

Safety for All Users Report

*A Report Developed by the U.S. Department of
Transportation Under Section 1442 of the
Fixing America's Surface Transportation (FAST)
Act*

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Introduction

Section 1442 of the Fixing America's Surface Transportation (FAST) Act – the U.S. Department of Transportation's (DOT) funding authorization for fiscal years (FY) 2016-2020 – which directs the Secretary of Transportation to “make available to the public a report cataloging examples of State law or State transportation policy that provide for the safe and adequate accommodation of all users of the surface transportation network, in all phases of project planning, development, and operation.”¹ A separate section of the FAST Act, Section 1404, permits States to allow local jurisdictions to use additional roadway design publications, providing additional flexibility to provide for the safe and adequate accommodation of all users.

In Senate Report 114-243 accompanying the Senate's proposed 2017 Appropriations Bill (S. 2844), Congress provided additional guidance regarding this report in a committee recommendation on Nonmotorized User Safety. While S. 2844 was never passed, DOT used the following language in Senate Report 114-243 to guide the creation of this report:

“In fulfilling the report required in section 1442, the Secretary should include guidance to States on how to identify the design and accommodation needs for each class of roadway user, separated by categories of age and ability, as well as actions that could be taken by State and local partners to improve safe and adequate accommodations for all users of the transportation network, including recommendations on changing policies and procedures; practical steps to modify planned and existing infrastructure; a list of common barriers to implementation and recommendations to overcome such barriers; guidance on evaluating the costs and benefits of safe and adequate accommodations; and recommendations for maximizing State and local cooperation.”²

This report is consistent with Section 1442 and congressional guidance on Nonmotorized User Safety accompanying the proposed FY 2017 Appropriations bill (S. 2844) by identifying eight multimodal policy and program areas that State departments of transportation (State DOTs) can adopt and implement to improve safety for motorists, motorcyclists, pedestrians, bicyclists, transit users, and freight vehicles. While the report considers the safety needs of all users of the surface transportation network, it focuses on the most vulnerable users – pedestrians and bicyclists – and infrastructure approaches that can provide for their safety. In some States, the State DOT owns, operates, and maintains a significant amount of infrastructure, while in others the majority of roads may be owned and operated by local and regional agencies. In both cases, State DOTs influence the funding and design of projects. They also provide technical assistance to partners and regional, local and Tribal stakeholders in their States on

¹ Section 1442(b), Fixing America's Surface Transportation (FAST) Act, Public Law No. 114-94.

² Senate Report 114-243, accompanying S. 2844, Transportation and Housing and Urban Development, and Related Agencies Appropriations Bill, 2017, 114th Congress, Second Session.

infrastructure project planning, development and execution, as well as operations, and can provide leadership in implementing effective practices that promote safety for all users.

This report discusses national trends in safety and multimodal transportation, and DOT's ongoing efforts to provide for safe and adequate accommodation of all users of the surface transportation network. Each section contains an overview of the policy or program, examples of State DOTs that have implemented the approach, and key resources available to States and local governments interested in learning more about these policies and programs. Information and examples are also provided on common barriers to implementation and solutions to those barriers, how to evaluate project efficacy, and how States effectively cooperate with local partners.

The report discusses how State DOTs can integrate the policy and program approaches into their project planning, development, and operations to overcome barriers and improve safety for all users of the surface transportation network. Finally, the report discusses how DOT's work to make progress on its goals in the areas of safety, infrastructure, and innovation can promote safety for all users.

National Trends in Safety and Multimodal Transportation

A range of users, including motorists, pedestrians, bicyclists, and transit users, rely on the U.S. surface transportation network to reach jobs, education, and other important destinations. This network also helps freight vehicles deliver products to market. Over decades, many roads across the U.S. were designed primarily for motorists without full consideration of the needs of pedestrians and bicyclists. Pedestrians and bicyclists are considered vulnerable users because, lacking protective devices such as seat belts and air bags, they are at greater risk of death or serious injury in the event of a crash. In recent years, many States and local jurisdictions have responded to increasing demand for safe walking and bicycling facilities by pursuing a vision for safe, multimodal surface transportation networks to allow individuals to choose the transportation option that best meets their needs for each trip. Doing so requires balancing the needs of the different users and making tradeoffs to redesign roads in ways that provide for the safety of all users.

After many years of progress in reducing traffic fatalities and serious injuries, over the last two years, traffic fatalities and serious injuries have increased. In 2016, 37,461 people died in crashes on U.S. roadways, a 5.6 percent increase over 2015 when 35,485 people died.³ An 8.4 percent increase in fatalities between 2014 and 2015 represented the largest increase in more than 50 years, with fatalities increasing across all crash types, including significant increases for pedestrians and bicyclists.⁴ Compared to 2015, in 2016 passenger car occupant fatalities and motorcyclist fatalities each increased by 5.1 percent. Bicyclist fatalities increased 1.3 percent to the highest number since 1991.⁵ Pedestrian fatalities

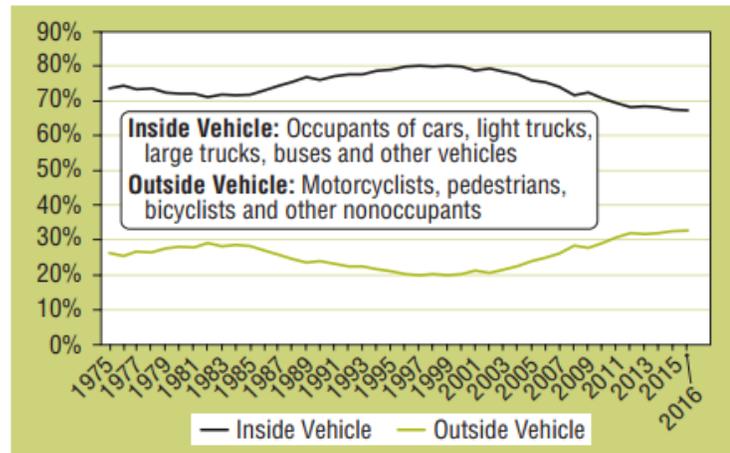
³ [2016 Fatal Motor Vehicle Crashes: Overview](#), p. 1, NHTSA, 2017.

⁴ [2016 Fatal Motor Vehicle Crashes: Overview](#), p. 1, NHTSA, 2017.

⁵ [2016 Fatal Motor Vehicle Crashes: Overview](#), p. 1, NHTSA, 2017.

increased 9.0 percent – the largest increase of any group – and are now at their highest number since 1990.⁶ This amounts to a pedestrian dying every 1.5 hours.⁷ Over the past decade, pedestrians have accounted for an increasing proportion of all traffic fatalities – up from 11 percent in 2006 to 16 percent in 2016.⁸ As shown in Figure 1, this fits into a two-decade trend in which the proportion of more vulnerable users “outside the vehicle” has increased from a low of 20 percent (1996-2000) to a high of 33 percent (2015-2016) as the proportion of people killed “inside the vehicle” has declined from 80 percent to 67 percent.⁹

Proportion of Fatalities Inside/Outside Vehicle, 1975–2016



Source: FARS 1975–2015 Final File, 2016 ARF

Figure 1. Proportion of Fatalities Inside and Outside the Vehicle (Source: NHTSA 2016 Fatal Motor Vehicle Crashes: Overview)

The causes of the overall increase in fatal crashes are not fully understood; however, likely contributing factors include an increase in vehicle miles traveled (VMT), which may be due to low gas prices coupled with a stronger economy, as well as impaired driving, speeding, and alcohol – all contributing risk factors. As discussed below, walking, bicycling, and public transportation use have also been increasing.

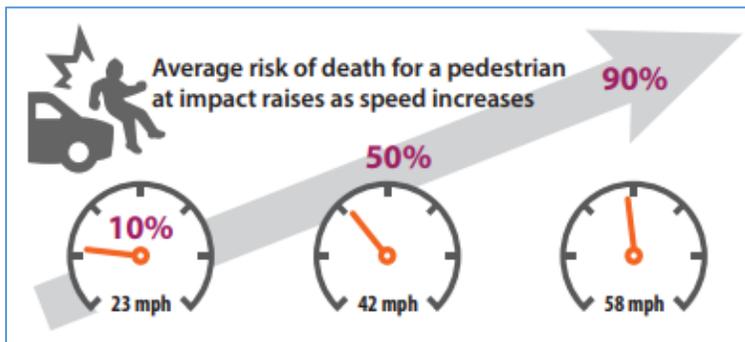


Figure 2. Pedestrian’s Risk of Death Relating to Speed Impact. (Source: FHWA Integrating Speed Management Report)

In 2016, speeding was a factor in 27 percent of the total crashes, with 10,111 fatalities.¹⁰ While speeding is a critical factor in all crash types, it is particularly dangerous for pedestrians and bicyclists, for whom higher vehicle speeds significantly increase the risk of death. Figure 2 shows that the risk of pedestrian fatalities in crashes increases from 10 percent to 90 percent as vehicle speeds at time of

⁶ [2016 Fatal Motor Vehicle Crashes: Overview](#), p. 4, NHTSA, 2017.

⁷ [Quick Facts 2016](#), NHTSA, 2017.

⁸ [Traffic Safety Facts: Pedestrians](#), p. 2, NHTSA, 2017; [2016 Fatal Motor Vehicle Crashes: Overview](#), p. 4, NHTSA, 2017.

⁹ [2016 Fatal Motor Vehicle Crashes: Overview](#), p. 5, NHTSA, 2017.

¹⁰ [2016 Fatal Motor Vehicle Crashes: Overview](#), p. 6, NHTSA, 2017.

impact increase from 23 mph to 58 mph.¹¹ A recent report by the National Transportation Safety Board (NTSB)¹², examines the causes of speed-related crashes, describing how speeding increases both the likelihood and severity of crashes, and how to further improve upon proven countermeasures.

The Governors Highway Safety Association (GHSA) recently released two reports – one focused on [bicyclists](#) and a second on [pedestrians](#) – in response to the increase in fatalities for these modes. The reports analyze crash data to better understand how, when, and why these crashes are occurring. The GHSA reports also make recommendations for improving safety for bicyclists, pedestrians, and motorists, which emphasize multi-pronged approach combining engineering, education and enforcement interventions. For bicyclists, GHSA emphasizes that safety increases significantly when there is physical separation from motorists through infrastructure. A study cited in the report found that on-street bike lanes that use barriers to physically separate bicyclists from motor vehicles are 89 percent safer than streets with parked cars and without bicycling infrastructure.¹³ When physical separation is not possible, infrastructure such as striped bike lanes, bicycle boulevards, and bike boxes help reduce the risk of conflict with motor vehicles.¹⁴ For pedestrian safety, the GHSA report highlights the safety benefits of investing in pedestrian infrastructure by highlighting the Federal Highway Administration (FHWA) Nonmotorized Transportation Pilot Program. According to a 2014 FHWA report, this program invested over \$79.8 million in Federal funds in bicycle and pedestrian infrastructure in four communities, which experienced a 20 percent decrease in pedestrian fatalities and a 17.9 to 55 percent decrease in pedestrian injury rates despite a 15.8 percent increase in pedestrian traffic.¹⁵ One point of particular relevance for this report is that safe roadway infrastructure takes on an added importance in preventing and mitigating nonmotorized crashes, because the safety advances for vehicle occupants are not available to those on foot and bicycle.

Every life lost in a traffic crash is a tragedy that deeply affects family members, friends, and coworkers of those who perish. These fatalities also have significant economic and societal costs. According to a 2014 report, the economic cost of motor vehicle crashes in 2010 totaled \$242 billion.¹⁶ These costs include losses in productivity, property damage, medical costs, rehabilitation costs, congestion costs, legal and court costs, emergency services such as medical, police, and fire services, insurance administration costs, and the costs to employers. The overall societal harm – including both economic costs and

¹¹ [Impact Speed and a Pedestrian's Risk of Severe Injury or Death](#), p.1, AAA Foundation, 2011.

¹² [Reducing Speeding-Related Crashes Involving Passenger Vehicles](#), NTSB, 2017.

¹³ [A Right to the Road](#), p.48, GHSA, 2017.

¹⁴ [A Right to the Road](#), p.48, GHSA, 2017.

¹⁵ [Everyone Walks: Understanding and Addressing Pedestrian Safety](#), pp. 24-25, GHSA, 2016; [Nonmotorized Transportation Pilot Program: 2014 Report](#), FHWA, 2014.

¹⁶ [The Economic and Societal Impact of Motor Vehicle Crashes, 2010](#), p. 1, NHTSA, 2015.

valuation for lost quality of life – totaled \$836 billion.¹⁷ Crashes involving pedestrians and bicyclists accounted for 7 percent of the total economic costs and 10 percent of the societal harm.¹⁸

From 2007-2016 there was a 12 percent average increase in walking commute mode share across the U.S., and a 50 percent average increase in bicycle commute mode share.¹⁹ In general, walking accounts for 10.4 percent of all trips, up 21 percent between 2001 and 2009, according to 2009 National Household Travel Survey (NHTS) data.²⁰ In response to this increase and growing demand for walking and bicycling infrastructure, many State DOTs, metropolitan planning organizations (MPOs), and local jurisdictions have devoted more attention to ensuring that transportation projects provide for the safe accommodation of all users on their streets. Given that crashes have been increasing across all modes, it is even more important to focus on ensuring safe travel, at appropriate speeds, on multimodal streets. From building separated bike lanes, to ensuring that pedestrians and bicyclists can safely cross intersections, there is an increasing emphasis on implementing solutions that accommodate all roadway users. There is also an increasing number of bike share systems being implemented around the country, which provide a new transportation option for residents, tourists, and local businesses. Many local leaders are also working to address traffic congestion at peak times and in doing so seek to make efficient use of constrained rights-of-way by improving the people moving capacity of their streets. Many of the trips made in the U.S. are less than three miles, distances that can be easily traveled by walking or bicycling.²¹ In many communities, transportation agencies are investing in safe walking and bicycling infrastructure, as well as transit services, to help make better use of existing capacity.

Small towns and rural areas also benefit from walking and bicycling infrastructure, and many smaller communities are taking steps to improve pedestrian and bicyclist safety. Many town centers in rural areas are compact, making them ideal sizes to support multimodal transportation. Walking and bicycling infrastructure in town centers, and along key network corridors, support thriving business districts and help residents access employment centers, healthcare, and other destinations. In many small towns, multi-use trails promote tourism-based economic activity, and may also provide access to public lands. Given that active transportation is quite common in rural areas, but infrastructure is often limited, it is important to prioritize design that supports safety for these users.²²

¹⁷ [The Economic and Societal Impact of Motor Vehicle Crashes, 2010](#), p. 4, NHTSA, 2015.

¹⁸ [The Economic and Societal Impact of Motor Vehicle Crashes, 2010](#), p. 11, NHTSA, 2015.

¹⁹ [American Community Survey, Commute Mode Share, 3 Year Estimates](#), U.S. Census Bureau.

²⁰ [Summary of Travel Trends, 2009. FHWA National Household Travel Survey](#), p. 20, 2011.

²¹ Fifty percent of trips are three miles or less; 40 percent are two miles or less; and 28 percent of trips are one mile or less. [2009 National Household Travel Survey Highlights](#), p. 1, League of American Bicyclists, 2010.

²² [Small Town and Rural Multimodal Networks](#), Chapter 1, p. 4, FHWA, 2016.

Safety is DOT's Top Priority

Safety has consistently been DOT's top priority. DOT strives to support State DOTs, MPOs, Tribes, Federal land management agencies, and local transportation agencies in providing a safe transportation system with options that allow the traveling public to choose the routes and modes that best suit their daily needs. The trend of increasing traffic fatalities and serious injuries is alarming and detrimental to the Nation, and DOT is committed to reversing this trend.

DOT plans to leverage data to better understand the factors contributing to the increase in traffic fatalities and serious injuries, and will use this information to implement effective policies to address these factors. DOT coordinates across the Department and with stakeholders to address safety challenges. The DOT Pedestrian and Bicycle Coordinating Committee convenes representatives from the Office of the Secretary (OST), FHWA, National Highway Traffic Safety Administration (NHTSA), Federal Transit Administration (FTA), Federal Motor Carrier Safety Administration (FMCSA), and Federal Railroad Administration (FRA) to focus on department-wide, cross-cutting issues, and works to ensure that a multimodal perspective is fully represented in discussions and initiatives across DOT. In 2016, NHTSA, FHWA, and FMCSA partnered with the National Safety Council (NSC) on the [Road to Zero initiative](#), with the goal of eliminating traffic fatalities within 30 years. The initiative includes an NSC-sponsored grant program to support proven life-saving strategies as well as a long-term vision to eliminate traffic risks.

This report focuses on achieving safety for all users through investments in surface transportation infrastructure, another important priority for DOT. Providing complete, comfortable, and connected multimodal networks reduces conflicts between modes, thereby improving safety. Improvements to streets and roadways that support multimodal travel have many benefits, including:

- Safer travel for people of all ages and abilities,
- Improved mobility for people and businesses, which benefits local and regional economies,
- Improved access to jobs and essential services, and
- Increased resilience for all communities.²³

DOT works with State, MPO, Tribal, local, and private partners to support their investments in multimodal transportation infrastructure that provides for the safety for all users, and help them address behavioral safety challenges. DOT activities include creating resources and guides to assist States and local partners, providing formula-based Federal-aid funding, targeted grants for improving safety, and leading or funding initiatives that offer States, MPOs, and Tribal and local governments technical assistance and capacity building opportunities.

²³ [Strategic Agenda for Pedestrian and Bicycle Transportation](#), pp. 8-9, FHWA, 2016.

Several DOT programs, initiatives, and resources, including the following, focus on infrastructure investments that can help promote the safety of all users. Several offices within FHWA collaborate to integrate safety into the life cycle of a roadway, and FTA focuses on access to transit.

- [FHWA Office of Safety](#): Together with customers, stakeholders, partners, and other DOT agencies, this office provides leadership to make the Nation's roadways safer by integrating safety into the entire life cycle of a roadway, including planning, design, engineering, environmental management, construction, and operations and maintenance. This includes several key programs and initiatives highlighted below.
 - [Highway Safety Improvement Program \(HSIP\)](#): This program focuses on achieving a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State-owned roads and roads on tribal land. The HSIP requires a collaborative, data-driven, and strategic approach to improving highway safety on all public roads with a focus on performance. In 2016, approximately \$2.4 billion in HSIP funding supported safety infrastructure projects selected by States and localities, and of this total, \$81.4 million went toward projects that primarily focused on improving pedestrian and bicycle safety.²⁴
 - The Strategic Highway Safety Plan (SHSP) is a statewide-coordinated safety plan that provides a comprehensive framework for reducing highway fatalities and serious injuries on all public roads. It identifies a State's key safety needs and guides investment decisions towards strategies and countermeasure with the most potential to save lives and prevent injuries.
 - In 2016, FHWA issued the [Safety Performance Management Final Rule](#), which supports the HSIP, and requires all State DOTs and MPOs to set targets for five performance measures, including targets for the number and rate of overall fatalities and serious injuries, and the number of nonmotorized fatalities and serious injuries. States submitted their first safety targets to FHWA in August 2017, and will continue to track progress towards these goals. MPOs will establish their first safety targets by February 2018.
 - [Proven Safety Countermeasures](#): FHWA has identified safety treatments and strategies, which are selected based on proven effectiveness and benefits, and encourages their widespread implementation. Such countermeasures include Road Safety Audits and road diets among other safety strategies and treatments.
 - [Crash Modification Factors Clearinghouse](#): This clearinghouse helps estimate the reduction in crashes following the implementation of safety countermeasures. These tools assist States with identifying and evaluating interventions to address safety issues in their SHSP.

²⁴ [HSIP 2016 National Summary Report](#), p. 30, FHWA, 2017.

- [Speed Management Program](#): FHWA's Office of Safety takes a multimodal, multidisciplinary approach to address the issue of speeding and has a number of resources available online to assist transportation agencies with setting safe and consistent speed limits, and recommendations for designing roadways to encourage safer driver behavior. FHWA's resources include [Speed Management Countermeasures](#) and the [Traffic Calming ePrimer](#), which contain interventions and countermeasures such as speed feedback signs, speed humps and roundabouts, and [USLIMITS2](#), a web-based tool to help practitioners set reasonable, safe, and consistent speed limits. The [Integrating Speed Management](#) report examines trends in roadway crashes and suggests strategies for crash reduction in three safety focus areas: roadway departures, intersections, and pedestrians and bicyclists.
- [Pedestrian and Bicycle Safety Focus States and Cities](#): The FHWA Office of Safety works with 16 Focus States and 35 Focus Cities on reducing pedestrian and bicyclist deaths. Efforts have included the development of Pedestrian Safety Action Plans, bi-monthly topical webinars, and training courses in collaboration with the Pedestrian and Bicycle Information Center (PBIC).²⁵ NHTSA targets technical assistance to many of these same Focus States and Focus Cities.
- [Every Day Counts Initiative](#): In 2009, FHWA and the American Association of State Highway and Transportation Officials (AASHTO) partnered to launch the Every Day Counts (EDC) initiative with the goal of accelerating the delivery of highway projects and addressing the challenge of limited budgets. In the third round of EDC innovations, FHWA promoted road diets, a low-cost strategy that reconfigures a roadway to safely accommodate all users, increase mobility and access, and improve a community's quality of life. As part of the fourth round of EDC efforts, FHWA launched the Safe Transportation for Every Pedestrian (STEP) innovation, focusing on the reduction of pedestrian fatalities by promoting road diets, pedestrian hybrid beacons, pedestrian refuge islands, raised crosswalks, and crosswalk visibility enhancements. The EDC-4 efforts help communities deploy these Proven Safety Countermeasures and support the goals of FHWA's Strategic Agenda for Pedestrian and Bicycle Transportation.²⁶
- [FHWA Bicycle and Pedestrian Program](#): FHWA provides many resources to support nonmotorized transportation networks and facilities, including details on funding opportunities under various surface transportation funding programs and recent updates to guidance and legislation. FHWA provides resources that assist State and local partners in implementing safer multimodal networks that are essential to mobility for people of all ages and abilities. Recent

²⁵ The [Pedestrian and Bicycle Information Center](#) is supported by FHWA and NHTSA and is housed within the University of North Carolina Highway Safety Research Center in Chapel Hill, North Carolina.

²⁶ The [Strategic Agenda for Pedestrian and Bicycle Transportation](#) will inform the FHWA's pedestrian and bicycle activities in the next 3 to 5 years. It will inform future investments, policies, and partnerships and serves as the update to DOT's 1994 National Bicycling and Walking Study.

featured publications include [Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts](#), and the [Small Town and Rural Multimodal Networks guide](#).

- [Manual on Uniform Traffic Control Devices](#) (MUTCD): FHWA publishes the MUTCD, which defines the standards used nationwide to install and maintain traffic control devices on all public streets, highways, bikeways, and private roads open to public travel. The FHWA collaborates on experimentation with States and localities to test new traffic control devices, and issues Interim Approvals for the use of proven innovative devices to improve the safety and operations of multimodal facilities, including roadways and bikeways. Two examples of Interim Approvals are green-colored pavement for bicycle lanes, which help clearly identify bicycle facilities, and two-stage bicycle turn boxes, which help bicyclists navigate intersections.
- [Manual on Pedestrian and Bicycle Connections to Transit](#): FTA recently released a manual that focuses on improving pedestrian and bicycle connections to transit. The guide will help transportation agencies make accessing transit safer and more attractive, particularly for nonmotorized users. This guide covers topics such as access sheds, connected multimodal networks, station area comfort, complete sidewalks and crossings, and bicycle parking. The manual also provides detailed information on implementation, including funding, marketing, interagency coordination, and data collection.

Although not the focus of this report, NHTSA focuses on addressing behavioral safety factors that contribute to a significant number of traffic fatalities and serious injuries, and these efforts also support DOT's comprehensive approach to improving the safety of all users.

- [NHTSA Highway Safety Grants Program](#): NHTSA supports State DOT highway safety programs by administering grants for efforts that will reduce deaths, injuries, and economic losses from motor vehicle crashes. Under Section 405, NHTSA administers grants to States to focus on improving safety in areas such as motorcyclist safety, distracted driving, and impaired driving countermeasures. The FAST Act established nonmotorized safety grants, which focus on projects that improve safety and reduce pedestrian and bicycle fatalities and injuries from crashes with motor vehicles.
- [NHTSA Speed Management Program Plan](#): This document defines six key elements for changing public attitudes regarding speeding and speed management: 1) data and data-driven approaches, 2) research and evaluation, 3) technology, 4) enforcement and adjudication, 5) engineering, and 6) education and communications. It identifies action items under each of these categories that DOT can take to continue to support speed management on the Nation's roadways.

In addition to this report, DOT is responding to Section 1442(a) by funding eight workshops led by the [Governors' Institute on Community Design \(GICD\)](#) to help State DOTs understand how to use performance-based practical design principles to balance the needs of all users in varying contexts and take advantage of existing flexibility to design streets that provide for the safety of all users. Workshops are being held in Delaware, Iowa, Louisiana, New Hampshire, North Dakota, Pennsylvania, Tennessee,

and Virginia. In August 2017, the first workshop in Tennessee brought together 55 participants, including Tennessee Department of Transportation (TDOT) leadership and staff from around the State, as well as several decision-makers from local governments and MPOs. The workshop focused on integrating the TDOT's multimodal access policy into all departmental practices and determining how to make tradeoffs between the needs of each mode. It included a walking audit and discussion of Charlotte Pike, a proposed future light rail corridor in Nashville, to help participants work through the challenges of accommodating all modes in the context of a real case study project and identify barriers, missing guidance, and gaps in coordination in current practices.

These programs and initiatives continue to support the implementation of targeted efforts to improve safety on the expanding multimodal networks across the U.S. DOT is continually working to assess how to best meet the needs of States and local partners.

Policy and Programs that Promote Safety for All Users

Consistent with FAST Act Section 1442 and the further guidance on Nonmotorized User Safety provided in Senate Report 114-243 accompanying the Senate's proposed FY 2017 Appropriations bill (S. 2844), this report focuses on eight policy and program areas that are effective in improving road safety for all users of the surface transportation network. While many of these policy and program areas target improvements for bicyclists, pedestrians, and transit users, in many cases, improvements for these users also improve the safety of motorized travel and benefit the surface transportation system overall. The policy and program areas respond to the Appropriations language by providing examples of barriers, policies, and steps to modify infrastructure.

The policies and programs in this report are both broad in supporting safety for all users, and specific in addressing safety concerns for specific populations such as children and people with disabilities. Each of these policies or initiatives can also encourage State-local cooperation by drawing together stakeholders to improve the safety of the surface transportation network for all users. The following policy and program areas are included in this report:

- **Road Safety Audits (RSAs):** RSAs bring together multidisciplinary stakeholders to identify potential concerns for user safety in roadway plans or existing projects. The results of RSAs can lead to infrastructure improvements and policy changes.
- **Project Selection Criteria:** State DOTs can establish and use performance-based project evaluation criteria to strategically choose projects that increase safety for all users.
- **Complete Streets Policies:** By adopting and implementing Complete Streets policies, States can ensure that roadway infrastructure projects support implementation of road design that appropriately accommodates all roadway users, including pedestrians, bicyclists, transit riders, and motorists.
- **Improving Accessibility for All Users:** In addition to Complete Streets policies, the Americans with Disabilities Act (ADA) transition plans and other tools help ensure that transportation

facilities safely accommodate travelers of all ages and abilities. States achieve this by integrating accessibility requirements into construction and maintenance, as well as Statewide and metropolitan Transportation Improvement Programs. The ADA transition plans ensure that design of transportation facilities supports all users regardless of ability.

- **Design Flexibility:** Design flexibility encourages innovative solutions for improving transportation facilities for all users that fit into community context. A flexible design approach allows States to balance the needs of various users given the range of design possibilities for roadway elements within Federal and State guidelines.
- **Safe Routes to School (SRTS):** These activities improve opportunities for children to walk and bicycle to school, promoting safety and physical activity. Through SRTS activities, States have supported the addition of sidewalks, crosswalks, and pedestrian bridges, as well as hosting Walk and Bike to School Day events.
- **Zero Deaths Vision:** These multidisciplinary approaches set the vision of ending traffic fatalities and serious injuries. They focus on collaboration to reduce barriers to safety through public safety campaigns and target critical factors that impact crashes and fatalities, such as lowering speed limits.
- **Road Diets and Resurfacing:** Road diets involve reconfiguring an existing roadway to encourage appropriate speeds and create space for dedicated turn lanes, medians, bike lanes and sidewalks. Road diets benefit State safety goals by significantly reducing crash rates.

Each of these policy and program areas includes a detailed description of the approach, case studies, and key resources. Many of these topic areas overlap in the ways they relate to planning, development, and operation of transportation facilities. For example, Road Diets can be a part of flexible design efforts, and SRTS activities can support Vision Zero goals. This list does not cover the full range of activities and approaches that States use to improve safety, but highlights known and effective practices that States can adopt to more safely accommodate all users of the surface transportation network.

Road Safety Audits

A [Road Safety Audit](#) (RSA) is a formal safety performance examination of a future roadway plan or project or an existing facility, and it is typically conducted by a multidisciplinary team. RSAs are usually conducted along corridors or at intersections that have safety challenges, which may be identified through crash analyses or other data-driven processes. RSAs include an eight-step process (see Figure 3) and primarily focus on enhancing safety by identifying potential issues that may affect a group of roadway users, or generally affect all users. The outcomes of RSAs are suggestions and measures for consideration by the design team at the responsible agency.

RSAs are useful tools to assess safety and accessibility for all road users in a variety of locations and contexts. RSAs can be customized to the area in which they are conducted, whether it be a rural, suburban, or urban context. RSAs may focus on bicyclists and pedestrians or other vulnerable roadway users, but also account for freight and private vehicle operators. RSAs may identify both physical and policy barriers to safe roadway use, and also solutions that may include infrastructure improvements and policy changes. RSAs are a low cost, effective method to facilitate a multimodal street network for all users, and can be conducted at any stage in a project's life cycle (before, during, and after construction).



Figure 3. The eight-step RSA Process. (Source: FHWA Bicycle Road Safety Audit Guidelines and Prompt List)

State DOTs can sponsor or conduct RSAs on facilities that they own to address existing or perceived safety issues and learn more about identified problems. State DOTs may also provide support, training or funding to locals to conduct RSAs on their roads. Less formal roadway assessments can also be a first step in identifying issues that need to be addressed to ensure safety for all users. For example, DOT field offices (including FHWA, FMCSA, FTA, and NHTSA) recently coordinated [such assessments](#) in every State to begin to address the safety needs of bicyclists and pedestrians.

The most successful RSAs are conducted by multidisciplinary teams with representation from local, State, and Federal governments, as well other community stakeholders. Working together helps these groups provide the perspective of all road users, and identify a range of interventions to address identified barriers. The results of RSAs are often incorporated into future planning efforts and project scoping, and can assist agencies in securing funding for improvements.

Case Study: Connecticut

In 2017, the Connecticut Department of Transportation (CTDOT) established the [Community Connectivity Grant Program](#) (CCGP), which is intended to improve conditions for walking and bicycling to and around Connecticut's community centers. The program funds projects that allow municipalities to perform small scale capital improvements.

One component of the grant program provides assistance to towns and cities to conduct an RSA at important bike and pedestrian corridors and intersections. The RSA consists of three parts conducted during one business day: a pre-audit meeting, a field audit, and a post-audit meeting. Upon completion of the RSA, each participating municipality is provided with a report detailing the documented safety concerns, RSA results, and individualized short-term and long-term recommendations for safety

improvements. Over 80 RSAs have been completed since 2016 across the State, and all RSA reports are documented on the CCGP website for other municipalities to use as a resource. The CTDOT grant assistance has provided vital information to address safety issues and identify countermeasures to improve safety and reduce crashes at important multimodal corridors and intersections across the State.

Case Study: Washington

In 2003, the Washington State [Tribal Transportation Planning Organization](#) (TTPO) was established to help tribes take an active role in Statewide transportation planning. There are 29 Federally recognized Tribes in Washington, and Tribal lands comprise approximately 8 percent of the land area in the State.²⁷ In 2005, the Washington State Department of Transportation (WSDOT) initiated the [Tribal Transportation Database Project](#), which inventoried the transportation needs and road systems in tribal land in the State. Beyond this inventory, WSDOT has partnered with Tribes to use RSAs to support and address safety issues related to [Tribal reservation transportation](#). The RSA teams operate through a collaborative model, featuring Tribal representatives such as transportation staff, planners and engineers, and law enforcement. In 2007, the Shoalwater Tribe worked with WSDOT on nine roadways and a pedestrian/bicycle path, identifying lists of action items related to drainage, signs, lighting, and other features.²⁸ In 2015, Shoalwater Bay used [Tribal Transportation Program Safety Funds](#) to conduct more RSAs in the reservation. In 2016, WSDOT held an RSA training for local Tribes at Lummi Nation. The training workshop included two RSAs on two areas identified in the Lummi Nation's 2015 Transportation Safety Plan. [The report](#) offers information on safety risks and guidance for short and long-term solutions. WSDOT also held a [Washington Tribal-State Transportation Conference](#) in 2016, which addressed data-driven traffic safety planning and how to engage the public in the process.

Key Resources

[Road Safety Audit Webpage](#) (FHWA)

FHWA's RSA website contains guidance, resources, and case studies on the benefits of conducting RSAs.

[Road Safety Audit Toolkit for Federal Land Management Agencies and Tribal Governments \(FHWA, 2010\)](#)

This resource focuses on conducting RSAs on or adjacent to Federal and Tribal Lands. The toolkit contains information relevant to the unique situations that occur on such lands.

[Bicycle](#) and [Pedestrian](#) Road Safety Audit Guidelines and Prompt Lists (FHWA, 2012 and 2007)

FHWA created separate guidance for RSAs focused on bicyclists and pedestrians. Each resource provides transportation agencies and RSA teams with a better understanding of the safety of nonmotorized users of the transportation system. The guidelines describe how to conduct an RSA and effectively assess the safety of bicyclists and pedestrians in order to implement a multimodal approach to safety.

²⁷ [Washington State Tribal Transportation Planning Organization](#), p. 1, 2006.

²⁸ [Road Safety Report: Shoalwater Bay Roads](#), p. 7, WSDOT Highways & Local Programs, 2007.

[Checklist for Assessing the Accessibility of Transportation and Mobility](#) (Easter Seals, 2016)

Easter Seals is a nonprofit that provides resources for individuals and families living with disabilities. Their 2016 *Checklist for Assessing the Accessibility of Transportation and Mobility* is a resource for transit agencies and public works departments to help enhance the accessibility of transit stops, or assist in the development of a strategic plan to achieve system-wide accessibility.

Project Selection Criteria

With limited resources, transportation agencies must make effective decisions about which projects to fund and implement. Project selection criteria based on [performance based transportation planning](#) add objectivity to the project selection process and can help State DOTs and regional and local transportation agencies choose projects that align with their mission and goals and increase accountability to taxpayers. Incorporating safety considerations into project selection criteria helps ensure that projects increase the safety of the transportation system for all users.

The Moving Ahead for Progress in the 21st Century Act (MAP-21) required State DOTs and MPOs to transition to a performance-based approach to transportation planning and decision making, including using performance measures and targets established to support national goals associated with safety, congestion reduction, and system performance. Performance management provides opportunities for states to invest strategically in projects that will improve safety for all users. Under the [Safety Performance Management Final Rule](#), States are required to set targets and track five safety performance measures, including pedestrian and bicyclist fatalities and serious injuries. States set targets for the first time in 2017. States should consider these performance measures when developing the policies, programs, and investment priorities reflected in their long-range transportation plans and Statewide Transportation Improvement Programs (STIPs).

FHWA also requires States to develop [Strategic Highway Safety Plans \(SHSP\)](#), which are Statewide plans that provide a comprehensive framework for reducing highway fatalities and serious injuries on all public roads. The SHSP uses a collaborative, data-driven approach to analyze a State's key safety needs, and guides investment decisions towards strategies and countermeasures with the greatest potential to save lives and prevent injuries. This process identifies several safety emphasis areas, and projects that support these emphasis areas are eligible for funding through the [Highway Safety Improvement Program \(HSIP\)](#). The SHSP emphasis areas can also inform project selection criteria for the STIP and long-range transportation plan, as well as performance measures to help States meet their established safety targets and ensure that funding decisions support SHSP priorities and planning goals.

A challenge in establishing project selection criteria related to safety can be the data collection and analysis required to understand the current situation and how proposed projects will improve safety.

The data analysis for the SHSP can help provide information on crashes and other safety need areas. However, in many States and localities, pedestrians and bicyclists counts are not collected as frequently as for vehicles, nor are they counted with consistent methodologies, presenting challenges in assessing their exposure to risk. In order to start addressing this issue, FHWA has updated the Travel Monitoring and Analysis System (TMAS) to allow consistent submission of nonmotorized count data. FHWA published a [resource](#) to help agencies collect pedestrian and bicyclist counts in the Traffic Monitoring Guide (TMG) format, which is necessary for submitting nonmotorized counts into TMAS. Jurisdictions conducting such counts are able to use associated project selection criteria to prioritize projects in areas where there are high numbers of bicyclists and pedestrians or projects that fill gaps in a network, reduce VMT in congested areas, or improve intersections that have had repeated crashes or high rates of crashes.

State DOTs can also choose to weight project selection criteria to give higher scores to projects that support priorities like safety. Agencies can adjust criteria and weighting schemes depending on the characteristics of the project; for example, there could be different criteria or weighting for urban versus rural projects, or roadway versus transit projects.

Case Study: Virginia

In 2014, the Virginia legislature unanimously passed House Bill 2 (HB2), which required the Virginia Department of Transportation (VDOT) and the Commonwealth Transportation Board (CTB) to develop a quantifiable and transparent prioritization process for making funding decisions for capacity enhancing projects. The legislation required the CTB to prioritize projects based on enumerated priorities: safety, congestion mitigation, economic development, accessibility, environmental quality, and (in areas with a population over 200,000 people) coordination with land use. In response to the legislation, VDOT and CTB developed a project prioritization process called [Smart Scale](#), which assigns points to projects based on evaluation measures of these priorities. The priorities and measures are weighed differently based on the type of community where the project is located.

For roadway projects, scoring for safety is directly related to the number of fatal and injury crashes expected to be avoided due to project implementation and the change in fatality and injury crashes per VMT. For transit projects, the safety measure used is the expected shift from cars to transit and the resulting decrease in crash frequencies. For bicycle and pedestrian projects, the score is based on the roadway methodology and/or intersection improvement crash modification factors. In 2016, Virginia received 321 applications seeking Smart Scale funds and selected 163 of these projects with an average benefit-to-Smart Scale cost ratio of 10.7.²⁹

²⁹ [Annual MPO Meeting SMART SCALE Update](#), pp. 3-4, Commonwealth of Virginia, Office of the Secretary of Transportation, 2017.

Case Study: Tennessee

The Tennessee Department of Transportation (TDOT) established the [Multimodal Access Grant Program](#) in 2013 to fund projects that improve pedestrian, bicycle, and transit access. TDOT developed the program to address gaps in multimodal connectivity along State routes and improve access to transit hubs, in response to priorities established through its long-range planning program. The program is funded through TDOT's Three-Year Work Program, and since the first round of grants in 2014, TDOT has awarded a total of \$30 million of funding to 40 projects.

Under the program, MPOs and Regional Planning Organizations submit projects during the application period to request State funds for a variety of multimodal infrastructure improvements. TDOT evaluates and prioritizes the applications received using a set of scoring criteria. Projects that address a location with a history of bicycle and pedestrian crashes are given the highest weight. Other criteria include: whether the project will contribute to an integrated transportation system linking a variety of activity centers; whether the project is identified in State and/or local plans; whether there is a likelihood that the project will be constructed within 18 months of an executed contract based on demonstrated readiness; and whether the project will support economic development and serve economically disadvantaged populations. TDOT also looks specifically for projects that demonstrate coordination with transit agencies and provide last mile connectivity for transit riders.

Key Resources

[Highway Safety Improvement Program \(HSIP\)](#) (FHWA)

FHWA's HSIP website contains guidance and resources on developing SHSPs, safety performance measures, and other safety-related initiatives.

[Guidebook for Developing Pedestrian and Bicycle Performance Measures](#) (FHWA, 2016)

This resource is intended to help communities develop performance measures that can fully integrate pedestrian and bicycle planning into ongoing performance management activities.

[Planning and Data Collection Tools](#) (PBIC)

PBIC's website provides links to tools that can help transportation agencies collect crash, count, roadway, and other data. This data can be used to identify transportation and safety needs for bicyclists and pedestrians and to select the appropriate improvements to make conditions safer and more comfortable for all roadway users.

Complete Streets Policies

[Complete Streets](#) policies are intended to ensure that future transportation projects are designed to provide safe and adequate transportation options for roadway users, of all modes, ages and abilities. A Complete Streets approach starts with a policy commitment to accommodate all anticipated users into future transportation projects, and from there goes on to outline guidelines or requirements for implementation and decision-making. The ultimate goal of Complete Streets policies is that pedestrians, bicyclists, motorists and transit riders will be able to safely, conveniently, and easily use roads, sidewalks, bike paths, transit and rails to get to their destination. Since Complete Streets policies require accommodation of all users, careful consideration of freight movement and emergency response may also be part of a Complete Streets policy.



Figure 4. Complete streets improvements were made in 2013 on Main Street in Urbana, IL. The improvements included this pedestrian crossing, with a refuge island. Image courtesy of Champaign County Regional Planning Commission. (Source: FHWA Case Studies in Delivering Safe, Comfortable and

A primary goal of a transportation system is to safely and efficiently move people and goods. Walking and bicycling are efficient transportation modes for most short trips and, where convenient intermodal systems exist, these nonmotorized trips can be linked with transit to significantly increase trip distance. Infrastructure and design features that provide for safe nonmotorized use may include lighting, sidewalks, curb extensions, crosswalks, pedestrian refuge islands, bus shelters, bus lanes, and bike lanes. Figure 4 shows improvements made to a street in Urbana, Illinois, to more safely accommodate all users.

Complete Streets policies are adopted by States, MPOs, municipalities, and DOTs or other agencies, and the most comprehensive policies impact all phases of planning, project scoping, implementation, operation, and maintenance. Complete Streets approaches take into account the safety of all roadway users, and avoid the implementation of road designs that consider only certain road users. The National Complete Streets Coalition provides guidance on creating [comprehensive policies](#), recommending that such policies apply to both new and retrofit projects, encourage connectivity of bicycle and pedestrian networks, include direction on using the most up-to-date design guidance and criteria, and include performance measures to evaluate and track outcomes.

State DOTs have supported adoption and implementation of Complete Streets by adopting Statewide policies, and encouraging the implementation of policies at the local and regional level. Some State

DOTs incentivize the adoption of local Complete Streets policies by making this an eligibility requirement for certain funding or technical assistance opportunities.

Case Study: Massachusetts

To facilitate and promote the adoption of Complete Streets policies by municipalities across Massachusetts, the Massachusetts Department of Transportation (MassDOT) established a [technical assistance and funding program](#). This program employs a tiered process that rewards municipalities for integrating the needs of all road users into their policies and project development.

Tier 1 provides assistance to municipalities in the form of Complete Streets training and policy development. Tier 2 provides technical assistance to develop a Complete Streets prioritization plan. Tier 3 provides project construction funding for municipalities that successfully advance through the first two tiers and move into implementation. By taking this approach at the State level, MassDOT has successfully encouraged municipalities to implement Complete Streets policies into their transportation projects. The availability of this training, technical assistance, and funding has led to adoption of 142 policies across the State, 90 prioritization plans, and 26 completed construction projects, as of October 2017. MassDOT makes this data and associated documents public on an [interactive map](#). Washington State is pursuing a similar program.

Case Study: Florida

The Florida Department of Transportation (FDOT) adopted its [Complete Streets policy](#) in 2014 as a part of a strategy to reduce pedestrian fatalities, which national studies identified as being disproportionately high in Florida compared to other States. The policy included direct changes to agency guidance and decision-making practices to ensure that Complete Streets adoption took root in FDOT's organizational culture.

FDOT undertook this effort by convening stakeholders to develop a [Complete Streets Implementation Plan](#). The plan calls for a five-part approach to implementation, including:

- Revising guidance documents, standards, manuals, and other policies to align with the Complete Streets policy;
- Updating decision-making processes to ensure consideration of Complete Streets;
- Modifying performance measures to align with and incorporate Complete Streets approaches;
- Improving management of internal and external communication to incorporate Complete Streets approaches; and
- Providing ongoing education and training to staff and partners in other government agencies.

As part of these efforts, [FDOT recently adopted eight context classifications](#) that help determine whether a roadway might need additional accommodations to serve all road users. While FDOT's changes draw on existing research and classifications, Florida is one of the first States to incorporate

such changes into formal decision-making processes that will apply in design decisions for new or modified roads. The overarching result has been a shift in agency mindset at FDOT through comprehensive adoption of Complete Streets and context-sensitive approaches. FDOT has become a leader in Complete Streets polices, and now routinely considers all users in the planning, design, construction, and operation of streets. Several other States, including Louisiana, New Hampshire, and Tennessee, are also implementing their commitment to safety for all users by undertaking reviews of standards, manuals, other policy documents, and processes to eliminate barriers and make implementation easier.

Key Resources

[Statewide Pedestrian and Bicycle Planning Handbook](#) (FHWA, 2014)

This resource provides guidance to State DOTs on how to develop or update bicycle and pedestrian plans to promote safety, including information on States' existing Complete Streets policies.

[Metropolitan Pedestrian and Bicycle Planning Handbook](#) (FHWA, 2017)

This resource provides guidance to MPOs on how to develop or update bicycle and pedestrian plans to promote safety, including information on MPOs' existing Complete Streets policies.

[Small Town and Rural Multimodal Networks](#) (FHWA, 2016)

This resource guide supports small towns and rural communities in developing multimodal networks to improve safety and accessibility for all roadway users. It translates existing design guidance for traffic facilities to a rural context.

[National Complete Streets Coalition](#)

The National Complete Streets Coalition is the leading national organization promoting the adoption and implementation of Complete Streets policies. Their website includes information about Complete Streets policies across the Nation, as well as resources on how to implement Complete Streets policies.

[Planning Complete Streets for an Aging America](#) (AARP, 2009)

This guide focuses on designing streets to accommodate aging populations. As the U.S. population grows older and lives longer, Complete Streets policies can facilitate the development and implementation of roadways that accommodate safe and comfortable travel for aging populations.

Improving Accessibility for All Users

Many communities have taken steps to promote the safe mobility of people of all ages and abilities. At the Federal level, such actions are governed by [Section 504 of the Rehabilitation Act of 1973](#) and the [Americans with Disabilities Act of 1990](#) (ADA). These laws require State DOTs and local governments to ensure that individuals are not, on the basis of disability, excluded from participation in or denied the

benefits of the public entities' services, programs, or activities—including use of public rights-of-way, streets, and sidewalks.

Creating safe streets for people with disabilities, older adults, children, and others requires pedestrian facilities such as sidewalks, curb ramps, pedestrian signals, and crosswalk markings. It is also important to understand how a person's limitations can create barriers to mobility. Eliminating barriers (see Figure 5) that block the path of travel, including poorly placed steps, utility poles, street furniture, missing curb ramps, and construction work, helps ensure safe travel for all users in the public rights-of-way. Providing audible signals and tactile warnings for people with vision impairments, and creating clear signs for older citizens also helps to ensure safe travel.

Many people with disabilities use public transportation as their primary means of transportation. When fixed-route transit service is not accessible, some use paratransit services mandated by the ADA. Accessible streets and public transportation systems reduce the need for expensive paratransit service and promote freedom in mobility for more people. The ability to use the fixed-route service, supported by a fully accessible streetscape and system, affords people a degree of freedom and spontaneity not possible with the advanced booking requirements of traditional paratransit service. In the absence of such systems, some people are forced to make unsafe choices, like walking or wheeling in the street. Connected and well-maintained pedestrian infrastructure makes it both possible and safe to wheel or walk to more destinations in a community, affording access to all a community can offer. FTA is helping to improve safe travel for people with disabilities through its [Accessible Transportation Technologies Research Initiative](#), which develops innovative technologies to support independent travel for those with disabilities in pre-trip planning, wayfinding, safe intersection crossing, and automation. FTA also works with industry partners in developing technology to improve personal mobility through the [Mobility on Demand Sandbox Program](#).



Figure 5. A bus stop shelter obstructs the sidewalk.
(Source: DOT)

The ADA requires all public entities to evaluate their existing programs and services that may not be accessible and make necessary modifications to achieve accessibility. Based on the results of that evaluation, where structural changes to facilities are required, a public entity with 50 or more employees must develop a transition plan, setting forth the steps necessary to complete such changes.

ADA transition plans are meant to identify system needs and integrate them into the State's planning processes. These plans must be made available for public comment, and include specific outreach to local community groups representing people with disabilities. At a minimum, ADA transition plans must include the following:

- Identification of an ADA coordinator, the official responsible for implementation of the ADA transition plan;
- An inventory of physical obstacles in the public entity's facilities (such as a lack of accessible curb ramps) that limit the accessibility of its programs or activities to individuals with disabilities;
- A description of the methods that will be used to make all facilities in the public rights-of-way accessible; and
- A prioritized schedule for making the identified facilities accessible.³⁰

In 2015, the FHWA Office of Civil Rights created a multi-disciplinary [Working Group](#) that works closely with FHWA Division offices to ensure that their State DOT ADA transition plans address the minimum required attributes. This approach focuses on outcomes and on accelerating the States' efforts to improve the accessibility of existing facilities in the public rights-of-way.

In addition to providing program access, State DOTs must integrate accessibility requirements into all construction projects, scheduled maintenance activities, other relevant projects, and the overall transportation planning process to ensure safe and equal access for all users. In order to most effectively and holistically improve accessibility for all users, it is a best practice for planners, engineers and other staff to work together with ADA coordinators and people with disabilities to ensure that accessibility solutions are integrated into transportation planning and project development processes. For example, the FHWA and Department of Justice [memo](#) on incorporating curb ramps into resurfacing projects, and a supplementary [Q&A resource](#), highlight when roadway resurfacing work is considered an alteration under the ADA, requiring the installation of curb ramps.

Case Study: Oregon

According to its [ADA webpage](#), "a fully inclusive transportation system is critical to fulfilling the Oregon Department of Transportation (ODOT)'s mission." ODOT inventories its public access buildings, curb ramps, pedestrian signals, sidewalks, shared use paths, transit stops, and parking facilities in order to identify barriers to accessibility. The Features, Attributes & Conditions Survey – Statewide Transportation Improvement Program reporting tool uses this data and provides summary reports for transportation features to help ODOT staff monitor progress. The public can use ODOT's [TransGIS](#) maps to view and provide comments on the location and condition of curb ramps on ODOT highways. [ODOT's ADA Transition Plan](#) includes priority ranking for ADA improvements, with priority given to citizen requests, critical corridors as defined by disability stakeholders, and cities without public transportation.

³⁰ See 28 CFR 35.150

ODOT is committed to continual improvement and has a schedule for eliminating barriers based on 5-year and 30-year timeframes.

ODOT ensures transparency and accountability by making [ADA guidelines](#) easily accessible to the public. The ODOT "[Engineering for Accessibility](#)" web page provides detailed information on all project elements that impact ADA accessibility. Each project element includes links to technical documents and standards. The website includes contact information and links for users to request reasonable accommodations, such as assisted listening devices or printed materials. An [ADA Issue Request Form](#) is available for modifications of the State transportation system.

Case Study: Nevada

The [Nevada Department of Transportation](#) (NDOT) website provides comprehensive, well-organized resources for both State employees and members of the public to learn about accessibility and reasonable accommodation. It provides an easily accessible [form](#) for reporting access barriers, as well as a general [recommendation and comment form](#) for NDOT's ADA Coordination Program. Visitors can easily access the [ADA Transition Plan](#), as well as its [public comments](#) and [comments from the FHWA review process](#). The ADA transition plan includes a self-assessment of accessibility features of NDOT's facilities, noting compliance rates as a measure of progress. Using this self-assessment, NDOT will prioritize improvement projects to improve safety and accessibility. The ADA transition plan also includes a list of roles and responsibilities for NDOT's divisions to ensure ADA compliance of all facilities.

According to its ADA Transition Plan, NDOT has "surveyed and mapped all State-owned sidewalks, ramps, pedestrian push buttons and other roadway features for ADA compliance. . . [and] pinpointed and prioritized the important accessibility improvement projects." NDOT provides an [online map](#) feature for its inventory, which includes details and photos of the condition of pedestrian push buttons, sidewalks, and ramps. It identifies areas with narrow access, cross slopes from driveways, and other potential areas in need of improvement for people with disabilities.

Key Resources

[ADA Update: A Primer for State and Local Governments](#) (DOJ, 2015)

The DOJ primer provides States and municipalities with background information on the requirements of the ADA and how to implement them. The guide outlines the general nondiscrimination requirements, as well as how to make the built environment accessible and plan for program success.

[ADA Transition Plans: A Guide to Best Management Practices](#) (National Cooperative Highway Research Program, 2009)

This guide is intended to provide State and local departments of transportation with ideas, information, and examples of successful practices for developing and updating ADA transition plans. It provides an overview of plan requirements, presents potential challenges departments may encounter, and offers examples of how other departments have addressed these.

[Checklist for Assessing the Accessibility of Transportation and Mobility](#) (Easter Seals Project ACTION, 2016)

Easter Seals Project ACTION was a technical assistance center operated as a cooperative agreement between FTA and Easter Seals, Inc. This guide consists of an introduction to assessing the accessibility of a transit route, and includes three checklists that cover walking to the transit stop/station, the transit stop/station itself, and riding on the transit vehicle. The checklists are designed to be a resource to enhance the accessibility of a community, including public transportation, by evaluating individual routes/trips and fostering awareness of people's different needs and abilities.

[Public Right-of-Way Accessibility Guidelines \(PROWAG\)](#) (United States Access Board)

The United States Access Board is developing new guidelines for public rights-of-way that will address various issues, including access for blind pedestrians at street crossings, wheelchair access to on-street parking, and various constraints posed by space limitations, roadway design practices, slope, and terrain. The new guidelines will cover pedestrian access to sidewalks and streets, including crosswalks, curb ramps, street furnishings, pedestrian signals, parking, and other components of public rights-of-way. Once these guidelines are adopted by the Department of Justice, they will become enforceable standards under Title II of the ADA.

Design Flexibility

The DOT encourages design flexibility and the use of engineering judgement by State DOTs and local agencies delivering roadway projects to safely and comfortably accommodate all users. In many communities, accommodating and encouraging walking and bicycling requires retrofitting an existing transportation system with constrained rights-of-way to include new or enhanced pedestrian and bicycle infrastructure.

FHWA supports State and local partners in understanding and using the design flexibility available to them by promoting approaches including [Performance-Based Practical Design](#) and [Context-Sensitive Solutions](#). These approaches allow States to evaluate the short-term and long-term holistic impact of a project beyond its direct purpose. In 2013, FHWA issued a [memo](#) stating the agency's support for taking a flexible approach to bicycle and pedestrian facility design and recognizing a list of manuals and resources that can inform the planning and design process for these modes. To help address common challenges and barriers in accommodating multiple modes on roadways, FHWA published a report on [Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts](#) (Figure 6 demonstrates how narrower lane widths can provide safety benefits for bicyclists and pedestrians, and contribute to lower vehicle operating speeds). In 2016, FHWA revised the [controlling criteria for design](#) to allow more flexibility in how State, city, and county engineers design highway projects, and to "encourage the design of lower-speed roads to be more in line with community and environmental

needs.”³¹ Section 1404 of the FAST Act, Congress permitted States to allow local jurisdictions to use additional roadway design publications, providing additional flexibility to provide for the safe and adequate accommodation of all users. FHWA also issued a [memo](#) in 2016 containing guidance on this additional design flexibility provided for in Section 1404 of the FAST Act.

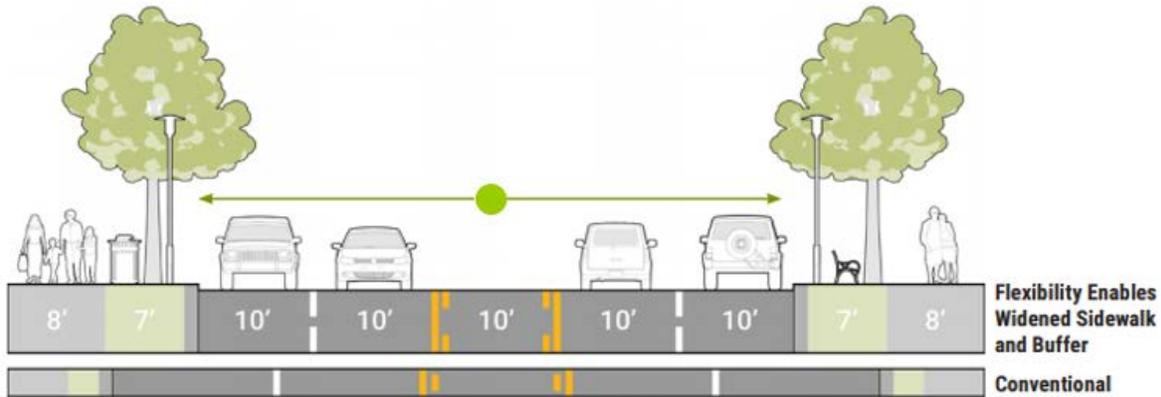


Figure 6. Narrower travel lanes can provide space for widened sidewalks and buffers, reduce crossing distances, and contribute to lower vehicle operating speeds. (Source: FHWA Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflict)

State DOTs can take advantage of the flexibility available to them to ensure that roadway projects are designed to meet the unique needs of each context, and can also support and encourage local governments to do the same on their own roads.

Case Study: Colorado

In 2014, the Chief Engineer of the Colorado Department of Transportation (CDOT) released a [memo](#) highlighting the importance of prioritizing multimodal transportation and encouraging context-specific design that supports all users. Subsequently, CDOT revised its [Roadway Design Guide](#) to include a comprehensive chapter on bicycle and pedestrian facilities, and CDOT now offers annual trainings on design for nonmotorized infrastructure. Colorado is one of nine States that have endorsed the National Association of City Transportation Officials (NACTO) [Urban Street Design Guide](#), and it has also endorsed the NACTO [Urban Bikeway Design Guide](#); both guides are aimed at meeting the needs of urban areas.

In 2016, CDOT began construction on the Grand Avenue Bridge, which connects downtown Glenwood Springs, the Historic Hot Springs District, and I-70. The [existing vehicle and pedestrian bridges](#) were in poor condition, and the substandard lane widths and lack of shoulders made travel difficult for large vehicles such as buses and emergency service vehicles, as well as bicyclists and pedestrians. The [Grand](#)

³¹ “[FHWA Move to Encourage Highway Design Flexibilities Kicks Off with Changes for Lower Speed Roads](#),” U.S. Department of Transportation, October 2015.

[Avenue Bridge](#) project is an example of CDOT's commitment to using context-specific design; CDOT is leveraging the bridge's needed repairs to improve multimodal access. The project's [main goals](#) include meeting design standards while improving multimodal connectivity and safety, minimizing environmental and aesthetic impacts, and incorporating Context Sensitive Solutions. The five-phase, 30-month project is expected to be completed ahead of schedule and will provide a new pedestrian/bicycle bridge and a widened bridge for vehicle traffic.

Case Study: Arizona

In 2016, the Arizona Department of Transportation (ADOT) published the [Complete Transportation Guidebook](#), a resource to support transportation planning for all users. The guidebook offers seven core strategies, including design flexibility, and complements the States' Complete Streets and Context-Sensitive Solutions. The guidebook provides examples of collaboration to create flexible solutions, such as in Sedona, where ADOT and stakeholders addressed challenges related to preserving aesthetic and cultural values, tourism, multimodal needs of residents, and addressing safety and congestion concerns.

ADOT has moved towards adding wider paved shoulders of at least six feet on State highways undergoing major reconstruction to accommodate bicyclists, and to maintain and sometimes widen paved shoulders on pavement preservation projects. ADOT has also revised traffic engineering guidelines and associated processes related to rumble strips to include a clear shoulder width of four feet so that shoulders are usable for bicyclists.³²

Key Resources

[Context Sensitive Solutions](#) (FHWA)

FHWA provides information on how to develop transportation solutions that involve all relevant stakeholders and consider unique features of a project's context. The site offers over 100 case studies across 23 topic areas, as well as a collection of webinars and resources.

[Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts](#) (FHWA, 2016)

This resource provides information and case studies on how to use design flexibility to help build multimodal transportation networks in rural, suburban, and urban contexts.

[Bicycle and Pedestrian Funding, Design, and Environmental Review: Addressing Common Misconceptions](#) (FHWA, 2015)

This document serves to address common misconceptions that can prevent States from developing bicycle and pedestrian infrastructure. It specifically focuses on misconceptions relating to funding, design guidelines, and environmental requirements.

³² [Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts](#), p. 44, FHWA, 2016.

Safe Routes to School

The goals of Safe Routes to School (SRTS) are to improve opportunities for children to safely walk and bicycle to school, thereby helping to improve their health and wellbeing. Safe Routes to School initiatives are usually locally driven by school districts and community members and focus on a combination of infrastructure changes, enforcement, and encouragement activities. DOT has supported these initiatives through funding and technical support provided under the last three transportation authorization acts. By 2015, over \$1 billion in Federal funding had been dedicated to SRTS projects, benefitting over 17,400 schools and 6.8 million students.³³ After MAP-21 was enacted in 2012, SRTS activities were eligible to compete for funding under the Transportation Alternatives Program (TAP). This eligibility has continued under the Transportation Alternatives (TA) set-aside of the Surface Transportation Block Grant (STBG) Program under the FAST Act.

Most SRTS efforts involve infrastructure improvements, such as the addition of sidewalks, crosswalks, bike lanes, signs, and traffic calming features. These are paired with educational initiatives and awareness campaigns such as Walk and Bike to School Day and Vision Zero for Youth. These initiatives can be used to catalyze new SRTS activities as the events and campaigns allow communities to start programs at little to no cost. The [National Center for Safe Routes to School](#), which is part of



Figure 7. A clearly marked crosswalk and a crossing guard assisting with safe street crossings. (Source: PBIC Image Library, courtesy of Dan Burden)

the University of North Carolina Highway Safety Research Center, assists States in implementation by promoting these educational initiatives, providing data and peer exchange opportunities, and the integration of SRTS concepts into other planning efforts. Figure 7 shows a clearly marked crosswalk and a crossing guard helping ensure that children and others safely cross the street, two common SRTS activities.

Following the end of the formal Federal program in 2012, many States have continued implementing SRTS projects and activities using State and local funding, and [Federal funding sources](#) under which SRTS

³³ [Creating Healthier Generations](#),” p. 5, National Center for Safe Routes to School, 2015.

activities are eligible. Many State DOTs have continued to assist localities in implementing SRTS programs, and have created resources and training programs, and offered technical assistance opportunities.

SRTS activities benefit communities in many ways, including by providing opportunities for children to be physically active, reducing their risk of being injured or killed in traffic crashes, reducing school transportation costs, and addressing other community issues related to safety, health, and infrastructure. The National Safe Routes to School Partnership has identified that a “critical mass” of schools (between 15 and 20 percent) participate in SRTS programs. State DOTs can continue improving safety for children by promoting best practices, and supporting local SRTS programs.

Case Study: Ohio

The Ohio Department of Transportation (ODOT) began a SRTS program in 2008 and as of 2015 had granted \$40 million in funds to communities. In 2016, ODOT obligated approximately \$1.5 million of State funding on projects with a SRTS component. On its [website](#), ODOT provides local jurisdictions with guidelines for developing a School Travel Plan (STP), approximately 200 approved STPs, and toolkits for both infrastructure and non-infrastructure related efforts. In addition to these resources, local jurisdictions can apply to the [Ohio Safe Routes Academy](#), a training program to help communities reach active transportation goals, including “train the trainer” programs for individuals to instruct others in their communities. Trainings include school walk audits, the “girls in gear” bicycle education program, and School Travel Plan development. Jurisdictions can contact one of ODOT’s 12 SRTS district coordinators for support.

ODOT’s high level of organization has supported a significant number of projects. A SRTS [10-year summary report](#) noted that in 2010, the Columbus public school district used \$560,000 for improvements to connect schools, community centers, bikeways, the business district, and a park in an underserved community. In 2017, the City of Newark [completed the construction of a pedestrian bridge](#) connecting Legend Elementary and Liberty Middle Schools over Log Pond Run, providing children with an important new link and bypassing a road with no sidewalks.

Case Study: New York

The New York State Department of Transportation (NYSDOT) began its SRTS Program in 2003, and had awarded \$63 million in funding as of 2015. The State created a [SRTS Guidebook for Sponsors and Applicants](#) to help local governments, school districts, and other applicants understand Federal requirements and funding opportunities. The resource provides guidance on applications, timelines, and assistance on compliance with the ADA and other legislative requirements.

Working with NYSDOT, New York City (NYC) launched its formal SRTS program in 2004. As of 2007, half of traffic crashes resulting in the fatality of a child pedestrian in NYC occurred within 700 feet of a

school. However, a study by Columbia University concluded that between 2001 and 2010 pedestrian injuries decreased by 44 percent in school zones with SRTS interventions.³⁴ Another study by Columbia researchers concluded that SRTS programs led to a net societal benefit of almost \$230 million by reducing costs associated with traffic-related injuries, disabilities, and deaths.³⁵ Many other New York towns and cities have also benefited from SRTS projects, such as sidewalk improvements, ADA-accessible ramps, connector paths, and pedestrian signals.

Key Resources

[Creating Healthier Generations: A Look at the 10 Years of the Federal Safe Routes to School Program](#) (National Center for Safe Routes to School, 2015)

This resource examines the safety and health benefits for children and the accomplishments of the Federal Safe Routes to School Program over a 10-year period.

[Integrating Safe Walking and Bicycling to School into Comprehensive Planning](#) (Safe Routes to School National Partnership, 2014)

This resource provides guidance for integrating walking and bicycling to schools in comprehensive plans, and includes case studies of cities and towns that have done so effectively.

[Rural Communities: Best Practices and Promising Approaches for Safe Routes](#) (Safe Routes to School National Partnership, 2015)

This resource offers guidance on addressing challenges for implementing SRTS programs in rural communities and offers strategies such as walking school buses and remote drop offs.

Zero Deaths Vision

The zero deaths vision is a way of clearly and succinctly describing how an organization is going to approach transportation safety – with the goal of eliminating traffic deaths. The zero deaths methodology uses a data-driven, interdisciplinary approach that targets areas for improvement and uses proven safety countermeasures, integrating education, enforcement, engineering, and emergency medical and trauma services (the "4Es"). These fatality eradication campaigns also typically include a wide variety of stakeholders beyond the immediate traffic safety community. The zero deaths vision differs from conventional practice in its objective of creating a transportation system that accommodates human errors and protects road users from serious injury when an error occurs. This concept of transportation system design is known as the Safe Systems Approach.

³⁴ "[Effectiveness of a Safe Routes to School Program in Preventing School-Aged Pedestrian Injury](#). Charles DiMaggio, PhD, MPH, and Guohua Li, MD, DrPH, *Pediatrics* 131:2, p. 1294, February 2013.

³⁵ [The Cost-Effectiveness of New York City's Safe Routes to School Program](#). Peter A. Muennig et al. *American Journal of Public Health* 104:7, p. 1297, July 2014.

A growing number of States and cities have adopted zero deaths visions under different initiatives, such as “Toward Zero Deaths” and “Road to Zero.”

The [Vision Zero Network](#) is a national coalition of community-based programs working to end traffic deaths and significant injuries. Vision Zero calls for a multidisciplinary approach to ending traffic deaths by bringing together stakeholders such as traffic planners and engineers, police officers, policymakers, public health professionals, and others to consider the wide range of factors that contribute to safe and equitable mobility.

[Toward Zero Deaths](#) (TZD) is a similar movement among traffic safety stakeholders and State DOTs to end traffic deaths. Since its inception in 2009, TZD has developed a [National Strategy on Highway Safety](#) that highlights the most effective methods for improving the safety of roads, the behaviors of road users, and the availability of effective post-crash medical care.

The [Road to Zero Coalition](#) brings together a broader coalition of stakeholders – including public and private sector organizations representing healthcare, business, government, and industry from the local, State, and national levels. These groups are united by a commitment to eliminate traffic fatalities within 30 years. The program continues the direction and extends the reach of the Vision Zero Network and TZD efforts. The Road to Zero Coalition is developing a unifying vision for zero deaths in the U.S. and is fostering continued innovation through a series of [Safe System Innovation Grants](#).

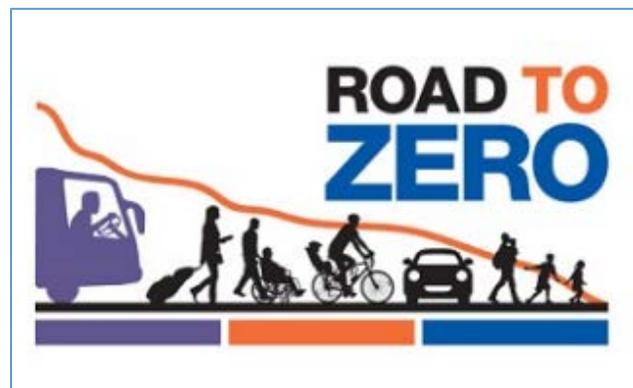


Figure 8. The logo for the Road to Zero Coalition logo, a partnership between NSC, NHTSA, FHWA, FMCSA, and other organizations. (Source: NSC)

The combined effects of these efforts have expanded the range of road safety stakeholders and placed renewed emphasis on the need for coordinated, multidisciplinary approaches to achieve road safety goals. FHWA’s [Strategic Agenda for Pedestrian and Bicycle Transportation](#) included the goal of zero pedestrian and bicycle fatalities and serious injuries nationwide in the next 20-30 years. Many States and local governments have identified and implemented strategies to reduce traffic deaths, such as:

- Speed management,
- Redesigning streets,
- Implementing campaigns targeted at changing behaviors, and
- Enhancing data-driven traffic safety enforcement.

By adopting these national strategies, State DOTs and transportation agencies across the country have signaled their commitment to ending traffic deaths. The Vision Zero Network and TZD National Strategy

promote comprehensive and coordinated efforts, and the implementation of policies and strategies to address the underlying conditions that lead to significant traffic deaths each year.

Case Study: Arkansas

Arkansas' [Toward Zero Deaths](#) initiative is a coordinated effort to end traffic deaths in the State, led by the following partner agencies: the Arkansas State Police, the Arkansas State Highway, the Arkansas Transportation Department and the Arkansas Department of Health. The [2014 Arkansas Highway Safety Plan](#) identifies and prioritizes several emphasis areas and integrates strategies employing education, engineering, enforcement, and emergency services to reduce traffic deaths. Each emphasis area also includes a list of strategies specifically tailored to reduce traffic deaths attributable to that emphasis area. For example, the emphasis area of teenage driver safety is identified as a primary area as the deaths related to driving are one of the leading causes of teen deaths. In order to reduce traffic deaths for those under age 20, the Highway Safety Plan recommends expanding the [Building Consensus for Safer Teen Driving Project](#), which is a coalition led by the Arkansas Children's Hospital. The project website includes resources for teens, parents, educators and law enforcement.

Arkansas' coordinated TZD campaign employs many approaches and strategies emphasized in broader TZD and Vision Zero efforts. For example, Arkansas' plan uses data to identify and prioritize emphasis areas and sets specific goals to measure progress. In addition, by coordinating across relevant agencies, Arkansas has developed multidisciplinary strategies to target challenges from multiple angles in order to better address emphasis areas and achieve the goals set forth in the plan.

Case Study: Washington, DC

In December 2015, Washington, D.C., after nearly a year of work and coordination among 30 District agencies, launched the [Vision Zero DC Action Plan](#). This plan calls for the District to achieve zero traffic-related deaths by 2024. The Action Plan includes 67 strategies targeted at different elements that contribute to traffic deaths. The plan was developed by four interagency work groups—organized around data, enforcement, education, and engineering—and was guided by a public engagement strategy to identify District residents' traffic safety concerns.

The plan divides strategies into topic-specific areas and goals, including creating safe streets, protecting vulnerable users, preventing dangerous driving, and a commitment from DDOT to be transparent and responsive with requests for data and information. Strategies include gathering and making available more data, making changes to policies and implementation strategies to reduce dangerous conditions for vulnerable users, and enhancing enforcement against dangerous driving, among others. Monitoring of annual data and tracking of projects that include Vision Zero implementation strategies informs future decisions and strategies as the District works towards its 2024 goal.

Key Resources

[Towards Zero Deaths: A National Strategy on Highway Safety](#) (Toward Zero Deaths Steering Committee, 2014)

This report is a tool to mobilize and coordinate efforts across the U.S. targeted at ending traffic deaths. It outlines a wide range of challenges and strategies to reduce and ultimately end traffic deaths.

[Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices](#) (NHTSA, 2015)

This comprehensive guide supports States in prioritizing traffic safety countermeasures based on cost, effectiveness, and implementation time. It includes chapters for nine major topic areas, including specific users by age and mode, and common problem areas such as impaired and distracted driving.

[Moving from Vision to Action: Fundamental Principles, Policies and Practices to Advance Vision Zero in the U.S.](#) (Vision Zero Network, 2017)

This document from the [Vision Zero resource library](#) provides guidance for implementing successful Vision Zero programs, covering topics such as data, speed management, and low-tech solutions.

Road Diets and Resurfacing

A road diet consists of removing one or more motor vehicle lanes from a roadway and reallocating the extra space for other uses or travelling modes. The most common road diet format converts an existing four-lane, undivided roadway segment into a three-lane segment consisting of two through lanes and a center two-way, left-turn lane (see Figure 9). This reduction in vehicle lanes creates space for other uses, such as turn lanes, bus lanes, pedestrian refuge islands, sidewalks, bike lanes, transit stops, or parking.

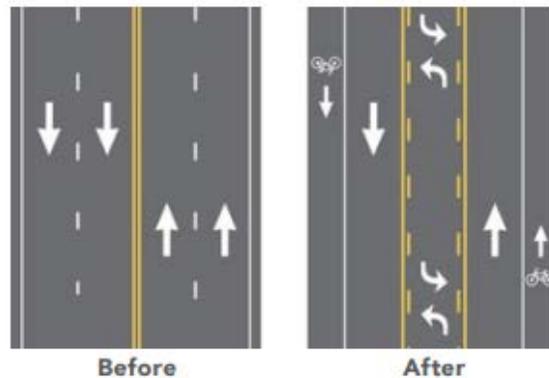


Figure 9. Example of a Road Diet (Source: FHWA Road Diet Policies)

Studies show that implementing a road diet can result in a crash reduction of 19 to 47 percent.³⁶ Road diets improve roadway safety by reducing the speed differential between roadway users and making left turns safer and easier, leading to fewer vehicle-vehicle, vehicle-pedestrian, and vehicle-bicycle conflicts, and reducing the severity of crashes that do occur. It simplifies road scanning and gap selection for motorists (especially older and younger drivers). With fewer travel lanes to cross and the opportunity to install pedestrian refuge islands, it also helps pedestrians cross the street more safely.

[Road diets](#) are one of the FHWA [Proven Safety Countermeasures](#), and have been implemented by transportation agencies across the country for over three decades. Road diets may be completed in

³⁶ [Evaluation of Lane Reduction “Road Diet” Measures on Crashes](#), p. 4, FHWA, 2010.

conjunction with routine State and local resurfacing efforts, which provide an opportunity to efficiently and inexpensively restripe roads to add bike lanes or other road features. Routine roadway resurfacing projects can also be used to allocate more space to non-vehicular uses without necessarily removing vehicle travel lanes. Road diets can create space to extend and connect pedestrian and bicycle networks and improve mobility and access for all users. Connected bicycle and pedestrian facilities help to promote walking and bicycling by enhancing user comfort and safety while connecting to key destinations, such as employment and educational opportunities.

States and municipalities across the country have implemented road diets to improve safety for all roadway users. They are generally a low-cost solution, particularly if planned in conjunction with routine resurfacing, and existing reconstruction or overlay projects.

Case Study: New Mexico

In 2014, the New Mexico Department of Transportation (NMDOT) established the goal of institutionalizing road diets as part their participation in FHWA's Every Day Counts, an initiative to accelerate delivery of highway projects and address challenges given limited budgets. In order to meet this goal, NMDOT developed a [Road Diet Guide](#) to aid transportation practitioners on the use of this proven safety countermeasure in New Mexico. The guide was officially adopted in December 2016, and provides direction on reasons to consider a road diet; methods for identifying suitable roads; best practices for implementation; and project evaluation factors. The guide also includes a Road Diet Decision Matrix to aid municipalities in demonstrating the benefits of a road diet to a community. The Road Diet Guide outlines possible reasons for why communities in New Mexico may wish to implement a road diet, including for access management, economic development-driven initiatives, multimodal accommodation, and to increase safety and reduce speeding.

In developing the Road Diet Guide, NMDOT conducted informational peer reviews and trainings on the guide's use. This included hosting the Western Region Road Diet Peer-to-Peer Exchange in Albuquerque in April 2016, where representatives from seven States shared their processes and experiences relating to road diets.

NMDOT continues to work to institutionalize road diets and is also developing a statewide Complete Streets policy. NMDOT plans to monitor road diet projects as they are implemented in order to evaluate crash reduction, speeds, mobility, quality of life, and more.

Case Study: Michigan

The Michigan Department of Transportation (MDOT) first implemented road diets in the 1980s to improve safety while accommodating existing highway use levels. Since then, the practice has become commonplace throughout the State, as MDOT views all existing four-lane, undivided roads as potential implementation sites.

In 2012, MDOT released a [report](#) summarizing the impacts of existing road diet conversions to inform best practices for identifying new locations for road diet implementation. MDOT based its studies on road diets at 24 sites across the State. The report finds that in general there was a decrease in crashes across almost all of the sites examined, and it encouraged early operational analyses to develop projects that successfully reduce crashes and crash severity. This research allows MDOT to provide better guidance and support to local agencies in implementing road diets that are appropriate and context sensitive.

MDOT provides guidance on the following topics related to reducing lanes when considering implementation of a road diet: planning and policy; feasibility determination factors; operations criteria; geometric design criteria; systems considerations; project costs; and public involvement. Many Michigan communities are actively working to identify four-lane undivided roads that may be good candidates for a road diet to reduce vehicle speeds and improve safety.

Key Resources

[Road Diet Informational Guide](#) (FHWA, 2014)

This guide provides information for the decision-making process to help agencies determine if a road diet should be implemented. The guide includes safety, operational, and quality of life considerations from research and practice, and provides design guidance and encourages post-implementation evaluation.

[Road Diet Case Studies](#) (FHWA, 2015)

This document is intended to provide State, local agencies, and Tribal governments with examples and advice to assist in planning and implementing road diets in their own jurisdictions. The publication includes photographs and drawings to help illustrate the concepts described.

[Incorporating On-Road Bicycle Networks into Resurfacing Projects](#) (FHWA, 2016)

This guide provides recommendations and case studies to assist transportation agencies in integrating bicycling facilities into their resurfacing program. This resource includes considerations for how and when to include bicycle facilities in resurfacing timelines, methods to integrate bicycle facilities, and information on costs and materials.

Overcoming Barriers to Better Accommodate Safety for All Users

The policy and program areas highlighted in this report represent actions that States can take to facilitate transportation projects – through all phases of planning, development, and operations – that support safe travel for all users of the surface transportation network – pedestrians, bicyclists, transit users, and motorists. The eight policies and programs identified in this report are interconnected, in that they complement each other and help State DOTs and local agencies overcome various challenges or barriers in building and maintaining multimodal surface transportation networks.

Identifying common barriers to safe travel for all users was the focus of a recent DOT initiative in which field offices worked with local communities to conduct road safety assessments, similar to RSAs, in every State. Barriers identified included insufficient infrastructure, such as missing or incomplete sidewalks, and missing curb ramps and crosswalks. In many places, infrastructure may need repair and replacement, or a retrofit, to improve its condition and ensure safety for those traveling by bicycle, foot, transit, or vehicle. Physical barriers present challenges for people with disabilities and make it more difficult to access transit and other locations. The State DOTs and local stakeholders who participated also noted that they often face obstacles in providing safe, multimodal travel options as a result of policy and planning decisions, limited data on nonmotorized users, limited funding, and intergovernmental coordination challenges.³⁷ When States and their partners overcome, or at least identify, planning and policy barriers, they can often successfully address existing physical barriers and ensure future infrastructure investments include safe features. State DOTs and their local and regional partners can use the policy and program areas described in this report to help overcome barriers that arise in various stages of transportation project planning, development, and operations. RSAs, in particular, are a valuable tool for State DOTs and partners to use to evaluate safety issues and identify solutions, which may include reconfigurations or other changes to reduce barriers to safe travel.

Complete Streets policies help States and partners holistically consider all users in every stage of the transportation planning and project development process. By forming a multidisciplinary team with involvement by engineers, planners, and potentially other disciplines, projects are more likely to address the needs of all users. Complete Streets policies are most effective when they involve each department of a State DOT, and when fully implemented, can positively impact planning, development, and operations. State DOTs that implement Complete Streets policies can influence local governments and encourage adoption of these policies by providing targeted assistance, or by requiring local governments to implement a policy to be eligible for certain funding sources.

State DOTs, MPOs, and local agencies can use project selection criteria that prioritize safety to influence how their own — and local projects — are selected and developed. Effective project selection criteria can have a cascading effect; by giving greater weight to projects that address safety problems or to projects that are located on prioritized multimodal networks, State DOTs can allocate resources effectively and build the highest priority projects. A clear, transparent, data-driven project selection process also helps State DOTs and partners demonstrate and communicate both internally and externally that they are making best use of limited public funds.

When States or municipalities are developing roadway projects, design flexibility assists with overcoming barriers to safe roads by allowing agencies to consider solutions that meet the needs of all road users in each unique context. As described above, FHWA has taken several actions to make it simpler for transportation agencies to design roads for the context in which they are located, which can

³⁷ [Pedestrian and Bicyclist Road Safety Assessment Summary Report](#), DOT, 2015.

help meet the needs of all road users. Design flexibility also helps States and partners use roadway design to facilitate appropriate vehicle travel speeds, rather than relying largely on posted speed limits and traffic enforcement to achieve the intended travel speed. There are several effective interventions that States and local agencies can implement to change driver behavior depending on the context of the roadway, such as roundabouts, raised crosswalks, pedestrian hybrid beacons, leading pedestrian intervals, and medians.

State DOTs can use road diets to retrofit operations on existing roadways to improve safety for travel for all users. Road diets reconsider how space is allocated to various users on a roadway, and often involve reconfigurations to provide infrastructure for nonmotorized users, turn lanes, medians, and parking, while maintaining adequate vehicle throughput. State DOTs can implement road diets or reconfigurations in coordination with resurfacing that may already be taking place to optimize cost-effectiveness.

Assessing the benefits and costs of a transportation project can aid states in prioritizing transportation safety improvements, as well as assess potential tradeoffs within a single improvement project. This type of analysis is known as benefit-cost analysis, and DOT provides [guidance](#) on performing such analyses for various types of transportation improvements, as well as various monetization values and example calculations. Generally, the largest benefit category will be safety, stemming from a reduction of deaths, injuries, and property damage owing to the safety improvement. The [Crash Modification Factors Clearinghouse](#) provides information on the relationship between different transportation improvements, including multimodal transportation infrastructure improvements, and the estimated reductions in crashes. Such factors, when combined with local data on the number of users, can form the basis for estimating the societal benefits of a transportation improvement.

In addition, other benefits may include, but are not limited to, a reduction in travel times for some users, emission reduction benefits from modal diversion, and other categories of benefits that are more difficult to quantify, such as noise reduction, connectivity improvements, health benefits, and aesthetic improvements. Care must be taken to assess benefits as well as negative outcomes that might subtract from the estimated benefits. For example, improving connectivity for nonmotorized users may result in improved travel times for those users, but may also cause increased delay for motorized users. However, it should not be assumed that either group of users impacted by these improved or diminished travel times is fixed; more people may walk or bike because of an improvement, resulting in lower demand for automobile travel, while some automobile travel may be shifted to other routes. As discussed in DOT's [guidance](#), State DOTs should also avoid issues with double-counting, counting transfers as benefits, and have a well-defined, credible no-build scenario to benchmark against when estimating the benefits of the build scenario.

Once a State DOT has estimated and monetized the benefits of a transportation improvement project, while netting out any negative benefits³⁸, these values should be compared to the project's costs. Project costs include both the capital costs (acquisition of right of way, engineering and design, construction, etc.) and the ongoing operations and maintenance costs. The stream of benefits and costs should be discounted to a common base year to ensure comparability, and the sum of discounted benefits can be divided by the sum of discounted costs to produce a benefit-cost ratio. Benefit-cost ratios greater than one imply that the quantified benefits of an improvement exceed the quantified costs to implement that improvement. Furthermore, by calculating and comparing the benefit-cost ratios of multiple improvement projects, State DOTs can prioritize scarce public funds investments that create the largest estimated benefits. When using benefit-cost ratios in decision-making, State DOTs should also keep in mind benefits or costs of a project that are difficult to estimate or monetize, and consider to what extent such benefits or costs could be significant and impact investment decisions or project prioritization.

The transportation planning process is iterative, with planning, development, and operations of facilities taking place continually.³⁹ Over the course of several decades, many roadways have been designed primarily for vehicular travel, and many of these roads need to be redesigned or retrofitted to safely accommodate all users. Through all stages of planning or operations for a roadway facility, State DOTs can draw on the policies, initiatives, and resources in this report to better accommodate all users of the surface transportation network.

DOT Priorities & Next Steps

Going forward, DOT will continue to build on its progress in advancing safe, multimodal transportation systems, partnering with State, local, and private stakeholders. The following are steps DOT is pursuing to advance the Department's top goals of safety, infrastructure, and innovation.

³⁸ In the context of benefit-cost analysis, negative benefits, sometimes called "dis-benefits," are understood to be a separate concept from costs. Costs include resources required to implement a project, such as construction and operations and maintenance expenditures. Benefits refer to the impacts of a project on users and non-users, which, while generally positive, can be negative in particular categories or even overall. For example, the addition of a new traffic signal at a previously un-signalized roadway intersection may increase safety and decrease travel times for pedestrians and bicyclists, but automobile users may experience increased delay waiting for the signal. In this scenario, increased delays to automobile users should be counted as a negative benefit, and thus should be netted out of any estimated benefits from the project.

³⁹ [PlanWorks: Better planning. Better projects.](#) is a FHWA web resource that supports collaborative decision-making in transportation planning and project development, which includes information on integrating safe, comfortable, and connected pedestrian and bicycle networks to allow people of all ages and abilities to safely and conveniently get where they want to go.

Safety

As discussed above, crash fatalities increased in both 2015 and 2016, including for bicyclists, pedestrians, and motorcyclists. DOT plans to leverage data to better understand why traffic fatalities and serious injuries have increased in the last two years, and will use this information to implement effective policies and interventions to reduce traffic fatalities and serious injuries. This includes both infrastructure design and behavioral countermeasures that are proven through evidence-based research.

Through guidance, technical assistance, outreach, and education, FHWA will work with State, regional, and local partners to ensure design standards adequately meet the safety needs of every community; many of the documents that form the basis of this report help inform those design standards. In addition, FHWA tools assist local governments in identifying appropriate safety interventions and countermeasures to continuously improve the safety of roadways through an evidence-based, data-driven approach to safety. NHTSA will work with State partners to identify and promote the use of effective behavioral countermeasures such as education, outreach, and enforcement. DOT will pursue efforts to improve analyses of crashes and risk factors, promote the access and use of safety data, and work to establish data integration with partners internal and external to DOT. To accomplish these objectives, DOT plans to strategically prioritize and address transportation safety risks using data science to inform policy, with the following objectives:

- Improve the collection, management, and integration of data on transportation-related fatalities and serious injuries, and their precursors, to enhance risk analysis;
- Identify the risk factors that contribute to fatalities and serious injuries and implement evidence-based risk elimination and mitigation strategies;
- Collaborate with stakeholders to foster infrastructure and behavior changes that improve safety; and
- Address the disproportionate transportation safety risks in rural communities.

Infrastructure

USDOT seeks to invest in infrastructure to ensure mobility and accessibility and to stimulate economic growth, productivity and competitiveness for American workers and businesses. New infrastructure investments present an opportunity to use the wide variety of innovations discussed in this report to improve safety. Opportunities also exist to take advantage of roadway resurfacing and routine maintenance work as a cost-effective way to add new multimodal facilities that better accommodate all users of the transportation network. For example, a FHWA report cites an example showing that the cost of adding bike lanes during a roadway resurfacing project is about 40 percent cheaper than it would be as a standalone project.⁴⁰

⁴⁰ [Incorporating On-Road Bicycle Networks into Resurfacing Projects](#), p. 40, FHWA, 2016.

DOT will continue providing funding, guidance, technical assistance, and research that supports State DOTs and other partners in improving transportation infrastructure.

Bicyclists and pedestrian projects can be relatively low-cost in comparison with major road and rail infrastructure projects. One of the positive outcomes of a policy-based approach to ensuring safety for all users, such as a Complete Streets policy or design flexibility, is that the cost of implementing such improvements can be reduced when they are incorporated into a larger construction or reconstruction project. In addition, performance-based practical design may result in lower costs as agencies avoid over-designing facilities. When bicycle and pedestrian projects complete identified multimodal networks in cities, and rural town centers, they can help achieve a variety of benefits by increasing transportation options while reducing congestion and improving air quality.

In order to speed the efficiency of construction projects, and accelerate project delivery, the DOT will work to streamline the environmental review process to deliver transportation projects more quickly and efficiently, helping to provide more timely safety benefits for all users while maintaining important environmental safeguards. These efforts include facilitating synchronized environmental reviews among agencies, better integrating the planning and review processes, and expanding the use of programmatic approaches such as categorical exclusions for small projects or routine actions like resurfacing.

Innovation

Innovation is a central DOT priority, and many of the programs discussed here involve encouraging the deployment of innovations that have been shown to improve safety. Emerging technologies are transforming the transportation system. The DOT seeks to continue its leadership role in guiding selective public research investments and facilitating the deployment of beneficial transportation technologies. Automation and connectivity are transformative in that they hold the potential to save lives by addressing human factors that contribute to the vast majority of roadway fatalities.

As new infrastructure is built, it can help support the move to safe automation. For example, innovations that reduce the potential for serious crashes, such as roundabouts, benefit current road users and will also ease roadway navigation challenges for automated vehicles. There is an opportunity to examine the ways in which automation and connectivity can interact with current roadway infrastructure and how we plan, design, standardize, and deploy the next generation of technology-enabled infrastructure to reduce roadway fatalities. There will be a need to invest in smart infrastructure in rural areas in addition to urban areas, and to consider the unique needs of each of these areas to provide for the safety of all users of the surface transportation network. There will be a need for infrastructure that allows automated technologies to communicate with each other and with the infrastructure to maximize efficiency and safety.

In September 2017, DOT released its updated guidance on automated vehicles, [Automated Driving Systems: A Vision for Safety 2.0](#), which contains voluntary guidance measures and best practices for industry, government, safety advocates and the public. Automated vehicles have the potential to eliminate thousands of crashes in which human error is a major factor. While automated vehicle technologies have the potential to reduce crashes, there are special issues that need to be considered to ensure that these new technologies safely interact with non-automated roadway users: existing cars, motorcyclists, bicyclists, pedestrians, and transit vehicles. Many of these issues deal with detection, and how automated vehicles will recognize, react, and communicate with pedestrians and bicyclists.⁴¹ In addition, there is a need to ensure that the adoption of automated vehicles aligns with current policies that focus on maintaining and enhancing multimodal transportation systems.⁴² To ensure that DOT considers the needs of all users in an Automated Driving Systems (ADS) future, DOT will engage in extensive stakeholder engagements to discuss the potential issues and options for solutions that could potentially address the needs of all users interacting with ADS.

Conclusion

Consistent with Section 1442 of the FAST Act,⁴³ and further guidance on Nonmotorized User Safety provided in Senate Report 114-243 accompanying the Senate's proposed FY 2017 Appropriations bill (S. 2844), this report focuses on policies and programs that are proving to be effective in improving safety for all users of the surface transportation network, and it describes how States and local governments can implement these to overcome barriers. While the report considers the safety needs of motorists, pedestrians, bicyclists, transit users, and freight vehicles, it focuses on the most vulnerable users – pedestrians and bicyclists – and infrastructure approaches that can provide for their safety. It highlights examples of States that have implemented each of these policies and programs and provides key resources available to States and local governments interested in learning more about these policies and programs. The report includes information about national trends in safety and multimodal transportation, and it describes DOT's programs and initiatives aimed at providing for the safe and adequate accommodation of all users. It concludes by highlighting DOT's goals focusing on safety, infrastructure, and innovation, and how each of these can help promote safety for all users of the surface transportation network.

⁴¹ [Discussion Guide for Automated and Connected Vehicles, Pedestrians, and Bicyclists](#), p. 4, Pedestrian and Bicycle Information Center, 2017.

⁴² [Policy Statement on Automated Vehicles](#), p. 1, National Association of City Transportation Officials, 2016.

⁴³ Section 1442(b), Fixing America's Surface Transportation (FAST) Act, Public Law No. 114-94.

Appendix: Resources

General Resources

- [U.S. Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations](#) (DOT, 2010)
- [Strategic Agenda for Pedestrian and Bicycle Transportation](#) (FHWA, 2016)
- [Statewide Pedestrian and Bicycle Planning Handbook](#) (FHWA, 2014)
- [Metropolitan Pedestrian and Bicycle Planning Handbook](#) (FHWA, 2017)
- [The Role of Transportation Systems Management & Operations in Supporting Livability and Sustainability](#) (FHWA, 2012)
- [Delivering Safe, Comfortable, and Connected Pedestrian and Bicycle Networks: A Review of International Practices](#) (FHWA, 2015)
- [Small Town and Rural Multimodal Networks](#) (FHWA, 2016)
- [Bicycling & Walking in the United States](#) (Alliance for Biking and Walking, 2016)
- [The Innovative DOT: A Handbook of Policy and Practice](#) (Smart Growth America, 2012)
- [Manual on Pedestrian and Bicycle Connections to Transit](#) (FTA, 2017)
- [Speed Management Program Plan](#) (NHTSA, 2014)
- [Speeding Overview and Resources](#) (NHTSA)
- [USLIMITS2: A Tool to Aid Practitioners in Determining Appropriate Speed Limit Recommendations](#) (FHWA)
- [Speed Management Case Study: Georgia Department of Transportation Setting Speed Limits with Help from USLIMITS2](#) (FHWA)
- [Speed Management Case Study: Reducing Excessive Speeding in Rural Communities in Iowa](#) (FHWA)
- [Methods and Practices for Setting Speed Limits: An Informational Report](#) (FHWA, 2012)
- [The Transportation Planning Process Briefing Book](#) (FHWA, 2015)
- [Case Studies in Delivering Safe, Comfortable, and Connected Pedestrian and Bicycle Networks](#) (FHWA, 2015)
- [Case Studies in Delivering Safe, Comfortable, and Connected Pedestrian and Bicycle Networks, Volume II](#) (Pedestrian and Bicycle Information Center, 2016)

Complete Streets Policies

- [A Guide for Maintaining Pedestrian Facilities for Enhanced Safety](#) (FHWA, 2013)
- [National Complete Streets Coalition](#)
 - [Safer Streets, Stronger Economies: Complete Streets Project Outcomes from Across the Country](#)
 - [The Best Complete Streets Policies of 2016](#)

Safety for All User Report

- [Taking Action on Complete Streets: Implementation Processes for Safe, Multimodal Streets](#)
- [Planning Complete Streets for an Aging America](#) (AARP, 2009)
- [Speed Management Countermeasures](#) (FHWA)
- [Community Speed Reduction and Public Health: A Technical Report](#) (Health Resources in Action, 2013)
- [Engineering Speed Management Countermeasures: A Desktop Reference of Potential Effectiveness in Reducing Crashes](#) (FHWA, 2014)

Design Flexibility

- [Bicycle and Pedestrian Facility Design Flexibility Memo](#) (FHWA, 2013)
- [Bicycle and Pedestrian Funding, Design, and Environmental Review: Addressing Common Misconceptions](#) (FHWA, 2015)
- [Handbook for Designing Roadways for the Aging Population](#) (FHWA, 2014)
- [Achieving Multimodal Networks: Applying Design Flexibility and Reducing Conflicts](#) (FHWA, 2016)
- [Context Sensitive Solutions](#) (FHWA)
- [Traffic Calming ePrimer](#) (FHWA)
- [Revisions to the Controlling Criteria for Design and Documentation for Design Exceptions](#) (FHWA, 2016)
- [Separated Bike Lane Planning and Design Guide](#) (FHWA, 2015)
- [Pedestrian Hybrid Beacon Guide: Recommendations and Case Study](#) (FHWA, 2014)
- [Bicycle Network Planning & Facility Design Approaches in the Netherlands and the United States](#) (FHWA, 2016)
- [Flexibility in Highway Design](#) (FHWA)
- [A Policy on Geometric Design of Highways and Streets, 6th Edition](#) (AASHTO, 2011)
- [Guide for the Development of Bicycle Facilities, Fourth Edition](#) (AASHTO, 2012)
- [Guide for the Planning, Design, and Operation of Pedestrian Facilities](#) (AASHTO, 2004)
- [Designing Walkable Urban Thoroughfares: A Context Sensitive Approach](#) (ITE, 2010)
- [Urban Bikeway Design Guide](#) (NACTO, 2014)
- [Urban Street Design Guide](#) (NACTO, 2013)
- [Design Standards and Section 1404 of the FAST Act Memo](#) (FHWA, 2016)
- [Proven Safety Countermeasures](#) (FHWA)

Improving Accessibility

- [ADA.gov](#) (United States Department of Justice Civil Rights Division)
 - [ADA Update: A Primer for State and Local Governments](#)

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- [ADA Transition Plans: A Guide to Best Management Practices](#) (NCHRP, 2009)
- [Aging in Place, Stuck Without Options](#) (Transportation for America, 2011)
- [Checklist for Assessing the Accessibility of Transportation and Mobility](#) (Easter Seals Project ACTION, 2016)
- [Toolkit for the Assessment of Bus Stop Accessibility and Safety](#) (Easter Seals Project ACTION, 2014)
- [Public Rights-of-Way Accessibility Guidelines \(PROWAG\)](#) (United States Access Board)
- [Accessible Shared Streets](#) (FHWA, 2017)

Project Evaluation Criteria

- [Synthesis of Methods for Estimating Pedestrian and Bicyclist Exposure to Risk at Areawide Levels and on Specific Transportation Facilities](#) (FHWA, 2017)
- [Guidebook for Developing Pedestrian and Bicycle Performance Measures](#) (FHWA, 2016)
- [Bicycle-Pedestrian Count Technology Pilot Project: Summary Report](#) (FHWA, 2016)
- [MPO Guidebook for Using Safety as a Project Prioritization Factor](#) (FHWA, 2016)
- [Planning and Data Collection Tools](#) (PBIC)
- [Evaluation of Bicycle-Related Roadway Measures: A Summary of Available Research](#) (PBIC, 2014)
- [Bicycle and Pedestrian Forecasting Tools: State of the Practice](#) (PBIC, 2015)
- [Guidebook on Pedestrian and Bicycle Volume Data Collection](#) (NCHRP, 2014)
- [The Why and How of Measuring Access to Opportunity](#) (GICD, 2017)
- [Pedestrian and Bicycle Transportation Along Existing Roads—ActiveTrans Priority Tool Guidebook](#) (TRB, 2015)
- [Coding Nonmotorized Station Location Information in the 2016 Traffic Monitoring Guide Format](#) (FHWA, 2016)

Road Diets and Resurfacing

- [Incorporating On-Road Bicycle Networks into Resurfacing Projects](#) (FHWA, 2016)
- [Road Diet Case Studies](#) (FHWA, 2015)
- [Road Diet Informational Guide](#) (FHWA, 2014)
- [Joint Technical Assistance on the Title II of the Americans with Disabilities Act Requirements to Provide Curb Ramps when Streets, Roads, or Highways are Altered through Resurfacing](#) (DOT/Department of Justice, 2013)
- [Road Diet Conversions: A Synthesis of Safety Research](#) (PBIC, 2013)
- [Road Diet Policies](#) (FHWA, 2016)

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Road Safety Audits

- [Bicycle Road Safety Audit Guidelines and Prompt List](#) (FHWA, 2012)
- [Pedestrian Road Safety Audit Guidelines and Prompt List](#) (FHWA, 2007)
- [Toolkit for the Assessment of Bus Stop Accessibility and Safety](#) (Easter Seals, 2006)
- [Pedestrian and Bicyclist Road Safety Assessments, Summary Report](#) (DOT, 2015)
- [A Technical Guide for Conducting Bicycle Safety Assessments for California Communities](#) (UC-Berkeley, 2013)
- [A Technical Guide for Conducting Pedestrian Safety Assessments for California Communities](#) (UC-Berkeley, 2013)
- [Integrating Speed Management within Roadway Departure, Intersections, and Pedestrian and Bicyclist Safety Focus Areas](#) (FHWA, 2016)

Safe Routes to Schools

- [Safe Routes to School](#) (FHWA)
- [Integrating Safe Walking and Bicycling to School into Comprehensive Planning](#) (Safe Routes to School National Partnership)
- [Implementing Safe Routes to School in Low-Income Schools and Communities](#) (Safe Routes to School National Partnership, 2010)
- [At the Intersection of Active Transportation and Equity](#) (Safe Routes to School National Partnership, 2015)
- [Creating Healthier Generations: A Look at the 10 Years of the Federal Safe Routes to School Program](#) (Safe Routes to School National Partnership, 2015)

Zero Deaths Vision

- [How to Develop a Pedestrian and Bicycle Safety Action Plan](#) (FHWA, 2017)
- [A Resident's Guide for Creating Safer Communities for Walking and Biking](#) (FHWA, 2015)
- [Safe Roads for a Safer Future – A Joint Safety Strategic Plan](#) (FHWA, 2012)
- [Countermeasures That Work: A Highway Safety Countermeasure Guide for State Highway Safety Offices](#) (NHTSA, 2015)
- [High Visibility Enforcement on Driver Compliance with Pedestrian Right-of-Way Laws](#) (NHTSA, 2013)
- [Pedestrian Safety Enforcement Operations: A How-To Guide](#) (NHTSA, 2014)
- [Safer People, Safer Streets: Summary of U.S. Department of Transportation Action Plan to Increase Walking and Biking and Reduce Pedestrian and Bicyclist Fatalities](#) (DOT, 2014)
- [Everyone Walks: Understanding and Addressing Pedestrian Safety](#) (GHSA, 2015)
- [Bikesafe](#) (PBIC)
- [Pedsafe](#) (PBIC)

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- [An Overview and Recommendations of High-Visibility Crosswalk Marking Styles](#) (PBIC)
- [The Role of Law Enforcement in Supporting Pedestrian and Bicycle Safety: An Idea Book](#) (PBIC, 2017)
- [A National Strategy on Highway Safety](#) (Toward Zero Deaths, 2014)