DESIGN STANDARDS
for
URBAN INFRASTRUCTURE
13 PEDESTRIAN & CYCLE FACILITIES

Supplement 1
Treatments at Roundabouts
Share the Path sign

ACT Government
Territory and Municipal Services

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ACT Design Standards for Urban Infrastructure

13 PEDESTRIAN & CYCLE FACILITIES

Revision Register

Edition / Revision No	Clause No.	Description of Revision	Authorised	Date
Ed 1 / Rev 0		First Issue		Aug 02
Ed 1 / Rev 1	Various 13.1 13.2 13.3 13.4 13.5 13.6 13.7 13.8 13.9	Section references in text include hyperlink to relevant section. References to NSW Bicycle Guidelines and VicRoads Cyclenotes added. Added Key Reference Documents Added sections on best practice design, ACT context and policies. Updated Legislation, Industry standards and Policy and Guidelines including hyperlinks to refereed documents when possible. Performance statement replaced by objectives. New section on Main Routes Network. Planning process expanded and Community engagement added. Design principles and criteria for pedestrian and cycle facilities added. TCD's, treatment at intersections and roundabouts updated. Section to guide lane width selection for retrofit of on road bicycle facilities added. Coloured pavement treatment - warrant for use added. Tactile Surface Indicators - section added. Signage section added including guidance on Main routes, destination, behavioural and rural training circuit signage. Glossary updated. Standard drawings revised and added to compliment updates addition of sections as above.	M Zissler	29/6/07
Ed 1 / Rev 1 Supplem't 1	 13.1A 13.6 13.7.6 13.9	Treatments at Roundabouts and Share the Path sign Supplement Description of the supplement Treatment at roundabouts :modification of treatments at roundabouts to include treatment options based on speed environment; modification to coloured pavement treatment warrant to include reference to roundabouts and storage boxes. New Share the Path behavioural sign added with guidelines on its use. Standard drawings revised.		

13 PEDESTRIAN & CYCLE FACILITIES

Supplement 1 - Treatments at roundabouts Share the Path sign

13.1A Introduction to Supplement

13.1.1A General

This supplement to the standard sets out the revised requirements to be used by Practitioners in the planning and design of pedestrian and cycling facilities in the ACT in relation to treatments at roundabouts and use of the new Share the Path sign. The supplement includes revisions to the relevant areas of the standard and the provision of new standard drawings.

The supplement includes reference to the new Austroads guide *Cycling Aspects of Austroads Guides* (*Austroads CAAG*), which replaces *GTEP14.* This guide includes all cycling-related aspects of road design in one document, similar to the previous *GTEP14. Austroads CAAG* also includes the treatments prescribed in the *NSW Bicycle Guidelines* and *VicRoads Cycle Notes* and references to these documents have been removed or replaced as appropriate in this supplement.

Austroads CAAG is referred to in preference to other Austroads guides as it is more accessible than the other guides and in a format similar to *GTEP14* which is familiar to users other than engineers and other technicians.

The following sections completely replace the relevant sections of Edition 1, Revision 1.

13.6 Design of pedestrian and cycle facilities

13.6.4 On-road cycling

13.6.4.6 On-road connection to off-road system

Connections between the on-road and off-road systems should be provided wherever possible. On Main Routes the appropriate ramp type to suit the type of on-road facility should be provided in accordance with *standard drawing DS13-05*. Other ramps should be provided in accordance with *Austroads CAAG Section 4.4.3*.

If a bicycle lane or marked shoulder exists on the section of road where the ramp is to be positioned, the bicycle lane or marked shoulder is to continue through the ramp with a continuity line marked along the road edge to indicate the priority of the on-road facility. Any termination of a bicycle lane or marked shoulder associated with ramps should be in accordance with Section 13.6.4.9.

13.6.4.8 Treatment at roundabouts

The operating requirements of bicycle riders should always be considered in the design of roundabouts. A discussion of treatments and a number of design solutions applicable to roundabouts are provided in *Austroads CAAG Section 5.5.* The following section supplements or amends treatments shown in that document in response to the local conditions found in the ACT. Refer to Section 13.1.3 for a discussion of the specific conditions in the ACT that are different from those in NSW and also to some extent from those in other jurisdictions.

Table 13-6 provides guidance for the provision of treatments for pedestrians and cyclists at roundabouts in the ACT based on street type, speed environment and the function of the intersecting streets within the Main Routes Network. The necessary treatment should be considered firstly in the context of both the on-road and off-road networks and the provisions for crossings for pedestrians and off-road cyclists; and secondly with how these users will share paths with potentially faster-moving cyclists who have exited from the on-road environment where they are provided with connections or diverted to off-road paths at roundabouts.

The treatments listed in Table 13-6 relate to the approach to, through and departure from a roundabout for the appropriate street types within the road hierarchy. To assist in the selection of treatments for a roundabout at an intersection between roads / streets of differing types when combined with differing functions within the Main Routes Network, the standard drawings and Table 13-6 provide guidance based on the following considerations:

- Provision of a bicycle lane within the circulating roadway is related to the approach speed of the incoming vehicle and the desire to move the line of a circulating cyclist away from the left pavement edge for a better view by drivers approaching on roads with an approach speed of 70km/h and above. This provision is related to the greater diameter of the circulating roadway required by the higher speed and thus the positioning of a circulating cyclist further away from the approaching drivers' field of view. A bicycle lane is not permitted within the circulating roadway for a roundabout with an approach speed of 70km/h and above.
- Provision of a bicycle lane within the roundabout may improve drivers' awareness of the possible presence of cyclists and provides some separation of cyclists on roundabouts with approach speeds of 60km/h or less.
- The difficulty of the right turn movement for cyclists on multi-lane roundabouts.
- The loss of right of way resulting from an on-road cyclist moving to the off-road path to make a right turn (4 vehicle and up to 6 pedestrian conflict points compared to 2 vehicle conflict points if on-road, namely lane change and give way).
- Additional width of the off-road paths to address the risks of faster-moving cyclists mixing with pedestrians on off-road paths where appropriate.
- Provision of a bypass lane or path on the through carriageway of three-legged roundabouts.

Table 13–6 Provision of cycling and walking treatments at roundabouts

Speed environment of approach leg	**ST: Street type VU: vehicle usage NL: Number of circulating lanes**	**Pedestrian and cycling network function**	**Facility provision guidance C: Cycling P: Pedestrian**
50km/h or less	ST: **local access street** VU: local access where residential environment is dominant NL: single lane	Local pedestrian and cyclist use; low volumes	**Refer *CAAG Figure 5.18* and *std drg DS13-07*** C: No specific provision P: Path crossings
		Identified Connector Route, higher pedestrian and cyclist usage; refer *std drg DS13-11*	**Refer *std drg DS13-07*** C: Mark symbols and include signage as per Sections 13.6.4.3 & 13.7.4 P: As per above
	ST: **minor collector streets** VU: collects traffic from local access, may carry buses NL: single lane	Local pedestrian and cyclist use; low volumes, predominantly local vehicle access	**Refer *CAAG Figure 5.18* and *std drg DS13-07*** C: No specific provision P: Path crossings on all legs
		Identified Connector Route, higher pedestrian and cyclist usage; refer *std drg DS13-11*	**Refer *std drg DS13-07*** C: Mark symbols and include signage as per Sections 13.6.4.3 & 13.7.4 P: As per above

Speed environment of approach leg	**ST: Street type VU: vehicle usage NL: Number of circulating lanes**	**Pedestrian and cycling network function**	**Facility provision guidance C: Cycling P: Pedestrian**
50km/h – 60km/h	ST: **major collector street** VU: links from suburban areas to arterial roads – generally low numbers of heavy vehicles likely to carry buses NL: single lane	Link to local shops, schools and Main On-road Routes etc	**Refer *std drg DS13-08*** C: May include bicycle lane on approach, through and departure P: Path crossings on all legs
		Identified Connector Route; refer *std drg DS13-11*	**Refer *std drg DS13-08*** C: As per above except coloured pavement treatment to be included. P: As per above
	ST: **arterial road** VU: traffic volumes generally 6–10,000vpd, usually urban NL: single lane	Connectivity between town and group centres	**Refer *std drg DS13-08*** C: Bicycle lane to be provided with coloured pavement treatment on approach, through and departure P: Path crossings on all legs
		Identified Main On-road Route; refer *std drg DS13-11*	**Refer *std drg DS13-08*** C: As per above, separation island may be installed to encourage lane conformance or when heavy vehicle numbers are > 8% P: As per above
	ST: **arterial road** VU: traffic volumes generally greater than 10,000vpd, usually urban NL: two lanes	Connectivity between town and group centres	**Refer *std drg DS13-09*** C: Bicycle lane to be provided with coloured pavement treatment on approach, through and departure. Link to off-road path and marked hook turn area including rest rails to allow right turn movement P: Path width to allow for shared provision with faster-moving cyclists from on-road
		Identified Main On-road Route; refer *std drg DS13-11*	**Refer *std drg DS13-09*** C: As per above, separation island may be installed to encourage lane conformance P: As per above
70km/h or greater	ST: **arterial road** VU: traffic volumes generally 6–10,000vpd, controlled access / single lane	Connectivity between town centres and highways, experienced users only	**Refer *std drg DS13-08*** C: Provide off-road shared path, ramps and bicycle lane termination as shown on *std drg DS13-05* P: Path width to allow for shared provision with faster-moving cyclists from on-road
		Identified Main On-road Route; refer *std drg DS13-11*	**Refer *std drg DS13-08*** C: As per above except bicycle lane may continue through roundabout in certain circumstances P: As per above

Speed environment of approach leg	**ST: Street type VU: vehicle usage NL: Number of circulating lanes**	**Pedestrian and cycling network function**	**Facility provision guidance C: Cycling P: Pedestrian**
70km/h or greater	ST: **arterial road** VU: traffic volumes generally greater than 10,000vpd, controlled access NL: two lanes	Connectivity between town centres and highways, experienced users only	**Refer *std drg DS13-10*** C: Provide off-road shared path, ramps and bicycle lane termination as shown on *std drg DS13-05* P: Path width to allow for shared provision with faster-moving cyclists from on-road
		Identified Main On-road Route; refer *std drg DS13-11*	**Refer *std drg DS13-10*** C: As per above except bicycle lane may continue through roundabout in certain circumstances P: As per above
	ST: **rural road** VU: low traffic volumes NL: single lane	Touring and training circuits	**Refer *std drg DS13-08*** C: No provision; marked shoulders to be terminated as shown on *std drg DS13-05* P: Provision only where warranted

In the ACT, treatments that carry bicycle lanes through multi-lane roundabouts are not permitted on arterial roads with approach speed environments of 70 km/h and above. At these roundabouts, links to off-road paths and crossing points designed to cater for the likely user group should be provided. Cyclists should be encouraged, but not forced, to use the off-road links and entry to such facilities should be designed so that an experienced cyclist has the choice to become a vehicular cyclist through the roundabout. This can be achieved by installing a high-speed off-road connection ramp as illustrated on *standard drawing DS13-05* and not narrowing the pavement at the roundabout approach. This provision will allow the cyclist to continue through the roundabout without having to merge into the traffic lane.

To improve the safety of a vehicular cyclist choosing to travel through a multi-lane roundabout, the left lane should include additional width to act as a widened kerbside lane.

Where bicycle lanes are provided through a roundabout, use of DuraTherm™ or an equivalent hard-wearing treatment should be considered at vehicle crossing points.

In the retrofitting of cycling facilities to or the design of new roundabouts in approach speed environments of 70km/h and above, the following alternatives should be considered at an early stage to minimise safety risks to pedestrians and cyclists presented by this type of intersection. This is especially the case if the roundabout has or is proposed to have more than one circulating lane and is part of the Main Routes Network. These considerations must be balanced against other requirements that may be present at the location which may dictate preference for a roundabout.

- Implementation of other measures that may reduce cycle safety risks such as reducing the number of approach or circulating lanes, or decreasing the approach and departure speeds through revised geometry or other modifications that may lower the approach speed environment.
- Conversion of the intersection from a roundabout to a standard signalised intersection.

- Reduction of the speed limit at the intersection – this would normally require implementation of other measures to reduce the speed environment and be co-ordinated with the speed limits along the length of the road.

13.6.4.9 Termination of bicycle lanes and marked shoulders

Wherever a bicycle lane or marked shoulder ends, the edge line defining the facility should not run into the kerb or pavement edge. Instead the bicycle lane or marked shoulder should be terminated at full width or, if this is not possible, a minimum width of 1.0m for a marked shoulder or 1.2m (60km/h) to 1.5m (70km/h and above) for a bicycle lane will allow cyclists to merge into the adjacent traffic lane. This provision applies where required on approaches to intersections as well as to mid-block terminations. Details of the termination treatment and where combined with a ramp to an off-road path are provided on *standard drawing DS13-05*.

13.6.6 Coloured pavement treatment

13.6.6.1 General

Coloured pavement treatment should be considered for use on bicycle lanes at potential conflict points between cyclists and vehicles. The colour green has been adopted nationally, and internationally in many countries including New Zealand, for use to mark pavement defining cycle facilities. In the ACT this colour is defined as G15 Emerald Green or G16 Traffic Green; alternatively G23 Shamrock Green may be used with consent from the Road Authority.

Use of the treatment should be consistent with *NSW Bicycle Guidelines Section 8.1.3*; however, it should be noted that all paths are shared paths in the ACT and use of coloured pavement treatment to mark off-road paths could be considered solely on designated cycle-only paths.

13.6.6.2 Warrant for use of coloured pavement treatment

Coloured pavement treatment should be installed only after careful consideration, with due regard to the high cost of installation and maintenance as well as the risk that it may lose effectiveness as a warning device if over-utilised. Approval by the Road Authority is required prior to installation of coloured pavement treatment at any location.

There are a number of locations where coloured pavement treatment should be considered. These include drop-off parking locations, left turn slip lanes, exit ramps, storage boxes and on the approaches to and, in some instances, on the circulating carriageway of roundabouts.

For use of coloured pavement treatment at roundabouts, refer to Section 13.6.4.8 and *standard drawings DS13-09 and 10.* For storage boxes, refer to *NSW Bicycle Guidelines Section 7.3.4.*

For drop-off parking, left turn slip lane or exit ramp locations, a warrant system has been developed to assist Practitioners in objectively identifying locations where coloured pavement treatment should be installed. The weightings and ratings applying to these locations for each criterion are shown in Table 13–4.

To calculate a score for a location, multiply the weighting by the rating assessed for each applicable criterion and sum together. For drop-off parking locations, add together the products of criterion 1-4; for left turn slip /exit lanes, add together the products of criterion 1-3 and 5.

A score of 400–420 is an objective indicator that coloured pavement treatment may be warranted at the location.

Table 13–4 Warrant System for Coloured Pavement Treatments

No.	Criterion	Weight		Rating		Rating		Rating
	Common Criteria							
1	Speed environment	**10**	*80 km/h*	*10*	*70 km/h*	*8*	*60 km/h*	*6*
2	Visibility (sight distance from vehicle travelling in left lane)	**10**	*Less than 60 m*	*8*	*60 m to 100 m*	*6*	*More than 100 m*	*4*
3	Traffic volume							
a	Vehicular traffic in the left traffic lane	**5**	*3000 vpd or more*	*10*	*Between 3000 and 1500 vpd*	*6*	*Less than 1500 vpd*	*2*
b	Overall through vehicular traffic in all traffic lanes	**5**	*10,000 vpd or more*	*10*	*Between 10,000 and 5000 vpd*	*6*	*Less than 5000 vpd*	*2*
c	Cyclist traffic (future expected)	**5**	*300 cycles per day or more*	*10*	*Between 300 and 100 cycles per day*	*6*	*Less than 100 cycles per day*	*2*
	AND ***Drop-off parking***							
4	Adjacent drop-off parking areas	**10**	*High use drop-off area with more than 5 spaces*	*20*	*High use drop-off with less than 5 spaces*	*17*	*Medium use drop-off with less than 5 spaces*	*15*
	OR ***Left turn lane / exit lane***							
5a	Vehicular traffic turning left	**10**	*3000 vpd or more*	*10*	*Between 3000 and 1500 vpd*	*8*	*Less than 1500 vpd*	*4*
5b	Left turn slip lane exposure length	**10**	*50m or more*	*15*	*20m to 50m*	*8*	*10m to 20m*	*5*

Typical arrangements for the use of coloured pavement treatments for drop-off zones, left turn slip lanes and entry and exit ramps are shown on *standard drawings DS13-21* and *22*. Where coloured pavement treatment is installed at an exit ramp crossing, a rest rail arrangement must also be installed.

Exposure length is defined as the length of a bicycle lane where the cyclist can be regarded as having a high risk of conflict with vehicular traffic. Coloured pavement treatment should not generally be considered if exposure length is less than 10m for areas such as left turn slip lanes and adjacent drop-off parking areas.

On roads with speed environments greater than 60 km/h, continuation of bicycle lanes across higher speed entry or exit ramps should not be considered. Continuation of bicycle lanes across exit ramps can be considered only in 80km/h speed environments where there are two traffic lanes in the direction of travel to allow vehicles to change lanes if a vehicle slows to

give way to a cyclist. Refer to *standard drawing DS13-04* for examples of exit ramp crossings.

Refer to *NSW Bicycle Guidelines Section 7.5* for entry ramp crossings and entry and exit ramp signage arrangements.

Holding rail turn-outs should be provided where appropriate (for details refer to *standard drawing DS13-04*). Holding rails and turn-outs should generally be provided on exit ramps on roads in the urban area and may be omitted in rural areas.

Add the following paragraphs to the relevant section of Edition 1, Revision 1.

13.7 Signage

13.7.6 Behavioural signage

The Share the Path sign (DS13/15-1) has been developed for use on Main Community Routes to encourage appropriate walking and cycling behaviour by path users. Refer to *standard drawing DS13-15* for details of the sign.

The DS13/15-1 sign should be used in pairs facing path users approaching from each direction, generally at a spacing of 500m to 1km on Main Community Routes. Main inflow points onto a Main Community Route, such as paths at a main road junction, may require a split installation of the sign to address people moving in either direction on the Main Community Route from the inflow path(s). At other locations the signs may be installed on each side of a single pole. The sign may also be installed at specific locations to address reported behavioural issues. Wherever possible, the signs should be installed to minimise the number of new poles, either through use of existing light poles where opportunity allows or use of the back of other paired signs such as Road Ahead signs.

The following section completely replaces the relevant section of Edition 1, Revision 1.

13.9 Standard Drawings

The standard drawings relevant to Pedestrian and Cycle Facilities are:

Title	**Drawing Number**
Path Standard Details	DS13-01
Vehicle Restriction Details	DS13-02
Bus Stop Standard Details	DS13-03
Cycle Rest Rail Details	DS13-04
On to Off-Road Path Connection Details	DS13-05A
Main Community Route Driveway Crossing	DS13-06
Single lane roundabouts : 50km/h or less	DS13-07
Single lane roundabouts : greater than 50km/h	DS13-08
Two lane roundabouts : 60km/h	DS13-09
Two lane roundabouts : 70km/h and above	DS13-10
Main Routes Network (Proposed and Existing)	DS13-11

Title	Drawing Number
Main Routes Guide Signs Standard Details	DS13-12
Sign Location Layouts - 1 of 2	DS13-13
Sign Location Layouts - 2 of 2	DS13-14
Share the Path Sign	DS13-15
Coloured Pavement Treatment	DS13-21
Coloured Pavement Treatment at Exit Ramps	DS13-22
Signage Extent of Influence - Belconnen	DS13-31
Signage Extent of Influence - City	DS13-32
Signage Extent of Influence - Gungahlin	DS13-33
Signage Extent of Influence - Queanbeyan	DS13-34
Signage Extent of Influence - Tuggeranong	DS13-35
Signage Extent of Influence - Weston Creek	DS13-36
Signage Extent of Influence - Woden	DS13-37