The work of transportation planners and roadway engineers has a profound effect on community character and on the availability of transportation choices. Implementation of older driver and pedestrian safety measures occurs within this larger roadway planning and engineering context.

Transportation planning precedes roadway design and engineering. It provides an opportunity for community members to come together to articulate a vision for the community, and for transportation planners to evaluate future mobility and infrastructure needs based on this vision, on existing and planned land use, and on projected demographic change and travel demand.

The development of a transportation project is not a linear process carried out by a single agency. It consists of interlinked processes carried out at multiple levels of government,

### Transportation Planning Agencies

In metropolitan areas of more than 50,000 people, regional transportation planning is carried out by a federally designated Metropolitan Planning Organization (MPO). In small communities and rural areas there is no such federally designated body. Depending on the state, rural planning may be carried out by the state department of transportation (DOT), regional Rural Planning Organizations (RPOs), local governments, tribal government, or other designated entities. Many local comprehensive plans include a transportation element that may inform the regional and state planning process.

The federal government, through the U.S. Department of Transportation, does not develop transportation plans. Instead, it reviews the planning activities of the MPOs and state DOTs for consistency with federal policy and law. Before a project can receive federal funding it must be included in the Regional Long Range Transportation Plan, the Transportation Improvement Program (TIP) and the Statewide Transportation Improvement Program (STIP).

The most recent federal surface transportation legislation (SAFETEA-LU) requires states to develop a Strategic Highway Safety Plan (SHSP). These plans define a state’s key safety needs and guide investment decisions to reduce highway fatalities and serious injuries on all public roads. These plans are developed with input from public and private stakeholder groups. In addition to the local, state, and regional plans described above, the SHSP provides an excellent opportunity for states to address the specific safety needs of older drivers and pedestrians.
which intersect at key points as projects are planned, developed, and funded. Regional and local long-range transportation plans are strongly influenced by community goals, while engineering and design decisions for projects are governed more by state and local agency standards and policies.

Following World War II, the United States entered a boom period in suburban housing and highway construction. With postwar optimism and wealth, the nation embraced the newfound mobility of the automobile and directed its transportation planners and engineers to build a road network to facilitate that movement. President Eisenhower’s landmark investments in an interstate highway system served to provide the nation with unprecedented levels of mobility, opening up land far from employment districts for young couples and families. Suburban development patterns, lengthened commute distances, cheap gas prices, and a general love for the automobile put pressure on road designers to focus their work on moving vehicles.

By 1991, when Congress enacted the Intermodal Surface Transportation Efficiency Act (ISTEA), America had already begun to ask how it could reintroduce balance into its transportation system. Today, federal law requires that all modes of transportation, including pedestrian and bicycle travel, be addressed in state and regional planning. “The long range metropolitan and statewide transportation plans, and the Metropolitan and Statewide Transportation Improvement Programs shall provide for the development and integrated management and operation of transportation facilities (including accessible pedestrian walkways and bicycle transportation facilities) that will function as an intermodal transportation system…” (23 U.S.C 134[c][2] and 135[a][2]).

KEY RESOURCES FOR ROADWAY DESIGNERS

Decisions on road design are made by either the state or local DOT, depending on who will own and maintain the road. Though somewhat different in every state, generally states have jurisdiction over design standards for rural roads and major urban thoroughfares, while cities or counties have jurisdiction over the design of local urban streets. Regardless of the decision-making entity, however, most road design standards are based on nationally accepted guidelines such as those published by AASHTO, and supplemented by other publications from organizations such as ITE and the U.S. Access Board.

AASHTO Policy on Geometric Design of Highways and Streets (AASHTO Green Book)

The single most authoritative publication used by state and local roadway engineers is A Policy on Geometric Design of Highways and Streets, universally known in the transportation community as the AASHTO Green Book.

The AASHTO Green Book historically has reflected the institutional needs and priorities of the organization’s members, which comprise state departments of transportation
(DOT) (including the District of Columbia and Puerto Rico) having the official highway responsibility for that state or territory. The United States Department of Transportation (USDOT) is an ex officio member. Given this membership, its guidelines focus largely on interstate and intercity roads.

Over the past ten years, in response to the concerns of those planners and engineers who have sought road design guidelines that more effectively address the needs of multimodal urban areas, AASHTO has developed supplementary guidance for pedestrian and bicycle accommodations. While largely contained under separate cover, these guides are considered important components of the AASHTO Green Book.

While the AASHTO Green Book is used by state and local transportation officials as a manual of design standards, its name, “A Policy,” intentionally reflects the need for engineering judgment to properly assess a particular road environment and engineer its design appropriately. As such, the AASHTO Green Book provides ranges of acceptable design parameters (e.g., 9’–12’ travel lanes and 5’–50’ curb radii) and describes the conditions that a professional should assess in making a determination of appropriate design.

Too often, however, in an attempt at simplification, states and localities remove the range of design flexibility from their design manuals. Another common problem is that engineers interpret the range narrowly, assuming that the standard with the most generous facilities for drivers (such as the 12’ lane) is preferred unless unusual circumstances exist. These types of practices have resulted in design treatments that are applied regardless of the surrounding context, such as residential streets engineered with freeway lane widths and curb radii, or a prohibition of street trees in the median of a four-lane road through a shopping district.

It is this narrow interpretation in the application of design guidance that has, in part, led to the many vociferous debates over street design in planning forums across America. During the 1990s, Congress spearheaded a movement toward a transportation system that accommodates the multimodal movement of people and goods above and beyond motor vehicles with passage of the Intermodal Surface Transportation Efficiency Act (1991) and the Transportation Equity Act for the 21st Century (1998). The call for more walkable, livable, and accessible communities has seen public agencies and public interest groups striving to define the most appropriate way in which to accommodate the various modes within the overall transportation system so that those who walk or ride bicycles, as well as drive cars, can safely, conveniently, and comfortably access every destination within a community.

**FHWA Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD)**

A companion document to the AASHTO Green Book for road designers is the *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD), published by the Federal Highway Administration. In its most recent (2003) edition, the MUTCD defines
the standards used by road managers nationwide to install and maintain traffic control
devices (signs, signals, and pavement markings) on all streets and highways.

Several recommendations from the last edition of the FHWA Handbook have been
incorporated into the AASHTO Green Book and MUTCD. In addition, FHWA is expected
to publish a final rule in 2009 on a proposal to reduce the pedestrian walk speed by which
signals are timed. This would have the effect of increasing pedestrian crossing time.

The following resources resulted from initial efforts to address bicycle and pedestrian
accommodations in roadway design and currently serve as the industry standard for
balancing the needs of multiple users.

**AASHTO Guide for the Development of Bicycle Facilities**

The AASHTO Guide for the Development of Bicycle Facilities (1999) is the industry
standard for bicycle facility design issues. Subjects include shared roadways, signed shared
roadways, bike lanes, shared use paths (trails), bicycle planning, and other issues. Usage
of the guide has grown rapidly as more bikeway projects have been funded and developed
following the passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in
1991. The guide is currently under review. A revised document is expected to be released
in 2009.

**AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities**

The AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities
(1st ed., 2004) provides guidance on the planning, design, and operation of pedestrian
facilities along streets and highways. Specifically, the guide focuses on identifying effective
measures for accommodating pedestrians on public rights-of-way. Appropriate methods for
accommodating pedestrians, which vary among roadway and facility types, are described
in this guide. This guide also recognizes and addresses the effect that land use planning
and site design have on pedestrian mobility.

Since the guide was published in 2004, many states, such as Oregon, Vermont, Florida,
Georgia, and Washington, had already created their own design manuals. Some may replace
their manuals with the AASHTO guide (as Arizona did with its bikeway guide). However,
others may keep their own manuals.

**ITE Guidelines for Design and Safety of Pedestrian Facilities**

The Institute for Transportation Engineers has long been a leader in addressing pedestrian
and bicycle issues. In 1998 ITE published recommended practice guidelines for the design
and safety of pedestrian facilities to provide safe and efficient opportunities for people
to walk near streets and highways. Chapters include “Roadway Design Considerations”;
“Pedestrians with Disabilities”; “Sidewalks and Paths”; “Pedestrian and Motorist Signing”;
“Signalization”; “Crosswalks and Stop Lines”; “Pedestrian Refuge Islands”; “Pedestrian
Barriers”; “Curb Parking Restrictions”; “Grade-Separated Crossings”; “School Practices”;

20
“Neighborhood Traffic Control Measures”; “Pedestrian-Oriented Environments”; “Transit Stops”; and “Work Zone Pedestrian Safety.”

**U.S. Access Board and Americans with Disabilities Act Accessibility Guidelines**

The Americans with Disabilities Act (ADA) was passed in 1990 to prohibit discrimination against people with disabilities in services, programs, and activities by state and local governments. ADA standards for new construction, adopted in 1991, were principally developed for buildings and site work. They were not easily applicable to sidewalks, street crossings, and related pedestrian facilities in the public right-of-way, even though the law does apply to these facilities.

In 1999, the U.S. Access Board initiated a rulemaking process for accessible pedestrian facilities in public rights-of-way. Since that time multiple drafts have been published. The 2005 draft Public Rights-of-Way Accessibility Guidelines (PROWAG) serves as the current best practice for accessible pedestrian design (as identified by the USDOT). It provides guidance on all types of public rights-of-way, and contains a useful summary of ADA and ADA Accessibility Guidelines (ADAAG) regulations as well as industry design practices on bus stops, curb ramps, pedestrian crossings, and street furniture relevant to bus stop accessibility.

**ENGINEERING RESOURCES FOR OLDER DRIVER SAFETY**

**FHWA Highway Design Handbook for Older Drivers and Pedestrians**

In January 1998, FHWA released a comprehensive set of guidelines that attempted to translate the knowledge about human aging into principles of highway geometric design and operations. Collectively known as the Older Driver Highway Design Handbook, the guidelines recommend a wide array of practices—such as using larger letters on signs, placing advance street name signs before intersections, and improving intersection layouts, among other things—for the design and operation of roadways to make them easier for normally aging drivers to navigate. While these practices are designed to address older drivers’ needs, implementation of many of the recommendations can make roads safer for all drivers. It should be noted that the Older Driver Highway Design Handbook did not attempt to offer design solutions for those with severe cognitive impairments such as dementia. The Older Driver Highway Design Handbook was revised in 2001 as the Highway Design Handbook for Older Drivers and Pedestrians (FHWA Handbook) to update and expand recommended practices to improve safety for older drivers and older pedestrians. An update is currently underway and is expected to be published in 2009.

With a few notable exceptions, states have done little in the way of implementing the recommendations of the FHWA Handbook. The GAO report (GAO, 2007) presents a fairly pessimistic view. When asked “To what extent has your department invested resources in older driver safety projects?” 80 percent of the states reported little or no extent. Despite
workshops conducted by FHWA to familiarize more than 1,000 state, county, and municipal engineers with this resource, the online survey of transportation planners and engineers conducted as part of this research in 2008 found that less than 40 percent of transportation planners and engineers surveyed were familiar with the FHWA Handbook. See Appendix D for the online survey results. Appendix E includes the Summary of States’ Progress in Implementing the FHWA Handbook.

Other Guidebooks and Studies

Over the years, a number of federal, state, and local agencies, along with countless other organizations, have taken an interest specifically in the needs of older driver and pedestrian mobility. Among them the National Highway Traffic Safety Administration (NHTSA), Federal Highway Administration (FHWA), and Transportation Research Board (TRB) have published research and have offered programs and policies that improve the safety of older road users. Other national organizations, including the National Institute on Aging (NIA), American Association of State Highway and Transportation Officials (AASHTO), and a wide range of private, nongovernmental organizations have also contributed to the efforts.

TRB’s landmark publication *Special Report 218: Transportation in an Aging Society* (1988) and subsequent update, *Transportation in an Aging Society: A Decade of Experience* (2004), helped to place the needs of older road users in the forefront of transportation safety agendas, fostering numerous research and programmatic activities.

NHTSA focuses on reducing traffic-related injuries and fatalities among older people by promoting, in conjunction with nongovernmental organizations, research, education, and programs aimed at identifying and assisting older drivers with functional limitations that impair driving performance. They have developed guides, brochures, and booklets for use by the medical community, law enforcement officials, older drivers, and their family members that provide guidance on actions and strategies to improve older drivers’ capabilities or to compensate for lost capabilities.

USDOT—through FHWA and NHTSA—has a role in promoting older driver safety, although states are directly responsible for operating their roadways and establishing driver licensing requirements. Of particular interest to this study is the examination of FHWA’s *Highway Design Handbook for Older Drivers and Pedestrians* and its relationship to policies promoting Complete Streets.

**APPROACHES TO ROADWAY DESIGN AND ENGINEERING**

**Traditional Approaches**

Transportation planning’s decades-long emphasis on auto mobility has meant a heavy reliance on performance measurements and analytical tools related to driving. Most
transportation plans aim to reduce anticipated traffic congestion on corridors defined as having poor levels of service by travel demand models. This puts the emphasis on vehicle mobility from the start. Meanwhile, roadway design decisions are typically based upon vehicle-oriented criteria such as design speed and functional classification. The following sections discuss these issues in more detail.

**Travel Demand Modeling**

Travel demand models were first developed in the 1950s to aid in highway planning. Using mathematical equations to make projections of the amount of travel along a corridor or in a metropolitan region given population projections, existing and planned land use, and the facility, or network of facilities, transportation planners are able to make predictions of how well alternative plans (either project alternatives at the corridor level or long-range plans at the regional level) perform in meeting planning goals. At the corridor level, planners compare the projected traffic volumes with the existing and planned capacity for the roadway to make level of service (LOS) projections.

The passage of ISTEA and the requirement for multimodal planning has pressed modelers to project travel by public transportation, walking, and bicycling, in addition to travel taken in motor vehicles. In fact, an entire subdiscipline of transportation planning is dedicated to making travel demand models more sensitive to these other modes of travel. Nonetheless, planners and engineers recognize the limitations of current modeling practice with respect to accurately forecasting transit and, more significant, pedestrian and bicycle travel.

**Level of Service (LOS)**

LOS is a qualitative measure describing the flow of traffic on a roadway. It generally describes these conditions in terms of speed, travel time, freedom to maneuver, traffic interruptions, safety, and the perceived comfort and convenience of the driver.\(^1\) LOS is represented as a spectrum from A (free-flow conditions) to F (severe congestion). The standard methodology for calculating level of service can be found in the *Highway Capacity Manual* (HCM) published by the Transportation Research Board (TRB, 2000). Average Daily Traffic (ADT) and peak hour vehicle counts are used as a basis for calculating current and anticipated future LOS.

The HCM provides roadway designers with information on “the effects of transit, pedestrians, and bicycles on the performance of these systems,” but does not attempt to equally measure the comfort of the road environment for pedestrians, bicyclists, or the transit vehicle. The TRB and other entities such as the Florida Department of Transportation have developed multimodal LOS measurement techniques that include transit, bicycles, and pedestrians, but these are not yet standard practice across the nation.

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Design Speed

Design speed is another factor that strongly influences engineering decisions. A common design assumption used by engineers is that drivers wish to minimize their travel time and delay. Indeed many designers consider design speed as a surrogate for design quality.

Roads are commonly engineered for speeds 5–10 miles per hour (mph) higher than the posted speed limit in order to provide a safety buffer for the 15th percentile of drivers that can be expected to drive faster than the posted speed. Given the traditional equating of design speed with design quality, the notion of designing a high-quality, lower-speed road is counter to many highway engineers’ training.2

But when balancing the needs of all road users within a given urban, suburban, or town environment, small differences in speed can make significant differences in pedestrian comfort and safety. For instance, pedestrians face a 5 percent chance of death if hit by a motor vehicle at 20 mph, but at 30 mph the risk increases to 45 percent, and at 40 mph the risk increase to 85 percent.3 At all levels, the risks are higher for older adults, because of their increased frailty.4 See Figure 3.

While progress has been made in providing the road planning and engineering community with resources on flexible highway design and guidelines for the incorporation of pedestrian and bicycle accommodations, it is not yet standard practice. In fact, according to the latest version of the AASHTO Green Book, “the first step in the design process is to define the function that the facility is to serve.” The designer then determines the level of service needed to fulfill this function for the anticipated volume and composition of traffic.5 For a mention of the need to rely upon the public process in defining other design controls, one needs to consult another AASHTO publication entirely.6

To create roads that work for all users, planners, in cooperation with the public, must identify design controls beyond those of functional classification, level of service, and speed early in the planning and design process. Other control factors that measure a community’s desire for increased walking, biking, and transit travel, increased safety for older drivers, economic revitalization of a corridor, or environmental protection should

inform the functional classification and other key design parameters, such as the number and width of lanes.

Functional Classification

The functional classification system defines public streets and highways by one of three major classes: local, collector, or arterial. The system was originally created for the purpose of defining roadway funding categories but has been widely adopted as a framework for roadway planning and design. The system is outlined in the AASHTO Green Book and universally used by state DOTs around the country as a fundamental element for highway planning, design, and engineering decisions.

In most highway plans and engineering projects, planners and engineers strive to balance the need for mobility (generally measured as speed or travel time between origins and destinations) and accessibility (generally measured in terms of proximity and connectivity within a given area). Arterial design favors mobility, while local street design emphasizes accessibility. Collectors serve a dual function in accommodating shorter trips and feeding the arterials; thus, they are engineered to provide some degree of mobility and also serve adjacent properties.7

Some transportation planners, engineers, and urban designers have challenged this “one size fits all” approach to roadway engineering, arguing that it exacerbates, rather than resolves, the conflicts between different roadway users, especially along arterials and collectors. The volumes of traffic these roads are expected to accommodate, coupled with an overarching goal of moving traffic, impose a design standard that favors speed and travel time. If this goal is not tempered by accommodating other users, travel environments that are inhospitable to pedestrians, bicyclists, and drivers with functional limitations can ensue.

For the foreseeable future, the functional classification system is firmly in place as a traffic engineering framework. Yet, transportation planners have realized that the simple array of definitions in the functional classification system do not fully define a roadway’s purpose or its multimodal functionality. For example, a corridor classified as a principal arterial may serve a wide variety of purposes and roadway users depending upon its context. When it passes through a small town, it may serve as the local Main Street, where pedestrian safety is paramount and 25-mph design speeds are appropriate. A few miles away, it may transition into a 55-mph connector to the city, and then it may become a 45-mph urban boulevard serving an array of modes including buses, trucks, bicycles, pedestrians, and cars. It would be inappropriate to apply the same design standards to all these segments of the corridor, even though they all have the same functional classification.

New Approaches

Context Sensitive Solutions (CSS)

In response to the need for design criteria beyond the functional classification system, AASHTO, ITE, and the Federal Highway Administration have published Context Sensitive Solutions methodologies that show engineers how to introduce more flexibility into their road design processes so that a wider range of community values and user needs might be addressed. The Context Sensitive Solutions (CSS) approach is defined as “a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic, historic, and environmental resources, while maintaining safety and mobility.”

In 2006, the Institute for Transportation Engineers and the Congress for New Urbanism (sponsored by the Federal Highway Administration and the Environmental Protection Agency) published a draft recommended practice titled Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities. The book provides planners and designers with guidance on adapting AASHTO policies and design guidelines in order to achieve context sensitive approaches for arterials and collectors in urban and suburban areas.

The publication introduces a design framework encompassing a spectrum of urban and suburban community “context zones” (see Figure 4) and thoroughfare types. Urban design and planning elements such as buildings, landscaping, land use mix, site access, and public and semipublic open spaces are the primary factors used to define context. The thoroughfare typology refines, but does not discard, the functional classification system by providing a range of design recommendations that correspond to the range of contexts served by a given corridor. See Figure 5.

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A Context Sensitive Solutions approach recognizes that street design will vary with changes to the surrounding land use and other environment features.

For example, arterials in urban areas may be designed as boulevards, avenues, or streets, with design speeds ranging from 25 to 35 mph. They may be two to four lanes wide, with block lengths ranging from 300’ to 1,320’. They may be constructed with or without medians, curb parking, bike lanes, or sidewalks. All these design factors and more are defined for different community contexts.

The ITE guidebook offers design guidance not only for the roadway (lanes, medians, on-street parking, bike lanes) but also for the roadside (e.g., sidewalks and planting strips) and intersections (e.g., curb radii, channelization, and crosswalks) for road types according to their context zone and whether they are located in predominantly residential or commercial areas. While the broader approach is complex in its presentation, its flexibility may serve to expedite projects by making road design compatible with its surroundings and community goals. While not specifically stated, this approach allows transportation agencies and land use planners the opportunity to address the needs of older road users.

Complete Streets

A Complete Street is safe, comfortable, and convenient for travel by automobile, foot, bicycle, and transit, regardless of age and ability. The focus of Complete Streets initiatives has been to encourage local, regional, and state planning agencies to change policies and procedures so that multimodal accommodations are a routine part of project development. Usually this means putting more of an emphasis on the needs of pedestrians, bicyclists, and transit riders, but the intention is not to design the car out of the picture. Rather, the aim is to “right the balance” in a transportation planning system that is currently tilted toward automobiles. People who live in communities with Complete Streets reap the benefits associated with walking and bicycling, such as increased physical activity, broader travel choices, and improved safety.
Using a CSS approach, engineers have more flexibility to tailor road design to the surrounding context.

<table>
<thead>
<tr>
<th>Functional Classification</th>
<th>Thoroughfare Types</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FREWAY/EXPRESSWAY/ PARKWAY</td>
</tr>
<tr>
<td>PRINCIPAL ARTERIAL</td>
<td>❌</td>
</tr>
<tr>
<td>MINOR ARTERIAL</td>
<td>❌</td>
</tr>
<tr>
<td>COLLECTOR</td>
<td>❌</td>
</tr>
<tr>
<td>LOCAL</td>
<td>❌</td>
</tr>
</tbody>
</table>

Figure 5. Relationship between functional classification and thoroughfare type.

Source: Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities: An ITE Proposed Recommended Practice, ITE. 2006. Reprinted with permission from ITE.

Complete Streets policies do not focus on design specifics. Like all policies, they are structured as vision and goal statements that provide broad direction to the agencies and individuals who will implement them. In order to ensure that their goals are carried out properly, some jurisdictions write their own design manuals or compile references to manuals such as AASHTO’s Guide for the Planning, Design, and Operation of Pedestrian Facilities.

By adopting Complete Streets policies and developing design manuals, transportation agencies can address more effectively the needs of older road users. However, there is not currently a comprehensive reference document that offers solid guidance on how to design Complete Streets that address the specific needs of older drivers and pedestrians. The FHWA’s Highway Design Handbook for Older Drivers and Pedestrians is an excellent resource, but it is not written from a Complete Streets perspective, in which the needs of all older roadway users are addressed simultaneously. The ADA Accessibility Guidelines are also highly informative, but do not address the needs of older drivers. A comprehensive manual on designing Complete Streets for older adults would be a valuable addition to the transportation planning and design practice. In addition, the improvements needed to make streets safer for older adults also improve conditions for other vulnerable populations, such as children. By designing Complete Streets that work for older adults, communities will reap the benefit of streets that work better for everyone.
Planning and Promoting Complete Streets

Complete Streets policies seek to change the process of transportation planning so that the needs of everyone expected to use the facility are considered from the beginning. This is critical in ensuring the consideration of the needs of older travelers. A broad approach that begins well before design standards are written is crucial to success. Once the basic policies are adopted, four implementation steps should be taken to ensure this comprehensive approach:

- **Develop staff skills in planning and designing for all modes.** Many planners and engineers began their careers with training that focused on the needs of automobiles, without much regard to who was driving them or to other road users. Balancing the needs of all

**A Good Complete Streets Policy -**

- Establishes a vision for creating complete streets
- Specifies that ‘all users’ includes pedestrians, bicyclists, transit vehicles and users, and motorists, of all ages and abilities.
- Aims to create a comprehensive, integrated, connected network.
- Recognize the need for flexibility: that all streets are different and user needs will be balanced.
- Is adoptable by all agencies to cover all roads.
- Applies to both new and retrofit projects, including design, planning, maintenance, and operations, for the entire right of way.
- Makes any exceptions specific and sets a clear procedure that requires high-level approval of exceptions.
- Directs the use of the latest and best design standards.
- Directs that complete streets solutions fit in with context of the community.
- Establishes performance standards with measurable outcomes.
- Specifies implementation steps.

**Traffic Calming**

Traffic calming is the application of roadway engineering measures such as roundabouts, speed humps and raised crosswalks, designed to reduce vehicle speeds and improve quality of life. Traffic calming is typically applied in residential areas or central business districts where pedestrian safety and comfort is a top priority.

Traffic calming is not synonymous with complete streets, as a street may be complete at any speed. But traffic calming techniques can help make streets safer for pedestrians and bicyclists by slowing drivers down.
users is a challenge, and doing so with every project requires new tools and skills. For example, the state of South Carolina has used its Complete Streets policy to launch a comprehensive training program for staff.

- **Rewrite and/or refocus agency policies and procedures to serve all modes.** Many transportation agencies use transportation planning procedures focused on automobile capacity measures such as a higher LOS. They have not established a systematic way to determine all the types and modes of travelers along a corridor and to make sure their needs are met. The policy change should result in a restructuring of everyday procedures, beginning with much broader scoping processes, and new ways to decide on trade-offs. For example, in Charlotte, North Carolina, transportation planners are using a new six-step Complete Streets planning process that systematically evaluates the needs of all modes, focusing on fixing gaps in the network for nonmotorized and transit users. Once that evaluation is complete, an iterative process begins to decide on the best design features. In many cases, a project that fails to accommodate all expected modes must seek special approval.

- **Rewrite and/or adapt design guidelines to address the needs of all travelers using all modes.** This is the step most relevant to this report. Only a few jurisdictions have completely rewritten their primary design manuals, most notably Massachusetts and the cities of Charlotte, North Carolina, and Louisville, Kentucky. A few places have established new street classification systems and typical cross-sections as an overlay to the traditional functional classification system. Many others use existing references, simply expanding their reach to include manuals that cover design for bicycle, pedestrian, or persons with disabilities.

- **Collect data on all users and modes for performance improvements.** An important aspect of successful Complete Streets planning is having the tools to assess the success of new projects in meeting the needs of varied users. This is often a challenge because of a lack of data, particularly about nonmotorized users. In addition, some of the goals may be more qualitative than quantitative. Communities such as Destin, Kissimmee, and Boca Raton, Florida, and Ft. Collins, Colorado, among others, have adopted multimodal LOS standards to try to meet this challenge.

**Inventory and Assessment of Complete Streets Policies**

As part of this project, the study team conducted an analysis of existing Complete Streets policy documents to identify those that acknowledge the needs of older drivers and/or pedestrians. Complete Streets policies are being adopted by states and by local jurisdictions across the country. This review encompassed the 80 policies in the National Complete Streets Coalition’s database as of the end of 2008. Policy types range from local ordinances to simple resolutions to lengthy comprehensive and transportation plans, as well as rewritten street design manuals, all with the intent of accommodating all users in transportation projects. Five jurisdictions have adopted more than one type of policy, so in
all, at the end of 2008, 75 jurisdictions have adopted Complete Streets policies.

Twenty-one policies are in the form of state legislation or adoption of municipal ordinance. Twenty-one states, cities, or counties have passed Complete Streets resolutions, 12 have adopted policies through internal directives, and another 18 have included Complete Streets in transportation or comprehensive plans. Five jurisdictions have adopted more extensive design manuals reflecting Complete Streets principles, and three transportation funding measures have included a Complete Streets provision. \textit{See Figure 6}. The inventory table found in Appendix C is sorted by policy type, jurisdiction, and state. It includes a listing for the USDOT guidance document that has been the basis for many state and local policies, but this document was not included in the analysis.

Not all the surveyed Complete Streets policies address the needs of all travel modes. Forty-one percent, a total of 33 policies, address only bicycle and pedestrian travel. Another 26 policies add transit users, and 21 discuss balancing the needs of these three user types with the needs of motorists, freight, or both. \textit{See Figure 7}. One policy type, the comprehensive plan, is most likely to include all modes—44 percent of these policies address all roadway users.

The inventory also accounts for how many policies specifically include the needs of older users or persons with disabilities. Of the 80 policies analyzed, 58 make some reference to addressing these needs, with most of those references to persons with disabilities. Only 30 policies (38 percent) make specific mention of older adults, but few of these references were extensive. \textit{See Figure 8}. The most common reference (18) was use of the phrase “users of all ages and abilities” in the opening section of the policy. Not surprisingly, 11
of the policies with a more extensive discussion are the longer and more involved policies found in comprehensive or transportation plans.

A number of policies also refer to “meeting ADA standards.” In policies that include sections on specific user types (bicyclists, pedestrians, etc.), very few expand upon that intent by discussing the different travel needs of children, older people, or people with disabilities. Almost all the discussion of older travelers focuses on the needs of older pedestrians.

Five jurisdictions have written more extensive design manuals to accompany their Complete Streets policies. They include Charlotte, North Carolina; San Diego and Sacramento, California; Basalt, Colorado; and the Commonwealth of Massachusetts. Several others make some mention of specific design treatments. The other policies either refer readers to outside design guidance or do not mention design.

Only a few mention the Americans with Disabilities Act Accessibility Guidelines (ADAAG), and none mention the more recent Public Rights-of-Way Accessibility Guidelines (PROWAG), which are more specific to street design. Not a single policy mentions the FHWA’s Highway Design Handbook for Older Drivers and Pedestrians as a resource.

This review was an analysis of written policies, and so does not capture the ways that policies may have opened the door to greater consideration of the needs of older adults in transportation planning. For example, Kirkland, Washington, won an EPA Achievement Award for Active Aging, in part because of its implementation of its Complete Streets policy. In Honolulu, a Complete Streets amendment to the city’s charter was championed

While all Complete Streets policies address pedestrians and bicyclists, few are so comprehensive as to address the needs of transit users, motorists, and freight vehicles.

**Figure 7: Percentage of Complete Streets Policies by Mode**

![Pie chart showing the percentage of Complete Streets policies by mode: 41% Bicyclists & Pedestrians, 33% Bicyclists, Pedestrians, & Transit Users, 16% Bicyclists, Pedestrians, Transit Users, & Motorists, 10% Bicyclists, Pedestrians, Transit Users, Motorists, and Freight Vehicles.](chart_image)
Few existing complete streets policies acknowledge the needs of older road users.

![Figure 8: Policy Recognition of Older People and People with Disabilities](image)

by the state AARP chapter, which has continued to work to promote pedestrian safety.

That said, it is clear that most Complete Streets policies can do more to recognize the needs of older adults, specifically by incorporating the three planning and design principles discussed in Chapter 4.

**Complete Streets Survey**

In July 2008, AARP’s Public Policy Institute (PPI), in association with the Institute of Transportation Engineers (ITE) and the National Complete Streets Coalition, conducted an online survey of more than 1,100 state, regional, and local transportation engineers and planners. The survey was intended to identify keys to success for planning and implementing Complete Streets and older driver safety projects. Approximately 60 percent of respondents were engineers, and 20 percent were planners. The remaining 20 percent were advocates, academics, and other interested parties.

Almost 80 percent of all respondents were familiar with the concept of Complete Streets. Planners were more familiar than engineers. See Figure 9. One-quarter of respondents said their jurisdictions or agencies had policies that require multimodal planning on all projects; another quarter said their policies partially required multimodal planning. One quarter were unsure if they had such policies.

The survey also asked about respondents’ familiarity with FHWA’s *Highway Design Handbook for Older Drivers and Pedestrians*. Only six percent said the FHWA Handbook and their multimodal policies were “very helpful” in resolving potential conflicts between
Survey respondents also were asked to describe difficulties in accommodating the needs of multiple roadway users. Major barriers included limited funding (72 percent), lack of political support (54 percent), lack of political authority (41 percent), and conflicts between state DOTs and local jurisdictions (52 percent), between state DOTs and MPOs (31 percent), or between MPOs and local jurisdictions (22 percent).

In response to an open-ended question on the same subject, most respondents cited lack of funding and limited rights-of-way. Others noted difficulties making multimodal improvements on roads with major traffic congestion and balancing roadway capacity with other needs. In addition, respondents cited a lack of planning and engineering personnel knowledgeable about multimodal design, the challenge of balancing Complete Streets needs with DOT standards, general resistance to change, and a lack of public and political support.

Respondents were then asked to describe how their particular challenge was addressed. Many respondents indicated that the challenge is still an ongoing struggle. Others cited strategies and approaches, such as the following:

- Include more context sensitive design guidelines for roads and development projects.
COMPLETE STREETS POLICY EXAMPLES

Charlotte, North Carolina

Charlotte, NC has adopted an innovative Complete Streets policy, and has written Urban Street Design Guidelines to aid in its implementation. The second chapter of the Guidelines is a very readable answer to the question, “What does each user want from its streets?” with sections covering motorists, transit vehicles and users, pedestrians, and bicyclists. The chapter does not address the differing needs of older users of these modes, but does discuss the challenge of balancing the needs of different users.

Decatur, Georgia

The Community Transportation Plan adopted in 2008 by the city of Decatur, Georgia, a small town surrounded by suburban Atlanta, makes it clear that this town’s transportation emphasis will shift to promoting human health and safety:

“The creation and support of a healthy and active community is at the heart of the Decatur Community Transportation Plan. For this plan and the City of Decatur, that means establishment of a safe, integrated, transportation system that promotes bicycling and walking as a viable alternative to automobile travel, increased connectivity between neighborhoods and destinations, and equity for users of all ages and abilities.”

The plan lays out ways to increase opportunities for nonmotorized travel, making specific mention of “the City’s most vulnerable populations such as low income households, children and older adults, all of whom experience differing physical, mental and financial challenges to mobility.” Drawing upon information such as a townwide Health Impact Assessment, the plan makes numerous references to accommodation of older pedestrians through application of Universal Design principles with special attention to intersection design.

California

In March 2001, the California Department of Transportation, Caltrans, first adopted a Complete Streets policy for state roads, Deputy Directive 64. While it was a progressive policy, it was focused almost exclusively on accommodation for bicycles and pedestrians. In October 2008, Caltrans adopted a revised version of that directive, much stronger in language and reach. The new policy addresses users of all ages and abilities and shows that Caltrans recognizes bicycle, pedestrian, and transit modes as integral elements of the transportation system, and will plan for all modes in all future projects. The stronger Caltrans language was developed even as a bill worked its way through the California legislature, with support from the state AARP chapter. The new state law was signed in September 2008 and brings Complete Streets concepts to local roads, by mandating that counties and cities include Complete Streets policies as part of any update to the transportation element of their general plans. This will present an ongoing opportunity to address the needs of older adults as part of the comprehensive planning process.
Adopt flexible LOS standards and “routine accommodation” mandates.

- Organize a comprehensive stakeholder process that acknowledges the trade-offs involved in developing a workable solution. Users should be prepared to compromise in order to achieve a “mobility balance.”

- Refocus planning, design, and maintenance resources to ensure the needs of pedestrians and bicyclists are met.

- Pursue multiple avenues of funding such as Council of Governments funding combined with state and local funds; federal enhancement program grants; highway

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**Example Multi-Modal Roadway Projects**

A little more than a third (37 percent) of Complete Streets online survey respondents said their agency or jurisdiction incorporated the needs of older drivers and pedestrians into multimodal planning and project design. These respondents were asked to describe one multimodal project completed by their organization within the last two years that demonstrated principles of Complete Streets as well as safety for older drivers and pedestrians, as well as pedestrians and bicyclists of all ages. Most of the projects cited (45 percent) were on arterial roadways. Projects on collector roads (16 percent) and residential or local roads (11 percent) were also described. Nearly one-quarter of the projects were on some other form of road, or an unknown type.

Respondents were asked to identify the type of community (or land use context) in which their selected project was completed. The majority (58 percent) took place within an urban or suburban land use context such as a downtown mixed-use center (22 percent), urban residential area (12 percent), suburban commercial/office center (12 percent), or suburban residential area (12 percent). Seven percent of the projects were in small town or rural settings. Another 27 percent took place in midsized cities with populations from 100,000 to 499,999. Eighteen percent took place in towns (10,000–49,999) or small cities (50,000–99,999). Five percent of projects took place in rural communities of fewer than 10,000 people, while 12 percent were in cities of more than 500,000.

Respondents were asked to name the ways in which their project incorporated design elements for older drivers/pedestrians and Complete Streets. Most of the older pedestrian accommodations were also beneficial to all pedestrians, such as ADA accessible sidewalks and ramps, pedestrian refuge medians, reduced crossing distances, pedestrian crossing signals, fewer travel lanes, additional public space, streetscaping, benches, and bus shelters. Similarly, the most popular Complete Street design elements were wide sidewalks, 4-feet shoulders, bike lanes, transit stops, shorter crossing distances, reduced speed limits, curb extensions, road diets, planted medians, street trees and buffer strips, and improved crosswalks. The most common measures that addressed older drivers and pedestrians specifically were larger street signs and longer crossing times for pedestrians.
funds; local revenues; and state funds for roads and transit.

- Reduce the need for public expenditures by changing zoning and subdivision regulations in order to promote more efficient development.

- Have patience—these processes take a long time.

Appendix B includes the online survey instrument and responses.