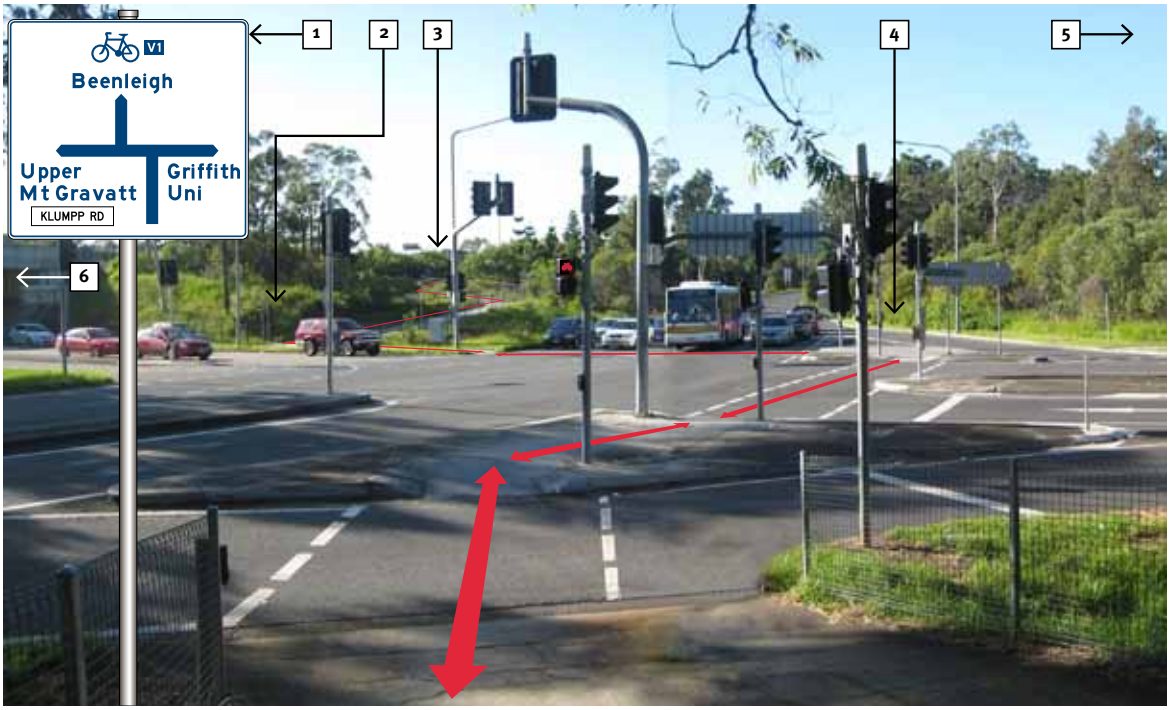
Figure 22: Typical layout for four way intersection with cycle routes on each leg. The example is for intersection 'c' shown on Figure 10.

including bicycle destination information or routing details on normal road directional signage is to be avoided. Care should always be taken to place signs where they can be clearly seen by cyclists and in a location where their message will not be compromised or overwhelmed by proximity to other signage.

Though the indication of street names does not form part of the principal cycle network signage system, it is vital for riders that they can see clearly legible street signs on every route turning/intersection to enable them to reach their destination as quickly as possible.

Local routes typically terminate at destinations such as suburban centres, educational and community facilities and public transport interchanges. Signage for this type of route should be closely integrated with local street signage by using fingerboards or markers (see Figure 7) with existing or upgraded street name signage.

Photo 14 (below left): Signage example for off-road cycleway travelling through a complex intersection. Some signs are not shown in this photomontage but indicated in the text. Cyclist path is shown in red. (1) Due to the complexity of the intersection it is advisable to use a simplified intersection diagram type sign for all advance direction signs. (2) At this off-road path junction three fingerboards (on same pole) will indicate route turnings. (3) In advance of this intersection, a diagram-type advance direction board, similar to 1, will face cyclists travelling from the opposite direction. (4) At this route junction three fingerboards (on traffic island) will indicate the route turnings. (5) In advance of this intersection, a diagram-type advance direction board, similar to 1, will face cyclists travelling from Griffith University. (6) A diagram-type advance direction board, similar to 1, will face cyclists approaching the intersection from Upper Mt Gravatt.



MR regions and councils will need to assess the fitting of new cycle network signage adjacent to street name signs and the repositioning or reinstallation of street names signs on a case by case basis. Where placing a cycle route sign below a street name sign reduces clearance to less than 2.5m, alternative provision will have to be made. This may include re-installation of the existing street name sign on a new taller pole. Additional information on the layout design and mounting of this type of signage can be obtained in *MUTCD, Part 5*.

Cycle route signage and path signage

TRUM 1.36 recommends that on local paths cycle network signage should take into account any current local government path signing policy. Where local path signs have been installed, the principal cycle route signage should be installed only where the principal route enters and exits the path or at any other path junction with a principal route.

If no local path signage exists at the time of signing it should be installed along the section of the path used by the cycle route being signed. If no local path signing policy is in place cycle network signage should be used to sign the relevant path section.

Local path signage should provide the necessary advance, reassurance and fingerboard signs as well as directions to facilities and side destinations, intersecting and cross street names and map display boards. Care should be taken to harmonise the use of standard cycle network signage with existing path signage systems through careful sign location and mounting. Off-road path junctions should be signed the same as on-road routes.

3.3 Preparing the signing schedule

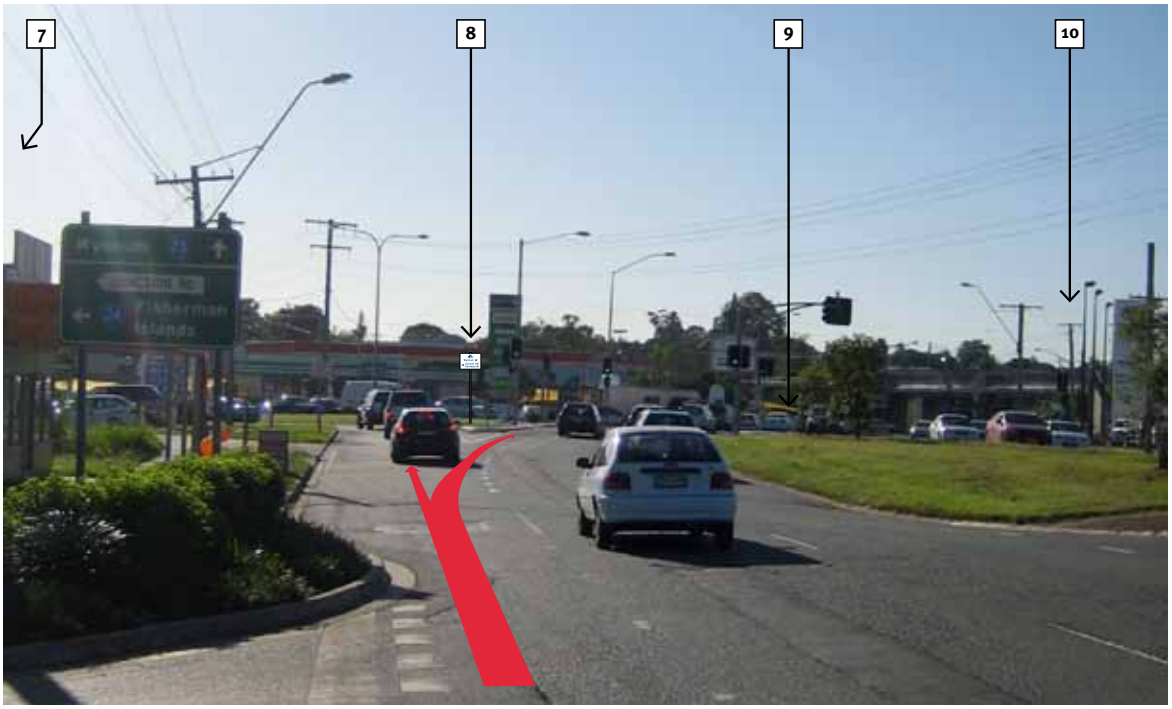
The information collected from the site assessment will be added to new columns in the route signing summary table (see Figure 20). This table, when completed, will become the cycle route signing schedule and will be used to specify the manufacture of the signs by a sign maker and to provide precise details for the contractor or in-house crew to carry out the final site installation.

Additional details needed for each sign to complete the signing schedule are:

- Precise location of each sign (it is recommended that marked-up site photos be appended to the sign schedule to ensure an accurate communication of each signs intended siting;
- Mounting support (new pole, existing etc);
- Mounting fixing type;
- Additional path signs found necessary by the site assessment – services and facilities signs, signs indicating connecting paths to the street system and street name signs at intersecting streets; and,
- Additional work (installation where needed of new taller street sign poles to replace existing poles).

Costs for signs and installation can be added to the table at this stage to produce a budgetary estimate.

Photo 15 (below right): Signage example for on-road cycle route travelling through a complex intersection. Cyclist path is shown in red. Bicycle lanes are fitted to Wynnum Road, a divided roadway with a large centre median. Cyclists approach the signals at the intersection in a bicycle lane. Junction Road exits to the left. Cyclists turning into Junction Road share the road space with other vehicles until the bicycle lane resumes further on. (7) The cycle route advance direction sign for this intersection needs to be positioned just before the side street (partly visible in the foreground) to provide sufficient warning for cyclists to position themselves for the intersection ahead. (8) Direction board type sign on this traffic island fitted in place of the usual fingerboards. (9) Reassurance direction board (optional) on departure side of intersection. (10) Similar signage scheme for travel in opposite direction for both Wynnum and Junction Roads.



4 Sign installation and maintenance

The previous sections of this guide have detailed the processes for planning cycle networks and designing a coherent signage system on a route by route basis. With the completion of the signing schedule and the allocation of sufficient funding to undertake a route signing project, the task now is to contract a sign designer/manufacturer and sign installer. Some councils prefer to undertake signage projects using in-house staff. Regardless of who performs the actual tasks, the process detailed in this section still require a degree of supervisory skill and checking at all stages.

4.1 Sign manufacture

The signs described in this guide and their usage should be manufactured in accordance with *TRUM 1.36* and the relevant sections of the *MUTCD*. A sign manufacturer with in-house design capability will be able to accurately design and fabricate cycle route signage to *TRUM 1.36* specifications. Main Roads sign software *TraSiCAD* is commonly used by council design staff and can be used to design and specify cycle network signs for manufacture. Design wizards for cycle network signage are available as software updates.

4.2 Materials and mounting

Cycle network directional signage is made from sheet aluminium or aluminium/zinc coated steel. Sheet aluminium is the preferred material. Local route fingerboard signage and services and facilities signage may be manufactured from extruded aluminium to the sizes shown in the sign layout drawings (Figures 7 and 19). Sign specifications are detailed in *TRUM 1.36*. Materials are specified in Main Roads *Standard Specification for Roadside Furniture MRS11.14*.

Double sided fingerboards for principal and tourism and recreational routes should be made of thick aluminium sheet able to withstand bending by the elements. Fingerboards should be fixed to galvanised steel pipe supports by means of galvanised steel or aluminium clamps (see Main Roads *Standard Drawing 1295* for clamp details). Fingerboard signs should be always attached to the mounting pole via the mounting clamp method and not secured to the pole in the centre of the sign as shown in Photo 14.

Anti-rotational fittings or fixing screws should be used on fingerboard clamps to prevent rotation by either wind or vandalism. This is particularly important on fingerboard signs which indicate travel direction at intersections.

Advance direction, reassurance direction and tourist and recreational markers are manufactured from aluminium sheet. These signs are single sided, stiffened as required and mounted on a single galvanised steel post as per Main Roads *Standard Drawing 1368*.

In urban environments signs should be mounted sensitively to avoid sign clutter. Where intersections have existing signs in an untidy or cluttered state, it is wise to replan the layout and placement of all signage (including the new cycle route signs) so that the legibility and general appearance of the total signage installation is improved. Any redundant signage should be removed during new sign installation.

Photo 16: Poor practice example of cycle network signage in an urban environment. This four-way intersection has cycle routes on three legs. The cycle route signage is poorly mounted with double, back to back signs for each cycle leg. These are centre mounted on a new steel pole. The street sign has its own timber pole. The badly faded and unreadable community sign and the blue cycle route sign above it are redundant and should be removed. The damage sustained by the blue marker, points to the eventual fate of this sign group. Bondi NSW.

4.3 Checking the installation

The accuracy of the signage installation and particularly the positioning of the signs and poles should be checked by the cycle specialist who has prepared the signage schedule following installation. Installation errors should be remedied promptly and prior to any public promotion of the route.

4.4 Maintenance

The maintenance of cycle route signage is usually the responsibility of the government agency, local government or private landowner which owns or operates the road, street or path. It is important that ongoing sign maintenance responsibilities be assigned and carried out, particularly where joint funding and partnership arrangements have been developed for the construction phase. Any ongoing maintenance of cycle network infrastructure should include the maintenance of the sign system.

An on-going system for public reporting of signage faults and damage due to graffiti, storm or heavy vehicle damage is recommended as an additional aid to maintaining a high quality cycle route information. This system can either be integrated into existing fault-reporting systems or set up as a new service on council internet sites.

5 Resources

Australian Standard AS 1742.6, Manual of Uniform Traffic Control Devices – Part 6, Service and Tourist Signs for Motorists. Standards Australia. Sydney. 1990.

Australian Standard AS 1744, Standard Alphabets for Road Signs. Standards Australia. Sydney. 1995.

Bikeway and Greenway Signage Manual. Brisbane City Council. Brisbane. 2008.

Cycle Network and Route Planning Guide. Land Transport Safety Authority of New Zealand. Wellington, New Zealand. 2004.

Cycle Note Number 10 - Shared Path Behavioural Signs. Vicroads. Melbourne. 2001.

Design Manual for Bicycle Traffic. *CROW* Record 25. Centre for Research and Contract Standardisation in Civil and Traffic Engineering. The Netherlands. 2007.

Guide to Pavement Markings. Main Roads Department. Brisbane. 2001.

Guide to Traffic Engineering Practice, Part 14 – Bicycles. Austroads. Sydney. 1999.

Main Roads Asset Maintenance Guidelines, Part 6 Road Furniture Maintenance. Main Roads Department. Brisbane. 2002

Manual of Uniform Traffic Control Devices Part 2, Traffic Control Devices for General Use. Main Roads Department. Brisbane. 2003.

Manual of Uniform Traffic Control Devices Part 5, Street Name and Community Facility Name Signs. Main Roads Department. Brisbane. 2003.

Manual of Uniform Traffic Control Devices Part 9, Bicycle Facilities. Main Roads Department. Brisbane. 2003.

NSW Bicycle Guidelines. Roads and Traffic Authority of NSW. Sydney. 2003.

Queensland Parks and Wildlife Service Signage Manual. Queensland Parks and Wildlife Service. Brisbane. 2008.

Signage Planning Manual. Patrick Wenzel. www.signageplanning.com. 2004.

South East Queensland Principal Cycle Network Plan. Department of Transport and Main Roads. Brisbane. 2007.

Standard Specification for Roadside Furniture MRS11.14. Main Roads Department. Brisbane. 2007.

The Human Factors of Transport Signs. Candida Castro and Tim Horberry editors. CRC Press. Boca Raton, USA. 2004.

Traffic and Road Use Manual Section *1.12*, Service and Tourist Signing Guide. Main Roads Department. Brisbane. 2007.

Traffic and Road Use Manual Section 1.21, Direction Signs – Legends and Layout. Main Roads Department. Brisbane. 2005.

Traffic and Road Use Manual Section 1.36, Queensland Cycle Network Directional Signage Guidelines. Main Roads Department. Brisbane. 2009.

Standard drawings

Main Roads *Standard Drawing 1295* for fingerboard mounting bracket assembly.
Main Roads *Standard Drawing 1368* for single pole mounting of board type signs.

Figure 23: Australian Standard AS1744 Modified E typeface used on cycle network direction signs

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
12345678

X–height

X height measurement is the height of the capital X letter

Queensland Government

Department of Transport and Main Roads, *A guide to signing cycle networks*, July 2009