



# CONNECTICUT DEPARTMENT OF TRANSPORTATION

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## *BICYCLE FACILITY SELECTION GUIDE*

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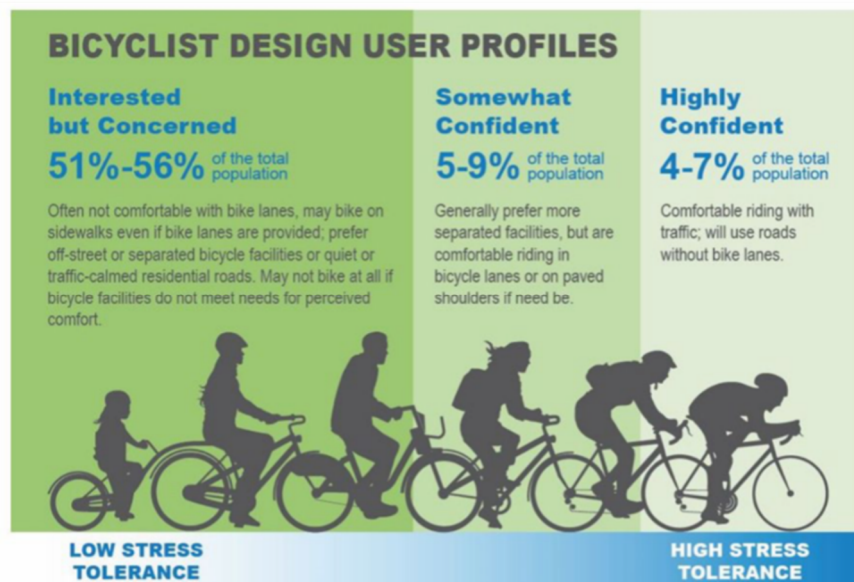
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## **BICYCLE FACILITY SELECTION GUIDE**

This guide is prepared in support of Engineering Directive ECD-2024-3, Complete Streets Controlling Design Criteria, as may be revised. This guide should be used by designers to determine the most appropriate bicycle facility type for all projects subject to this directive.

Several factors should be considered when selecting appropriate bicycle facilities for a street or roadway corridor. The primary factors include traffic speed and volume, but also include usership, roadway geometry, adjacent land uses, and existing and planned bicycle facilities in proximity to the corridor for which bicycle facilities are considered.

Bicyclists vary in age, experience, skill, and preferences. As such, bicycle networks should accommodate a wide range of users. According to FHWA's Facility Selection Guide, approximately 30% of people surveyed do not cycle and have no interest in cycling. The greatest share (51-56%) of those surveyed are "interested but concerned"; this group is more likely to ride on a quiet street or on a sidewalk. A smaller share (5-9%) of those surveyed are characterized as "somewhat confident" and are comfortable riding in bike lanes but might prefer separated facilities. The smallest share (4-7%) of those surveyed are comfortable riding with traffic. Most bicyclists prefer low stress facilities. The stress level of a facility is based upon several factors, the primary factor being the degree of separation between bicyclists and traffic. In addition to degree of separation from traffic, traffic speed and volume affect user comfort; higher speeds and volumes are associated with higher levels of bicyclist stress. Less experienced bicyclists exhibit a strong preference for low stress facilities, this is also true of youth and elderly bicyclists.



*Bicyclist Design User Profiles.  
Credit: FHWA Facility Selection Guide*

The selection of a bicycle facility for a corridor should seek to maximize the safety and comfort of bicyclists while maintaining the appropriate and effective operation of other modes of travel along that corridor. As such, the selection of appropriate bicycle facilities is not a “one size fits all” approach; facilities should be selected in response to the unique characteristics of that corridor. In some contexts, the provision of bicycle facilities may not be feasible given operational impacts, physical constraints, or construction cost.

Given these factors and constraints and for the consideration of this guide, bicycle facilities are classified as one of the following:

- **Premium Facilities:** No Design Exception Required. These facilities are acceptable for use but may exceed the measures necessary based upon the conditions present. The application of these facilities may be associated with higher cost of implementation, higher maintenance cost, and additional space requirements than would otherwise be necessary. This may reduce the feasibility of implementation. These facilities will provide the lowest level of bicycle stress and highest comfort, allowing for use by most bicyclist design user profiles.
- **Recommended Facilities:** No Design Exception Required. Recommended facilities are the recommended facility type given conditions specific to that corridor.
- **Acceptable Facilities:** No Design Exception Required. Acceptable facilities are acceptable for application where physical conditions, cost of construction, and/or property constraints do not allow for implementation of the recommended (or Premium) facility type.
- **Provisional Allowances:** Design Exception Required. Facilities may be allowed provided additional improvements associated with the installation of the bicycle facility are installed and are expected to bring traffic speed conditions within an acceptable range.

Tables 1 and 2 below provide guidance on selecting the appropriate bicycle facility, given traffic volumes and speed conditions, based on different land use contexts as follows:

**Table 1** is recommended for use in the following areas:

1. **Downtown/Commercial Business District** – areas of the highest density, with mixed land uses within and among predominantly high-rise structures, and with small building setbacks. On-street parking is often more limited and time restricted than in urban areas. Substantial parking is in multi-level structures attached to or integrated with other structures. Sidewalks are present nearly continuously, with pedestrian plazas and multi-level pedestrian bridges connecting commercial and parking structures in some locations. Transit corridors, including bus and rail transit, are typically common and major transit terminals may be present. Residences are often apartments or condominiums. Driver speed expectations are low, and pedestrian and bicycle flows are high.
2. **Urban** – areas that have high-density development, mixed land uses, and prominent destinations. On-street parking and sidewalks are often present, and building setbacks are mixed. Urban locations often include multi-story and low- to medium-

rise structures for residential, commercial, and educational uses. Driver speed expectations are generally lower, pedestrian and bicyclist flows are typically higher, and the density of transit routes are generally greater than in suburban areas.

3. **Suburban Town Center** – built-up areas consisting of commercial and residential uses. Commercial uses are usually concentrated together and are notable for a uniform building setback. Pedestrian and bicycle activity are the highest in town centers compared to suburban residential areas and sidewalks are usually present. On-street parking is often found in these areas.
4. **Rural Town Center** – rural areas located within developed communities. Rural town centers generally have low development densities with diverse land uses, on-street parking, sidewalks in some locations, and small building setbacks. Rural town centers may include residential neighborhoods, schools, industrial facilities, and commercial main street business districts, each of which present differing design challenges and differing levels of pedestrian and bicycle activities.

**Table 2** is recommended for use in the following areas:

1. **Suburban Residential** – areas which are usually located at the fringes of urban areas characterized by low to moderate-density residential development and isolated commercial properties. Pedestrian and bicycle activity is higher than in rural areas. These areas may have occasional transit service.
2. **Rural Residential** – areas of low-density residential development or occasional commercial uses. Buildings generally have large setbacks from the roadway and are frequently invisible due to tree cover. Pedestrian and bicycle activity are more frequent than in rural areas and transit activity is uncommon.
3. **Rural** – areas that are not within a developed community. These include areas with the lowest development density; few houses or structures; widely dispersed or no residential, commercial, and industrial land uses; and usually large building setbacks. Rural areas may include undeveloped land, farms, outdoor recreation areas or low densities of other types of development.

**Table 1: Bicycle Facility Selection Summary Matrix – Downtown/Commercial Business District, Urban, Suburban Town Center, Rural Town Center**

Traffic Volume (ADT)	0-5,000	5,000-10,000	10,000-18,000	18,000-20,000	20,000-25,000	25,000+
Paved outside shoulder	Recommended Facility	Acceptable Facility				
Bicycle lane	Recommended Facility	Acceptable Facility				
Buffered bicycle lane or buffered outside shoulder <sup>1</sup>	Premium Facility	Recommended Facility		Acceptable Facility		
Side path <sup>2</sup>	Premium Facility		Recommended Facility			
Separated bicycle lane <sup>3</sup>	Premium Facility		Recommended Facility			

Posted Speed (mph)	≤25	30	35	40	45	>45
Paved outside shoulder	Recommended Facility		Acceptable Facility		Provisional	
Bicycle lane	Recommended Facility		Acceptable Facility		Provisional	
Buffered bicycle lane or buffered outside shoulder <sup>1</sup>	Premium Facility		Recommended Facility		Acceptable Facility	Provisional
Side path <sup>2</sup>	Premium Facility			Recommended Facility		
Separated bicycle lane <sup>3</sup>	Premium Facility			Recommended Facility		

<sup>1</sup> Use a Buffered Bicycle Lane when there is a separate pedestrian facility available and use a Buffered Outside Shoulder when there is no separate pedestrian facility available.

<sup>2</sup> Use when there is no separate pedestrian facility available.

<sup>3</sup> Use when there is a separate pedestrian facility available.

**Table 2: Bicycle Facility Selection Summary Matrix – Suburban Residential, Rural Residential, Rural**

Traffic Volume (ADT)	0-5,000	5,000-10,000	10,000-18,000	18,000-20,000	20,000-25,000	25,000+
Paved outside shoulder	Recommended Facility	Acceptable Facility				
Bicycle lane	Recommended Facility	Acceptable Facility				
Buffered bicycle lane or buffered outside shoulder	Premium Facility	Recommended Facility				
Sidepath <sup>1</sup>	Premium Facility					

Posted Speed (mph)	≤25	30	35	40	45	50+
Paved outside shoulder	Recommended Facility			Acceptable Facility		
Bicycle lane	Recommended Facility			Acceptable Facility		
Buffered bicycle lane or buffered outside shoulder	Premium Facility		Recommended Facility			
Sidepath <sup>1</sup>	Premium Facility					

<sup>1</sup> A Side Path may be an appropriate facility when it is determined that *Interested but Concerned Bicyclist Design User* profiles may be present. These may be in areas near schools, or other rural bicyclist generators.

**Below are examples for demonstrating how Tables 1 and 2 are used:**

**Sample 1** – A roadway with an ADT of 19,000 vehicles and a posted speed limit of 35 mph located in a Downtown/Commercial Business District land use context area:

Use Table 1 – The Recommended Facility is a *Separated Bike Lane* or *Side Path* due to the high ADT. While not the recommended facility, a *Buffered Bicycle Lane* would be acceptable in a constrained area and would not require a Design Exception. A Design Exception would be required for a *Paved Outside Shoulder* or standard *Bicycle Lane*.

**Sample 2** – A roadway with an ADT of 3,000 vehicles and a posted speed of 45 mph located in a Rural land use context area:

Use Table 2 – The Recommended Facility is a *Buffered Bicycle Lane* due to the higher posted speed. A *Paved Outside Shoulder* or *Standard Bicycle Lane* is acceptable in a constrained area and would not require a Design Exception. It should be noted that if a *Paved Outside Shoulder* or *Standard Bicycle Lane* is selected, consideration should be given to increasing the width as speed increases. A *Side Path* may also be considered if a potential need is identified by the Bicycle Design User Profile.

**Sample 3** – A roadway with an ADT of 4,900 vehicles and a posted speed of 35 mph located in a Suburban Residential land use context area:

Use Table 2 – The Recommended Facility is a *Paved Outside Shoulder* or *Bicycle Lane* due to the lower speed and volume. A *Buffered Shoulder*, *Buffered Bicycle Lane* or a *Side Path* may also be considered if a potential need is identified by the Bicycle Design User Profile.

**Sample 4** – A roadway with an ADT of 14,000 vehicles and a posted speed limit of 45 mph located in an Urban Town Center land use context area:

Use Table 1 – The Recommended Facility is a *Separated Bike Lane* or *Side Path* due to the higher posted speed. While not the recommended facility, a *Buffered Shoulder* or *Buffered Bicycle Lane* is an acceptable facility in constrained areas and would not require a design exception. A *Paved Outside Shoulder* or *Bicycle Lane* may be considered, providing improvements associated with the project are expected to bring traffic speeds to within an acceptable range. However, this option would require a design exception.

## SAMPLE IMAGES OF BICYCLE FACILITIES



**Figure 1: Paved Outside Shoulder**, -Image Credit: Clay Dolan. Paved outside Shoulders designate a shared space on the roadway for bicycle travel. Paved Outside Shoulders are typically located between a motor vehicle travel lane and the curb or road edge.



**Figure 2: Typical Bicycle Lane**, Simsbury, CT - Image Credit: FHI Studio: Bike lanes designate an exclusive space on the roadway for bicycle travel, which is signified by pavement markings and signage. Bike lanes are typically located between a motor vehicle travel lane and the curb, road edge, or parking lane.



**Figure 3: Typical Buffered Bicycle Lane**, West Hartford, CT - Image Credit: FHI Studio. Buffered bicycle lanes are conventional striped bike lanes with a painted or textured pavement buffer space that is used to separate the bike lane from the adjacent motor vehicle lane and/or parking lane.



**Figure 4: Buffered Outside Shoulder**, Montville, CT - Image Credit: CTDOT Project Planning Unit. Buffered or "Visually Separated" Shoulder: Buffered or "Visually Separated" Shoulders can be an acceptable treatment for both cyclists and pedestrians in rural and suburban contexts without significant non-motorized generators. These facilities can be used on higher speed and/or volume rural roads where sidewalks and dedicated bicycle facilities are not present or warranted. The Buffer area should consist of two parallel white lines, 2' or more apart, and may include hatching in the buffer area.





**Figure 5: Side Path**, Farmington Canal Trail, Simsbury, CT- Image Credit: FHI Studio. Side Paths provide a separated facility for the shared use of bicyclists and pedestrians. Like sidewalks, these facilities are physically separated from motor vehicles by a curb, open space, or barrier. These facilities are adjacent to the roadway and are typically located within the right-of-way.



**Figure 6: Separated Bicycle Lane - 1-way at Sidewalk Level**, New Haven, CT – Image Credit CTDOT Photolog. Separated Bike Lanes (also known as cycle tracks or protected bike lanes) are bicycle lanes that are physically separated from motor vehicle traffic. Separated bike lanes can be designed for one-way or two-way travel and can be at street level, at sidewalk level, or at an intermediate level between the two.



**Figure 7: Shared Use Path**, Charter Oak Greenway, Manchester, CT - Image Credit: CTDOT. A shared use path is a facility that is shared by bicyclists and pedestrians. These facilities are recreational in nature and often travel through open space areas and along natural features such as riverfronts. While similar in design and function to a side path, shared use paths, are not typically located adjacent to a roadway.