

# Bicycle and Pedestrian Resources for Transportation Professionals



On the following pages are some of the latest research, resources, and guidance on pedestrian and bicycle planning, safety, and design. The American Association of State Highway and Transportation Officials (AASHTO) *Guide for the Development of Bicycle Facilities* and AASHTO's *Guide for the Planning, Design, and Operation of Pedestrian Facilities* are still the primary resources to refer to for designs for bicyclists and pedestrians. The resources presented in this document were selected to enhance the decision-making process.





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# Resources for Transportation Professionals

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## Acronyms

**AASHTO:** American Association of  
State Highway and Transportation Officials

**BRT:** Bus Rapid Transit

**CMAQ:** Congestion Management Air Quality

**FAST Act:** Fixing America's Surface Transportation Act

**FHWA:** Federal Highway Administration

**HAWK:** High-Intensity Activated crossWalk

**ISTEA:** Intermodal Surface Transportation Efficiency Act

**ITE:** Institute of Transportation Engineers

**MAP-21:** Moving Ahead for Progress in the 21st Century Act

**MDOT:** Michigan Department of Transportation

**MUTCD:** Manual on Uniform Traffic Control Devices

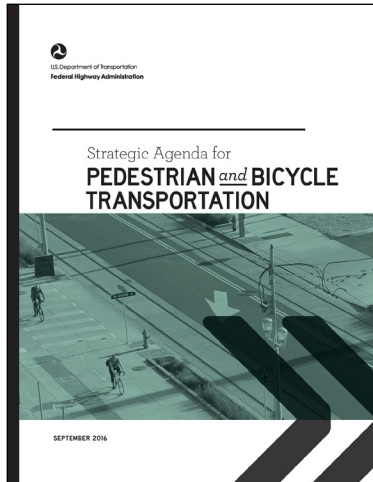
**NACTO:** National Association of City Transportation Officials

**TAP:** Transportation Alternatives Program

**USC:** United States Code

**USDOT:** United States Department of Transportation

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### Strategic Agenda for Pedestrian and Bicycle Transportation

**Release Date:**  
September 2016

**Author:** FHWA

**Keywords:** Bicycle, Pedestrian, Safety, Networks, Activity, Equity, Policy, Data Research

**Summary:** This Strategic Agenda will guide the Federal Highway Administration's (FHWA) pedestrian and bicycle activities in the next three to five years and is being organized around four goals: (1) Networks, (2) Safety, (3) Equity, and (4) Trips. Each goal includes actions relating to (a) Capacity Building, (b) Policy, (c) Data, and (d) Research. The Strategic Agenda will steer future investments, policies, and partnerships, and serves as the update to USDOT's 1994 National Bicycling and Walking Study.



### Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts

**Release Date:**  
September 2016

**Author:** FHWA

**Keywords:** Bike, Bicycle, Pedestrian, Walking, Multimodal, Network, Shared Use Path, Sidewalk, Design Flexibility, Reducing Conflicts

**Summary:** This publication is a resource for practitioners seeking to build multimodal transportation networks. The publication highlights ways that planners and designers can apply the design flexibility found in current national design guidance to address common roadway design challenges and barriers. It focuses on reducing multimodal conflicts and achieving connected networks so that walking and bicycling are safe, comfortable, and attractive options for people of all ages and abilities.

This resource includes 24 design topics, organized into two themes. The 12 design topics in Part 1 focus on design flexibility. The 12 topics in Part 2 focus on measures to reduce conflicts between modes. Each design topic is four pages in length and includes relevant case studies and references to appropriate design guidelines.

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## Bicycle and Pedestrian Funding, Design, and Environmental Review: Addressing Common Misconceptions

**Release Date:**

Aug. 20, 2015

**Author:** FHWA

**Keywords:** Bike, Bicycle, Pedestrian, Safety, Design, TAP, AASHTO, Green Book, Road Diets, Separated Bike Lanes, Protected Bike Lanes, Cycle Tracks, CMAQ, Funding, NACTO, Lane Widths, Curb Extensions, Roundabouts, 85th Percentile, Environmental Review

**Summary:** Since launching the Safer People, Safer Streets Initiative in 2014, USDOT has engaged safety experts, stakeholders, local officials, and the public on a range of targeted strategies to encourage safety for bicyclists and pedestrians on and around our streets. Through these discussions, a number of common misconceptions have been raised about the use of federal funding, street design, and the Environmental Review process that can cause confusion and result in project delay.

This website addresses many common misconceptions and distinguishes between federal standards and state and local practice. Where possible, the webpage provides links identifying resources that provide more detail on the topic. This document focuses on three policy areas: Funding, Design, and Environmental Review.

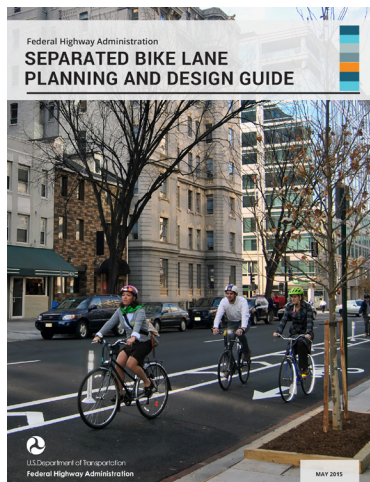
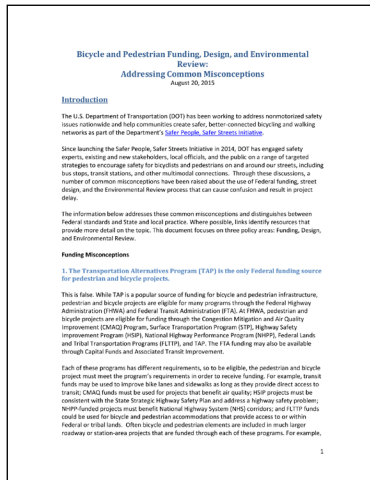
## Separated Bike Lane Planning and Design Guide

**Release Date:** May 2015

**Author:** FHWA

**Keywords:** Bike, Bicycle, Bike Lane, Separated Bike Lane, Planning, Protected Bike Lanes, Cycle Track, Design

**Summary:** This document gives readers an idea of how to plan for separated bike lanes and the designs needed for them to function properly. This report has five chapters that go into detail about the process: 1) What are separated bike lanes, 2) Overview for the guide and planning process, 3) Why choose separated bike lanes, 4) Planning separated bike lanes, and 5) Menu of design recommendations.



## Resources for Transportation Professionals

### Pursuing Equity in Pedestrian and Bicycle Planning

April 2016

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For:  
U.S. Department of Transportation  
Federal Highway Administration

### Pursuing Equity in Pedestrian and Bicycle Planning

**Release Date:** April 2016

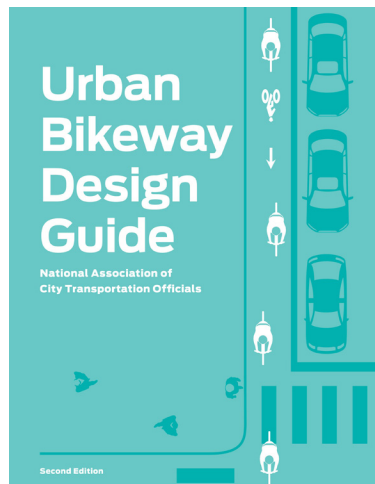
Last Update: May 26, 2016

**Author:** FHWA

**Keywords:** Low Income, Environmental Justice, Minority, Older Adults, Limited English Proficiency, Person with Disabilities, Equity, Pedestrian, Bicycle, Planning

Summary: The purpose of this paper, intended for transportation practitioners and decision-makers, is to:

- Define transportation equity-related terms in the context of planning for bicycle and pedestrian facilities and programs;
- Synthesize and highlight recent research findings related to the travel needs of traditionally underserved populations and the role of pedestrian and bicycle planning in addressing equity concerns; and
- Share strategies, practices and resources to address bicycle and pedestrian planning inequities.



### Urban Bikeway Design Guide (Bicycle Focus)

**Release Date:** March 2014

**Author:** NACTO

**Keywords:** Bike, Bicycle, Bike Lane, Cycle Track, Separated Bike Lanes, Protected Bike Lanes, Intersection Treatments, Bicycle Signals, Bikeway Signing, Bicycle Boulevards, Buffered Bike Lane, Colored Pavement Material Guidance, Shared Lane Marking, Bike Box

Summary: The purpose of the National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide is to provide cities with state-of-the-practice solutions that can help create complete streets that are safe and enjoyable for bicyclists.

The designs in this document were developed by cities for cities since unique urban streets require innovative solutions. Most of these treatments are not directly referenced in the current version of the AASHTO Guide for the Development of Bicycle Facilities, although they are virtually all (with two exceptions) permitted under the Manual on Uniform Traffic Control Devices (MUTCD). The Federal Highway Administration has posted information regarding MUTCD [approval status](#) of most of the bicycle-related treatments in this guide and in August 2013 issued a [memorandum](#) officially supporting use of the document. Most of the NACTO Urban Bikeway Design Guide treatments are in use in cities around the United States.

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### Urban Street Design Guide (Pedestrian Focus)

**Release Date:**

October 2013

**Author:** NACTO

**Keywords:** Streets, Design Elements, Interim Design Strategies, Intersections, Design, NACTO, Pedestrian, Urban Streets, Crosswalks, Sidewalks, Curb Extensions

Summary: The Urban Street Design Guide charts the principles and practices of the nation's foremost engineers, planners, and designers working in cities today. This is a guide for unique urban areas. The Urban Street Design Guide allows for more case-sensitive design ideas in cities. This is a blueprint for designing 21st century streets. The guide unveils the tools and the tactics cities need to make streets safer, more livable, and more economically vibrant.



### Transit Street Design Guide

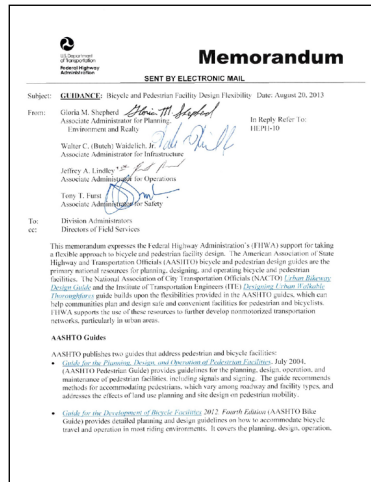
**Release Date:** April 2016**Author:** NACTO

**Keywords:** Transit Streets, Stations, Stops, Stop Elements, Transit Lanes, Intersections, Bicycle Rail Crossings, Shared Bus-Bike Lane, Vehicle Widths and Buffers, Bus Rapid Transit (BRT)

Summary: The Transit Street Design Guide provides guidance for the development of transit facilities on city streets, and for the design and engineering of city streets to prioritize transit, improve transit service quality, and support other goals related to transit. The guide has been developed on the basis of other design guidance, as well as city case studies, best practices in urban environments, research and evaluation of existing designs, and professional consensus. This book goes into detail about how bicycles and transit should interact. This book also mentions how to design a bus-bicycle lane.



# Resources for Transportation Professionals



## Memorandum: Bicycle and Pedestrian Facility Design Flexibility

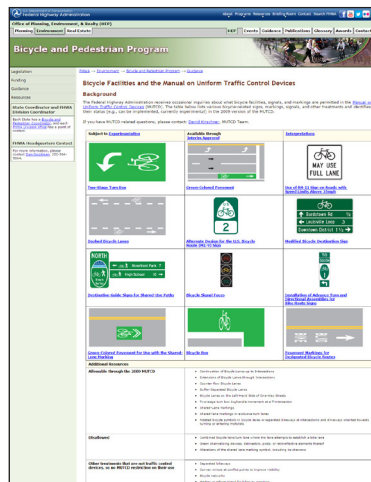
**Release Date:**

Aug. 20, 2013

**Author:** FHWA

**Keywords:** Bike, Bicycle, Pedestrian, Walking, Multimodal, Network, Shared Use Path, Sidewalk, Design Flexibility, AASHTO, NACTO, ITE, Planning

**Summary:** This memorandum expresses the Federal Highway Administration's (FHWA) support for taking a flexible approach to bicycle and pedestrian facility design. The American Association of State Highway and Transportation Officials (AASHTO) bicycle and pedestrian design guides are the primary national resources for planning, design and operating bicycle and pedestrian facilities. The National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide and the Institute of Transportation Engineers (ITE) Design Urban Walkable Thoroughfares Guide builds upon the flexibilities provided in the AASHTO guides that can help communities plan and design safe and convenient facilities for pedestrian and bicyclists.



## Bicycle Facilities and the Manual on Uniform Traffic Control Devices

**Release Date:**

Dec. 15, 2015 (FHWA may have updated this page since this document was prepared)

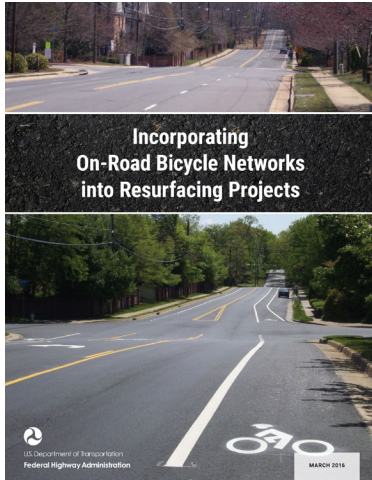
**Author:** NACTO

**Keywords:** Experimentation, Bicycle, MUTCD, Pavement Markings, Signals, Signs, Approval, Interim Approval

**Summary:** The Federal Highway Administration (FHWA) receives occasional inquiries about what new and innovative bicycle facilities, signals, and markings are permitted per the Manual on Uniform Traffic Control Devices (MUTCD). This online table/webpage lists various bicycle-related signs, markings, signals, and other treatments and identifies their status (e.g., can be implemented, currently experimental, disallowed) per the 2009 version of the MUTCD and subsequent interim approvals and interpretations.



## Resources for Transportation Professionals



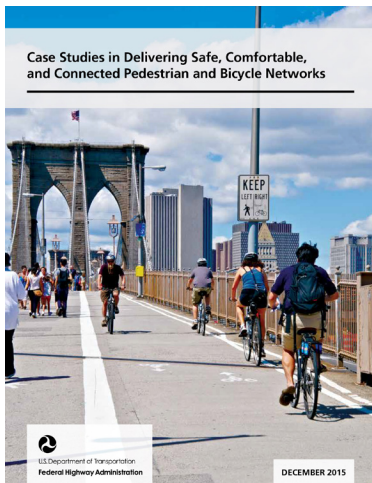
### Incorporating On-Road Bicycle Networks into Resurfacing Projects

**Release Date:** March 2016

**Author:** FHWA

**Keywords:** Bicycle, Bike, Bike Lane, Resurface, Road Diet

**Summary:** This report is a guide on how to incorporate bicycle infrastructure into a resurfacing project. This document highlights the resurfacing process and timelines, the methods for including bikeways, and the costs and the material considerations.



### Case Studies in Delivering Safe, Comfortable, and Connected Pedestrian and Bicycle Networks

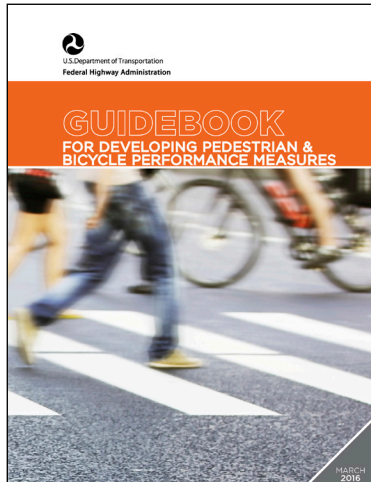
**Release Date:**  
December 2015

**Author:** FHWA

**Keywords:** Bicycle, Bike, Network, Pedestrian, Trail, Path, Connected, Comfortable, Case Study

**Summary:** This report provides an overview of pedestrian and bicycle network principles and highlights examples from communities across the country. The Appendix provides a complete listing of projects highlighted in the report and additional projects that were identified in the study process.

## Resources for Transportation Professionals



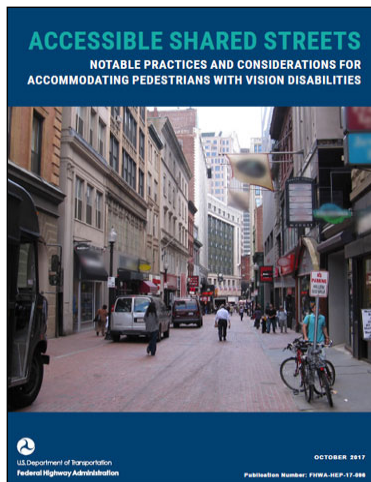
### Guidebook for Developing Pedestrian and Bicycle Performance Measures

**Release Date:** March 2016

**Author:** FHWA

**Keywords:** Pedestrian, Bicycle, Bike, Performance Measures, Active Transportation, Nonmotorized, Data Collection, Performance-Based Planning

**Summary:** This guidebook is intended to help communities develop performance measures that can fully integrate pedestrian and bicycle planning in ongoing performance management activities. It highlights a broad range of ways that walking and bicycling investments, activity, and impacts can be measured and documents how these measures relate to goals identified in a community's planning process. It discusses how the measures can be tracked and what data are required, while also identifying examples of communities that are currently using the respective measures in their planning process. This report highlights resources for developing measures to facilitate high-quality performance-based planning.



### Accessible Shared Streets: Notable Practices and Considerations for Accommodating Pedestrians with Vision Disabilities

**Release Date:** October 2017

**Author:** FHWA

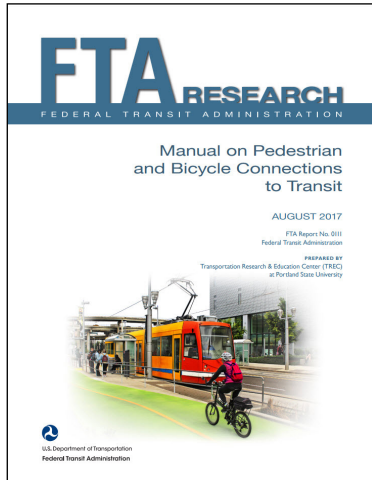
**Keywords:** Shared Street, Accessibility, Pedestrian, Walking, Bike, Bicycle, Design Flexibility, Planning, Design, Vision Disabilities

**Summary:** The guide includes a description of shared streets, an overview of vision disabilities and the strategies people with vision disabilities use to navigate in the public right-of-way. It discusses the specific challenges pedestrians with vision disabilities face when navigating shared streets. It provides an overview of relevant U.S. guidance, a toolbox of strategies for designing shared streets that improve accessibility for pedestrians with vision disabilities, and ideas on how accessibility for pedestrians with vision disabilities can be addressed in the planning and design process.

It provides information from case studies of completed shared streets in the United States that highlight accessibility features and lessons learned, as well as a bibliography that includes sources specifically referenced in the body of the guide and other sources that inspired the guide content and may be useful for shared street designers.



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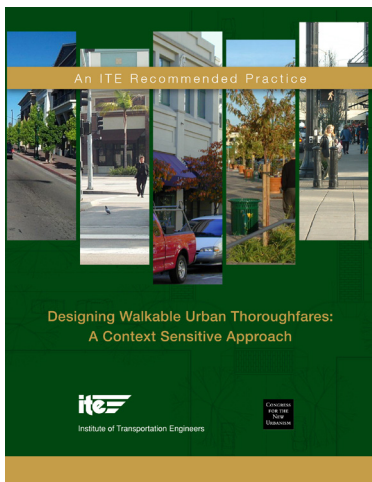
### Manual on Pedestrian and Bicycle Connections to Transit

**Release Date:** August 2017

**Author:** Federal Transit Administration

**Keywords:** Public Transportation, Transit, Pedestrians, Bicycle, Transit Connections, Pedestrian Safety, Bicycle Safety, Transit Access, Multimodal Networks

**Summary:** This manual provides a compendium of best practices to help transportation professionals improve pedestrian and bicycle safety and access to transit, including information on evaluating, planning for, and implementing improvements to pedestrian and bicycle access to transit. Topics covered include integrating bike share with transit and making bike share and transit more accessible to people who are unable to ride standard bicycles. The manual also features a detailed section on implementation that covers funding, marketing, interagency coordination, and data collection. Also included are references to existing guidance documents and information collected through a literature review, interviews with professionals, and three case studies of regions that are taking innovative approaches to integrating pedestrians and bicycles with transit; Atlanta, Los Angeles, and Minneapolis-St. Paul.



### Designing Walkable Urban Thoroughfares: A Context Sensitive Approach

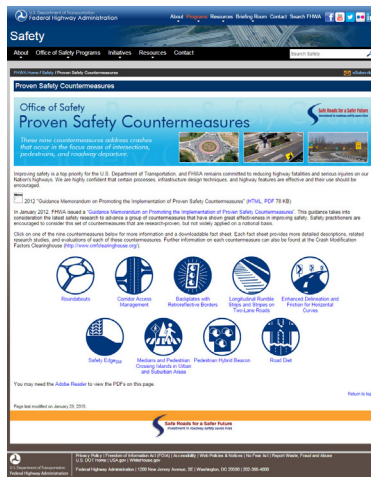
**Release Date:** 2010

**Author:** ITE

**Keywords:** Walkable, Intersections, Networks, Thoroughfare, Bicycle Lane, Curb Extensions, Pedestrian Treatments at Intersections, Bicycle Lanes at Intersections, Midblock Crossings

**Summary:** This report was developed in response to widespread interest for improving both mobility choices and community character through a commitment to creating and enhancing walkable communities. This report is from the engineer's point of view. It goes into detail about bicycle lanes, curb extensions, and treatments for both pedestrians and cyclists at intersections.

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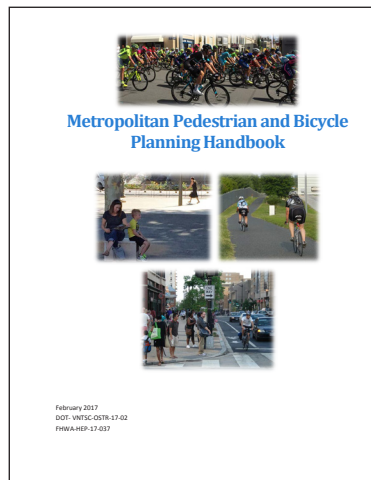
### FHWA Proven Safety Countermeasures

**Release Date:** Jan. 29, 2015  
(FHWA may have updated this page since this document was prepared)

**Author:** FHWA

**Keywords:** Medians, Pedestrian Crossing Islands, High-Intensity Activated crossWalk (HAWK), Road Diet

**Summary:** This document presents nine different safety countermeasures that have been documented to improve safety. Three of these countermeasures improve safety for bicyclists and pedestrians. They are medians and pedestrian crossing islands in urban and suburban areas, High-Intensity Activated crossWalk (HAWK), and road diets. This website presents information and detail on these safety countermeasures.



### Metropolitan Pedestrian and Bicycle Planning Handbook

**Release Date:**  
February 2017

**Author:** FHWA

**Keywords:** Nonmotorized transportation, metropolitan planning, pedestrian, bicycle planning, engaging, stakeholders, conditions, needs, setting priorities, travel patterns, MTP, TIP, funding, evaluation

**Summary:** The purpose of this handbook is to provide Metropolitan Planning Organizations (MPOs) with practical information and examples, as they consider pedestrian and bicycle transportation in their regional planning activities. This handbook covers integration of pedestrian and bicycle information into the metropolitan transportation planning process. Content includes engaging the public and stakeholders, Analyzing walking and bicycling conditions and needs, setting priorities, implementing projects and success stories.



## Resources for Transportation Professionals

## Pedestrian and Bicycle Funding Opportunities

[illegible]

Summary: This online table/webpage indicates potential eligibility for pedestrian and bicycle projects under USDOT surface transportation funding programs.

**Release Date/Last Updated:**  
Aug. 12, 2016 (FHWA may have  
updated this page since this  
document was prepared)

**Author:** FHWA

**Keywords:** Bicycle, bike, Pedestrian, Safety, Trail, Funding

# Bicycle Network Planning and Facility Design Approaches in the Netherlands and the United States



**Summary:** This report explores similarities and differences in the approach to bicycle network planning and facility design in the Netherlands and the United States. A very brief historical overview is provided as context for a discussion about bicycle planning and design approaches and physical infrastructure “on the ground,” as observed during a visit to the Netherlands in August 2015. Following a high-level discussion of respective design approaches, this report highlights four specific areas or themes (Prioritize Seamless and Efficient Bicycle Movement, Trust in Users in the Adaptability of the Transportation System, Design for the Behavior You Want to See, and Prioritize Network Connectivity) observed in practice in Holland that are applicable to transportation practice in the United States.

**Release Date:** April 2016

**Author:** FHWA

**Keywords:** Bicycle, Bike, Design, Planning, Netherlands

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### FHWA Guidance: Bicycle and Pedestrian Provisions of Federal Transportation Legislation

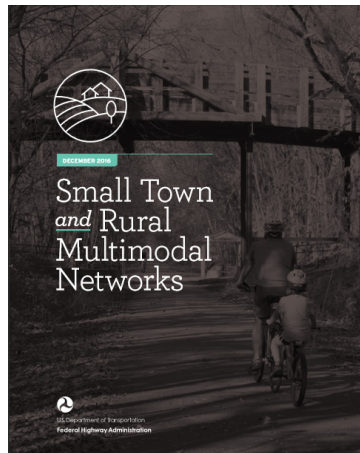
**Release Date:**  
Sept. 10, 2015

**Last Update:**  
Dec. 23, 2015

**Author:** FHWA

**Keywords:** Bicycle, Bike, Pedestrian, Project, funding, Legislation, Policy, ISTE, TEA-21, SAFETEA-LU, MAP-21, Title 23, Title 49

**Summary:** This webpage describes federal legislative and policy direction related to safety and accommodation for bicycling and walking. From the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 to the Moving Ahead for Progress in the 21st Century Act (MAP-21) of 2012, this webpage highlights the program changes regarding consideration and eligibility for bicycling and walking per federal transportation legislation. The statutory provisions affecting bicycling and walking are codified in titles 23 and 49 of the United States Code (U.S.C.). This document describes the range of opportunities to improve conditions for bicycling and walking. As of the date of the preparation of this document, the website did not include information on the FAST Act.



### Small Town and Rural Multimodal Networks

**Release Date:** Dec. 2016

**Author:** FHWA

**Keywords:** Bicycle, Bike, Pedestrian, Safety, Networks, Activity, Rural, Small Town, Multimodal, Nonmotorized, Planning, Bridge, School

**Summary:** The Small Town and Rural Multimodal Networks report is a resource and idea book intended to help small towns and rural communities support safe, accessible, comfortable, and active travel for people of all ages and abilities. It provides a bridge between existing guidance on bicycle and pedestrian design and rural practice, encourage innovation in the development of safe and appealing networks for bicycling and walking in small towns and rural areas, and show examples of peer communities and project implementation that is appropriate for rural communities.



## Resources for Transportation Professionals



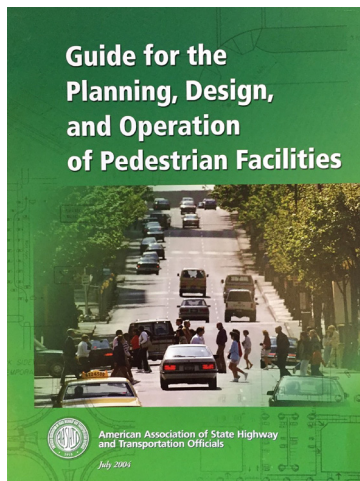
### FHWA Bicycle-Pedestrian Count Technology Pilot Project

**Release Date:** Dec. 2016

**Author:** FHWA

**Keywords:** Pedestrian and Bicycle, Count Programs, Baseline Data, Selecting and Installing Technology, Planning

**Summary:** This report summarizes the Federal Highway Administration (FHWA)'s one-year Bicycle-Pedestrian Count Technology Pilot Project. The purpose of the pilot project was to increase the organizational and technical capacity of Metropolitan Planning Organizations (MPOs) to establish and operate effective bicycle and pedestrian count programs, and to provide lessons learned for peer agencies across the country. FHWA selected ten MPOs from across the country to participate in the pilot, and this report highlights their experiences with identifying count locations; selecting and installing count technology; and collecting and using the count data. The report concludes with the key benefits and lessons learned by the MPOs throughout the course of the project.



### Guide for the Planning, Design, And Operation of Pedestrian Facilities (available for purchase)

**Release Date:** July 2004

**Author:** AASHTO

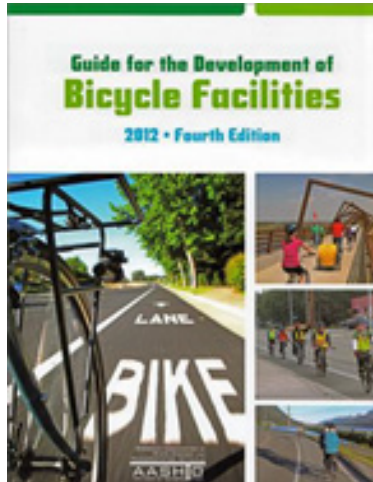
**Keywords:** Pedestrian, Bulb-Out, Crosswalk, Curb ramp, Detectable Warning, Path, Sidewalk, Woonerf

**Summary:** The purpose of this guide is to provide guidance on the planning, design, and operation of pedestrian facilities along streets and highways. Specifically, the guide focuses on identifying effective measures for accommodating pedestrians on public right of ways. Appropriate methods for accommodating pedestrians, which vary among roadway and facility types, are described in this guide. The primary audiences for this manual are planners, roadway designers, and transportation engineers, whether at the state or local levels, the majority of whom make decisions on a daily basis that affect pedestrians. This guide also recognizes the profound effect that land use planning and site design have on pedestrian mobility and addresses these topics as well.

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### [Guide for the Development of Bicycle Facilities](#) [\(available for purchase\)](#)

**Release Date:** 1999

**Last Updated:**  
4th Edition 2012

**Author:** AASHTO

**Keywords:** Bicycle Operation and Safety, Design of On-Road Facilities, Design of Shared Use Paths, Bicycle Parking Facilities, bicycle lanes

**Summary:** This guide provides information on how to accommodate bicycle travel and operations in most riding environments. It is intended to present sound guideline that result in facilities that meet the needs of bicyclists and other highway users. Sufficient flexibility is permitted to encourage designs that are sensitive to local context and incorporate the needs of bicyclists, pedestrians, and motorists. However, in some sections of this guide, suggested minimum dimensions are provided. These are recommended only where further deviation from desirable values could increase crash frequency or severity.

### For More Information

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*MDOT: Providing the highest quality integrated  
transportation services for economic benefit  
and improved quality of life.*

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