South Carolina Department of Transportation

Engineering Directive


Subject: Considerations for Bicycle Facilities

References: AASHTO Guide for the Development of Bicycle Facilities
SCDOT Highway Design Manual

Purpose: Provide Guidance for the Design of Bicycle Facilities

This Directive Applies to: Preconstruction, Traffic Engineering, Construction, and Maintenance

This directive addresses shared roadways and bike lanes/paved shoulders and provides guidance on design requirements for new projects. In addition, typical sections for both the design of bicycle facilities on new projects and restriping of existing five-lane sections to accommodate bicycle facilities are provided in Appendix A of this directive. Other design considerations for bicycle accommodations are also discussed.

A. Shared Roadways

Description

Shared roadways are the way most bicycle travel in the United States occurs. This type of facility can be used to accommodate bicyclists without signing and striping roadways for bicycle travel. These facilities work well to accommodate bicycles through urban areas that are not considered to be high bicycle-demand corridors or where other constraints do not allow the development of bike lanes/paved shoulders.

Design Considerations

On urban sections (curb and gutter), an outside travel lane width of 14 feet is the minimum recommended width for a shared-use lane. The gutter pan is not to be included in the width of the shared roadway. On stretches of roadways with grades greater than 5 percent, consideration should be given to providing a 15-foot travel lane width. Shared roadway widths greater than 14 feet that extend continuously along stretches of roadway may encourage undesirable motor vehicle operations, especially in urban areas. Therefore, they are not recommended as shared use roadways and consideration should be given to striping the additional width. The South Carolina Department of Transportation’s (SCDOT) pedestrian and bicycle coordinator and Traffic Engineering can provide assistance in determining the need for a shared roadway as opposed to bike lanes/paved shoulders.

On rural sections (shoulder), criteria should be used as described in the Bike Lanes/Paved Shoulders section of this document.
B. Bike Lanes/Paved Shoulders

Description

This type of facility incorporates bicyclists onto a roadway by utilizing bike lanes/paved shoulders adjacent to motor vehicle traffic. Bike lanes should be specifically signed and marked as indicated in the Manual on Uniform Traffic Control Devices (Part 9). Paved shoulders may be used to accommodate bicycle travel without specific markings and signs present. Bike lanes provide for more predictable movements by motorists and bicyclists. Bike lanes should be one-way facilities and carry bike traffic in the same direction as adjacent motor vehicle traffic. This type of facility should be used where SCDOT desires to provide continuity to other bicycle facilities or designate preferred routes through high demand corridors, such as any of our designated South Carolina bicycle touring routes or a municipality’s bikeway. SCDOT’s pedestrian and bicycle coordinator and Traffic Engineering can provide assistance in determining the need for bike lanes as opposed to a shared roadway.

Design Considerations

On rural sections (shoulder) with average daily traffic (ADT) greater than 500, bike lanes/paved shoulders should be a minimum of 4 feet wide in each direction to accommodate bicycle travel. Bike lanes/paved shoulders will have a cross slope of 24H:1V (4.17 percent). Where motor vehicle speeds exceed 50 mph or the percentage of trucks, buses, and recreational vehicles is greater than 5 percent of the ADT, consideration should be given to providing a minimum width of 6 feet to accommodate bicycle travel adjacent to the higher speeds (50 mph or greater) and to lessen the effect of windblast from larger vehicles. On rural sections (shoulder) with ADT less than 500, paving 2 feet of the earthen shoulder will be adequate to better accommodate bicyclists.

On urban sections (curb and gutter), bike lanes/paved shoulders should be a minimum of 4 feet wide to accommodate bicycle travel. Bike lanes/paved shoulders will have a cross slope of 24H:1V (4.17 percent). The gutter pan is not to be included in the width of the bike lane/paved shoulder. Where the percentage of trucks, buses, and recreational vehicles is greater than 5 percent of the ADT, consideration should be given to providing a minimum width of 6 feet. Where motor vehicle speeds are 50 mph or greater, SCDOT guidelines for shoulder widths should be utilized as defined in the SCDOT Highway Design Manual, thus giving the bicyclist either 8 or 10 feet of paved shoulder width to utilize.

C. Other Design Considerations for Bicycle Facilities

Paving Existing Shoulders

In order for a shoulder to be usable by a bicyclist, it must be paved. Adding or improving paved shoulders often can be the best way to accommodate bicyclists in rural areas and benefit motor vehicle traffic. Paved shoulders have the added benefit of not only accommodating bicyclists, but they can also extend the service life of the road surface since edge deterioration will be significantly reduced. It is currently Department policy to provide 2
feet of paved shoulder width on all new projects utilizing earthen shoulders. Where practical and attainable, a minimum width of 4 feet should be paved on the shoulder to provide for bicycle facilities where the ADT of the road is greater than 500.

Where constraints do not allow obtaining the indicated widths, any additional width can be beneficial to a bicyclist.

**Resurfacing/Restriping Existing Roadways**

When SCDOT desires to accommodate bicycle facilities by resurfacing/restriping existing roadways, lane or median widths may be narrowed to obtain the desired bicycle facility. Roadways designated as being on the National Truck Network or South Carolina Truck Network or roadways where the percentage of trucks, buses, and recreational vehicles is greater than 5 percent of the ADT should have lane widths of 12 feet. Where conditions allow utilizing lane widths narrower than 12 feet to accommodate bicycle facilities, impacts of narrower lane widths to motor vehicle traffic should be determined. Guidance on selecting the proper lane width for a roadway can be found in Chapters 19 through 22 of the SCDOT Highway Design Manual.

A flush/painted median width of 15 feet is indicated by the SCDOT Highway Design Manual, but the width can be reduced to 12 feet to accommodate bicycle facilities on an existing roadway or existing project. Median widths less than 12 feet are not recommended where posted speeds are greater than 35 mph and the percentage of trucks, buses, and recreational vehicles is greater than 5 percent of the ADT.

**Drainage Inlet Grates**

Where practical, drainage inlets should be placed outside of the bicycle facility. Where this is not practical, hydraulically efficient, bicycle-safe grates should be utilized and should be placed or adjusted to be flush with the adjacent pavement surface. On bridges, a minimum of 4 feet from the edge of the travel lane should be clear of drainage inlets.

**Longitudinal Rumble Strips**

Bicycle traffic should be considered when determining the placement of longitudinal rumble strips. For further guidance, refer to the AASHTO Guide for the Development of Bicycle Facilities.

**Bridges**

In general, bridge widths should match the approach roadway widths (travelway plus bike lanes/paved shoulders). However, in determining the width for major water crossings, consider the cost of the structure, traffic volume, and potential for future width requirements.

**Valley Gutter Sections**

Guidelines for shared roadways and bike lanes/paved shoulders will be utilized to accommodate bicycle facilities on roadways with valley gutter. Since valley gutter sections
are typically used on low-volume, two-lane secondary roadways, the cross slope of the paved shoulder/bike lane should be 48H:1V (2.08 percent).

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APPENDIX A
FOR ENGINEERING DIRECTIVE 22
BIKE LANE - POSTED SPEED > 50 MPH OR > 5% TRUCKS

BIKE LANE - POSTED SPEED < 50 MPH OR < 5% TRUCKS

5-LANE RURAL SECTION (SHOULDER) NEW CONSTRUCTION

BICYCLE FACILITIES
Bike Lane - Posted Speed ≥ 50 MPH OR ≥ 5% Trucks

Shared Roadway - Less Than 500 ADT

2-Lane Rural Section (Shoulder) New Construction Bicycle Facilities

SCDOT Highway Design Manual
Δ Lane Width Per

SCDOT Highway Design Manual
Δ Shoulder Width Per
BIKE LANE

SHARED ROADWAY

SHARED ROADWAY - LESS THAN 500 ADT

2-LANE VALLEY GUTTER SECTIONS
NEW CONSTRUCTION
BICYCLE FACILITIES
SHARED ROADWAY

BIKE LANE

URBAN SECTION (CURB AND GUTTER) RESTRICTING EXISTING 5-LANE BICYCLE FACILITIES