



Highway Safety & Design Engineering Instructions (HSDEI)

Distribution: Highway Division, Director of Policy, Planning and Intermodal Development,
American Council of Engineering Companies of Vermont

Approved: _____ **Date:** _____
Jesse A Devlin, P.E.,
Highway Safety & Design Program Manager

Subject: **Bicycle Facility Design Guidance**

Administrative Information:

Effective Date: HSDEI 17 – 100 shall be effective from the date of approval.

Superseded HSDEI: Not applicable.

Exceptions: When site specific conditions do not allow installation as detailed.

Disposition of HSDEI Content: The content of HSDEI 17–100 will be incorporated into future revisions of the Vermont State Standards.

Purpose:

As bicycling for transportation increases across Vermont, the Agency of Transportation strives to increase the amount of bicycle infrastructure. One cost effective and efficient way to do this is through routine paving and road reconstruction projects, as most bicycle infrastructure consists of pavement markings and signs.

Current guidance available for design of bicycle facilities is mostly focused on large cities and thereby can be hard to interpret for “Vermont urban” and suburban conditions. Additionally, there are multiple guidance documents as well as standard requirements for projects with federal funding.

In order to provide comfortable and consistent bicycle facilities on state highways, the following document is intended to establish design guidance for bike lanes, including buffers and when to use green pavement markings to highlight potential conflict areas as well as how to incorporate pavement striping and marking into roadway projects.

Technical Information:

I. General

Where bicycle lanes have been designated they shall have a 4-foot minimum width. Designers should reference the current version of the [Vermont Pedestrian and Bicycle Facility Planning and Design Manual](#) for identifying locations and specific design requirements. Additionally, the VTrans Bicycle and Pedestrian Program Manager can be contacted for reference.

To help deter the use of bicycle lanes by motor vehicles, buffers shall be included, between the motorized traffic lane and the bicycle lane, where a bicycle lane has been designated within an available shoulder width of more than 5 feet, unless otherwise approved by the Bicycle and Pedestrian Program Manager. Buffer width shall be in accordance with the chart below and hatched as detailed in [HSD Detail 646.01 Bicycle Markings at Intersections](#) and the *Manual on Uniform Traffic Control Devices* (MUTCD, Section 3B-24). Additional information can be found in the National Association of City Transportation Officials (NACTO) [Urban Bikeway Design Guide](#), section on Buffered Bicycle Lanes.

Available Shoulder Width	Bicycle Lane Width	Buffer Width*
4'	4'	N/A
5'	5'	N/A
6'	4' (default) 6' (optional)*	2' 0'***
7'	4' (default) 5' (optional)	3' 2'
8'	5'	3'
*If shoulder width varies, a consistent buffer should be carried through sections where the overall width varies, for ease of construction **approval of Bicycle and Pedestrian Program Manger required.		

Additionally, designers shall contact the Bicycle and Pedestrian Program Manager to determine design widths for any bicycle lane, including buffer, with an overall width greater than 8 feet.

II. Intersections

Where bicycle lanes, parallel and adjacent to motor vehicle lanes, traverse across an intersection, signalized or non-signalized, bicycle lane markings shall continue at the designed width through the intersection. If there is a buffer, the buffer pavement markings shall not be carried through the intersection. Bicycle lanes through intersections shall be marked as detailed in [HSD Detail 646.01 Bicycle Markings at Intersections](#). For Class 1

Town Highways, municipalities may choose any configuration identified in the current [Separated Bike Lane Planning and Design Guide](#) published by the Federal Highway Administration, and its latest revisions, for bicycle lane markings through intersections. The bike lane through the intersection shall not be marked if there is no vehicle turning conflict with the through bicycle movement (i.e. dedicated right turn lanes AND opposing protected left turns).

III. Right Turn Lanes

When bicycle lanes occur at an intersection with a dedicated right turn lane, the yielding/conflict area shall be marked as shown [HSD Detail 646.01 Bicycle Markings at Intersections](#). Furthermore, a “Begin Right Turn Lane Yield to Bikes”, R4-4 sign shall be used to alert drivers.

IV. Drives

Where bicycle lanes cross commercial or residential drives with an entering or exiting traffic volume of 40 vph, or more, the bike lane shall be marked as an intersection as detailed in [HSD Detail 646.01 Bicycle Markings at Intersections](#). For drives with an entering or exiting volume less than 40 vph, the bicycle lane and buffer (if present) shall be carried through the drive.

V. Other

While the previous sections identify areas where green pavement markings are required not all situations may be identified above. For areas outside of those identified above discretion is left to the Bicycle and Pedestrian Program to identify additional needs.

The markings have interim approval under MUTCD and are recommended in multiple instances throughout the NACTO Urban Bikeway Design Guide, which has been endorsed for use by FHWA.

Implementation:

The content of HSDEI 17-100 is to be implemented immediately.

Transmitted Materials:

Highway Safety & Design Details (<http://vtrans.vermont.gov/docs/highway-safety-design-details>):

- [HSD Detail 646.01 Bicycle Markings at Intersections](#)

Federal Highway Administration (FHWA). [Manual on Uniform Traffic Control Devices](#); 2009 Edition with Revisions 1 and 2

National Association of City Transportation Officials (NACTO). [Urban Bikeway Design Guide](#); Second Edition. 2011

FHWA. [Separated Bike Lane Planning and Design Guide](#); 2015