SMALL TOWN & RURAL MULTIMODAL NETWORKS

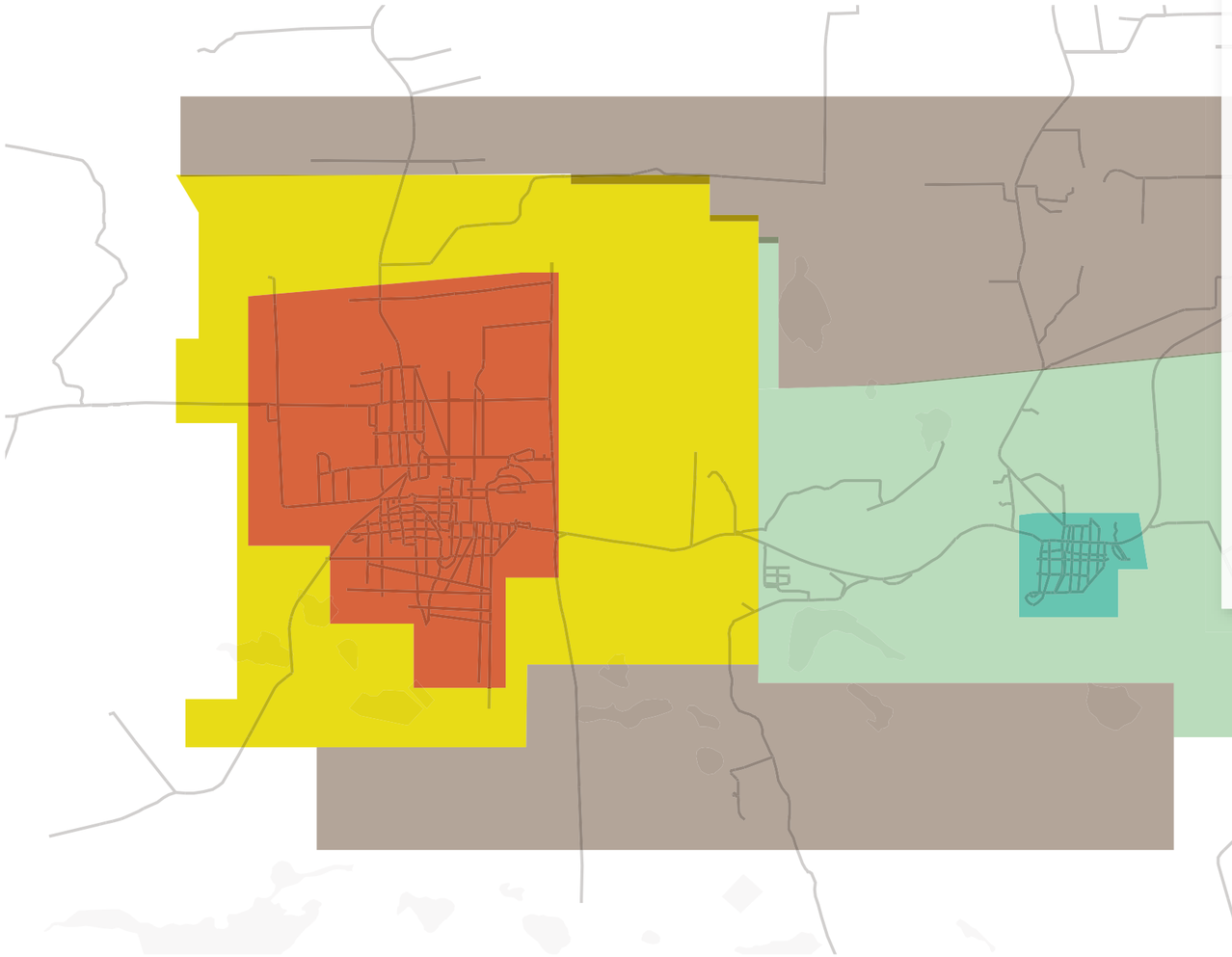
CREATING GREAT WALKING AND BICYCLING NETWORKS OUTSIDE OF URBAN AREAS

PHOTO: TAHOE REGIONAL PLANNING ASSOCIATION (TRPA)

UNIQUE NEEDS

DEMAND AND OPPORTUNITIES IN SMALL COMMUNITIES

RURAL PLACES



LARGE RURAL CORE
Rural towns of 10,000 to 50,000, often regional centers.

OUTER LARGE RURAL
Smaller Communities from which many people travel to Large Rural Core towns for work, shopping, services or school.

SMALL RURAL CORE
Towns of 2,500 to 10,000, often county seats.

OUTER SMALL RURAL
Smaller Communities from which many travel to Small Rural Core towns for work, shopping, services or school.

ISOLATED RURAL
Communities without strong economic and social links to a town of more than 2,500.

RURAL NEEDS

KEY ISSUES

LONGER NON-LOCAL TRIP DISTANCES

Rural trip distances have been increasing.

HEALTH DISPARITIES

Rural areas have higher rates of physical inactivity and chronic disease than urbanized areas.

HIGHER CRASH RATES

While only 17% of the population lives in rural areas, 58% of all fatal crashes and 60% of traffic fatalities were recorded in rural regions.

INCOME DISPARITIES

Urban households earn 32% more in yearly income than rural households.

RURAL NEEDS

OPPORTUNITIES

2 MILES

ALLENDALE, SC

Population 3,328

2 MILES

PALMER, AK

Population 6,250

1.3 MILES

RUSHFORD, MN

Population 2,102

2.3 MILES

UKIAH, CA

Population 15,956

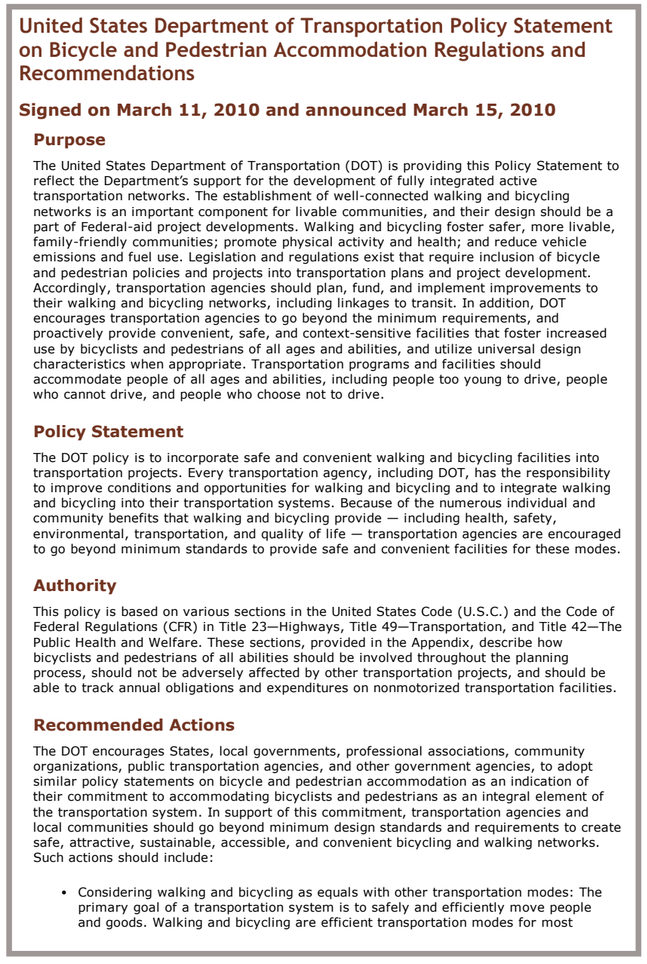
FLEXIBILITY IN FACILITY DESIGN

EMERGING FLEXIBILITY IN ROADWAY DESIGN

2010 FHWA POLICY STATEMENT

"Walking and bicycling foster safer, more livable, family-friendly communities; promote physical activity and health; and reduce vehicle emissions and fuel use. "

"… DOT encourages transportation agencies to go beyond the minimum requirements, and proactively provide convenient, safe, and context-sensitive facilities that foster increased use by bicyclists and pedestrians of all ages and abilities…"



United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations

Signed on March 11, 2010 and announced March 15, 2010

Purpose

The United States Department of Transportation (DOT) is providing this Policy Statement to reflect the Department's support for the development of fully integrated active transportation networks. The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments. Walking and bicycling foster safer, more livable, family-friendly communities; promote physical activity and health; and reduce vehicle emissions and fuel use. Legislation and regulations exist that require inclusion of bicycle and pedestrian policies and projects into transportation plans and project development. Accordingly, transportation agencies should plan, fund, and implement improvements to their walking and bicycling networks, including linkages to transit. In addition, DOT encourages transportation agencies to go beyond the minimum requirements, and proactively provide convenient, safe, and context-sensitive facilities that foster increased use by bicyclists and pedestrians of all ages and abilities, and utilize universal design characteristics when appropriate. Transportation programs and facilities should accommodate people of all ages and abilities, including people too young to drive, people who cannot drive, and people who choose not to drive.

Policy Statement

The DOT policy is to incorporate safe and convenient walking and bicycling facilities into transportation projects. Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems. Because of the numerous individual and community benefits that walking and bicycling provide — including health, safety, environmental, transportation, and quality of life — transportation agencies are encouraged to go beyond minimum standards to provide safe and convenient facilities for these modes.

Authority

This policy is based on various sections in the United States Code (U.S.C.) and the Code of Federal Regulations (CFR) in Title 23—Highways, Title 49—Transportation, and Title 42—The Public Health and Welfare. These sections, provided in the Appendix, describe how bicyclists and pedestrians of all abilities should be involved throughout the planning process, should not be adversely affected by other transportation projects, and should be able to track annual obligations and expenditures on nonmotorized transportation facilities.

Recommended Actions

The DOT encourages States, local governments, professional associations, community organizations, public transportation agencies, and other government agencies, to adopt similar policy statements on bicycle and pedestrian accommodation as an indication of their commitment to accommodating bicyclists and pedestrians as an integral element of the transportation system. In support of this commitment, transportation agencies and local communities should go beyond minimum design standards and requirements to create safe, attractive, sustainable, accessible, and convenient bicycling and walking networks. Such actions should include:

- Considering walking and bicycling as equals with other transportation modes: The primary goal of a transportation system is to safely and efficiently move people and goods. Walking and bicycling are efficient transportation modes for most

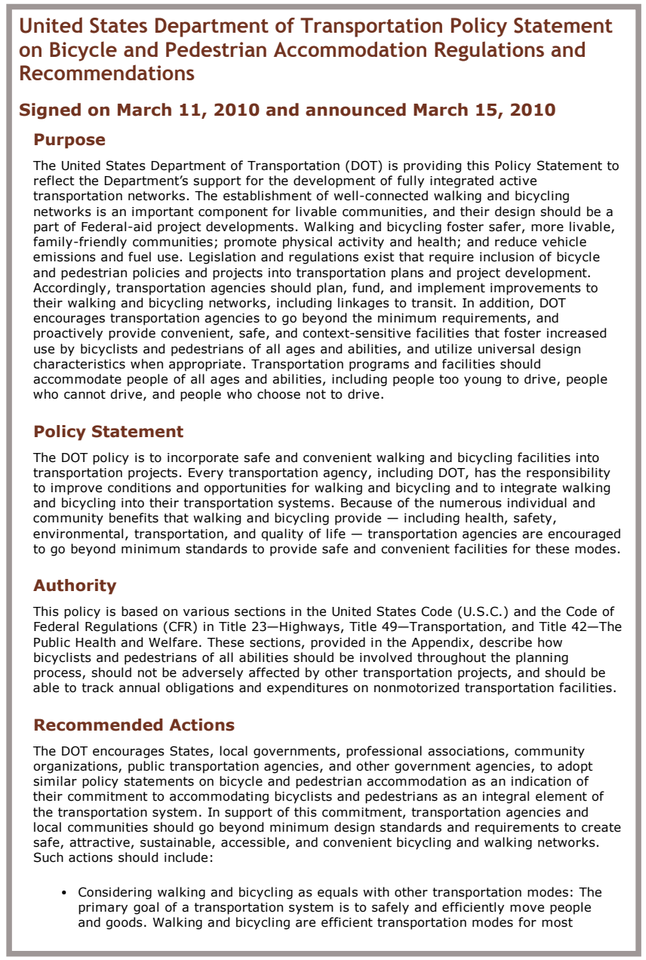
FHWA. *United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations.* 2010.

THE CONTEXT

2010 FHWA POLICY STATEMENT

"Walking and bicycling foster safer, more livable, family-friendly communities; promote physical activity and health; and reduce vehicle emissions and fuel use. "

"… DOT encourages transportation agencies to go beyond the minimum requirements, and proactively provide convenient, safe, and context-sensitive facilities that foster increased use by bicyclists and pedestrians of all ages and abilities…"



United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations

Signed on March 11, 2010 and announced March 15, 2010

Purpose

The United States Department of Transportation (DOT) is providing this Policy Statement to reflect the Department's support for the development of fully integrated active transportation networks. The establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments. Walking and bicycling foster safer, more livable, family-friendly communities; promote physical activity and health; and reduce vehicle emissions and fuel use. Legislation and regulations exist that require inclusion of bicycle and pedestrian policies and projects into transportation plans and project development. Accordingly, transportation agencies should plan, fund, and implement improvements to their walking and bicycling networks, including linkages to transit. In addition, DOT encourages transportation agencies to go beyond the minimum requirements, and proactively provide convenient, safe, and context-sensitive facilities that foster increased use by bicyclists and pedestrians of all ages and abilities, and utilize universal design characteristics when appropriate. Transportation programs and facilities should accommodate people of all ages and abilities, including people too young to drive, people who cannot drive, and people who choose not to drive.

Policy Statement

The DOT policy is to incorporate safe and convenient walking and bicycling facilities into transportation projects. Every transportation agency, including DOT, has the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems. Because of the numerous individual and community benefits that walking and bicycling provide — including health, safety, environmental, transportation, and quality of life — transportation agencies are encouraged to go beyond minimum standards to provide safe and convenient facilities for these modes.

Authority

This policy is based on various sections in the United States Code (U.S.C.) and the Code of Federal Regulations (CFR) in Title 23—Highways, Title 49—Transportation, and Title 42—The Public Health and Welfare. These sections, provided in the Appendix, describe how bicyclists and pedestrians of all abilities should be involved throughout the planning process, should not be adversely affected by other transportation projects, and should be able to track annual obligations and expenditures on nonmotorized transportation facilities.

Recommended Actions

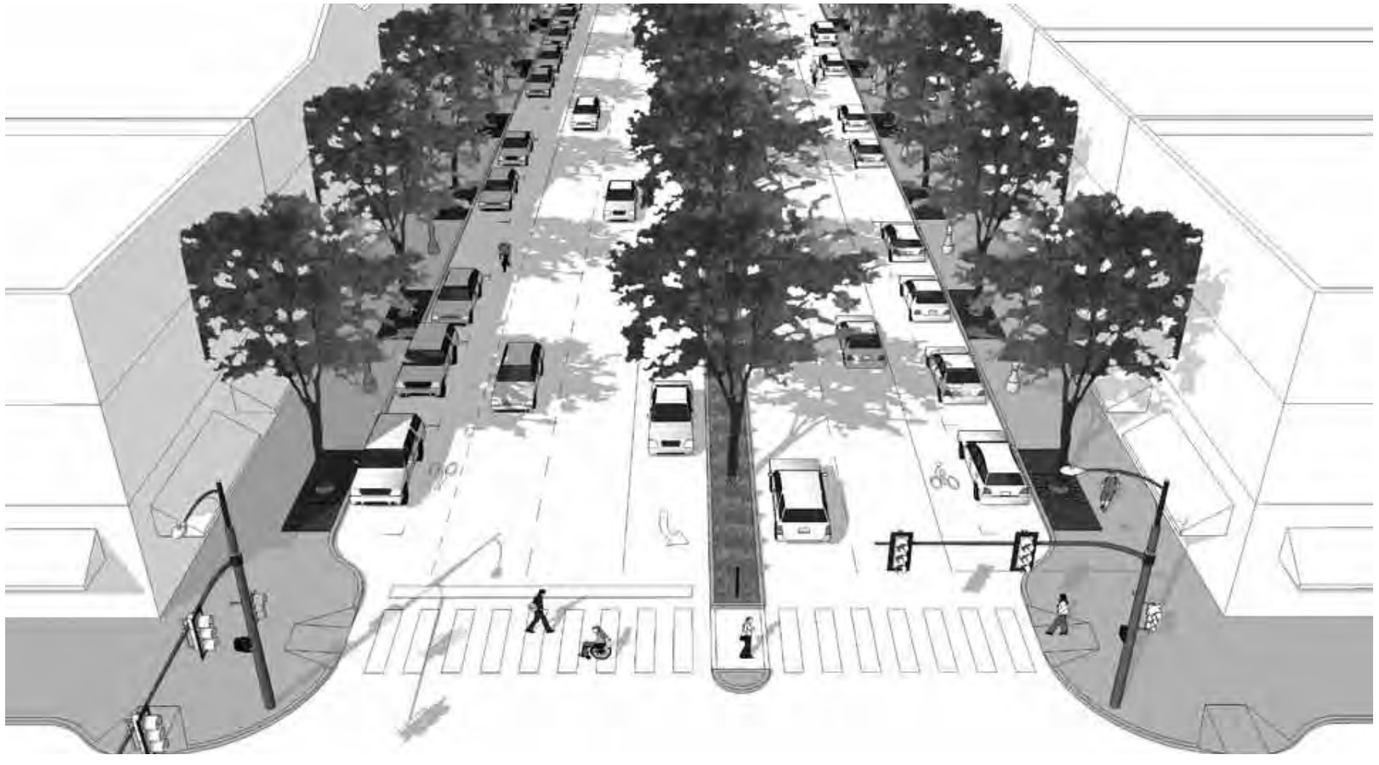
The DOT encourages States, local governments, professional associations, community organizations, public transportation agencies, and other government agencies, to adopt similar policy statements on bicycle and pedestrian accommodation as an indication of their commitment to accommodating bicyclists and pedestrians as an integral element of the transportation system. In support of this commitment, transportation agencies and local communities should go beyond minimum design standards and requirements to create safe, attractive, sustainable, accessible, and convenient bicycling and walking networks. Such actions should include:

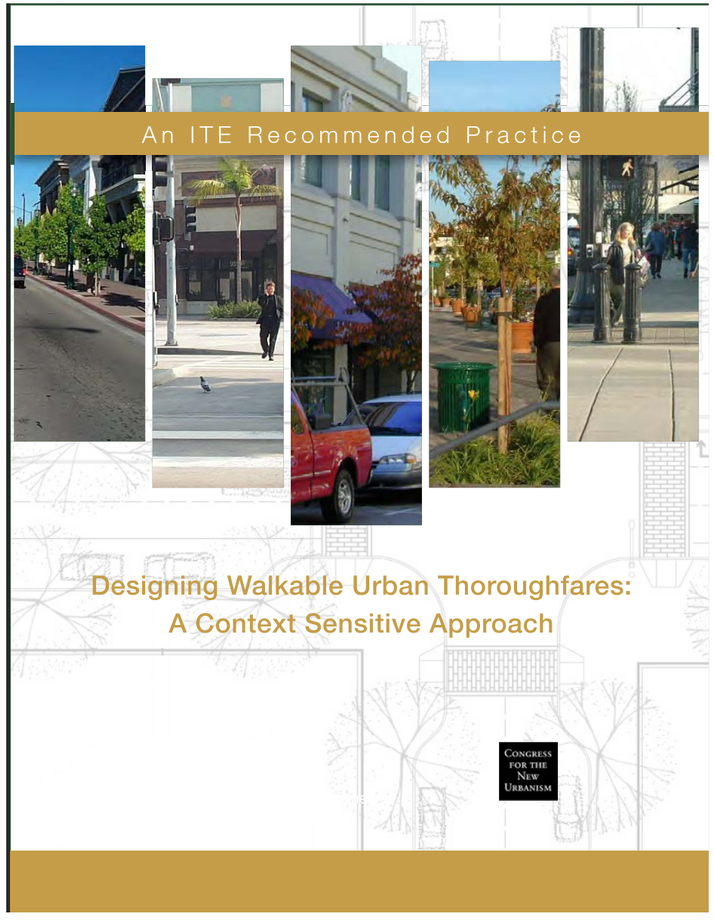
- Considering walking and bicycling as equals with other transportation modes: The primary goal of a transportation system is to safely and efficiently move people and goods. Walking and bicycling are efficient transportation modes for most

FHWA. *United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations.* 2010.

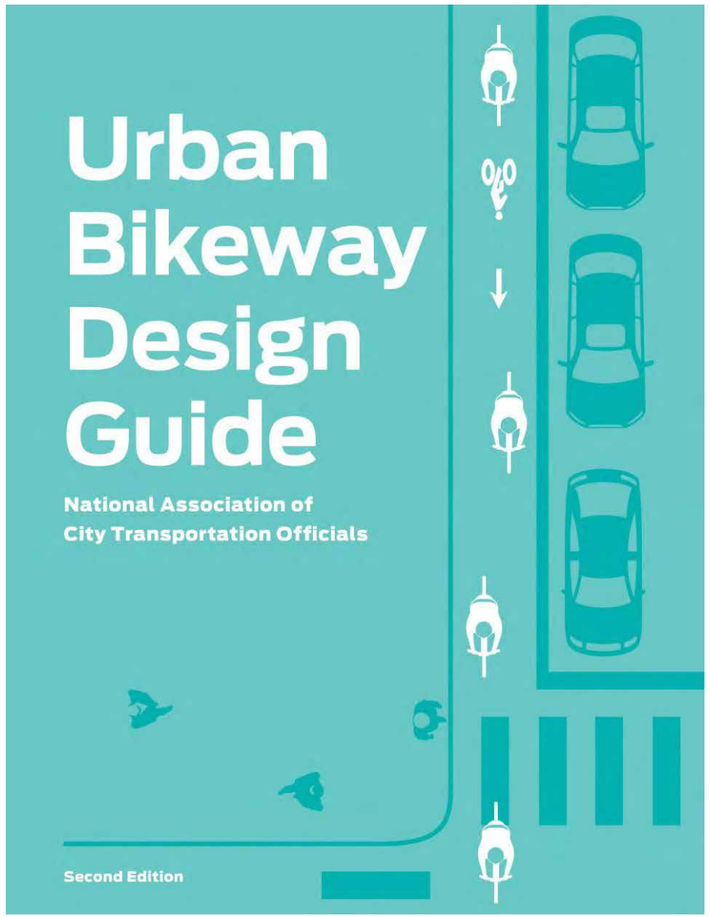
THE CONTEXT

ITE DESIGNING WALKABLE URBAN THOROUGHFARES



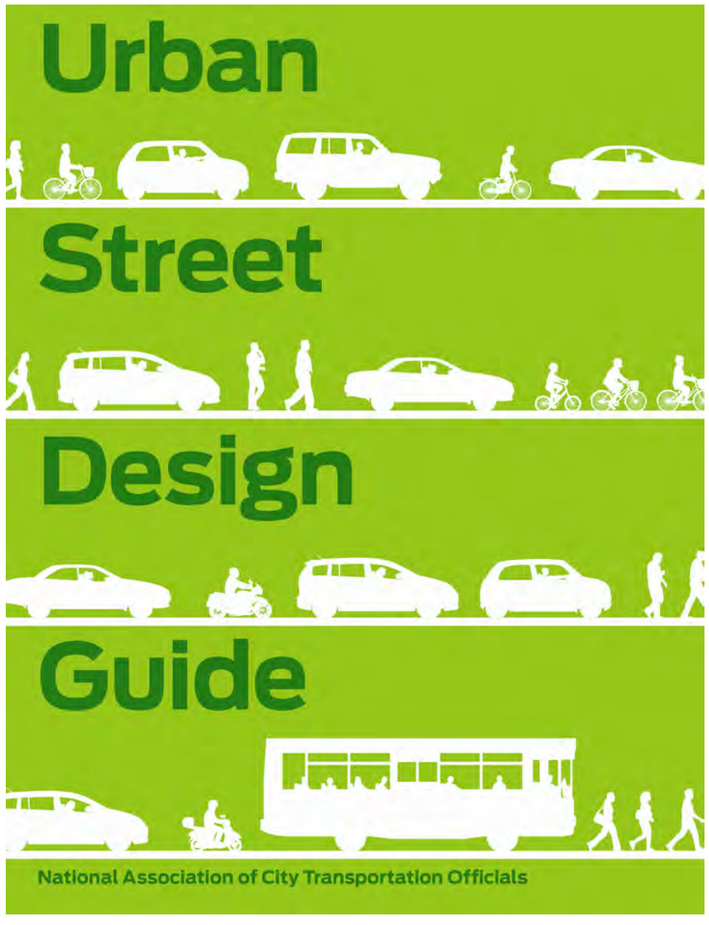


NACTO URBAN BIKEWAY DESIGN GUIDE



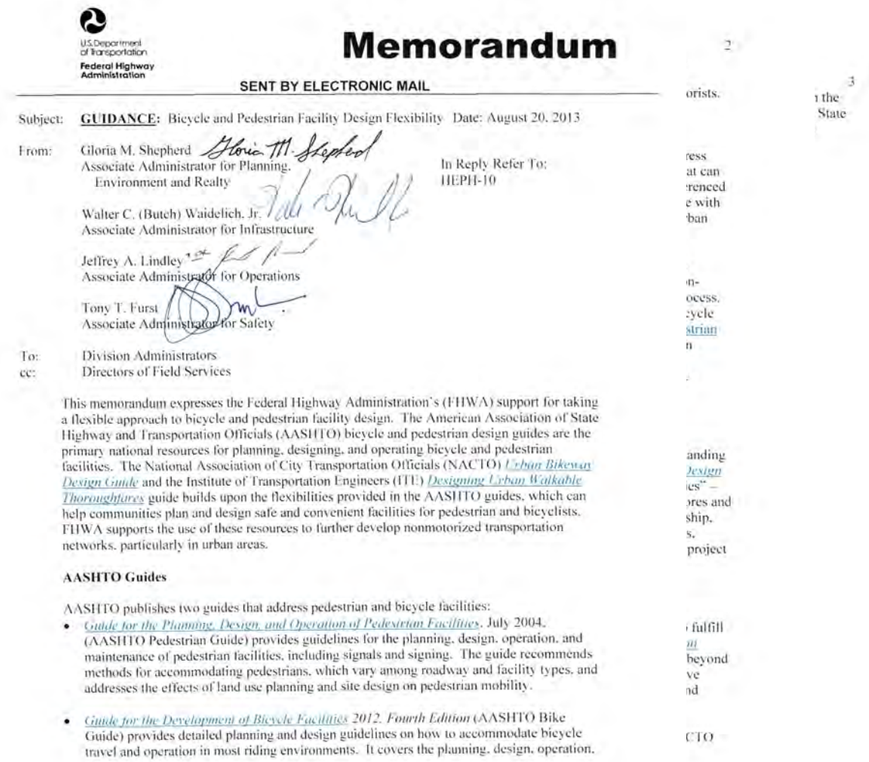
THE CONTEXT

NACTO URBAN STREET DESIGN GUIDE



FHWA DESIGN FLEXIBILITY

FHWA supports "taking a flexible approach to bicycle and pedestrian facility design. … The National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide, [the Urban Street Design Guide,] and the Institute of Transportation Engineers (ITE) Designing Walkable Urban Thoroughfares guide builds upon the flexibilities provided in the AASHTO guides, which can help communities plan and design safe and convenient facilities for pedestrian and bicyclists. FHWA supports the use of these resources to further develop nonmotorized transportation networks, particularly in urban areas."



U.S. Department of Transportation
Federal Highway Administration

Memorandum

SENT BY ELECTRONIC MAIL

Subject: **GUIDANCE:** Bicycle and Pedestrian Facility Design Flexibility Date: August 20, 2013

From: Gloria M. Shepherd
Associate Administrator for Planning, Environment and Realty

In Reply Refer To: HEPH-10

Walter C. (Butch) Waidelich, Jr.
Associate Administrator for Infrastructure

Jeffrey A. Lindley
Associate Administrator for Operations

Tony T. Furst
Associate Administrator for Safety

To: Division Administrators
cc: Directors of Field Services

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, designing, 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) *Designing Urban Walkable Thoroughfares* guide builds upon the flexibilities provided in the AASHTO guides, which can help communities plan and design safe and convenient facilities for pedestrian and bicyclists. FHWA supports the use of these resources to further develop nonmotorized transportation networks, particularly in urban areas.

AASHTO Guides

AASHTO publishes two guides that address pedestrian and bicycle facilities:

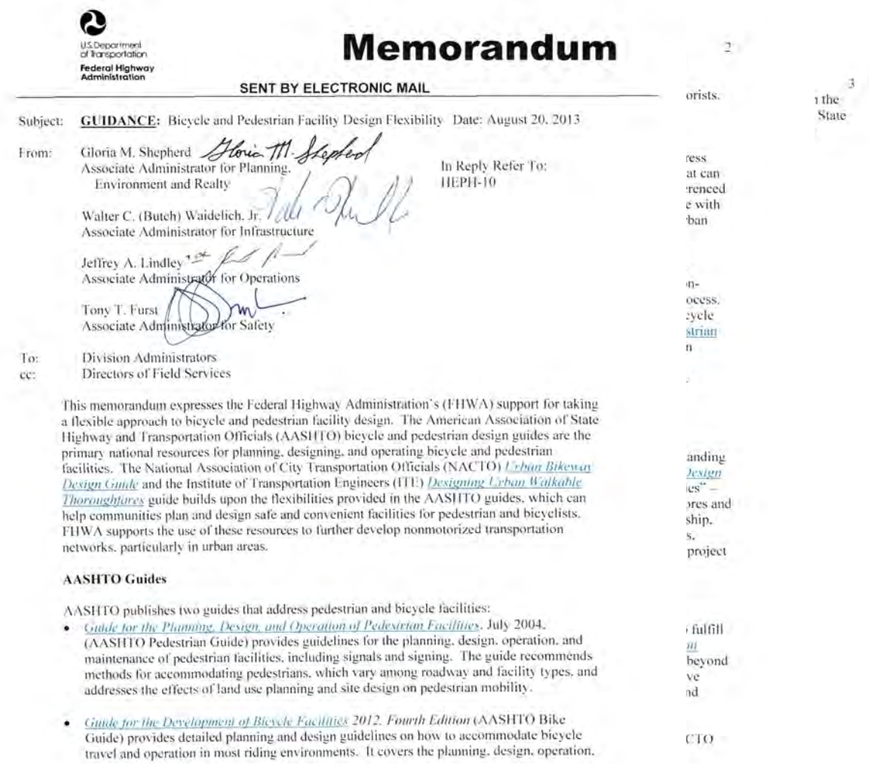
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, July 2004. (AASHTO Pedestrian Guide) provides guidelines for the planning, design, operation, and maintenance of pedestrian facilities, including signals and signing. The guide recommends methods for accommodating pedestrians, which vary among roadway and facility types, and addresses the effects of land use planning and site design on pedestrian mobility.
- *Guide for the Development of Bicycle Facilities 2012, Fourth Edition* (AASHTO Bike Guide) provides detailed planning and design guidelines on how to accommodate bicycle travel and operation in most riding environments. It covers the planning, design, operation,

FHWA. *Bicycle and Pedestrian Facility Design Flexibility.* 2013.

THE CONTEXT

FHWA DESIGN FLEXIBILITY

FHWA supports "taking a flexible approach to bicycle and pedestrian facility design. … The National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide, [the Urban Street Design Guide,] and the Institute of Transportation Engineers (ITE) Designing Walkable Urban Thoroughfares guide builds upon the flexibilities provided in the AASHTO guides, which can help communities plan and design safe and convenient facilities for pedestrian and bicyclists. FHWA supports the use of these resources to further develop nonmotorized transportation networks, particularly in urban areas."



U.S. Department of Transportation
Federal Highway Administration

Memorandum

SENT BY ELECTRONIC MAIL

Subject: **GUIDANCE:** Bicycle and Pedestrian Facility Design Flexibility Date: August 20, 2013

From: Gloria M. Shepherd
Associate Administrator for Planning, Environment and Realty

In Reply Refer To: HEPH-10

Walter C. (Butch) Waidelich, Jr.
Associate Administrator for Infrastructure

Jeffrey A. Lindley
Associate Administrator for Operations

Tony T. Furst
Associate Administrator for Safety

To: Division Administrators
cc: Directors of Field Services

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, designing, 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) *Designing Urban Walkable Thoroughfares* guide builds upon the flexibilities provided in the AASHTO guides, which can help communities plan and design safe and convenient facilities for pedestrian and bicyclists. FHWA supports the use of these resources to further develop nonmotorized transportation networks, particularly in urban areas.

AASHTO Guides

AASHTO publishes two guides that address pedestrian and bicycle facilities:

- *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, July 2004. (AASHTO Pedestrian Guide) provides guidelines for the planning, design, operation, and maintenance of pedestrian facilities, including signals and signing. The guide recommends methods for accommodating pedestrians, which vary among roadway and facility types, and addresses the effects of land use planning and site design on pedestrian mobility.
- *Guide for the Development of Bicycle Facilities 2012, Fourth Edition* (AASHTO Bike Guide) provides detailed planning and design guidelines on how to accommodate bicycle travel and operation in most riding environments. It covers the planning, design, operation,

FHWA. *Bicycle and Pedestrian Facility Design Flexibility.* 2013.


ONLY
BUS


TURNING
VEHICLES
STOP
TO
P
TWO HOUR
PARKING
7:00AM-6:30PM
ZONE 2 PERMIT
NO
CLEANING

THE GUIDE TO

SMALL TOWN & RURAL MULTIMODAL NETWORKS

THE GUIDE

FUNDING

Blue Cross Blue Shield of Minnesota – Center for Prevention

Federal Highway Administration Cooperative Agreement

NOTICE: the following project is a work in progress. The contents are under review and revision by project partners and are subject to change.

PROJECT GOALS

This document brings together ideas and visualizations of applying the latest multimodal facility design to a rural and small town context. It provides case study examples for all treatments and touches on critical topics related to working in rural communities and building rural transportation networks.

- **Provide a bridge** between existing guidance on bicycle and pedestrian design and rural practice.
- **Encourage innovation** in development of safe and appealing networks for bicycling and walking in small towns and rural areas.
- **Provide examples of peer communities** and project implementation that is appropriate for rural communities.

FOCUS ON FACILITIES TO COMPLETE NETWORKS

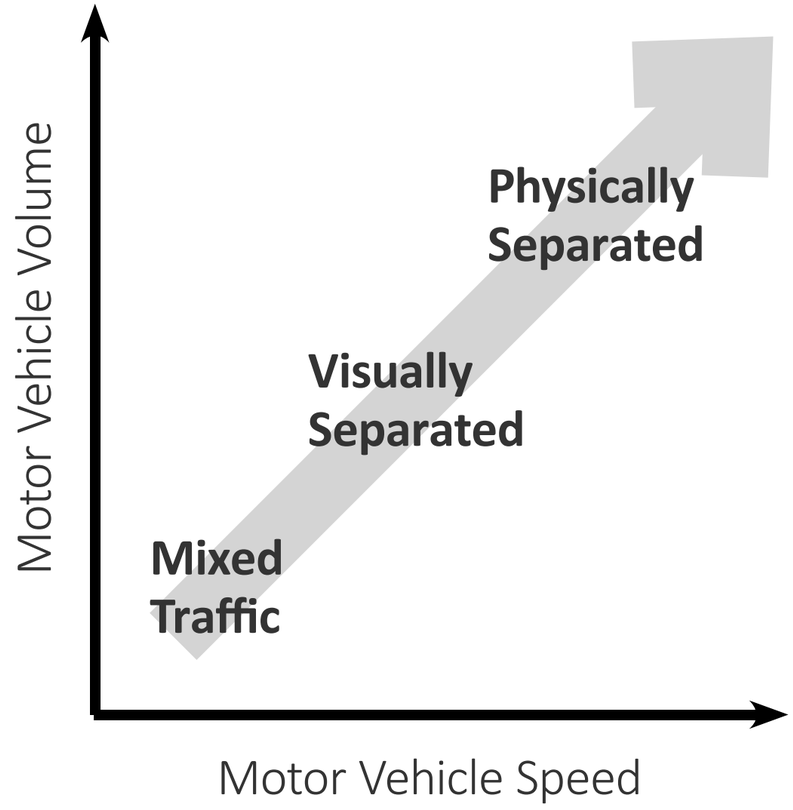
Networks are interconnected pedestrian and/or bicycle transportation facilities that allow people of all ages and abilities to safely and conveniently get where they want to go.

Facility Categories:

» Mixed Traffic

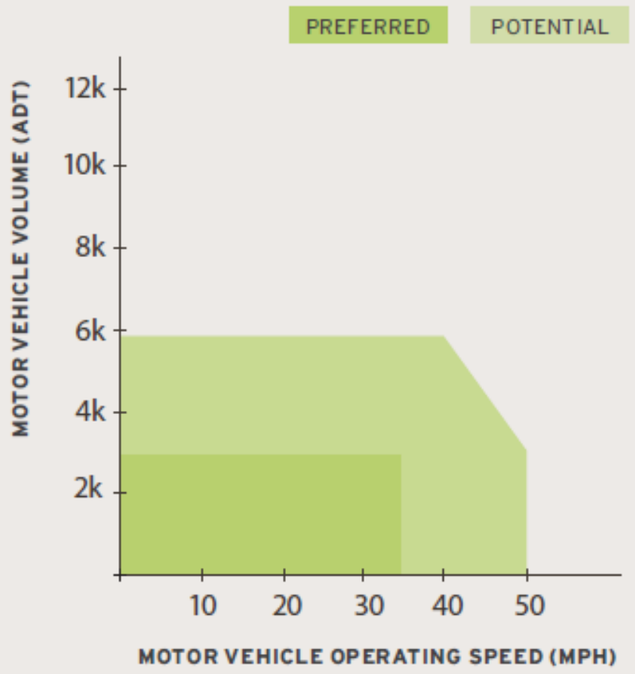
» Visually Separated

» Physically Separated



Speed and Volume

Most appropriate on streets with low to moderate volumes and moderate speed motor vehicles. [iiii ii]



Network

Applies to constrained connections between built up areas.

	LOCAL	COLLECTOR		ARTERIAL
Class	○	●	●	●	○

Land Use

For use outside, between and within built up areas with bicycle and pedestrian demand and limited available paved roadway surface.

Visual

Supports rural visual aesthetics through reduced paved surface requirements and minimal pavement marking.

Natural

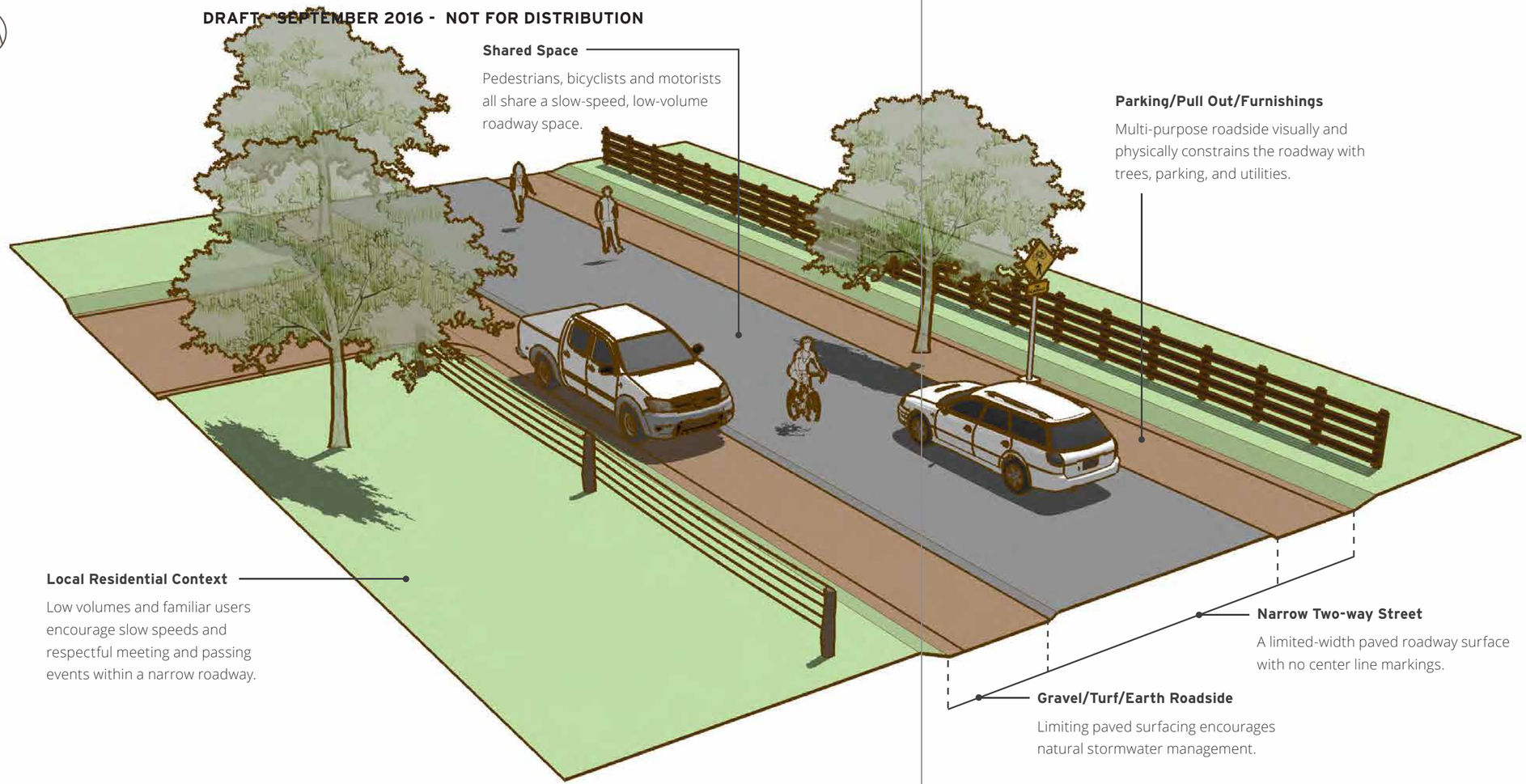
Supports the natural environment through reduced paved surface requirements.

	LOW		MODERATE		HIGH
Impact	●	○	○	○	○

THE GUIDE

MIXED TRAFFIC

- Yield Roadway
- Bicycle Boulevard
- Advisory Shoulder



Yield Roadway

A yield roadway is designed to serve pedestrians, bicyclists, and motor vehicle traffic in the same slow speed travel area. Yield roadways serve bidirectional motor vehicle traffic without lane markings in the roadway travel area.

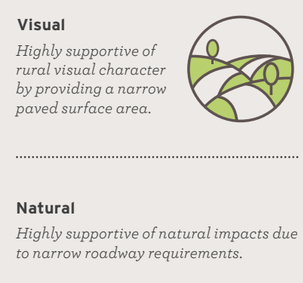
BENEFITS

- Less costly to build and/or maintain than fully paved cross sections.
- Connects local residential areas to destinations on the network.
- Reduces impermeable surface area and minimizes stormwater runoff.
- Maintains aesthetic preferences of narrow roads and uncurbed road edges.
- Encourages slow travel speed when narrower than 20 ft (6.0 m).
- Can support a larger tree canopy when located within wide unpaved roadside areas.
- Supports on-street or shoulder parking for property access.
- Low maintenance needs over time.

APPLICATION

Speed and Volume

Appropriate on roads with very-low volumes' and low speed.



Network

Local residential roadways. Not for through motor vehicle travel.

Land Use

Within built up areas, particularly near residential land uses where most traffic is familiar with prevailing road conditions.

Visual

Highly supportive of rural visual character by providing a narrow paved surface area.

Natural

Highly supportive of natural impacts due to narrow roadway requirements.

MANZANITA, OR

POPULATION 3,000 (Seasonal)

Traffic Calming

Horizontal and vertical deflection manages motorist speeds.

Route Markings

Markings identify proper positioning within the roadway, and alert all users to bicyclist presence.

Route Signs

Signs clearly identify and guide users along the local street bikeway alignment.

Bicycle Priority

Traffic control at minor intersections favor through travel by bicyclists.

Sidewalk

Separated pedestrian accomodations may be necessary as roadway speeds and volumes increase.

Shared Roadway

Bicyclists and motorists share the same roadway space and operate at similar speeds.

Bicycle Boulevard

A bicycle boulevard is a low-stress shared roadway bicycle facility, designed to offer priority for bicyclists operating within a roadway shared with motor vehicle traffic.

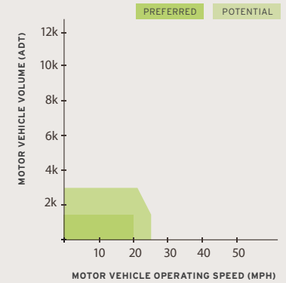
BENEFITS

- Increases comfort for people walking and biking by reducing motor vehicle operating speeds and volumes, if diversion is included.
- Connects local residential roads to commercial corridors and community services such as schools.
- Improves conditions for pedestrians when implemented with sidewalks and enhanced pedestrian crossings.
- May reduce the incidence of serious injuries through reduced travel speeds.
- Improves the quality of life for residents through calmer traffic and safer crossings.

APPLICATION

Speed and Volume

Appropriate on local streets with low volumes and low speed. Speed and volume management may be necessary to create desired operating conditions.



Network

Local residential roadways. Not for through motor vehicle travel.

Land Use

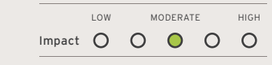
For use inside of built up areas to connect biking and walking routes in small town street networks.

Visual

Less visually impactful than separated facilities.

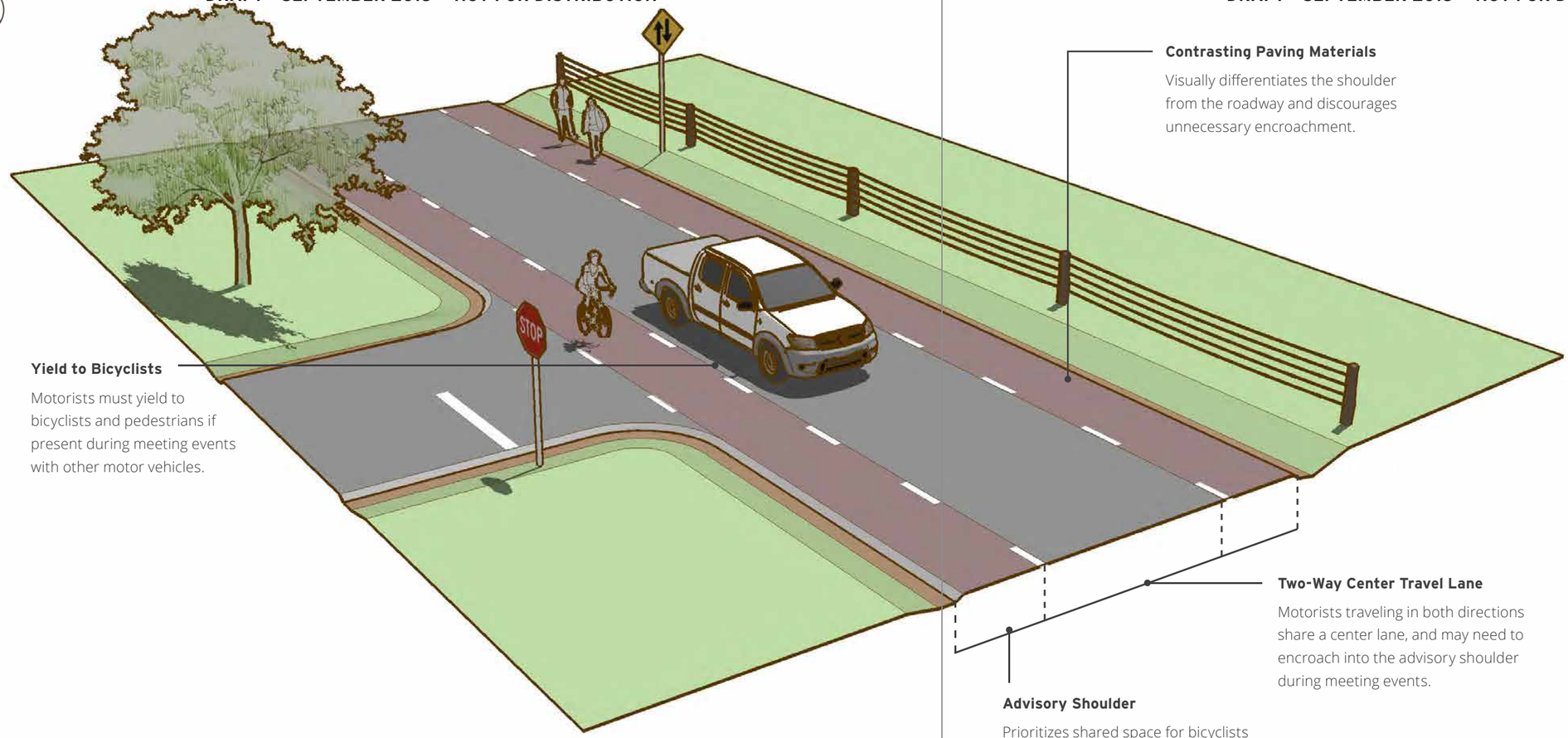
Natural

May require additional paved surface to provide sidewalk space for pedestrians.



OCEAN CITY, NJ

POPULATION 11,400



Yield to Bicyclists

Motorists must yield to bicyclists and pedestrians if present during meeting events with other motor vehicles.

Contrasting Paving Materials

Visually differentiates the shoulder from the roadway and discourages unnecessary encroachment.

Two-Way Center Travel Lane

Motorists traveling in both directions share a center lane, and may need to encroach into the advisory shoulder during meeting events.

Advisory Shoulder

Prioritizes shared space for bicyclists and occasional pedestrian travel.

Advisory Shoulders

Advisory shoulders create usable shoulders for bicyclists and occasional pedestrians on a roadway that is otherwise too narrow to accommodate one. The shoulder is delineated by pavement marking and optional pavement color. Motorists may only enter the shoulder when no bicyclists or pedestrians are present and must overtake these users with caution due to potential oncoming traffic.

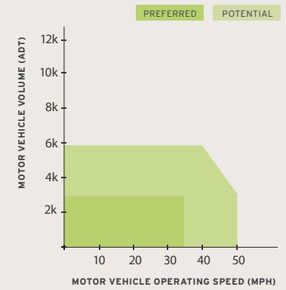
BENEFITS

- Provides a delineated but nonexclusive space available for walking and biking on a roadway otherwise too narrow for dedicated shoulders.
- May reduce some types of crashes due to reduced motor vehicle travel speeds. [i]
- Minimizes potential impacts to visual or natural resources through efficient use of existing space.
- Increases predictability and clarifies desired lateral positioning between people bicycling or walking and people driving in a narrow roadway.
- Functions well within a rural and small town traffic and land use context.
- May function as an interim measure where plans include shoulder widening in the future.

APPLICATION

Speed and Volume

Most appropriate on streets with low to moderate volumes and moderate speed motor vehicles. [ii] [iii]



Network

Applies to constrained connections between built up areas.

Land Use

For use outside, between and within built up areas with bicycle and pedestrian demand and limited available paved roadway surface.

Visual

Supports rural visual aesthetics through reduced paved surface requirements and minimal pavement marking.

Natural

Supports the natural environment through reduced paved surface requirements.

HANOVER, NH

POPULATION 11,000

BLOOMINGTON, IN

EDINA, MN

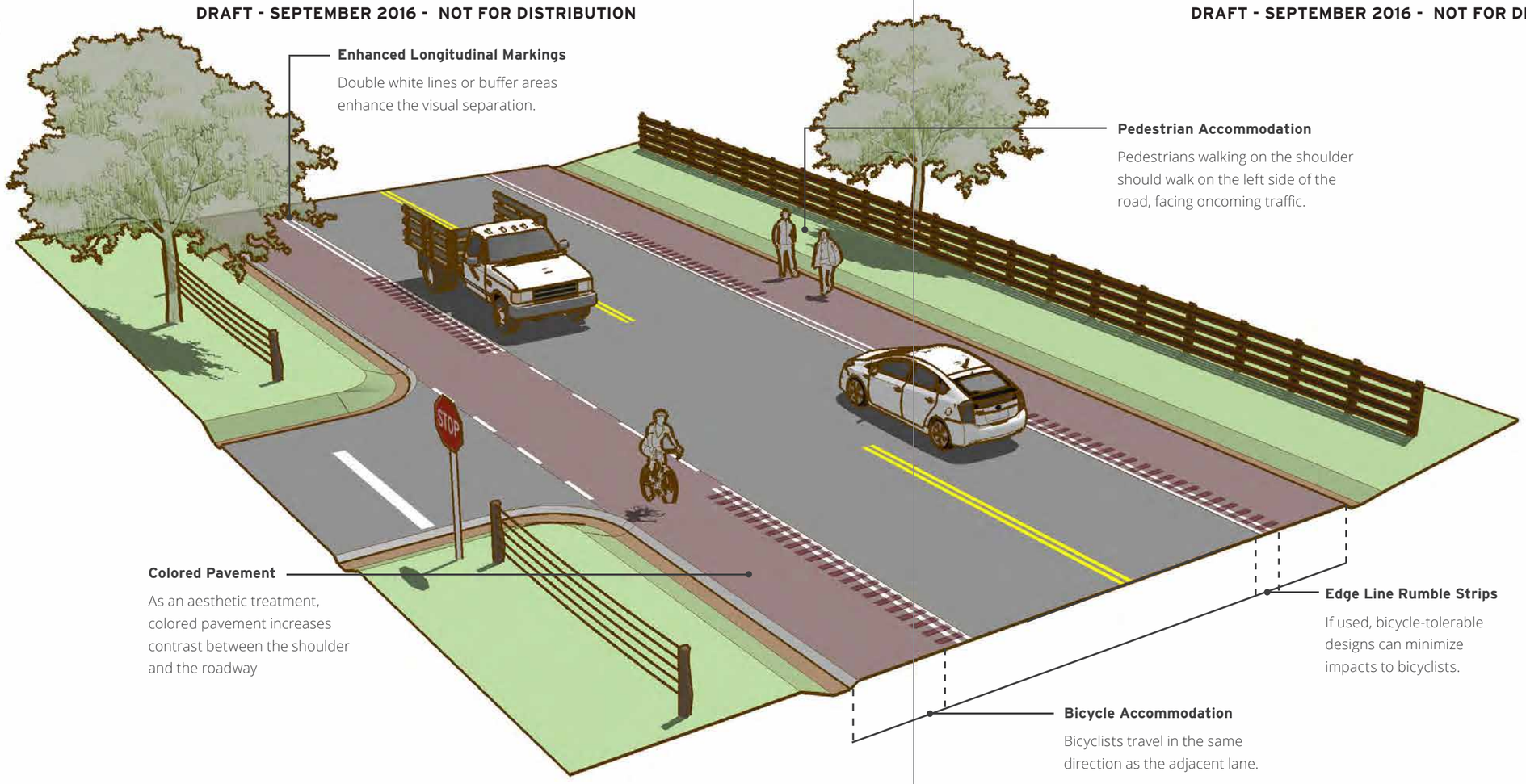
POPULATION 49,300

THE GUIDE

VISUALLY SEPARATED

- Shoulders
- Bike Lanes
- Pedestrian Lanes

DRAFT - SEPTEMBER 2016 - NOT FOR DISTRIBUTION



Enhanced Longitudinal Markings

Double white lines or buffer areas enhance the visual separation.

Pedestrian Accommodation

Pedestrians walking on the shoulder should walk on the left side of the road, facing oncoming traffic.

Colored Pavement

As an aesthetic treatment, colored pavement increases contrast between the shoulder and the roadway

Edge Line Rumble Strips

If used, bicycle-tolerable designs can minimize impacts to bicyclists.

Bicycle Accommodation

Bicyclists travel in the same direction as the adjacent lane.

Paved Shoulder

Paved shoulders on the edge of roadways can be enhanced to serve as a functional space for bicyclists and pedestrians to travel in the absence of other facilities with more separation.

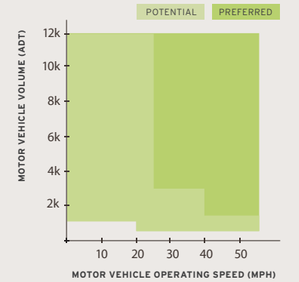
BENEFITS

- Improves bicyclist experiences on roadways with higher speeds or traffic volumes.
- Provides a stable surface off the roadway for pedestrians and bicyclists to use when sidewalks are not provided.
- Reduces pedestrian "walking along roadway" crashes.
- Can reduce "bicyclist struck from behind" crashes, which represent a significant portion of rural road crashes.
- Provides advantages for all roadway users, by providing space for bicyclists and pedestrians, as well as a benefit to drivers of motor vehicles.

APPLICATION

Speed and Volume

Appropriate on roads with moderate to high volumes and speeds and on roadways with a large amount of truck traffic. May function on multi-lane roads with heavy traffic, but fails to provide a low-stress experience in this condition.



Network

Serves long-distance and regional travel.

Land Use

Appropriate outside and between built up areas. Near school zones and transit locations, and where there is expected pedestrian and bicycle activity. Walkable shoulders should be provided along both sides of county roads and highways routinely used by pedestrians.

Visual

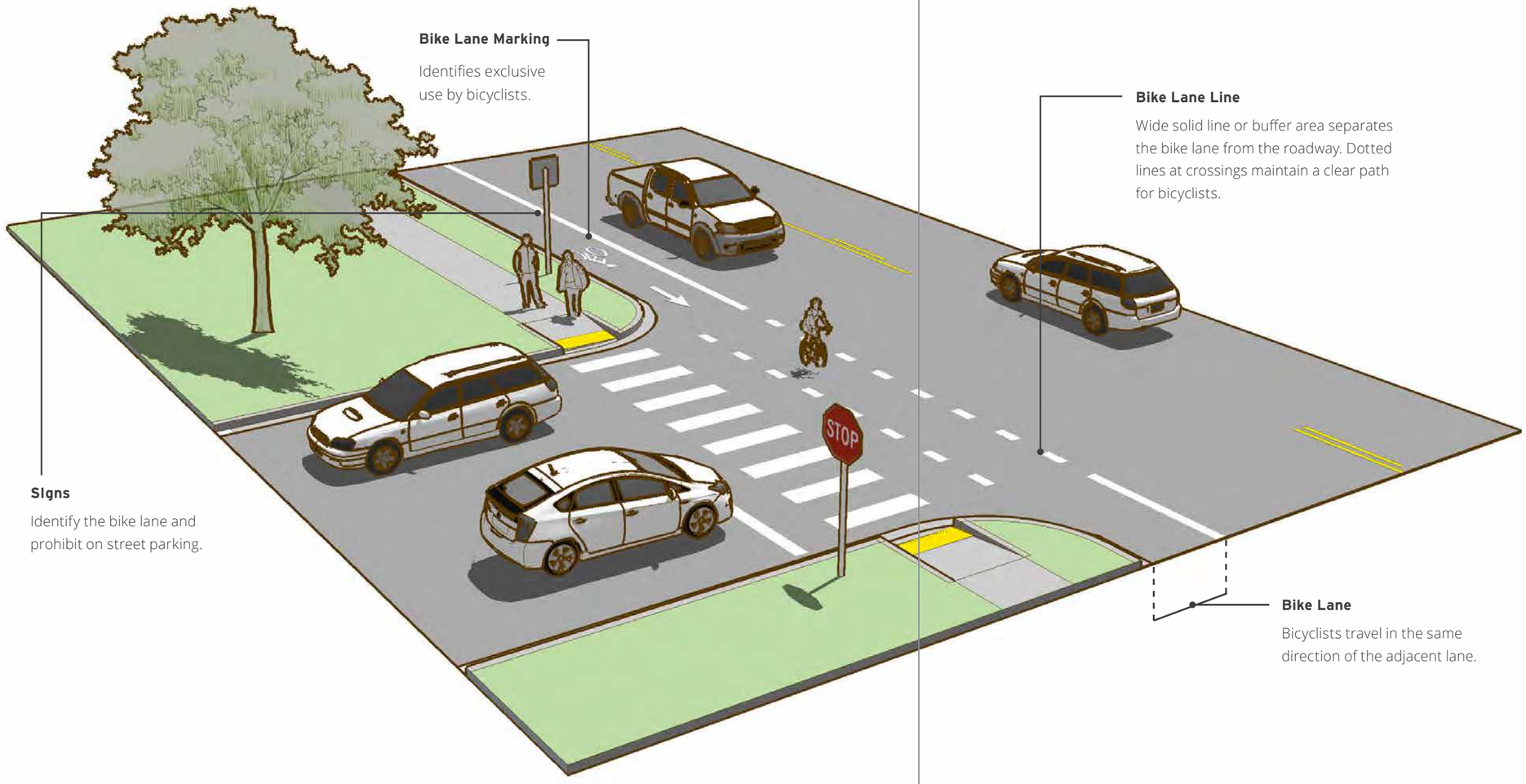
Enhancements with increased levels of striping and signs may interfere with the low-clutter character of a rural environment.

Natural

Requires a wider roadway to provide an accessible shoulder space.

CAPAY, CA

POPULATION 133



Bike Lane Marking

Identifies exclusive use by bicyclists.

Bike Lane Line

Wide solid line or buffer area separates the bike lane from the roadway. Dotted lines at crossings maintain a clear path for bicyclists.

SIgns

Identify the bike lane and prohibit on street parking.

Bike Lane

Bicyclists travel in the same direction of the adjacent lane.

On-Street Bike Lane

On-street bike lanes designate an exclusive space for bicyclists through the use of pavement markings and optional signage. A bike lane is located directly adjacent to motor vehicle travel lanes and follows the same direction as motor vehicle traffic.

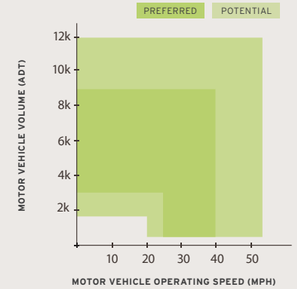
BENEFITS

- Provides additional separation distance between the sidewalk and motor vehicle travel area, if a sidewalk is present.
- Connects and completes bikeway networks through built up areas.
- Provides a designated space on the roadway suitable for many adult riders within built up areas of small communities.
- Can support school access by bicycle when configured as a wide bike lane on lower-speed, lower-volume streets.
- Provides additional visual cues to drivers that they should expect bicyclists on the roadway. This can be particularly useful when transitioning to a built up area from a highway context.

APPLICATION

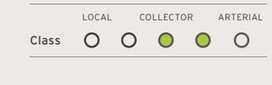
Speed and Volume

Appropriate on streets with moderate volumes and moderate speed. May function on multi-lane streets with heavy traffic, but fails to provide a low-stress experience in this condition, which would appeal to larger numbers of bicyclists.



Network

Serves moderate distance trips connecting local bikeway routes to regional corridors.



Land Use

For use inside, or between, built up areas where increased pedestrian and/or bicycle activity is present or expected.

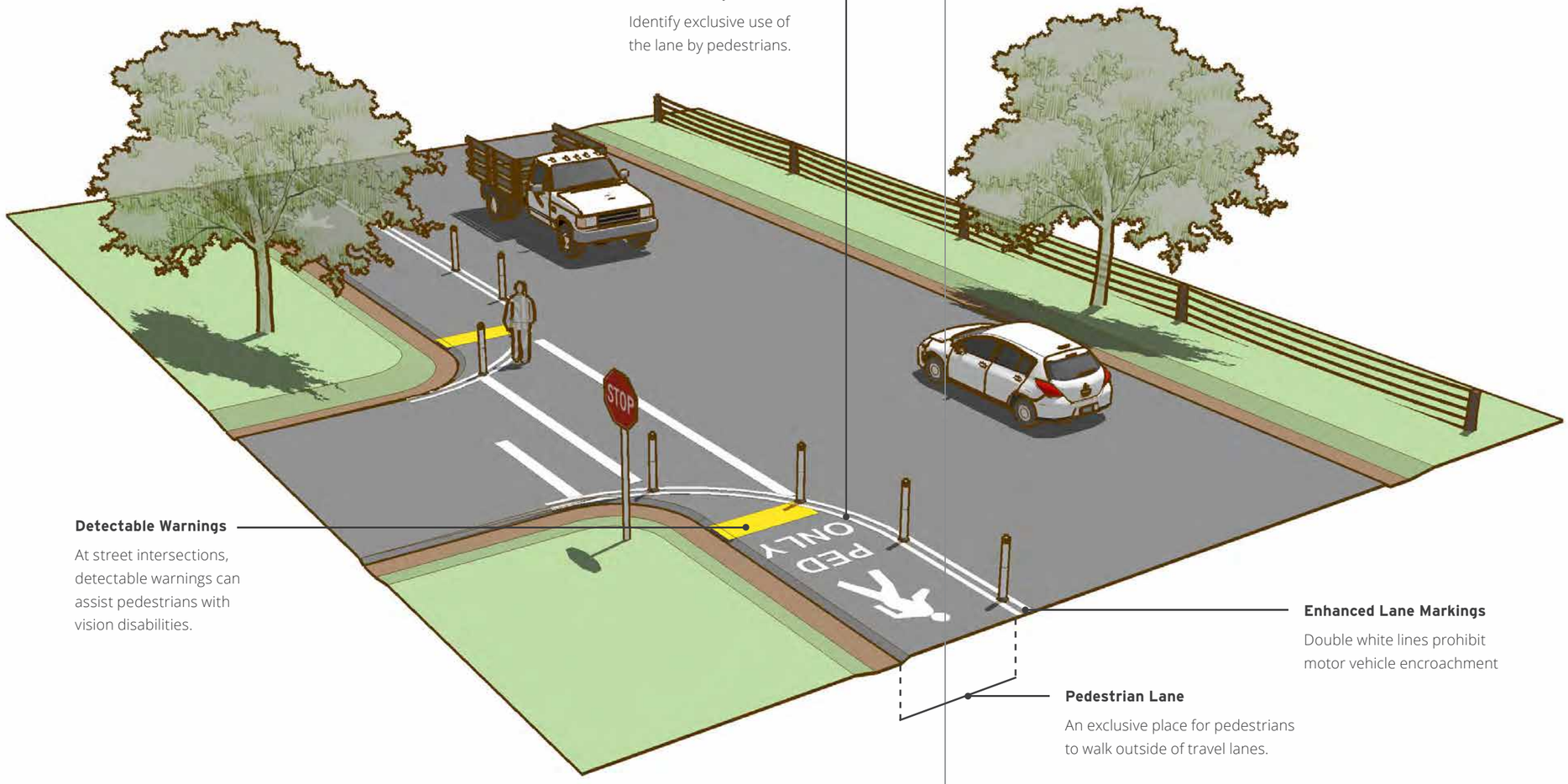
Visual

Reflects a more urban visual atmosphere than an unmarked shoulder.

Natural

Requires a wider roadway to provide an accessible shoulder space.

LYNDONVILLE, VT
POPULATION 1,200



Pedestrian Lane

A pedestrian lane is a low-cost alternative to a separated path or sidewalk that is only appropriate on roads with low to moderate speeds and volumes. The lane provides a space for pedestrians to walk that is separated visually from motor vehicle traffic by pavement marking.

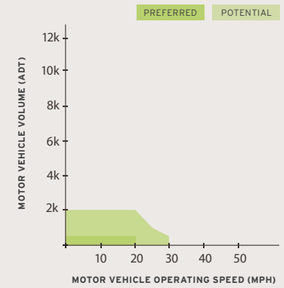
BENEFITS

- Provides a stable surface off of the roadway for pedestrians to use when sidewalks or sidepaths are deemed impractical or otherwise not desired.
- Reduces 'walking along roadway' crashes. [i]
- Can provide visual indication of prioritized connection to community amenity.
- Maintains rural character, without the built curb and gutter infrastructure of a sidewalk or other facility.

APPLICATION

Speed and Volume

Appropriate on streets with low-moderate volumes and low-moderate speed.



Network

Serves as a pedestrian connection on local and collector routes.

Land Use

For use inside of built up areas to provide a dedicated space for pedestrians.

Visual

Support rural visual aesthetics when compared to a sidewalk.

Natural

Requires minimal roadside infrastructure and no impacts to stormwater management.

DUCK, NC

POPULATION 370

Photo by ITRE Bike and Ped via Flickr (CC By 2.0)

THE GUIDE

PHYSICALLY SEPARATED

- Shared Use Path
- Sidepath
- Sidewalks
- Separated Bike Lanes

Intersection Crossings

Enhancements such as median crossing islands or raised crossings can increase comfort and safety for path users.

Roadway Crossings

Where paths intersect roads, enhancements should improve conditions for path users.

Independent Right of Way

Constructed outside of a roadway corridor, a shared use path offers a low-stress experience away from motor vehicles.

Shared Use Path

The single path combines bicyclists and pedestrians in both directions.

Shared Use Path

A shared use path provides a travel area separate from motorized traffic for bicyclists, pedestrians, skaters, wheelchair users, joggers, and other users. Shared use paths can provide a low stress experience for a variety users using the network for transportation or recreation.

BENEFITS

- Provides a dedicated facility for users of all ages and abilities.
- Provides, in some cases, a short-cut between cities or neighborhoods.
- Provides, in some cases, access to areas that are otherwise served only by limited-access roadways.
- Supports tourism through convenient access to natural areas or as an enjoyable recreational opportunity itself.

APPLICATION

Traffic

Paths operating in independent corridors are fully separated from traffic. Facility provision is based on opportunity and connectivity rather than roadway context. In some cases an independent corridor may offer similar connectivity and access to destinations as a nearby roadway.

Network

Serves connections independently of the street network. May function as a network alternative to limited access freeways.

	LOCAL	COLLECTOR	ARTERIAL
Class	○	○	○ ○ ○

Land Use

Generally appropriate outside of built-up areas, although may function well in water or utility corridors that pass through developed population centers. May also function for short connections such as between cul-de-sacs or disconnected road networks.

Visual

Paths have a small footprint and can display a distinctly rural character.

Natural

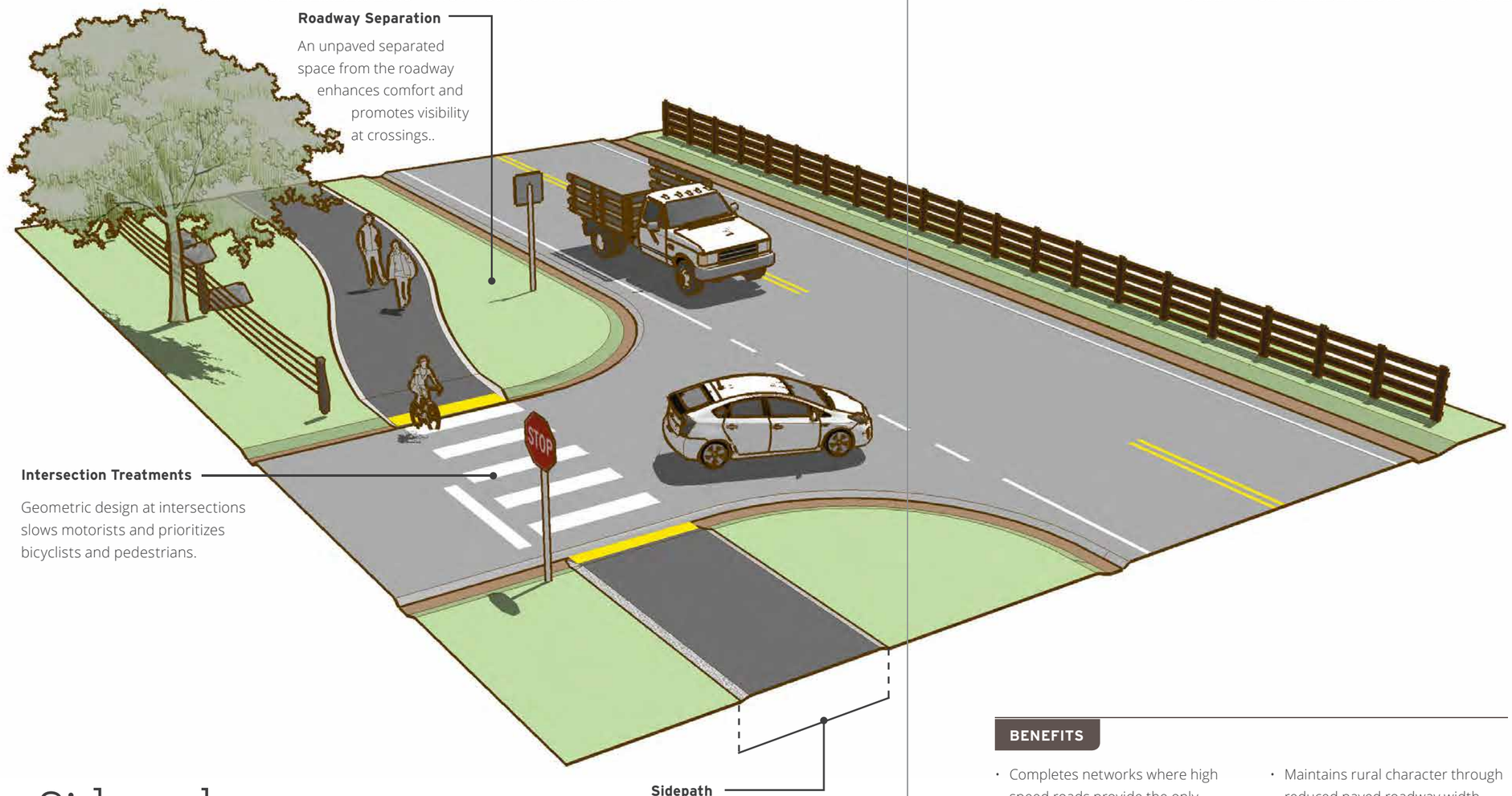
The narrow footprint of a shared use path can respond sensitively to natural features or environments.

	LOW	MODERATE	HIGH
Impact	●	○ ○	○ ○ ○

DRAFT - SEPTEMBER 2016 - NOT FOR DISTRIBUTION

BENTONVILLE, AR

POPULATION 40,000



Sidepath

A sidepath is a bidirectional shared use path located immediately adjacent and parallel to a roadway. Sidepaths can offer a high-quality experience for users of all ages and abilities as compared to on-roadway facilities in heavy traffic environments, allow for reduced roadway crossing distances, and maintain rural and small town community character.

DRAFT - SEPTEMBER 2016 - NOT FOR DISTRIBUTION

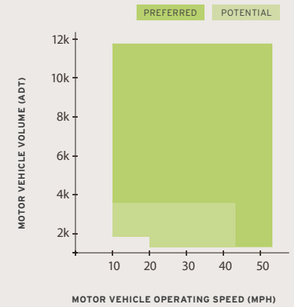
BENEFITS

- Completes networks where high speed roads provide the only corridors available.
- Fills gaps in networks of low-stress local routes such as shared use paths and bicycle boulevards.
- Provides a more appropriate facility for users of all ages and abilities than shoulders or mixed traffic facilities on roads with moderate or high traffic intensity. [i]
- Encourages bicycling and walking in areas where high-volume and high-speed motor vehicle traffic would otherwise discourage it. [ii]
- Maintains rural character through reduced paved roadway width compared to a visually separated facility. [iii]
- Very supportive of rural character when combined with native vegetation to visually and physically separate the sidepath from the roadway.

APPLICATION

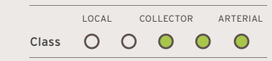
Speed and Volume

For use on roads with high volumes, and moderate to high speed motor vehicle traffic.



Network

For use on arterial links on the regional or local biking and walking network



Land Use

For use between and within built-up areas where a high degree of separation and comfort is expected.

Visual

Maintains rural character when paired with a wide landscaped roadway separation and reduced paved shoulder width.

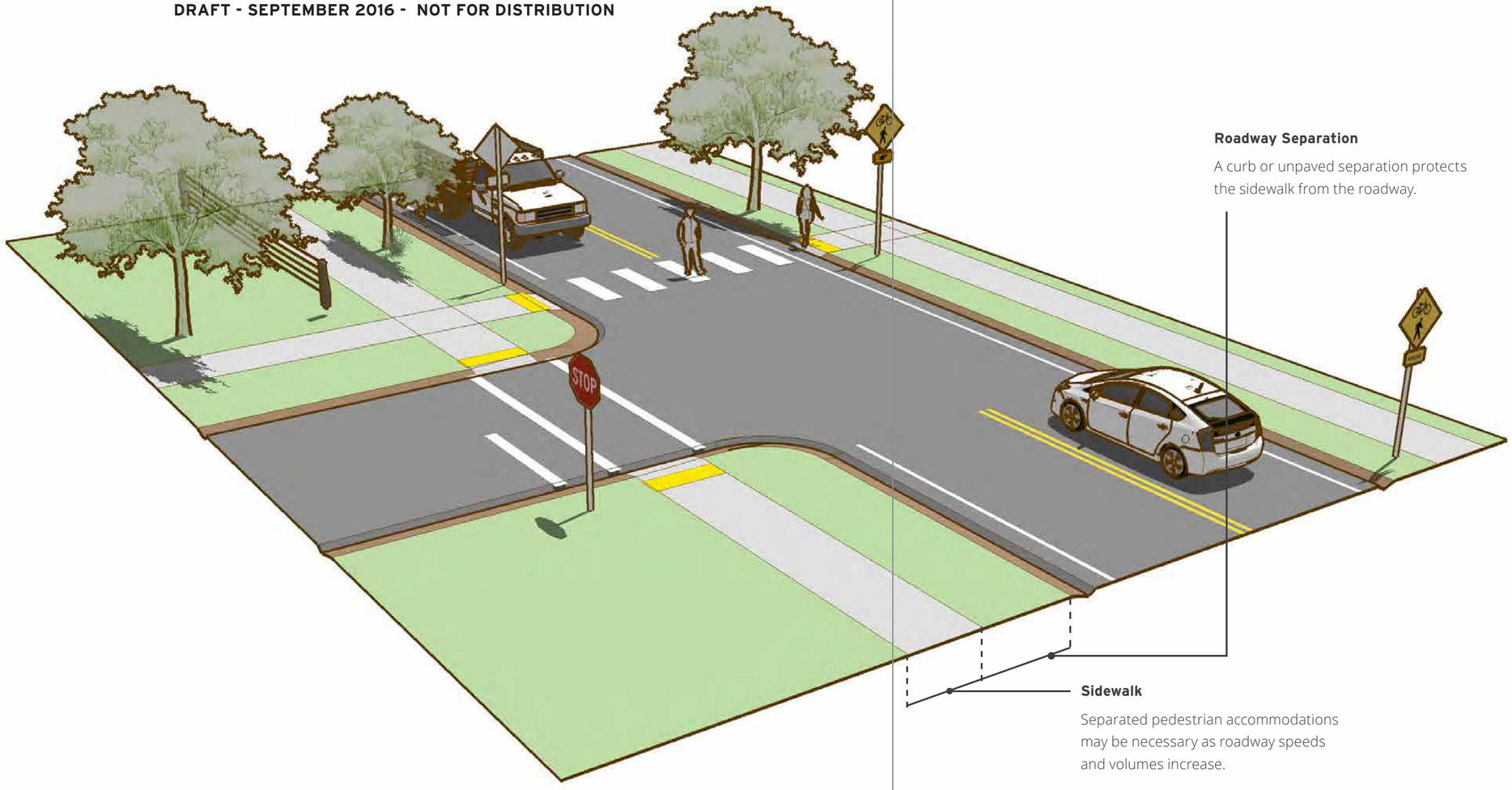
Natural

Requires a wide roadside environment to provide for separation and pathway area outside of the adjacent roadway.

SOUTH LAKE TAHOE, CA

POPULATION 20,100

Photo by Tahoe Regional Planning Associaion (TRPA)



Roadway Separation

A curb or unpaved separation protects the sidewalk from the roadway.

Sidewalk

Separated pedestrian accommodations may be necessary as roadway speeds and volumes increase.

Sidewalk

Sidewalks provide dedicated space intended for use by pedestrians that is safe, comfortable, and accessible to all. Sidewalks are physically separated from the roadway by a curb or unpaved buffer space.

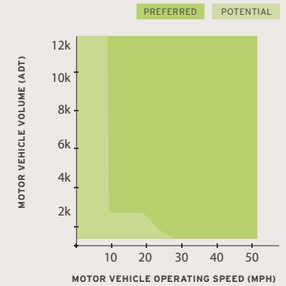
BENEFITS

- Provides a dedicated place within the public right-of-way for pedestrians to safely travel and reduces pedestrian collisions in rural areas.
- Provides a safe place for people to walk and encourages people to use sidewalk facilities.
- Reduces "walking along roadway" crashes.
- May notably increase levels of walking in areas with high traffic speeds and/or volumes. [i]

APPLICATION

Speed and Volume

Sidewalks are recommended on all but the most low-speed and low-volume roadways.



Network

Sidewalks are appropriate on all types of roadways where pedestrian activity is likely.

Land Use

Appropriate inside of built-up areas and population centers. May serve short distance travel between built up areas. Along or near highways in rural areas near pedestrian-generating development, such as residential development, schools, and businesses (AASHTO Green Book, 2004, pp. 4-56).

Visual

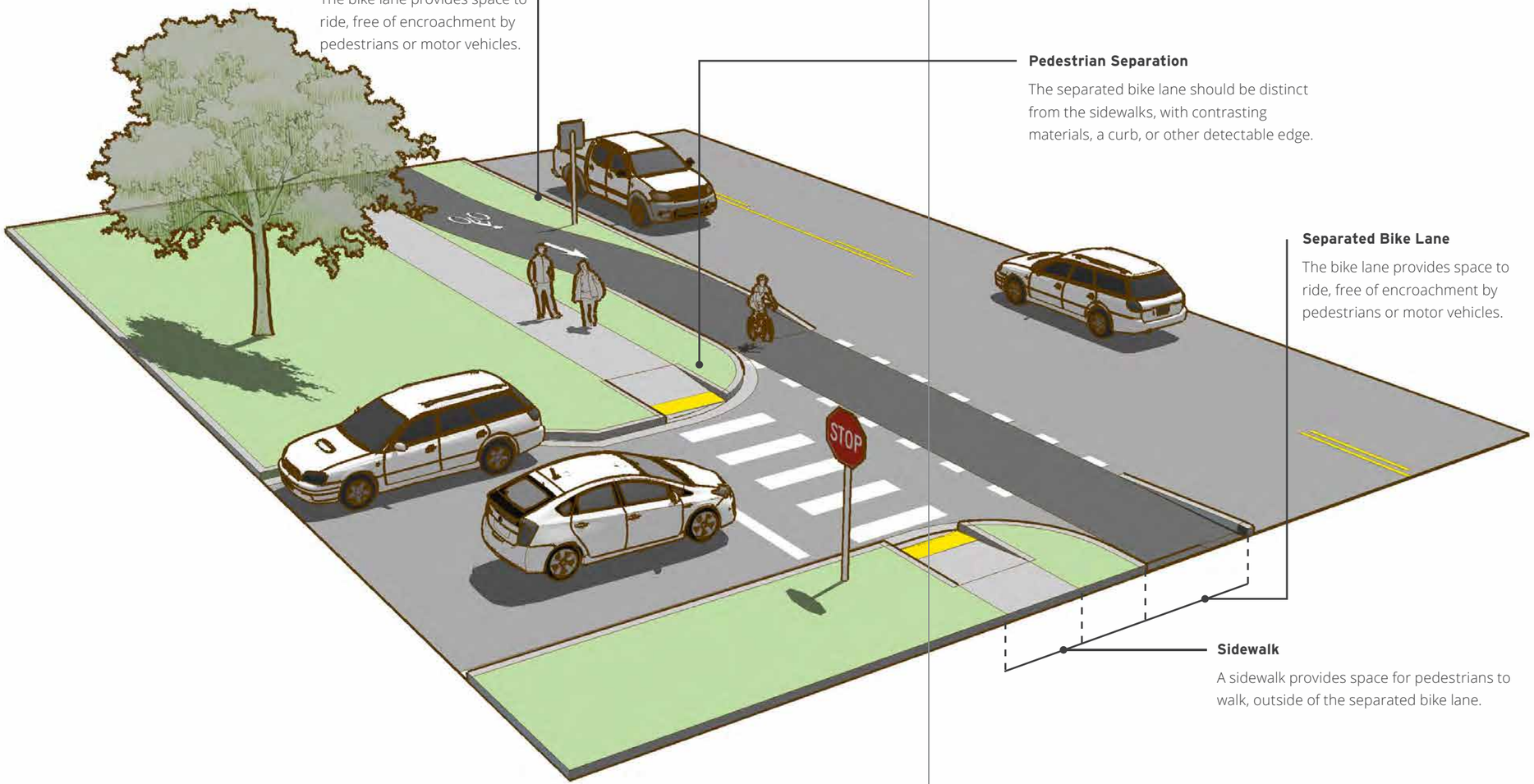
Sidewalks may not support a rural visual character when configured with curb and gutter and no landscaped separation.

Natural

Requires a moderate-width roadside environment to provide for separation and sidewalk area outside of the adjacent roadway.

DENMARK, SC

POPULATION 3,400



Roadway Separation

The bike lane provides space to ride, free of encroachment by pedestrians or motor vehicles.

Pedestrian Separation

The separated bike lane should be distinct from the sidewalks, with contrasting materials, a curb, or other detectable edge.

Separated Bike Lane

The bike lane provides space to ride, free of encroachment by pedestrians or motor vehicles.

Sidewalk

A sidewalk provides space for pedestrians to walk, outside of the separated bike lane.

Separated Bike Lane

A separated bike lane is an exclusive facility for bicyclists that is located within or directly adjacent to the roadway and is physically separated from motor vehicle traffic with a vertical element.

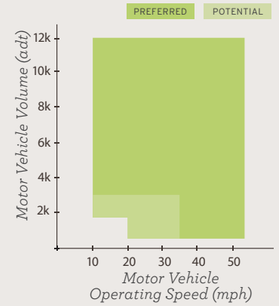
BENEFITS

- Provides a more comfortable experience on high speed and high volume roadways than on-road shoulders.
- Separated bike lanes offer bicyclists a similar riding experience to sidepaths, but with fewer operational and safety concerns over bidirectional sidepath facilities.
- Offers an increased level of service over sidepaths in areas with high volumes of pedestrians, when paired with sidewalks.
- Increases the degree of connectivity over a sidepath, when configured as a one-way directional facility on both sides of the street.
- Can reduce the incidence of sidewalk riding and potential user conflicts.

APPLICATION

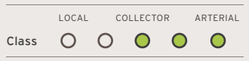
Traffic

For use on roads with high motor vehicle volumes, and moderate to high speed motor vehicle traffic.



Network

Serves primary connections on major roads through and across communities.



Land Use

For use inside built-up areas where a moderate to high volume of bicyclists and pedestrians is expected.

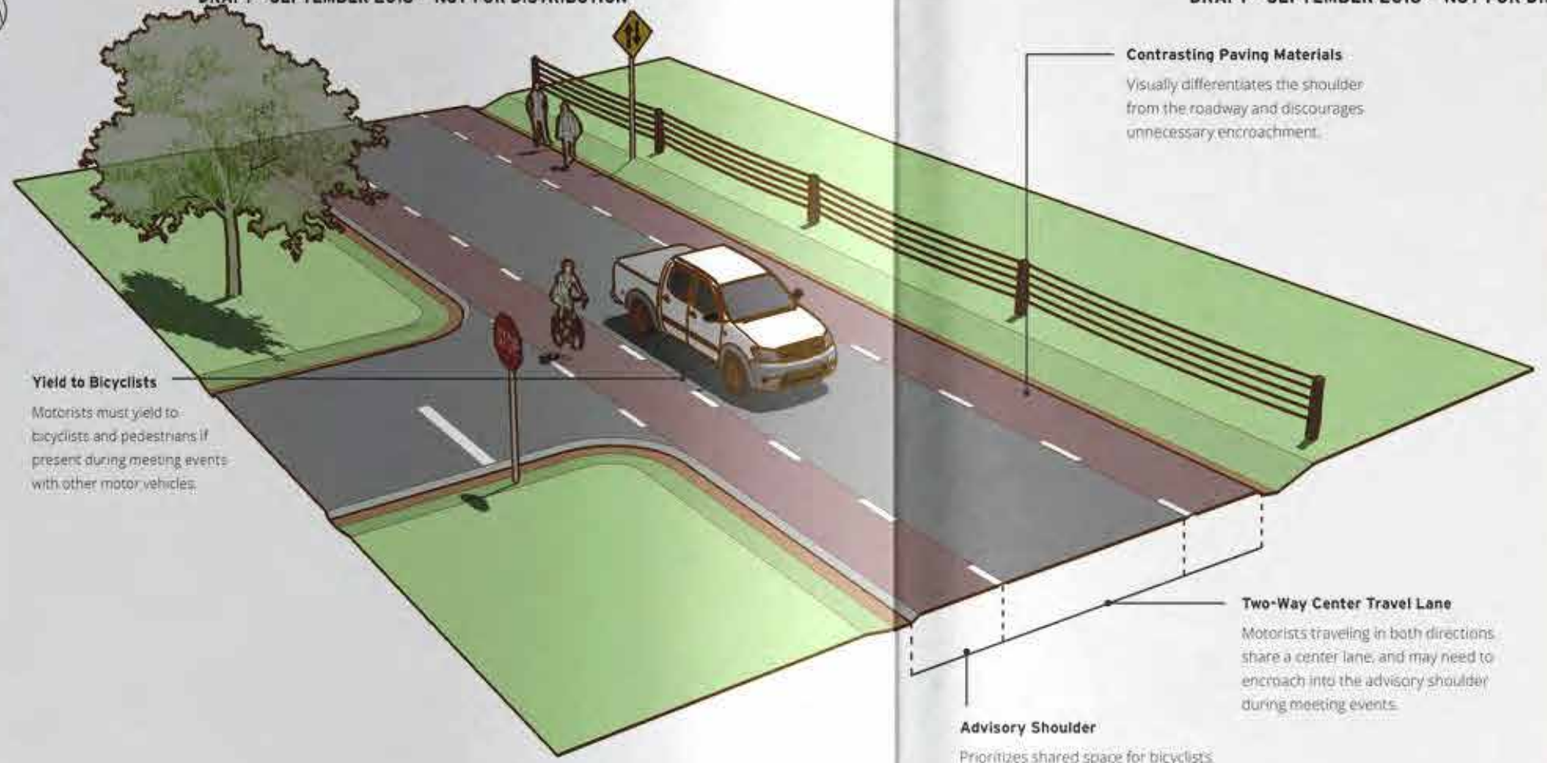
Visual

Reflects a more urban visual atmosphere than a sidepath. Use of a wide landscaped buffer may lessen visual impact concerns.

Natural

Requires a wide roadside environment to provide for separation, sidewalks and bike lane areas.

JACKSON HOLE, WY
POPULATION 9,600



Advisory Shoulders

Advisory shoulders create usable shoulders for bicyclists and occasional pedestrians on a roadway that is otherwise too narrow to accommodate one. The shoulder is delineated by pavement marking and optional pavement color. Motorists may only enter the shoulder when no bicyclists or pedestrians are present and must overtake these users with caution due to potential oncoming traffic.

DRAFT - SEPTEMBER 2016 - NOT FOR DISTRIBUTION

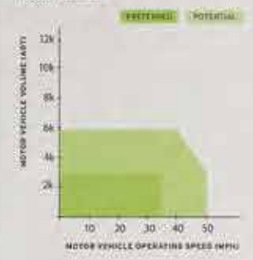
BENEFITS

- Provides a delineated but nonexclusive space available for walking and biking on a roadway otherwise too narrow for dedicated shoulders.
- May reduce some types of crashes due to reduced motor vehicle travel speeds.
- Minimizes potential impacts to visual or natural resources through efficient use of existing space.
- Increases predictability and clarifies desired lateral positioning between people bicycling or walking and people driving in a narrow roadway.
- Functions well within a rural and small town traffic and land use context.
- May function as an interim measure where plans include shoulder widening in the future.

APPLICATION

Speed and Volume

Most appropriate on streets with low to moderate volumes and moderate speed motor vehicles.



Network

Applies to constrained connections between built up areas.

Land Use

For use outside, between and within built up areas with bicycle and pedestrian demand and limited available paved roadway surface.

Visual

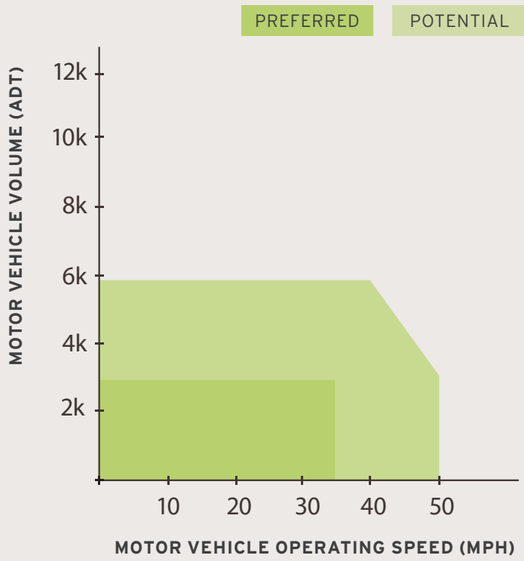
Supports rural visual aesthetics through reduced paved surface requirements and minimal pavement marking.

Natural

Supports the natural environment through reduced paved surface requirements.

Speed and Volume

Most appropriate on streets with low to moderate volumes and moderate speed motor vehicles. [iiii ii]



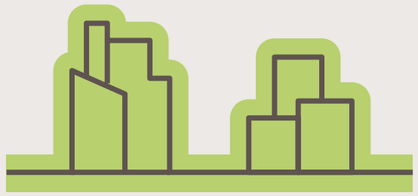
Network

Applies to constrained connections between built up areas.

	LOCAL	COLLECTOR	ARTERIAL
Class	○	●	● ● ○

Land Use

For use outside, between and within built up areas with bicycle and pedestrian demand and limited available paved roadway surface.



Visual

Supports rural visual aesthetics through reduced paved surface requirements and minimal pavement marking.

Natural

Supports the natural environment through reduced paved surface requirements.

	LOW	MODERATE	HIGH
Impact	●	○ ○ ○	○

Advisory Shoulder

Roads with advisory shoulders accommodate low to moderate volumes of two-way motor vehicle traffic and provide a prioritized space for bicyclists and pedestrians with little or no widening of the paved roadway surface.

(A) During meeting events between oncoming motor vehicles, motorists may need to enter the advisory shoulder for clear passage.

Figure x-x. *Advisory shoulders clarify positioning and yield priority on roads too narrow to provide exclusive travel space. When pedestrians or bicyclists are present, motorists may need to yield to users present in the advisory shoulder before passing.*

GEOMETRIC DESIGN

An advisory shoulder is a part of the traveled-way, and it is expected that vehicles will regularly encounter meeting or passing situations where driving in the advisory shoulder is necessary and safe, as illustrated in Figure X.

ADVISORY SHOULDER

The advisory shoulder space is a visually distinct area on the edge of the roadway, offering a prioritized space for people to bike and walk.

- The preferred width of the advisory shoulder space is 6 ft (2.0 m).
- Use of contrasting paving materials between the advisory shoulder and center travel lane is recommended to differentiate the advisory shoulder from the center two-way travel lane in order to minimize unnecessary encroachment and reduce regular straddling of the advisory shoulder striping.

TWO-WAY CENTER TRAVEL LANE

The two-way center travel lane is created from the remaining paved roadway space after the advisory shoulder has been accounted for.

- Preferred two-way center travel lane width is 13.5 to 16 ft (4.1 - 4.9 m) although may function with widths of 10 to 18 ft (3.0 – 5.5 m). Table X describes the impacts of various center lane widths on roadway operations.

Figure x-x. *Motorists travel in the center two-way travel lane. When passing a bicyclist, no lane change is necessary.*

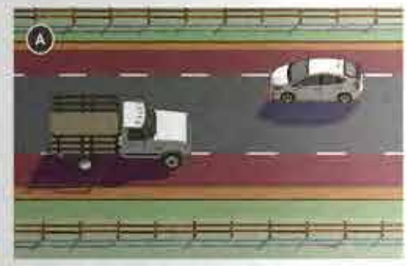


Figure x-x. *When two motor vehicles meet, motorists may need to encroach into the advisory shoulder space.*

DRAFT - SEPTEMBER 2016 - NOT FOR DISTRIBUTION

Advisory Shoulder

Table x-x. *Interactions between motor vehicles during meeting events by two-way center turn lane width*

	TWO-WAY CENTER TRAVEL LANE WIDTH	IMPACT ON ADVISORY SHOULDER ENCROACHMENT DURING MEETING EVENTS
(B) Practical minimum width	10 ft (3.0 m)	Requires vehicle encroachment into the advisory shoulder space during all motor vehicle meeting events.
(C) Preferred minimum width	13.5 ft (4.5 m)	Two passenger cars are physically able to meet each other within the center lane at very low speed. In practice, vehicles will encroach into the advisory shoulder.
Preferred maximum width	16 ft (4.9 m)	Permits meeting events of two passenger cars within the center lane at modest speeds without encroaching into the advisory shoulder.
(D) Absolute maximum width	18 ft (5.5 m)	This width is equivalent to two 9 ft (2.7 m) travel lanes and regular encroachment into the advisory shoulder space may not be necessary.

10 ft (3.0 m) Center Travel Lane | **13.5 ft (4.5 m) Center Travel Lane** | **18 ft (15.5 m) Center Travel Lane**

Figure x-x. *Total roadway width affects the number of road users that can meet and pass simultaneously. Wider roadways allows for more simultaneous interactions, and can support higher volumes of motor vehicles.*

MARKINGS

- A broken lane line used to delineate the advisory shoulder should consist of 3 ft (1.0 m) line segments and 6 ft (2.0 m) gaps. *
- A normal solid white edge line may be marked on the edge of the pavement in addition to the broken advisory bike lane line.
- In general, no center line should be marked on the roadway. Short sections may be marked with center line pavement markings to separate opposing traffic flows at specific locations, such as around curves, over hills, on approaches to at grade crossings, and at bridges.

At these locations, the paved roadway surface should be widened to provide space for paved bicycle-accessible shoulders and conventional width travel lanes. See Table X for sight distance requirements.

Table x-x. *Minimum Passing Sight Distances for No-Passing Zone Markings. Adapted from MUTCD Table 3B-1.*

85TH-PERCENTILE OR POSTED OR STATUTORY SPEED LIMIT	MINIMUM PASSING SIGHT DISTANCE
25 mph	450 ft (137 m)
30 mph	500 ft (152 m)
35 mph	550 ft (167 m)
40 mph	600 ft (182 m)
45 mph	700 ft (213 m)
50 mph	800 ft (243 m)
55 mph	900 ft (274 m)

Advisory Shoulder

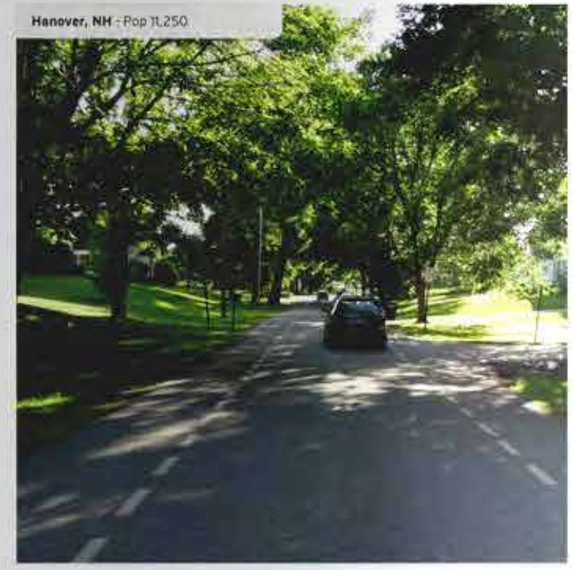
SIGNS

Signs may be used to warn road users of the special characteristics of the street. Potential signs for use with advisory shoulders include:

- As illustrated in Figure X. An unmodified Two-Way Traffic warning sign (W6-3) may be used to clarify two-way operation of the road.
- NO CENTER LINE warning sign (W8-12) may be used to help clarify the unique striping pattern.
- NO PARKING ON PAVEMENT (R8-1) may be used to discourage parking within the advisory shoulder.

Figure x-x. *The W6-3 two-Way traffic warning sign can clarify undivided two-way operation of the advisory shoulder configuration.*

Hanover, NH - Pop 11,250



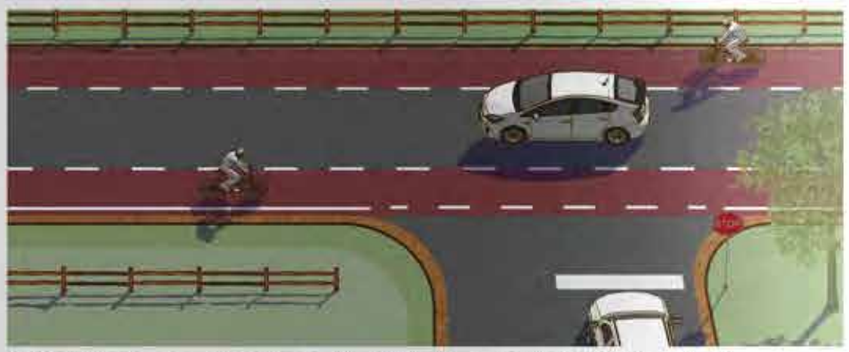


Figure x-x. *At crossings of minor intersections and driveways, maintain the striping and construction material (if used) of the advisory shoulder.*

Advisory Shoulder

INTERSECTIONS

Advisory shoulder designs work best on road segments without frequent stop or signal controlled intersections that require vehicles to stop within the roadway. The designer should strive to maintain the visual definition of the advisory shoulder through all driveways and street crossings, and provide a conventional shoulder at controlled intersections.

- At minor street crossings, a dotted line extensions should be used on both sides of the advisory shoulder to maintain delineation of the advisory shoulder space. (Figure X).
- If contrasting pavement material is used, maintain the material through driveway crossings and minor intersections.
- Where the road is controlled by a stop sign or traffic signal, the advisory shoulder may be discontinued 50 ft (15 m) in advance of the intersection.
- At these locations, provide a bicycle accessible paved shoulder outside of the travel lanes or design for operation as a shared roadway.

Edina, MN - Population 49,300

IMPLEMENTATION

The design described here is not included in the **MUTCD**. An experimentation process as described in section 1A.10 of the MUTCD may be necessary as part of implementation. FHWA is accepting experimentations with a similar treatment called dashed bicycle lanes.[9]

ACCESSIBILITY

Except where expressly prohibited, pedestrians may legally walk on roadways and shoulders when no separated pedestrian facility is available. Advisory shoulders as described here are not intended for use by pedestrians but can accommodate occasional pedestrian use.

CASE STUDY | ADVISORY BIKE LANES

Hanover, New Hampshire

PROJECT DESCRIPTION

In 2012, Hanover completed a Bicycle and Pedestrian Planning effort. This plan identified Valley Road as a local bicycle connection in the overall network. In 2013 Hanover completed a Safe Routes to School Plan, which introduced the idea of using Advisory Lanes on Valley Road. Hanover's Bicycle and Pedestrian Committee (HPBC) advocated to utilize Valley Road as a pilot project for advisory lanes. The HBPC surveyed the Valley Road neighbors and built support for a pilot project. While there was some resistance, the neighborhood was generally supportive of the idea. Hanover's Department of Public Works was open to the idea and it was presented to the town select board who approved installation of advisory lanes on Valley Rd. The lanes were painted on about 400 meters of Valley road in the summer of 2014. In 2016 an evaluation report was produced with traffic counts and results from a follow up survey. Based on the success of the Valley Road Advisory Lanes, Hanover is currently evaluating adding Advisory Lanes to another important bicycle and pedestrian connection between schools and neighborhoods.

Factors in the success of the advisory lanes were the leadership of the Bicycle and Pedestrian Committee, support from the adjacent neighbors, the willingness to pilot them by the Department of Public Works and inclusion of Valley Road and Advisory Lanes in both the SRTS and Bicycle and Pedestrian Plans.

DETAILS

COMMUNITY CONTEXT

Hanover, NH is a town of approximately 11,000 with 8,000 living in the town center. Hanover is home to Dartmouth College with a student population of 6,300. Hanover is located on the Connecticut River and has a dense built up area surrounded by small suburban neighborhoods that transition quickly to a very rural setting.

KEY DESIGN ELEMENTS

The advisory bike lane project was built on a low volume, low speed, residential road. Implementation included pavement markings and signs.

ROLE IN THE NETWORK

Valley Road is a local bicycle connection that connects neighborhoods with schools, the downtown, and the Dartmouth College campus. Sidewalks were removed due to root damage and were not replaced because the neighborhood preferred the rural look of streets without sidewalks. Advisory Lanes utilize existing pavement to provide space prioritized for bicycles and pedestrians at very low cost.

FUNDING

The Hanover Bicycle and Pedestrian Plan and the Advisory Lane project were both accomplished with funding from the HBPC. HBPC's funding comes from a $5 local fee on vehicle registration that was passed by the select board to support alternative transportation and generates approximately $30,000 annually.

CONTACT INFORMATION

Peter Kulbacki, PE, Public Works Director

Advisory Shoulder

Bloomington, IN - Population 82,000

FOOTNOTES

i Trials conducted by Transport for London (TfL) show a statistically significant speed reduction effect of 5.4mph to 8.6 mph as a result of removing center line markings on the roadway. **(TfL 2014).**

A four-year study from Wiltshire County (England) showed a 35 percent drop in motor vehicle crashes along 30 mph roadways where the center line was removed **(Wiltshire County Council 2014).**

ii Volume criteria listed here are based on FHWA guidance on center line provision. The **FHWA MUTCD** recommends center lines on roadways with motor vehicle traffic volumes above 3,000 ADT, and requires them on streets above 6,000 ADT **(2009, Sec. 3B.01).**

Installations in England have functioned well on streets with volumes as high as 10,000 ADT, and an existing installation carries nearly 14,000 ADT according to Department for Transport estimates **(Cardiff Council 2011)**

iii **FHWA MTUCD** application of broken line markings is to indicate a permissive conditions (Sec. 3A.06). The MUTCD allows use of "dimensions in a similar ratio of line segments to gaps as appropriate for traffic speeds and need for delineation." **(2009, p. 348)**

iv The FHWA is conducting experimentation with dashed bicycle lane treatments in at least 5 locations across the US. Guidance related to experimentation is available from the FHWA online resource **Bicycle Facilities and the Manual on Uniform Traffic Control Devices 2015.**

WORKS CITED

Cardiff Council. *Cardiff Cycle Design Guide*. 2011.

Federal Highway Administration. *Manual on Uniform Traffic Control Devices*. 2009.

Federal Highway Administration. *Bicycle Facilities and the Manuall on Uniform Traffic Control Devices*. 2015. Retrieved from: https://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/mutcd/dashed_bike_lanes.cfm

Transport for London (TfL). *Centreline Removal Trial*. 2014.

United States Access Board. *Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way*. 2011.

Wiltshire County Council. *White Line Carriageway Markings*. April 2014.

PHOTO CREDIT

Page 32. Western Transportation Institute

Page 33. Western Transportation Institute

Page 34. Western Transportation Institute

Page 35. Image: Google

THE GUIDE

CRITICAL LINKS

- Public Lands
- School Connections
- Main Streets
- Bridge Retrofits

Access to Public Lands

Leelanau County, Michigan
SLEEPING BEAR HERITAGE TRAIL

Boulder County, Colorado
RURAL ROAD STANDARDS

Three Forks, Montana
HEADWATERS TRAILS SYSTEM

School Connections

St Charles, Minnesota
POPULATION 3,695

Arlee, Montana
POPULATION 602

Mt Shasta, California
POPULATION 3,292

School Connections

The preferred facilities near schools should provide as much separation possible between children and motor vehicles. Facilities such as sidepaths and paved shoulders should also be wider than typical facilities when high volumes of children are expected to be present. Traffic calming measures that reduce motor vehicle operating speeds, as well as the volume of motor vehicles near schools, may also be appropriate.

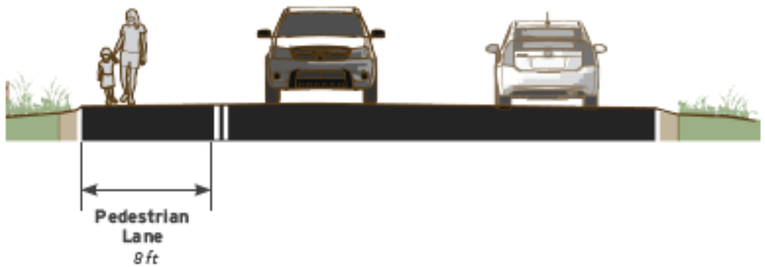
SEPARATION PREFERRED OVER MIXED TRAFFIC

Even in low speed and low volume conditions, parents and children may prefer walking in an exclusive pedestrian use space.

For more information, refer to the guidance on **Pedestrian Lanes**

Before

After



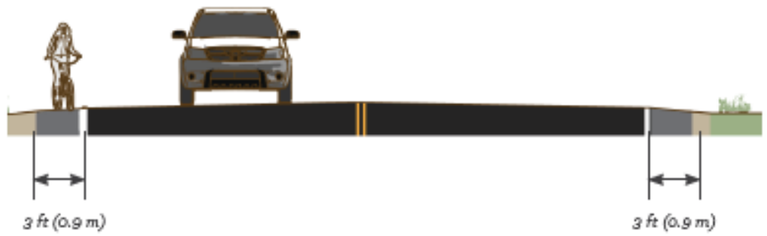
School Connections

SIDEWALKS PREFERRED OVER SHOULDERS

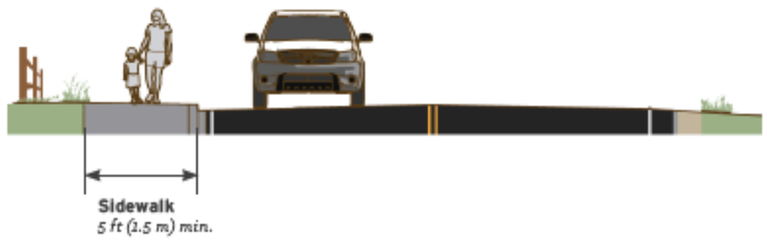
Narrow shoulders offer limited comfort for children. It may be possible to construct a sidewalk within the same paved roadway area.

For more information, refer to the guidance on Sidewalks.

Before



After



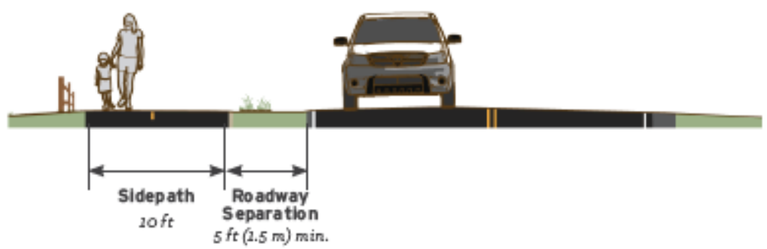
SIDEPATHS PREFERRED ON HEAVY TRAFFIC STREETS

On higher speed and volume streets, even wide shoulders may not offer adequate security for children to be comfortable walking to school. A separated path may be a good facility in these conditions.

For more information, refer to the guidance on **Sidepaths**.

Before

After



Building Main Streets

Imbler, Oregon
POPULATION 305

Los Molinos, California
POPULATION 2,037

Willow Creek, California
POPULATION 1,710

Building Main Streets

The **ITE Walkable Urban Thoroughfares Guide 2010** recommends the following design details for walkable and bikable commercial main streets:

- Minimum sidewalk width: 6 feet (1.8 m)
- Furnishing zone: 6 feet (1.8 m)
- Target travel speed: 25 mph (40 km/hr)
- Number of through lanes: 2
- Lane Width: 10-11 feet (3.0 - 3.3 m)
- Parallel On-Street Parking Width: 7-8 feet (2.1 - 2.4 m)
- Bike facility: 5-6 feet (1.5 - 1.8 m) min

The following roadway concepts show opportunities for reconfiguring a main street to support a multimodal context.

EXISTING CONDITIONS 2-LANE

A typical two lane roadway often has wider than necessary lane widths. Wide lanes encourage high-speed travel and should be avoided whenever possible. By narrowing lanes with excess width, the additional space can be reallocated for other uses.

MEDIAN SAFETY ISLAND

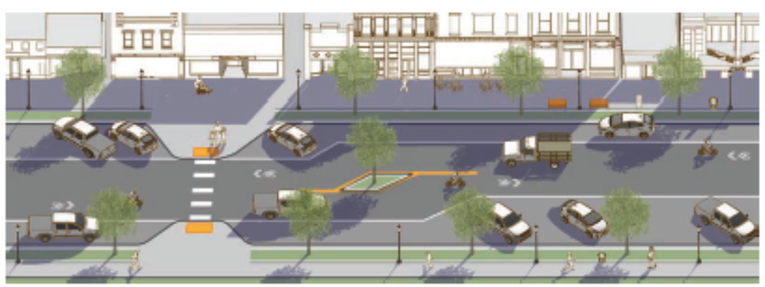
Providing curb extensions and median safety islands can enhance crossing experience for pedestrians.

For more information, refer to the **FHWA Proven Safety Countermeasures** on medians and pedestrian crossing islands.

ANGLED PARKING CHICANE

Where through traffic volumes are low, a slow-speed street design may maximize comfort and use by pedestrians and bicyclists.

For more information on creating slow speed conditions, refer to the guidance on **Bicycle Boulevards**.



Building Main Streets

EXISTING CONDITIONS 4-LANE

Highways are often widened through town centers, providing multiple travel lanes to reduce impediments to through traffic. These configurations may encourage inappropriately high-speed travel and erratic behavior in the vicinity of pedestrian and bicycle activity.

ROAD DIET

A 4-lane to 3-lane road diet can balance the needs of through travel and local community access.

Refer to **FHWA Resurfacing Guide 2015** and **FHWA Road Diet Guide 2014** for more information.

ROAD DIET WITH SEPARATED BIKE LANES

Where high quality bicycling experience is desired, a separated bike lane may be provided.

For more information, refer to the guidance on **Separated Bike Lanes** athe **FHWA Separated Bike Lane Planning and Design Guide 2014.**

MEDIAN AND SEPARATED BIKE LANES

A continuous center median may take up less space than a center turn lane, providing additional room to establish separated bike lanes and landscaping.

For more information, refer to the **FHWA Separated Bike Lane Planning and Design Guide 2014.**

Bridge Retrofit

Ferndale, California
POPULATION 1,362

Boonville Missouri
POPULATION 8, 370

Centerville, California.
POPULATION 362

Bridge Retrofit

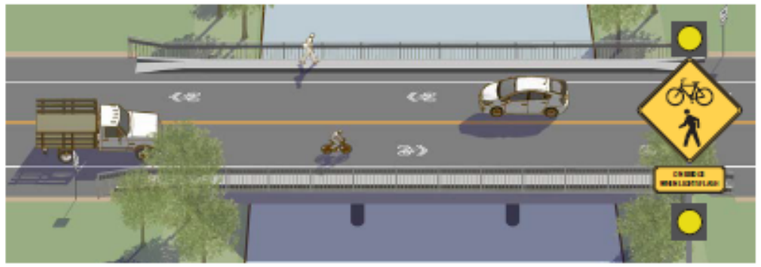
The following concepts identify potential design solutions for overcoming barriers at constrained bridge locations.

EXISTING CONDITIONS

Bridges may act as pinch points along an otherwise functional facility. Curb and railing construction may create conditions where neither the sidewalk or shoulder space is adequate for comfortable use.

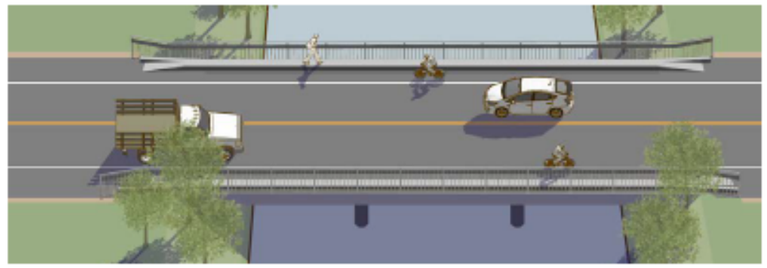
MARKINGS, SIGNS, AND BEACONS

Active warning beacons, R4-11 signs and Shared Lane Markings may be used to alert bridge users to the likely presence of bicyclists on the roadway. For increased bicycle comfort, consider reduced or advisory speed limits on the bridge.



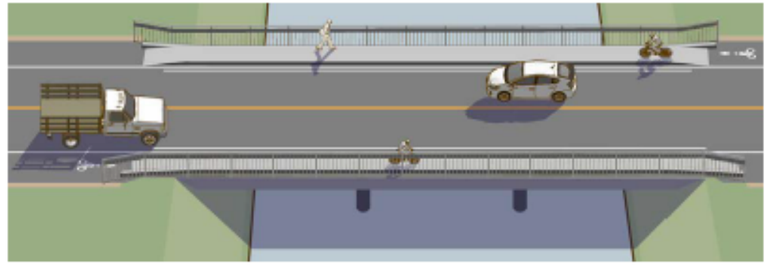
NARROW SIDEWALKS, WIDEN SHOULDERS

Removing narrow sidewalks in favor of widened shoulder space may add flexibility and functionality for more users.



NARROW SHOULDERS, WIDEN SIDEWALKS

Where additional width is available, extending existing curbs into the shoulder space to create adequate width sidewalks may increase user comfort.



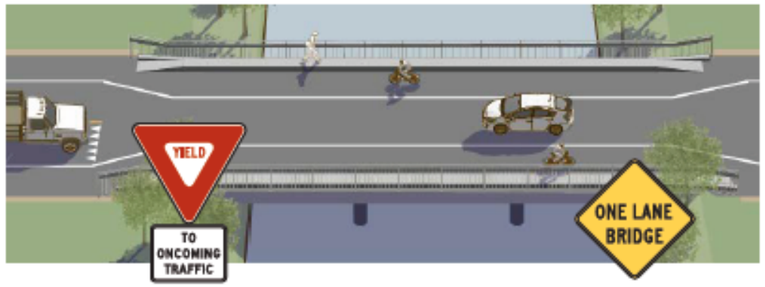
Bridge Retrofit

ADVISORY SHOULDERS

Establishing advisory shoulder operations on the bridge may create a bicycle priority space within the same roadway width. Refer to the guidance on **Advisory Shoulders**.

ONE LANE BRIDGE

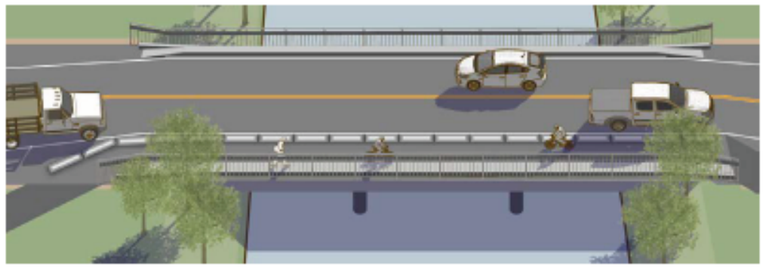
In areas with low motor vehicle volumes, configuring the structure as a one lane bridge can provide an exclusive separated space for pedestrians and bicyclists. Refer to the FHWA MUTCD section 2C.21.



ON DECK SIDEPATH

It may be possible to reduce lane width and align travel lanes to create a separated path on one side of the bridge deck.

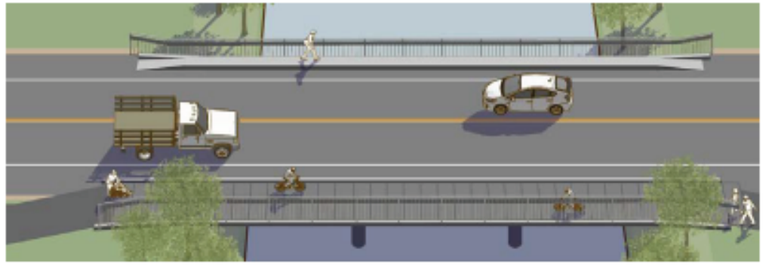
Refer to the **AASHTO Bike Guide 2012 Section 4.12.3.**



CANTILEVERED SIDEPATH

Where on-deck retrofits are impractical, it may be possible to cantilever a path on one or both sides of the bridge structure.

Refer to the **AASHTO Bike Guide 2012 Section 4.12.3.**



THE GUIDE

NEXT STEPS

- **Consolidate feedback** from partners, technical advisors, and FHWA bureaus
- **Updated Draft: Late November** and concurrence check with FHWA
- **Released: Early 2017**

THANK YOU!