

The Role of FHWA Programs In Livability:

State of the Practice Summary

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Table of Contents

Executive Summary	1
Introduction and Purpose	2
What is Livability?.....	2
Research Results.....	6
1. The Role of Highways and Highway Programs in Livability	8
Highway Projects and Programs.....	10
Safety Projects and Programs.....	12
Bicycle and Pedestrian Programs	13
Management and Operations	15
Freight Projects and Programs	16
Agency Roles.....	17
2. Strategies for Implementing Livability	18
Multimodal Corridors and Systems Planning	18
Programmatic Support and Technical Assistance	20
Practice Opportunities and Challenges	22
Benefits of Livability	23
3. Processes, Performance Measures, and Tools	25
Integrated Planning Processes	26
Performance Measures and Data.....	27
Policies and Guidance.....	28
Tools.....	29
4. Conclusion and Next Steps	30
References	33

Executive Summary

This research paper highlights the current state of the practice relative to the implementation of livability principles within the context of the Federal-aid highway program. It also highlights the challenges facing Federal Highway Administration (FHWA) and other transportation agencies in changing traditional planning approaches and evolving institutional frameworks to more effectively incorporate livability principles. It offers a sampling of strategies and tools for implementing livability through different programs and agencies, and across various scales as they pertain to highway program planning and development.

The research conducted for this paper focused on identifying integrated highway projects that address livability from multiple perspectives, including a national literature review/scan coupled with technical knowledge of the research team and outreach to transportation practitioners. As a result of the literature scan, many different types of organizations and planning products, at different geographic levels, incorporating Federal, State, regional, and local programs and projects, were reviewed for livability practices and broad analytical observations.

Transportation plays an integral role in advancing the key principles of livable communities, as broadly defined through the Partnership for Sustainable Communities initiated by the U.S. Department of Housing and Urban Development (HUD), U.S. Department of Transportation (DOT), and U.S. Environmental Protection Agency (EPA) (HUD-DOT-EPA Partnership).ⁱ However, at the transportation practitioner level, there remains significant interest in learning how to incorporate the livability principles into individual transportation plans, programs, and projects. There is also a need for effective guidance on implementation strategies and cross-agency coordination processes to integrate these principles with other Federal, State, regional, local and private sector plans and investments.

Livability in transportation is about integrating the quality, location, and type of transportation facilities and services available with other more comprehensive community plans and programs to help achieve broader community goals. It provides economic benefits to communities, businesses, and consumers. In practice, livable transportation systems accommodate a range of modes (walking, bicycling, transit, and automobiles) by creating mobility choice within more balanced multimodal transportation networks. This in turn helps support more sustainable patterns of development, whether in an urban, suburban, or rural context. Livable transportation systems can provide better access to jobs, community services, affordable housing, and schools, while helping to create safe streets, reduce energy use and emissions, reduce impacts on and enhance the natural and built environment, and support more efficient land use patterns.

Addressing these broader community goals can also help integrate planning processes between different agencies and levels of government. Livability is applicable at multiple scales—from urban or rural local projects, to regional plans, or at the State and Federal program level. This paper will guide discussion during FHWA’s planned regional livability workshops, intended to help advance livability within the context of the nation’s transportation infrastructure.



As shown by the before-and-after simulations above, new multimodal roadway networks can be created through aging commercial properties as mixed-use redevelopment occurs, improving mobility, housing choice, and access to businesses and services.

Introduction and Purpose

America's transportation industry has built one of the world's largest highway networks, connecting people, businesses, and communities across the country, linked with extensive public transportation systems in major metro areas – a significant feat of the 20th century. Enhancing and expanding this system to better support community livability is one of the country's next major challenges. Livability in transportation is about leveraging the quality, location, and type of transportation facilities and services available to help achieve broader community goals. It requires defining a new vision for highway systems that support and enable the alignment of different modes of transportation options – driving, transit, walking, wheeling, and bicycling – with existing and desired community development patterns and broader quality of life goals. This includes improving the effectiveness of multimodal networks (e.g., connected grids of complete streets) in urban and suburban settings; repurposing the form and function of multimodal corridors (major surface roadways for through-travel and transit, with parallel networks of smaller roads for local travel); implementing multimodal design solutions for new regional highways; and improving intermodal connections, while minimizing the impacts to the natural environment. Livability in transportation requires collaboration and innovation across other traditional highway agency programs, such as management and operations (M&O), intelligent transportation systems (ITS), transportation demand management (TDM), safety, and freight. It also requires collaboration between transportation agencies and partners concerned with land use, housing, environmental permitting, historic preservation, natural resource protection, economic development, and many other areas.

This paper is intended to help practitioners understand the role of highways and related programs in supporting livability. It also explores some of the commonalities and differences between livability and sustainability. It focuses largely on roadway transportation activities and the roles of Federal Highway Administration (FHWA) programs, State department of transportation (State DOT) programs, and regional transportation agencies in supporting livability. A variety of strategies already in practice or emerging are beginning to define how highways and highway agency programs can help bring communities together and support community livability goals.

The research scan for this paper focused largely on the role of highways and highway agency programs in livability, based on identification of best practices and case studies. It identified several strategies for implementing livability in transportation, along with processes, performance measures, and tools currently in use. This research is intended to help facilitate continued transportation agency discussions, and to help practitioners to identify key successes, lessons learned, effective planning processes, implementation tools, and other strategies for advancing livability.

What is Livability?

The concept of livability, which has evolved over the years, is often used to describe a range of initiatives aimed at improving community quality of life while supporting broader sustainability goals. Livability encompasses multi-dimensional issues relative to community design, land use, environmental protection and enhancement, mobility and accessibility, public health, and economic well-being. Incorporating livability into transportation planning, programs, and projects is not a new concept. Communities, developers, advocacy groups, businesses, and neighborhood residents have been working for generations to make places more livable through transportation initiatives, with varying degrees of support from local, regional, State, and Federal agencies. These initiatives have used a range of terms to describe an overlapping set of objectives and strategies—livability, sustainability, community impact assessment, scenario planning, land use and transportation, smart growth, walkable communities, new

urbanism, healthy neighborhoods, active living, transit-oriented development (TOD), complete streets, context-sensitive solutions (CSS), and many others. While advocates for each approach or “brand name” might find differences, most transportation practitioners understand the key concept behind livability in transportation: transportation planning is a process that must consider broader community goals. The table below highlights a few of the definitions used by DOT and national organizations to describe livability and livable communities.

Table 1: Livability Definitions

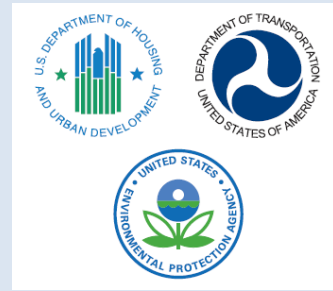
<p>U.S. DOT Secretary LaHood. Livability means being able to take your kids to school, go to work, see a doctor, drop by the grocery or post office, go out to dinner and a movie, and play with your kids in a park, all without having to get in your car.²</p>	<p>U.S. DOT Strategic Plan FY 2010-FY 2015. Livable communities are places where transportation, housing and commercial development investments have been coordinated so that people have access to adequate, affordable and environmentally sustainable travel options.³</p>	<p>U.S. DOT Deputy Assistant Secretary Beth Osborne. Livable communities have transportation options, housing options, destinations nearby, and save money for families and taxpayers (<i>from TRB Transportation Systems for Livable Communities Conference presentation, October 18, 2010</i>).⁴</p>
<p>AASHTO ‘Road to Livability.’ AASHTO’s ‘livability’ objective is to use transportation investments to improve the standard of living, the environment, and quality of life for all communities, rural, suburban, and urban... providing more transportation choices for families , by walking, biking, and transit;...driving is also a legitimate transportation choice.⁵</p>	<p>American Institute of Architects. Livability is best defined at the local level. Broadly speaking, a livable community recognizes its own unique identity and places a high value on the planning processes that help manage growth and change to maintain and enhance its community character.⁶</p>	<p>AARP Beyond 50.05. A livable community is one that has affordable and appropriate housing, supportive community features and services, and adequate mobility options, which together facilitate personal independence and the engagement of residents in civic and social life.⁷</p>

FHWA is not alone in the effort to address the complex issues of how community and transportation system design can positively influence quality of life. In addition to their traditional transportation partners at the State, regional, and local level, FHWA and the Federal Transit Administration (FTA), as part of the U.S. Department of Transportation, have joined with the U.S. Department of Housing and Urban Development (HUD) and the U.S. Environmental Protection Agency (EPA) in creating the Partnership for Sustainable Communities, and together have defined six livability principles. The three partner agencies are working to incorporate the livability principles into programs, policies, funding, and projects through a series of interagency working groups, targeted pilot projects, joint review of grant applications, multidisciplinary research, and other efforts. These efforts are described in the *Partnership for Sustainable Communities: A Year of Progress for American Communities* report.⁸

Each agency has a slightly different focus on livability and sustainable communities, based on its core mission. HUD focuses on coordinating Federal housing and transportation investments with local land use decisions to reduce transportation costs, improve housing affordability, save energy, and increase access to housing and employment.⁹ EPA provides tools, research, publications, and technical assistance to encourage development strategies that protect air and water, preserve open space and natural resources, and create healthy and attractive places for people to live, work, and play. This includes promoting smarter growth patterns and encouraging widespread adoption of green building practices.¹⁰

Partnership for Sustainable Communities

In June 2009, U.S. Secretary of Transportation Ray LaHood, U.S. Secretary of Housing and Urban Development Shaun Donovan, and U.S. Environmental Protection Agency Administrator Lisa P. Jackson announced the new Interagency Partnership for Sustainable Communities and its six livability principles to act as a foundation for interagency coordination. The interagency promotion of livability aims to help America's neighborhoods become safer, healthier, and more vibrant. The Partnership will encourage the incorporation of livability principles into Federal programs, while better protecting the environment, promoting equitable development, and helping to address the challenges of climate change.¹¹



The Livability Principles

- **Provide more transportation choices.** Develop safe, reliable, and economical transportation choices to decrease household transportation costs, reduce our nation's dependence on foreign oil, improve air quality, reduce greenhouse gas emissions, and promote public health.
- **Promote equitable, affordable housing.** Expand location- and energy-efficient housing choices for people of all ages, incomes, races, and ethnicities to increase mobility and lower the combined cost of housing and transportation.
- **Enhance economic competitiveness.** Improve economic competitiveness through reliable and timely access to employment centers, educational opportunities, services, and other basic needs by workers, as well as expanded business access to markets.
- **Support existing communities.** Target Federal funding toward existing communities—through strategies like transit oriented, mixed use development, and land recycling—to increase community revitalization and the efficiency of public works investments and safeguard rural landscapes.
- **Coordinate and leverage Federal policies and investment.** Align Federal policies and funding to remove barriers to collaboration, leverage funding, and increase the accountability and effectiveness of all levels of government to plan for future growth, including making smart energy choices such as locally generated renewable energy.
- **Value communities and neighborhoods.** Enhance the unique characteristics of all communities by investing in healthy, safe, and walkable neighborhoods—rural, urban, or suburban.

HUD, EPA, and DOT came together in 2009 to advance the livability principles, which represents a significant milestone in Federal interagency cooperation. Federal efforts continue to better define livability and sustainability, including the following descriptions included in the Notice of Funding Availability for National Infrastructure Investments under the Fiscal Year 2010 Appropriations Act (Transportation Investment Generating Economic Recovery II Discretionary Grants, or TIGER II):¹²

- **Livability:** Fostering livable communities through place-based policies and investments that increase transportation choices and access to transportation services for people in communities across the United States.
- **Environmental Sustainability:** Improving energy efficiency, reducing dependence on oil, reducing greenhouse gas emissions and benefitting the environment.

Commonalities and Differences between Livability and Sustainability

Since before the nation's founding, sustainability has traditionally meant meeting the needs of the present without depleting resources or harming the environment for future generations (paraphrased from President Thomas Jefferson, 1789).¹³ More recently, livability has referred to community quality of life, including transportation and housing choice and access.

Key Commonalities. Livability and Sustainability both:

- Address issues of social equity (e.g., the needs of low income, young and old, disabled, and minority populations).
- Address issues of human health (livability focuses more on 'active living'-type strategies; sustainability focuses more on environmental air/water quality-type impacts).
- Promote more environmentally sustainable travel options.
- Promote economic development (at different scales)

Key Differences.

- Sustainability includes a long-term, multi-generational focus (meeting the needs of the present while protecting natural and historic resources for future generations).
- Sustainability addresses larger environmental goals such as improving water and air quality, reducing climate impacts, increasing energy efficiency, and decreasing dependence on foreign oil.
- Livability can be less specific about larger environmental goals (although the Livability Principles include specific environmental outcomes).
- Livability includes more detailed strategies to improve travel choices and accessibility, lower transportation and housing costs, coordinate Federal policies and investments, and support neighborhoods and communities.

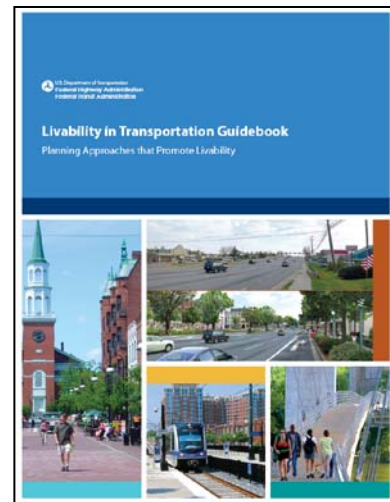
From the HUD and EPA perspectives, the term 'sustainable communities' refers to "places that balance their economic and natural assets so that the diverse needs of local residents can be met now and in the future."¹⁴ Within FHWA, a recent reorganization established a separate livability team (in the Office of Human Environment) and a sustainability team. While FHWA's sustainability efforts focus more on the natural environment, including climate change issues, there appear to be shared elements between livability and sustainability definitions. FHWA has described sustainability with "the 'Triple Bottom Line' concept, which includes equity (also known as social or people), ecology (also known as environment or planet), and economy. The goal of sustainability is the satisfaction of basic social and economic needs, both present and future and, the responsible use of natural resources, all while maintaining or improving the well-being of the environment and ecology on which life depends."¹⁵ While livability and sustainability have a somewhat different focus and scale, they both reflect the need for agencies to more explicitly address social and community values, objectives, and performance measures.

For the purposes of FHWA's livability initiative, it would appear that – while livability and sustainability may differ somewhat in concept – the terms livability and sustainable communities intertwine in practice. More importantly, the transportation solutions that support both are likely to be similar. Livability initiatives may be described as a **subset strategy** of sustainability and sustainable development focused more on near-term planning, funding, and implementation strategies at the community level.

Determining what livability means for highways and highway programs starts with a working definition of livability in transportation, framed by an understanding of FHWA and partner agencies' thoughts about livability and sustainability and the applications of livability in programs and projects. The following definition is updated from the definition in the FHWA/FTA *Livability in Transportation Guidebook: Planning Approaches that Promote Livability*.¹⁶

Livability in transportation is about leveraging the quality, location, and type of transportation facilities and services available to help achieve broader community goals such as access to a variety of jobs, community services, affordable housing, quality schools, and safe streets. This includes:

- Addressing road safety and capacity issues through better planning, design, and construction.
- Integrating health and community design considerations into the transportation planning process to create more livable places where residents and workers have a full range of transportation choices.
- Using TDM approaches and system M&O strategies to maximize the efficiency of transportation investments.
- Maximizing and expanding new technologies such as ITS, green infrastructure, and quiet pavements.
- Developing fast, frequent, dependable public transportation to foster economic development and accessibility to a wide range of housing choices.
- Strategically connecting the modal pieces—bikeways, pedestrian facilities, transit services, and roadways—into a truly intermodal, interconnected system.
- Enhancing the natural environment through improved storm water mitigation, enhanced air quality, and decreased green house gases



Research Results

The research goals and process focused on integrated projects that address livability from multiple perspectives. The research was conducted through a twofold approach starting with a national literature review/scan, coupled with technical knowledge and personal outreach based on extensive “in the field” expertise. As a result of the literature scan, the team reviewed resources from many different types of organizations, planning products, and projects at different geographic levels including national and state organizations, Federal Land Management Agencies (FLMAs) and Indian Tribes, MPOs, local governments, and transit operators. This review found that while many organizations are grappling with livability questions and definitions, they have been using similar language such as CSS, smart growth, etc. to develop effective programs and projects. Some of the key research findings include:

- **Many agencies have implemented livability in transportation by creating safer, more balanced local and regional multimodal roadway networks while incorporating CSS and improved design elements such as complete streets.** Examples include complete streets policies adopted at the regional level (Mid-Ohio Regional Planning Commission)¹⁷ or local level (St. Louis, MO);¹⁸ policy and design efforts such as the St. Louis Great Streets Initiative; or implementation strategies like Charlotte’s South Corridor Infrastructure Program, which used \$50 million in bond funding to build and enhance new streets, sidewalks, and intersection improvements around light rail stations.¹⁹
- **Creating livable transportation systems requires an interdisciplinary approach. Few of the examples researched involved singular agencies or stand-alone community goals.** The Atlanta BeltLine is a \$2.8 billion redevelopment project to provide new housing and mixed use development along existing historic rail lines, and help shape the way Atlanta grows over the next several decades. It will provide a network of transit, multiuse trails, and public parks along a historic 22-mile railroad corridor circling downtown and connecting 45 neighborhoods. Led by the nonprofit Atlanta BeltLine, the broad public-private partnership (including the City of Atlanta) created a Tax Allocation

District and other funding initiatives. Planned improvements include a 22-mile rail transit network, 5,000 new affordable workforce housing units, 1,300 acres of parks and greenways, 1,100 acres of brownfield remediation/redevelopment, and civic and cultural initiatives expected to result in over \$20 billion in economic development and 30,000 new jobs.²⁰

■ **Livable transportation plans and projects are most successful when planned in support of broader community goals.**

The "Road to Livability" report from the American Association of State Highway and Transportation Officials (AASHTO) notes that the livability objective is to use transportation investments to improve communities' standard



of living, environment and quality of life. States are focusing on integrated planning and increased public outreach; designing facilities that are sensitive to the communities they pass through; and developing partnerships to achieve multiple community objectives: a strong economy; safe neighborhoods; vibrant, healthful, aesthetically pleasing settings; and the preservation of historical, cultural, and natural resources.²¹

Rural highways can incorporate livability and sustainability principles, such as the multi-use trail, priority bus transit, context-sensitive guardrails, and landscaping shown on the rural highway above.

■ **The majority of implementation projects occur at the local scale – often with MPO and/or State partners and funding.**

The research effort collected over 100 projects nationwide, underscoring different dimensions of livability: development context, level of government/scale, transportation mode emphasis, livability principle focus, partnership agencies' programs, FHWA interest areas, geographic diversity, and age of cities/regions. Many of the projects relate only partially to roadways, but support transportation choice and other livability principles. Many States have Main Street, streetscape, or design assistance programs to help communities ensure that investments in downtown streets enhance quality of life, promote healthy living, and bring people and business to town centers.

■ **There can be significant differences in the application of livability principles in rural or gateway communities, urban, and suburban areas, both in rural roadway issues and transit service.**

However, many of the place-based strategies that work in larger cities can also work in small towns, at a smaller scale. A recent article in PBS Blueprint America noted that the transportation industry's "one-size-fits-all project driven approach of building more roadway capacity just doesn't fit into rural America." Applying context sensitive solutions might mean improved wayfinding, building a bus shelter, rightsizing a Main Street, spot capacity or safety improvements to regional roads, or widening or realigning highways in between villages but not within village centers.²²



Small towns like Snohomish, Washington have used improvements like the curb extensions, street trees, diagonal parking, and crosswalks shown above to create a vibrant, walkable downtown with a balance between through travel, parking and business access.

1. The Role of Highways and Highway Programs in Livability

While there are many projects and plans that incorporate livability, very little empirical research exists on the relationship between livability and highways, and on highway programs explicitly. The limited research that does exist has focused on strategies for maximizing multimodal options, minimizing or mitigating the impacts of Interstate highways on neighborhoods (such as environmental justice impacts), implementing CSS, or designing rural highways in a more environmentally sensitive manner to preserve small towns. At the October 2010 Transportation Research Board Conference on Transportation for Livable Communities, only a handful of presentations discussed the role of highways and highway programs in livability.²³ The majority of topics included projects focused on traffic calming, transit-oriented development, ridesharing, management and operations (M&O) strategies, and health and environmental issues. Most topics were geared towards creating a stronger multimodal balance within existing transportation networks or retrofitting existing roadways into more livable, urban thoroughfares.

This research gap demonstrates that many misconceptions still correlate livability only with promoting transportation modes for urban settings (e.g., walking, biking, and transit), or do not apply to roadways at all. However, several project examples from the team's research show that livability is relevant to all modes and community contexts. Table 2 highlights some common misconceptions and realities about livability and highways.

Urban Thoroughfares Manual

In 2006, FHWA and EPA, in partnership with the Congress for the New Urbanism and the Institute for Transportation Engineers, developed *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach*. The primary focus of the manual is to support development of more context sensitive, walkable urban roadways. This work creates a new template for designing roadways appropriate in an urban context and is a notable achievement in new thinking about roadway designs. The manual introduces several roadway types, including avenues and boulevards, along with planning and design principles for residential roadways and Main Streets.²⁴

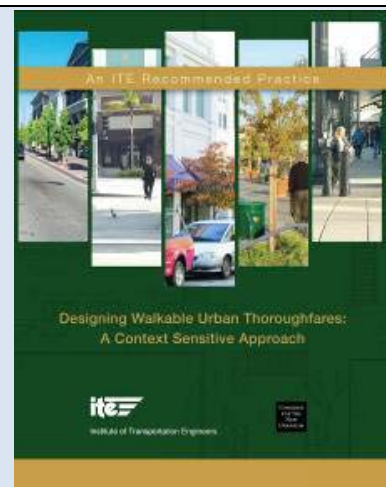


Table 2: Misconceptions About Livability and Highways

Misconceptions	Reality
<p>Livability does not apply to highways or traditional highway programs</p>	<p>Livability does apply to highways. Highways are an important part of a multimodal transportation network, providing vital links between communities. This network of highways needs to be maintained, strategically enhanced, efficiently operated within a multimodal context, and integrated with community-based programs that span land use, economic development, environmental, and other quality of life issues. Livability principles for highways include strategies to get more efficiency out of the existing highway network, maintaining reasonable travel times through operational improvements, and multimodal enhancements (high occupancy lanes or dedicated transit lanes). Livability principles can help set the context for strategic expansion of the highway network by aligning regional mobility goals with community based growth management and economic development initiatives.</p>
<p>Makes roadways less safe</p>	<p>Livability improvements do make roadways safer. Improving safety for all transportation system users is a key goal of most livability and context-sensitive design improvements. For example, under appropriate conditions, travel lane widths can be narrowed to add a bicycle lane without affecting crash rates or vehicle capacity. The added bicycle lane can also create a safer and more convenient facility for bicyclists.</p>
<p>Focuses mostly on walkable communities</p>	<p>Livability is about providing more transportation choices with a balance of modes and improved connectivity. It is also about ensuring equal access to the transportation network, for persons with disabilities or transportation-disadvantaged populations. Creating a highly accessible and balanced transportation system does include more walking, bicycling, and transit options, but it is also about creating more efficient and connected local roadway networks, regional networks to access regional destinations by highway or transit, and freight access to support a vibrant economy. A balanced, connected transportation network supports livability by increasing choice and convenience across all modes, while improving the efficiency and effectiveness of the entire system – from neighborhood to regional scales.</p>
<p>Targets cities and transit – and is not for rural communities.</p>	<p>Livability applies to communities regardless of location or size. Livability emphasizes a safer, more balanced multimodal transportation system, along with the preservation of existing communities – whether in a rural, suburban, or urban context. In rural settings, livability may involve improving regional mobility and safety on rural highways that connect families to communities, arms to markets and workers to jobs. Rural livability can also include traffic calming as highways transition through traditional main street downtowns to support local revitalization, economic development, or strategic growth and development goals. Livability strategies can apply to all types of places and transportation modes – the key is tailoring the approach and ultimate design solution to reflect that community's context or setting.</p>

Creating livability solutions is highly dependent on the community context and local issues. For instance, implementing safety strategies for making urban thoroughfares more livable might focus on resolving the vehicular and pedestrian conflicts in high traffic areas. In rural settings, the safety focus might be on reducing vehicular crashes due to high-speed moving traffic facing abrupt stops for left turns, uncontrolled access from side roads, truck traffic, slower moving vehicles sharing the roadway, or adding roadway shoulders to accommodate pedestrians and bicyclists and provide a more forgiving roadway for departure crashes, etc. When livability is 'siloes' into addressing stand-alone problems, like congestion, air quality, safety, operations, or pedestrian and bicycle travel, opportunities can be lost to address place-based, community-wide issues more holistically. The following sections highlight some existing examples of livability in practice. These examples demonstrate livability strategies applied to different community settings and scales, and coordinated across multiple programs and agencies.

Highway Projects and Programs

Applying livability principles to traditional highway projects is an evolving practice. Several Federal programs provide livability resources, materials, and training to transportation professionals nationwide. Examples of programs, processes, and other resources include Community Impact Assessment (CIA), a process to evaluate the effects of a transportation action on a community and its quality of life. The assessment process is an integral part of project planning and development that shapes the outcome of a project. FHWA's EcoLogical Program articulates a vision for infrastructure development and ecosystem conservation to harmonize economic, environmental, and social needs and objectives. The Transportation Planning Capacity Building (TPCB) Program has been a resource for agencies in need of scenario planning assistance.

FHWA offers technical assistance through its Resource Centers, which focus on technology deployment, interagency/intermodal coordination, technical assistance, and training support.²⁵ In addition, the National Highway Institute works to improve the performance of the transportation industry through training, including topics like bicycle/pedestrian facility design, integrating transportation and land use planning, and Environmental Justice.²⁶ To better integrate planning, project development and National Environmental Policy Act (NEPA) review, FHWA is developing a new "Guidance on Using Corridor and Subarea Planning to Inform NEPA," which incorporates livability concepts and protection of natural and historic resources. FHWA encourages State and local governments to coordinate land use and transportation planning to avoid future highway noise impacts and the need to provide noise abatement. To improve the quality of life in older neighborhoods impacted by traffic noise from existing highways, Tennessee DOT established a new program to facilitate the construction of "retrofit" noise walls.²⁷ FHWA has had a number of Federal funding programs that can support livability initiatives, such as the Congestion Mitigation and Air Quality Improvement (CMAQ) Program; the Transportation, Community, and System Preservation Program; the Transportation Enhancement Program, National Scenic Byways Program, and the Recreational Trails Program; and the Safe Routes to School Program.²⁸ The Federal Lands Highway Program also incorporates livability concepts in collaboration with FLMA's and Indian Tribes to enhance recreational experience, resource protection, and consider economic drivers of gateway communities, Tribal Sovereignty and safety.

Updates to the *Highway Capacity Manual* to incorporate multimodal level of service analysis will also benefit livability initiatives. On the State and local level, many agencies are also incorporating environmental, livability, and community context into their policies and design guidelines. Notable examples include new guidance from Massachusetts, Pennsylvania, and New Jersey DOTs (see below), or the Los Angeles *Downtown Design Guide*. Nearly all the documents include guidelines or performance measures for pedestrian and bicycle travel, and several include transit strategies. Several State DOTs have developed integrated planning, design, project development, or evaluation criteria.

- **NY State DOT Green Leadership In Transportation Environmental Sustainability (GreenLITES)**

Program is a self-certification program for transportation projects and operations that incorporate sustainable choices. Projects are self-scored based on how well they protect and enhance the environment; conserve energy and natural resources; preserve or enhance historic, scenic, and aesthetic characteristics; encourage public involvement; integrate smart growth land use practices; and encourage innovative approaches to sustainable design, operations, and maintenance.²⁹



- **Pennsylvania DOT's Smart Transportation Guidebook** (developed with New Jersey DOT) is intended to integrate transportation system planning and design to foster development of sustainable and livable communities, in rural, suburban and urban areas. The Smart Transportation goal is to plan,

program, design, and construct transportation projects that are affordable, able to be implemented, acceptable to the community, and supportive of economic development. The Guidebook is being used to update PennDOT's design manuals.³⁰

- **The Massachusetts DOT Project Development and Design Guide** encourages design flexibility, community context, an integrated multimodal approach, and clear project development guidelines. It includes reduced lane widths, new intersection design options, balanced multimodal Level of Service (LOS), and a range of urban-suburban-rural area types to help frame design context.³¹

One strategy already in common use is the CSS approach to corridor planning. The CSS approach reframes the transportation purpose and need to not only address mobility, but also other community goals. In Hamburg, NY, New York State DOT reconstructed the intersection of Main Street and Buffalo Street (U.S. Route 62 and NY Route 391) with modern roundabouts in place of four previously signalized intersections. The roundabouts' designs reflected community goals to both improve traffic flow and slow down traffic so that pedestrians and cyclists could safely use and cross downtown streets.



The reconstruction also incorporated new sidewalks, lighting and crosswalks with curb extensions, and a buffer zone between street parking and travel lanes for more safety. The reconstruction is also part of the community's economic development efforts aimed at attracting more people to visit, linger, and shop in the downtown.³²



Hamburg's roundabouts and road diet improved capacity, safety, and business access. The top picture shows a roundabout with raised truck apron and central landscaping. At bottom, a colored buffer zone separates parking from narrower travel lanes.

Another example is Florida's approach to Interstate 95 in the Miami region. Florida DOT coupled capacity expansion on this congested roadway with transit improvements to create a multimodal approach to congestion management. The road is constrained to its current right-of-way but, through changes in geometry, Florida DOT was able to create an additional lane in each direction. The new lanes joined existing carpool lanes to create two variably priced, high occupancy toll (HOT) lanes in each direction. The roadway improvements were accompanied by transit improvements in the corridor, including transit signal priority at 50 intersections parallel to the corridor and express bus service between the destinations served by the corridor. The project also included travel demand management strategies to promote carpooling, telecommuting, and flextime work schedules.³³

In addition to these examples, there are some notable emerging trends in highway practice:

- There are a handful of recent examples of the removal of aging elevated freeways, and conversion to high capacity surface boulevards. As major infrastructure ages, communities are rethinking how new highway design concepts can both accommodate through travel and better connect downtown neighborhoods, business districts, and support multimodal travel. Urban freeway teardowns in San Francisco (Embarcadero Freeway and Central Freeway/Octavia

Boulevard) and Portland, Oregon (Harbor Drive) have demonstrated that through travel can be accommodated while reconnecting neighborhoods and downtowns.³⁴ Three of the new US DOT TIGER II grants³⁵ include the tearing down (or planning to tear down) elevated freeways in New Haven, New York City, and New Orleans.³⁶

- Sustainable highways approaches include identifying planning and design techniques to ensure a more sustainable approach to highway construction, operations, and maintenance – which supports key livability principles. FHWA’s new *Sustainable Highways Self-Evaluation Tool* is in online beta testing mode.³⁷
- Innovations in interchange designs include creating tighter interchanges aimed at utilizing the adjacent network of streets for accessibility, limiting the need for elevated, land consumptive access ramps. North Carolina DOT and the City of Charlotte have reconfigured an Interstate 277 conventional cloverleaf interchange (built in 1988) to accommodate the NASCAR Hall of Fame and better connect surrounding surface streets. The project was partly funded by removing some of the large looping ramps and freeing up 12 acres of land for future development.³⁸



The aerial photo above shows how Charlotte’s rebuilt I-277 interchange helped reconnect surrounding surface streets; improved walkability with sidewalks, crosswalks and medians; and created redevelopment sites connected to downtown (the grassy areas at top of photo have been offered for sale to developers).

Safety Projects and Programs

The mission of safety programs has primarily been to reduce highway related fatalities and injuries. While safety efforts have traditionally focused on reducing vehicular crash fatalities on the roadway network, there have also been efforts to improve safety for all modes, across different community settings. Valuable resources to address safety in walking, bicycling, transit and on rural roadways are available from FHWA.³⁹ The Safe Routes to School Program is an excellent Federal aid program that demonstrates how Federal policy and funding can support efforts by State DOTs, local governments and activists to improve safety and livability. It provides funds to communities to make it safer and easier for children to walk or ride a bicycle to school.⁴⁰

Appropriate safety solutions to support livability are based on community character and the type and scale of transportation facilities. In compact, walkable communities, whether urban neighborhoods or small towns, an interconnected roadway network of smaller streets supports walking and biking trips, while offering multiple routes for local driving trips at moderate speeds. Many of the guidebooks noted in the previous section encourage flexibility in roadway and intersection design that increases both safety and multimodal capacity, such as medians, turning slip lanes, curb extensions, and roundabouts. These design solutions are being incorporated into new facility designs, as well as in re-engineering existing roadways and making customer access improvements near transit stations.

In October 2010, FHWA’s Office of Safety partnered with the Office of Planning and Environment to sponsor a Road Safety Assessment (RSA) on the El Paseo Road Corridor for the City of Las Cruces, New Mexico. The corridor was one of four corridors in the United States to receive an EPA technical assistance grant, and is the only corridor that included HUD and FHWA as partners. The comprehensive

planning approach will provide a potential working model for the agencies to use in the future. The EPA grant provided for a planning process to develop a shared vision for what El Paseo Road could become through revitalization over time. The purpose of the RSA was to perform a safety examination of the corridor. One of the end products will be to develop and implement a corridor plan and design overlay district for El Paseo Road, to coordinate economic development, housing, land use, and transportation.

At the local level, the Bird Rock Traffic Management Plan in La Jolla, California, demonstrates how a community revitalization and traffic calming strategy yielded significant safety improvements. This project included major reconstruction of an existing roadway to create a more complete street. Elements of the plan included:

- Five modern roundabouts, two constructed as conditions of development approval associated with projects fronting the roadway,
- A road diet component, with a narrowing of the street from five to two through lanes,
- Sidewalk reconstruction, median creation, plantings and amenities,
- Angle parking to provide more parking in space gained from lane reductions,
- Traffic calming on side streets impacted by the project (to avoid potential traffic diversion).

Because of this project, incidents and crashes were reduced by 90 percent. The project has helped revitalize La Jolla Boulevard, acting as a catalyst to several new mixed-use developments, a 139-unit condominium development, and a major drugstore.⁴¹

Bicycle and Pedestrian Programs

Enhancing the safety, attractiveness, and viability of bicycle and pedestrian networks is an essential element of livability. Bicycle and pedestrian planning for livability focuses on creating bicycle and walking facilities that serve a variety of trip purposes (i.e., connect an origin and destination). When coupled with local land use strategies to create walkable development patterns, bicycle and pedestrian networks can capture a significant share of overall travel demand. There is significant potential for increasing walking and bicycling on existing roadway networks by making streets more 'complete' – adding accessible sidewalks, bicycle lanes, and amenities, coupled with safer intersection improvements and transit enhancements. While many improvements and connections can be made incrementally over time as redevelopment occurs, targeted public investment can also help maximize the capacity of the existing transportation system. As part of Federal economic recovery efforts, over \$2 billion has been invested in bicycle and pedestrian projects over fiscal years 2009 and 2010.⁴² States invested an additional \$740 million in bicycle and pedestrian projects above their regular Federal-aid investments. Some of these projects consisted of installing curb ramps and accessible pedestrian signals to improve access for people with disabilities and completing missing sidewalk links.

In 2000, FHWA issued the Bicycle and Pedestrian Design Guidance that calls for flexibility and judgment be used in its application to particular projects so the nation's transportation system will be balanced, accessible, and safe for all Americans.⁴³ In 2010, DOT provided policy to reflect the Department's support for the development of fully integrated active transportation networks. DOT noted that establishment of well-connected walking and bicycling networks is an important component for livable communities, and their design should be a part of Federal-aid project developments. Walking and bicycling foster safer, more livable, family-friendly communities; promote physical activity and health; and reduce vehicle emissions and fuel use.

As part of PlaNYC, New York City’s overall sustainability framework, New York City DOT developed a new strategic plan Sustainable Streets.⁴⁴ In the last year, the DOT has launched many different initiatives and projects, including:

- Implemented complete street designs in many locations, including 9th Avenue.
- Implemented 90 miles of new bicycle lanes, yielding a 35 percent single year increase in bicycle commuting.
- Created new public spaces as walkable destinations in key city locations, frequently out of existing roadway rights of way, or by reconfiguring existing oversized intersections.
- Completed a Pedestrian Safety and Action Plan.⁴⁵
- Established a clear, cutting-edge direction in sustainable transportation policy with publication of “World Class Streets,” Sustainable Streets Index, and the Street Design Manual.

While New York City is a very large urban area, it is also a collection of neighborhoods. Many of the DOT’s initiatives and design solutions are applicable to a variety of roadway types and sizes in much smaller cities and towns.

When local projects are planned for and integrated into regional and statewide networks, the potential to use bicycles for both daily travel and long-distance trips can be realized. A national plan for the US Bicycle Route System is intended to facilitate bicycle travel on appropriate roads, paths, and highways over routes that are desirable for interstate bicyclists, providing continuity of roads through States, and connecting and travelling through areas of scenic, cultural, and recreational interest.⁴⁶ While adding pedestrian and bicycle facilities to all rural roads may not be feasible, both transportation choice and safety can be enhanced by focusing on key segments in existing rural communities. A new 3-mile long pedestrian path on Haxton Way in the Lummi Nation near Bellingham, Washington, is intended to improve safety where a number of pedestrian fatalities have been recorded. Improvements include a bicycle and pedestrian path, solar lighting, and bridges across environmentally sensitive wetlands.



Reconfigured lanes on Broadway in New York City provided separate lanes for bicycles (top) and reclaimed space for small pedestrian plazas (bottom), while reducing turning movement conflicts at intersections.



The new pedestrian and bicycle path along Haxton Way, a two-lane rural road in the Lummi Nation near Bellingham, WA provides a safe, attractive alternative to walking along the road. The path is separated from the roadway, using wooden bridges to cross wetlands (above left) and solar lighting (above right).

Management and Operations

Management and Operations (M&O) approaches include a range of strategies to gain more efficiency out of the existing transportation system. This includes (but is not limited to) access management, TDM, ITS, real time traveler information, freight and goods movement, and incident management. In each of these areas, there are opportunities for applying place-based, context-sensitive approaches in support of specific livability goals. For example, when signal timing is balanced in a corridor, it provides improved mobility for both vehicular and bus traffic, and improved pedestrian access.

Effective TDM strategies are broader than just encouraging people to carpool or take transit. Providing travelers with real time traffic and transit information can influence their choice of travel routes and modes, thereby decreasing vehicular loads on congested roadways; a confluence of M&O and TDM for livability benefits. FHWA is currently developing a “Primer on the Role of Management & Operations in Supporting Livability and Sustainability.” There are many M&O and TDM strategies that support livability – but explicit livability connections may not yet be made between them by planners and operators.

Examples that highlight livability connections include:

- **Neighborhood and corridor strategies applied at a local or regional level:** Parking management, traffic signal coordination, transit priority and integration, arterial management, roundabouts, and traffic calming.
- **Regional systems:** Traveler and roadway weather information; congestion pricing and electronic payment/tolls; managed lanes; management of freight, freeways, work zones, traffic incidents, special events; and emergency response and homeland security.
- **Modal connections:** Transit fleet management and dispatching, TDM/ridesharing, transit integration, Automatic Vehicle Location, and bicycle/pedestrian operations such as bicycle racks on buses or crosswalk signals.

Pittsburgh’s ParkPGH

ParkPGH technology helps drivers find available parking near events and destinations in Pittsburgh’s downtown cultural district. The smartphone ‘app’ provides the number and price of available spaces in all nearby garages, with data updated each minute through video cameras at each entry/exit.⁴⁷

Multimodal operational improvements can also help protect parks and forest resources while increasing transportation services and economic competitiveness for nearby gateway communities. The FLMA and National Park Service developed the Grand Canyon South Rim Visitor Transportation Plan to address traffic, parking, and visitor access issues, and reduce long wait times at park entrance stations. Improvements included a new shuttle route to the South Rim, a new parking facility, bike rental facilities at the Canyon View Information Plaza, and ITS deployment to improve traveler information. By partnering with nearby gateway communities, such as Tusayan, the Plan identified the need for enhanced transportation services to improve access to and from the National Park. In coordination with the Arizona DOT, a streetscape improvement project was also planned for Tusayan.⁴⁸



The new shuttle bus service, shown above picking up visitors at a stop overlooking Grand Canyon National Park, has increased Park access while reducing vehicle traffic.

As part of the Urban Partnership Agreement, the Minnesota DOT is combining Tolling, Transit, Telecommuting, Travel Demand Management, and Technology on Interstate 35. They are converting the existing bus-only shoulder lanes and HOV lanes along portions of the Interstate into wider price variable lanes – both occupancy and peak based. A portion of the toll revenues from the new lanes will fund significant fare discounts for transit riders taking trips using the new facilities during peak periods. Increases in transit service and a bus rapid transit system plan are underway and six new park and ride lots are in planning. New dynamic message signs and some existing signs will inform travelers about lane use, toll rates, travel speeds on the different lanes, and transit. The effort also supports expanding the successful Results-Only Work Environment program, in which employers agree to provide employees the flexibility to telecommute or shift their hours to avoid congested commutes. The overall system improvements will increase transportation choice, convenience, equity, and access for transit and carpool users.⁴⁹

Freight Projects and Programs

Management of freight and goods movement is an essential part of meeting regional mobility and local livability needs. Freight and goods movement covers several modes from on-road trucks, to freight rail, to maritime vessels, to aviation cargo. At the local and neighborhood scale, it includes local deliveries to commercial centers, retail and institutional end-users, and residential areas. Freight activity within a community can serve as an economic generator and support regional industry, helping to fulfill economic development goals. In some cases, freight mobility and local livability goals can come into conflict. One example is the competing interest in rail traffic in several urban areas where there are increasing freight rail capacity needs and increasing passenger rail needs – both limited to a single, constrained corridor. Another conflict area is in the location of freight and goods activity centers and the routing of truck traffic. In each instance, integrated land use and transportation planning can help identify potential conflicts early on and help communities reach consensus on different policy options. The Alameda Corridor is a 20-mile rail cargo expressway between the Port of Long Beach and the City of Los Angeles, including a series of bridges, underpasses, overpasses and street improvements that separate freight trains from street traffic and passenger trains. The \$2.4 billion project was funded through a public/private partnership, and included a 10-mile long trench through the central portion, lowering the railway lines to maintain speeds and reduce noise and air pollution. Thirty bridges helped to reconnect communities that had been separated by surface tracks.⁵⁰ Lowering the rail lines allowed communities like Compton to focus redevelopment on restoring areas along the corridor. Compton created a smart growth implementation plan to reconnect the two sections of Compton Boulevard, the community's historic Main Street.⁵¹

An example of the positive influence freight programs can have on local economic development and livability is the South Coast Rail and Economic Development Corridor Plan by the MassDOT and the Massachusetts Bay Transportation Authority. The project proposes to restore passenger rail transportation from South Station in Boston to the cities of Fall River and New Bedford along an existing freight rail corridor running south from Taunton to Fall River and New Bedford. The plan serves as a blueprint for economic and residential development, job creation, and environmental preservation in an area with growing populations, affordable housing, existing educational opportunities, strong continued freight connections, and an existing industrial base. The project will:

- Address long standing transportation inequity by extending transit service to two urban areas with large immigrant and low income populations – currently underserved by the existing transportation network.
- Allow residents of the South Coast to access jobs and services in the Boston area, and Boston area workers greater access to affordable housing in the South Coast.

- Reduce automobile congestion through multimodal options for residents and employers.
- Support South Coast municipalities by providing them with the planning tools needed to leverage the opportunities provided by future passenger rail to downtown Boston.⁵²

The CREATE partnership between U.S. DOT, the State of Illinois, City of Chicago, Metra, Amtrak, and the nation's freight railroads will invest billions to increase rail infrastructure efficiency and residents' quality of life. It will reduce rail and motorist congestion, improve passenger rail service, enhance public safety, promote economic development, create jobs, improve air quality, and reduce noise from idling or slow-moving trains. New overpasses and underpasses will reduce the time Chicago-area motorists spend waiting at railroad crossings, reduce accidents at 25 existing grade crossings, and improve emergency vehicle routes. Rail commuter travel times, schedule reliability, and capacity will improve. Emissions from cars, trucks and locomotives will be greatly reduced, as will noise from idling or slow-moving trains. Green space will also be restored along the lakefront.⁵³

Agency Roles

Creating an efficient, complete transportation network that supports livable communities requires a coordinated effort among Federal, State, regional, and local entities that can influence plans and decisions regarding all modes of transportation and community development. The engagement of local communities to identify their own livability goals is important at all stages of transportation decision making. The following sections discuss existing and potential roles of relevant government agencies and interests at each level.

FHWA and FTA can provide guidance to the State DOTs, MPOs, and transit operators, local planning support and technical assistance, as well as prioritizing funding towards multimodal transportation capital investment. Specific potential actions include:

- Enhance integrated planning and investment.
- Focus program elements on livability.
- Continue to integrate housing and transportation affordability into transportation planning.
- Continue to align HUD, DOT, and EPA initiatives and funding.
- Develop livability measures and tools.
- Undertake joint research, data collection, and outreach.
- Promote funding program flexibility to States, MPOs and transit agencies, enabling communities to direct resources to their individual needs, regardless of mode.

State DOTs have a valuable role in supporting livability as they provide facilities for regional, interregional, and interstate traveling and goods movement. They can retool planning and design processes for facilities that pass through and connect communities, using a CSS approach. Specific potential actions include:

- Integrate planning and investment for livability outcomes in State transportation plans and programs.
- Begin to include housing and transportation affordability concepts into transportation planning.
- Identify gaps in practice and knowledge for incorporating livability.
- Support or lead partnerships with State housing, land use, and environmental agencies.
- Support regional and local livability plans, projects, and policies.

Regional Planning Agencies, including MPOs, Councils of Governments (COGs), Planning Districts and Development Districts, and Rural Planning Organizations (RPOs) provide a forum for integrated solutions across multiple jurisdictions. Creating place-based frameworks can help integrate policies and strategically target Federal, State, and local funds in support of broader livability goals. Specific potential actions include:

- Provide a forum for regional livability integration into plans, programs, policies, and projects.
- Develop a comprehensive regional livability plan integrating transportation, land use, housing, economic, and environmental goals.
- Assess and promote housing and transportation affordability.
- Create implementation mechanisms for livability initiatives, such as targeted funding, regional design guidelines, corridor strategies, project management staff, and performance measures.

Local Government: Counties, cities, and towns play the central role in implementing livability as they focus directly on improving quality of life for their citizens at the community scale. Specific potential actions include:

- Create livability-based collaboration mechanisms.
- Integrate local area community and economic development goals with transportation programs to enhance livability.
- Align local resources towards joint livability outcomes.
- Work effectively together at the regional level.
- Foster public-private partnerships with the development community.
- Develop and implement new standards and design guidelines.

2. Strategies for Implementing Livability

Given the current state of the practice, several challenges and opportunities remain for implementing livability within the transportation sector. While there are many instances of livability in practice already, there are significant opportunities to further enhance interagency coordination; expand technical assistance and program support for local initiatives; define parameters and measures for repositioning aging infrastructure; and more broadly address corridor issues from a multimodal or sustainability perspective.

Multimodal Corridors and Systems Planning

While CSS approaches provide a richer level of placed based planning and design for roadways, there remains a gap in early systems and corridor planning that fully addresses multimodal considerations and community development issues. Multimodal corridor planning begins with the premise that every roadway network or corridor will have a multimodal component linked to development that reflects the surrounding community context.

Multimodal corridor planning can work at all scales, identifying an interconnected system of projects that can be implemented incrementally, project by project, over time as funding is available or as surrounding development occurs. Multimodal corridor planning works best when linked to local or regional community visioning that addresses land use, urban design, and redevelopment. The land use side of the equation has a significant role in determining the livability outcomes of multimodal transportation investments. When corridors are designated as multimodal early on, it creates opportunities for communities to focus other planning efforts, such as affordable housing, open space

planning, or neighborhood revitalization with multimodal transportation investments. This creates opportunities to connect mixed income housing with transit, or economic development initiatives to locate new jobs within a region along highly accessible multimodal corridors.

The NCHRP Report “*Corridor Approaches to Integrating Transportation and Land Use*” identified notable multimodal corridor practices, including two significant efforts led by State DOTs.⁵⁴

- **Maine DOT Gateway 1.** Maine DOT initiated the Gateway 1 process as a forum to integrate community involvement in proactive land use and transportation planning for Route 1 as it passes through 21 small towns and cities in Midcoast Maine. The goals include preserving the integrity and capacity of Route 1 in the State highway system, while addressing growth and development and enhancing safety, transportation choice, economic vitality, and quality of life along the corridor.
- **New Jersey Futures in Transportation (NJFIT).** New Jersey DOT created a decisionmaking partnership with communities as part of the team directing consultant resources to create a vision for how each community wanted to evolve. Each project proceeded through three stages: 1) public education and outreach to elevate awareness and highlight the impacts of pursuing “business as usual;” 2) community consensus-building through visioning, information sharing, and shaping of shared values; and 3) community codification that involved revisions to municipal plans and ordinances, and drafting agreements that involved multiple jurisdictions.

At the MPO level, early planning or feasibility studies identified in the MPO’s Unified Planning Work Program could broaden the traditional transportation study scope to include non-transportation partners and issues. Each partner agency can review community visions and program needs, considering potential strategies, project options, and possible funding resources. Framing mobility needs within the context of community livability, while engaging representatives of other program areas (e.g. HUD, EPA, and local partners), may help identify resources far in excess of what the transportation program alone could support. In some cases, funding accruing for major projects that may be on hold can be repurposed into multimodal corridor target areas, providing more immediate results. Targeted short-term action could include TDM, operational and access improvements, transit service enhancements, nonmotorized transportation improvements, and key connect-the-dots roadway links to private investment. Corridor implementation funding can be allocated in Transportation Improvement Programs (TIPs) and agency budgets based on feasible multimodal plans that meet performance standards; adopted local land use plans and design guidelines; private investment committed; rights-of-way donated; and substantial public/private consensus on project priorities.

Multimodal corridors and adjacent (re)development areas are examples of projects that agency staff or policymakers could initiate or support at any level: local, regional, State, or Federal; transit, aging, public health, land management, environmental, or housing agencies; or advocacy groups. It works best if they are all involved.

This integrated approach to corridor planning can help focus a range of policy and investment decisions at the local level in support of community livability goals. Working effectively with multiple partners at the corridor level requires an extensive public outreach and engagement process to help the public and policymakers connect the dots between transportation investments and community livability goals. The FHWA/FTA *Livability in Transportation Guidebook* summarizes several effective public involvement approaches used on corridor projects at the rural, suburban, and urban scale.⁵⁵ An “all-hands-on-deck” public process should include neighborhoods and nonprofits, businesses and developers, supported by inter-agency collaboration and a technical team of agency staff. Using a voluntary incentive scheme that includes funding, transit access, and expedited approvals to encourage developer and landowner

participation may work better than mandates. The corridor plans can be integrated into local comprehensive plans, MPO plans, and State DOT and transit agency project programming, with projects used to demonstrate state-of-the-art practices and desired policy changes.



As this photo-simulation of potential improvements to a Honolulu roadway show, multimodal corridor design can incorporate separated lanes for through travel or transit, with lanes for local travel, walking and wheeling, parking, and business access. The landscaped medians separating the local and through travel lanes can enhance both the appearance and the function of the roadway.

Integrated, multimodal transportation and land use planning can help link cities and suburban corridors, growing rural counties, and nearby small towns. Re-engineering existing roadways can improve vehicle throughput; safety; and pedestrian, bicycle, and transit service. A multimodal network of parallel roads can be laid out through existing underused shopping centers and strip commercial development. This new network can be used for local driving, walking, and bicycle trips, and connect surrounding neighborhoods to jobs, shopping, and activities. The private sector can build much of this local transportation network, as revitalization and redevelopment occurs. Operational and access management improvements can boost regional throughput and local travel, safety, business access, and transit operations. Multimodal corridor planning has been conducted throughout the country, including: the Waterfront Boulevard Study of State Route 29 through the City of Trenton, New Jersey;⁵⁶ the Places29 and 29N Corridor Studies in Charlottesville and Albemarle County, Virginia;⁵⁷ and the U.S. 29/NC 49 interchange (near the City Boulevard light rail station) in Charlotte, North Carolina.⁵⁸

While there are tremendous opportunities for multimodal corridor planning to enhance livability goals, several issues require further attention:

- Access to improved technical tools and transportation needs analyses that can better quantify the gains in accessibility and mobility achieved through integrated land use and transportation planning.
- Use of visioning tools in scoping project development studies to better address multimodal considerations.
- Enhance interagency and public-private involvement in integrated planning.

Programmatic Support and Technical Assistance

There continues to be a need for more guidance and program support for implementation of livability principles at the Federal, State, regional, and local levels. Examples include providing technical assistance to implement CSS or complete streets design at the local level, assisting MPOs to use Surface Transportation Program funds creatively to conduct regional scenario planning processes, or providing

an expanded pool of modally “flexible” funds to respond to communities’ mobility needs. The following strategies can largely be conducted under existing program rules. Some of the strategies involving Federal funding and policies might require (or be enhanced by) legislation or adjustments to funding authority from Congress. Others may vary between States based on differences in State legislation, funding policies, or local land use authority.

- **Enhance integrated planning and investment.** U.S. DOT can continue to make planning and implementation grants to metropolitan areas and create mechanisms to ensure localities can implement the resulting projects. Federal funding is a powerful incentive communities can use to leverage local funding to better integrate transportation, water infrastructure, housing, and other investments in support of livability.
- **Develop new guidance on how to better integrate housing and transportation affordability into transportation planning.** Many areas are using transportation and housing affordability tools to help guide and maximize their transportation and housing investments. More guidance is needed at the Federal and State levels on how to coordinate more directly with State and local housing agency plans and investments.
- **Develop livability measures and tools.** FHWA and FTA can help communities attain livability goals by making analytical tools available to evaluate progress, as well as State and local technical assistance programs to remove barriers to coordinated housing, transportation, and environmental protection investments (see section 4 – Processes, Performance Measures, and Tools). Incentives can encourage communities to implement, use, and publicize the measures.
- **Support or lead partnerships with housing, land use, and environmental agencies.** At the Federal level, FHWA and FTA can identify opportunities to better coordinate their programs and encourage location efficiency in housing and transportation choices. HUD, DOT, and other agencies such as U.S. Department of Agriculture (USDA) and Department of the Interior agencies (for rural areas), Department of Defense (for military bases and Army Corps of Engineers lands), and the Federal Emergency Management Agency (FEMA) (for application of livability principles to hazard mitigation and post-disaster recovery planning) can also share information and review processes to facilitate better informed decisions and coordinate investments. For example, resources from the joint Transportation Planning Capacity Building program⁵⁹ can provide technical assistance to transit agencies, MPOs, and State DOTs in techniques for effectively planning for sustainable, livable communities. Likewise, HUD, EPA, and USDA are providing technical assistance to communities in support of smart growth and sustainability principles. This implementation assistance often includes planning and projects related to livable transportation systems. More guidance is needed to incorporate this same approach at the State and regional levels.
- **Undertake joint research, data collection, and outreach.** HUD, DOT, and EPA can continue to engage in joint research, data collection, and outreach efforts with stakeholders to develop information platforms and analytic tools to track housing and transportation options and expenditures, establish standardized and efficient performance measures, and identify best practices.⁶⁰ Ensure that research agenda and data collection leverages resources of other agencies, such as USDA.
- **Develop coordinated strategies for VMT reduction.** State DOTs can coordinate with regional and local land use planners to better define strategies for reducing vehicle miles traveled (VMT). Efforts to reduce VMT can include planning and implementation of regional and local

multimodal networks, or developing regional livability plans that incorporate land use, housing, and transportation elements.

- **Support opportunities for regional livability integration.** Regional agencies can strive to make sure that the region's livability matches the regional context. Negotiating between different issues in transportation, land use, environment, housing, etc. requires applying these issues to specific regions. What works in Detroit is different from what works in Miami; Greensboro, NC is different from Missoula, MT. There are also significant differences between localities within a given region. Implementing livability in different places requires different approaches.
- **Encourage comprehensive planning.** Comprehensive planning – usually at the local level – integrates transportation, housing, public infrastructure, environment, and economic strategies. Integrated planning at the regional level can maximize resources and help coordinate and target agency implementation efforts. A comprehensive plan can be based on existing plans, and feed into future individual agency plans – if the right partners are involved.

Practice Opportunities and Challenges

The examples cited show different ways that transportation agencies and traditional programs are currently addressing livability. While there are many success stories, some obstacles and evident gaps remain. One example is the need to identify the cross-program, cross-agency institutional barriers to addressing the various facets of livability at the system wide and corridor scales. This approach will also need to reflect the range of community place types (rural, suburban, transitioning, urban, etc.) and how, when and what each program office engages with a particular project.

Repurposing aging infrastructure

As aging highway infrastructure needs reconstruction, communities are considering repurposing segments of these facilities. The functional purpose of a segment of a regional highway passing through an urbanized or transitioning area may change, creating an opportunity for agency partners to come together to study, explore options and plan for more livable solutions. Several examples were identified in prior sections: aging elevated freeway segment teardowns transformed as surface boulevards; tighter interchanges integrated with surface street networks; new boulevard design concepts; or conversion of existing lanes into bus rapid transit service.

While the livability outcomes associated with making aging infrastructure more functionally useful for local trips or transit use provides notable benefits, this trend presents some larger policy issues and potential need for changes in Federal and State law and implications in highway planning:

- What are the variables in terms of community size, urban form, and function that warrant the transition of a corridor from a regional mobility and through traffic highway into a roadway focused on slower speeds, shorter trips, and proximate access to local destinations?
- If urban highways convert to local roads, how are regional and intrastate mobility goals met? How can regional freight and goods movement needs continue to be met?
- What is the multimodal design template for new highways that position them to transition over time as new communities grow and develop into more urban patterns?
- What is the appropriate corridor and intersection design and function for the interstate highway system as it passes through urban transition zones?

Benefits of Livability

Livability and sustainability outcomes result in more efficiently using available resources, whether people, land, energy, materials, or funding. In a time of economic challenges and fiscal constraint, limited transportation funds can be focused more effectively on projects that support economic revitalization and community development, while improving transportation and housing affordability, human and environmental health, while minimizing impacts to the natural environment and quality of life. Many of the examples referenced – such as roundabouts and road diets in La Jolla or Hamburg, reclaimed street space in New York City, or a smartphone parking ‘app’ in Pittsburgh – focus on maximizing use of existing resources while increasing mobility and accessibility. Creating safe, livable communities provides benefits at multiple levels and across sectors.

Transportation and land use benefits

While nearly four-fifths of Federal transportation funding goes to road projects, almost 85 percent of people and jobs are in metropolitan areas -- offering the potential for significant improvements in multimodal travel choices.⁶¹ By targeting metro-area highway investments to restore complete, connected street networks, tighter urban interchanges, and surface boulevards where appropriate, those investments can improve service across all modes. Since metropolitan regions are also where most trade, industry, and congestion occur—and where aging infrastructure requires significant reinvestment—rebuilding with a balanced multimodal approach can help maximize the effectiveness of existing transportation investments. In rural and micropolitan areas, strategic transportation investments, in accordance with best practice livability standards, can help reinvigorate rural regional economies. In addition, small-scale investments in accessibility and connectivity can improve quality of life in small communities. A report by the International City/County Management Association, “Putting Smart Growth to Work in Rural Communities,” outlines strategies to help guide growth in rural areas while protecting natural and working lands and preserving the rural character of existing communities.⁶²

How we design, retrofit, or revitalize our communities influences both what transportation modes are available and whether people choose to use the different modes.

Compact, connected communities built on a grid system encourage regular walking, bicycling, and transit use, reducing the need for auto travel – while making trips shorter for those who choose to drive. For example, a recent analysis of the effect of the built environment on travel behavior found that a 10 percent decrease in block size or in distance to a store, or a 10 percent greater balance of jobs and housing in a community could increase walking by 2-4 percent.⁶³ Similarly, studies have found that in more compact, walkable neighborhoods and regions, residents drive nearly a quarter less than those who live in more sprawling areas.⁶⁴ Looking forward, three recent national studies found that if the majority (60 percent or more) of development between now and 2050 were to be compact development, overall vehicle miles traveled (VMT) could be reduced by 8 to 18 percent.⁶⁵ While assuming even the possibility of 60 percent compact growth is a very big ‘if’ –and most transportation practitioners assume the goal is simply to reduce the rate of growth in VMT, not actual VMT—the studies did agree that a huge shift in development patterns over time would actually reduce overall VMT.



Creating small ‘town center’ type development adjacent to existing suburban areas or at rural crossroads, as shown above by a vision plan for Lake Monticello, Virginia, can increase transportation and housing choice and reduce environmental impacts.

Environmental benefits

Compact, connected development patterns that provide more transportation choices can reduce communities' environmental footprint. Less driving reduces energy use, dependence on foreign oil, and greenhouse gases (GHG) and other emissions. Urban development over the past 25 years has consumed land at nearly twice the rate as population growth (57 percent vs. 30 percent from 1982 to 2007), impacting wildlife habitat, agricultural land, and forests.⁶⁶ Compact development requires less land and paving, enabling communities to preserve natural and cultural resources while reducing stormwater runoff and groundwater pollution. Enhancing mobility in rural settings, while preserving rural character, iconic landscapes such as National Parks, Refuges, gateway communities, forests, and farmland, can be accomplished with innovative transportation planning and design.

Health and social benefits

The daily exercise associated with more effective transportation choices can improve human health, reduce obesity and health care costs, and encourage community social interactions. In terms of health outcomes, a recent study concluded that a 10 percent decrease in automobile use could reduce the likelihood of obesity by 4 percent.⁶⁷ This benefit also extends to public transportation users, who are less likely to be obese or sedentary,⁶⁸ in part because they can get their daily exercise simply by walking to and from transit. Over a quarter of public transit users get the minimum recommended 30 minutes of daily activity this way.⁶⁹ Health outcomes are further improved when reduced driving improves air quality, as the pollution from motorized transportation has been linked to higher rates of respiratory diseases, allergies, and general mortality.⁷⁰ More people actively using the streets contributes to a community's sense of community and brings neighbors into contact that might otherwise not meet if they were to drive everywhere. Increasing activity along streets can improve user safety, with appropriate facility design; increasing activity has also been shown to reduce crime. Even those who drive to a mixed-use "park once" district (or traditional downtown) find they can get exercise and social connections without having to drive between every destination—if a safe walking and bicycling network is in place. While reducing overall vehicle use is not a primary goal for most rural areas, many small towns want to restore their traditional town center, making walking and bicycling a convenient choice for in-town residents, visitors, kids, seniors, and customers.

The health and social benefits of active transportation networks are especially important for the aging population. Of Americans age 65 and above, one in five does not drive, whether because of a disability or for other reasons.⁷¹ At the same time, 'aging in place' has become a major desire for older Americans; in many communities, the inability to drive can result in a major loss of independence. A 2004 survey by AARP found that compared to those who can still drive, non-drivers over the age of 50 are six times more likely "to frequently or occasionally miss doing something they would like to do because they do not have transportation."⁷² For communities with good walking, bicycling, and public transportation systems, however, older residents can maintain greater independence, with or without a car.⁷³ In rural areas, access to healthcare, community facilities, shopping, and services is particularly challenging for the elderly. Transportation improvements that make communities more age-friendly (for seniors, persons with disabilities and youth) can also make the system more equitable for other community members without access to a car. On-demand transit, TDM, and ridesharing networks can also provide regional mobility options to rural residents.

Economic benefits

Livable communities that link housing and transportation and improve multimodal access to jobs and services can generate significant savings for households and businesses. Compact, connected

communities are 'location efficient,' meaning their residents are able to use less energy and money to get around. Where residents have more transportation options and are able to drive less, they can save money – from reduced gas and maintenance costs, reduced car ownership (one car instead of two, for example), and more walking, bicycling, and transit use. Transportation is the second largest expense for most households, after housing. In places with fewer transportation choices, where housing is cheap but transportation costs are high, any savings on housing can be more than offset by increased transportation expenses.⁷⁴

The Center for Neighborhood Technology developed the Housing + Transportation Affordability Index – with data from more than 330 metropolitan areas – that can be



used to analyze and map combined housing plus transportation costs for localities in a region. The index considers neighborhood and transportation variables and location that play a role in determining the overall cost and affordability of a location. Variables include households per residential area, average block size in acres, transit connectivity index, job density, average time of journey to work, household income, household size, and workers per household.⁷⁵ Compact development patterns can reduce by 10 percent or more the costs of expanding infrastructure (sewer, water, and local roads), as compared to sprawling development typically found on the edges of metropolitan areas.⁷⁶ These cost savings can translate into more affordable housing, with added savings over time due to lower maintenance and replacement costs, further increasing the affordability of these communities beyond their location efficiency.⁷⁷

Livability approaches can also be a catalyst for reinvesting in aging suburban corridors, restoring complete streets and networks, and revitalizing rural small towns and historic districts. Reinvented suburban corridors and revitalized main streets are prime targets for business reinvestment, especially when coupled with public infrastructure investments, an adopted plan, and new codes that support innovative project design. Preserving and supporting existing communities typically makes more efficient use of existing infrastructure.

3. Processes, Performance Measures, and Tools

Over the last decade, a wealth of new planning and policy decisionmaking processes, design guidance, and support tools have emerged to help better understand, quantify, and reframe transportation system performance. Once focused primarily on mobility, DOTs, MPOs, and local governments are advancing a whole systems approach to achieving mobility, livability, and sustainability goals. While the profession has yet to produce a single all-encompassing 'livability model' or reach consensus on livability performance measures, there have been several advances in this area in recent years. MPOs and local governments are incorporating new performance measures into transportation planning that include broader sustainability indicators. New analytical methods are emerging that better demonstrate the relationship of the built environment on a variety of factors such as:

- VMT and travel behavior,
- The benefits of walkable communities and transit systems, particularly on public health,
- The benefits of VMT reduction on GHG reduction, and
- Quantifying multimodal network needs over more traditional travel demand modeling.

Analytical tools can be very powerful in demonstrating the interrelatedness and interdependence of systems and desired outcomes. The tools aid in the planning and decisionmaking process used by the public, agency staff, and policymakers to incorporate livability considerations into traditional

transportation decisionmaking. Implementing livability principles requires integrated planning processes to reframe the conversation on how transportation projects can help achieve broader community goals. Examples include:

- Regional scenario planning that helps to align community visioning and transportation, housing, and infrastructure investment priorities.
- Climate action planning that supports the interrelated decisionmaking required to reduce GHGs,
- Local community planning that ties quality of life goals to green and complete street initiatives.

While there is a need for more research and development in tools, performance measures and decisionmaking processes – as evidenced by requests for such research on behalf of the National Cooperative Highway Research Program, the Transit Cooperative Research Program, and EPA – some noteworthy examples at the State, regional, and local level that demonstrate these new approaches and analytical tools.

Integrated Planning Processes

Integrated planning processes that incorporate the full range of issues relative to creating more sustainable and livable communities is an emerging area of practice. While comprehensive planning has been around for more than half a century, primarily in local and county plans, in practice it often gets bogged down into specialized disciplinary silos of transportation, land use, housing, economic development, environment etc. This misses the opportunity to integrate specific policies and plans and leverage investments in support of broader community goals. Another challenge is the ability to integrate planning efforts across geographic scales and jurisdictional boundaries – from States or mega regions to corridors or subarea plans. New approaches to address these issues of scale and cross-disciplinary integration are becoming more mainstream.

Scenario planning is an example of an integrated approach that helps communities to develop a range of “what if” scenarios to analyze different growth and transportation strategies and their relative impacts on a range of community livability goals. Scenario planning engages participants in defining a desired vision for their future, and understanding the tradeoffs and implications of each alternative growth scenario. Successful scenario planning efforts typically lead to new policy development in the form of comprehensive plans, long range transportation plans, community blueprints, housing strategies, land development codes, transit systems plans, green infrastructure and environmental plans, or climate action plans.⁷⁸

Most successful scenario planning efforts involve the community during visioning to develop meaningful indicators that are relevant and unique to community context. Whether trying to demonstrate reductions in VMT based on walkable development patterns, quantifying financial impacts of development on long term financial stability, comparing energy and infrastructure needs of compact versus dispersed development patterns, or creating peak oil price scenarios to test influences on travel demand and travel behavior, quantitative and qualitative analysis is an important part of the equation. Scenario planning processes have resulted in several notable community visions at various scales including Envision Utah. A 2007 study identified over 80 scenario planning projects from 50 metro areas, but noted that there was room for improvement in public participation, methodologies, and institutional structure.⁷⁹ The new *FHWA Scenario Planning Guidebook* provides a framework that transportation agencies can use to tailor a scenario planning process to meet their needs.⁸⁰

Performance Measures and Data

As new planning tools and processes emerge, there is a growing shift away from evaluating transportation system performance based simply on levels of service (congestion) and safety alone. The focus on livability and sustainability goals creates a new lens through which communities can evaluate transportation investment decisions in light of a host of other community goals. Doing so ties that transportation system's performance to other community goals such as growth management, location efficient housing, community service provision, etc. Another example is measuring accessibility overall – transit, auto, or other – for different segments of the population, including access for people with disabilities. This type of analysis can help to illuminate key environmental justice issues such as the predominance of poverty rates which are highly correlated to access to automobiles in rural areas.

Another example is using sketch-planning tools that measure VMT/VMC (Vehicle Miles of Capacity) to assess transportation needs. The Florida DOT District 4 is supporting the SR 7 Collaborative in conducting network and corridor based studies that help evaluate transportation system performance in a different way. Analyses on this project identified multimodal project alternatives to reduce areawide VMT. This analysis resulted in recommendations to complete the local street networks and enhance connectivity; increase transit, bicycle and pedestrian quality of service; and implement corridor management and operations strategies in lieu of significant roadway widening for this major arterial. This network based approach helped to demonstrate how a traditional roadway capacity project may have increased speeds and reduced congestion – but in doing so actually increased areawide VMT – which was seen as counter to other community goals. The final set of project recommendations helped achieve improved network mobility gains without increasing VMT.⁸¹

Linking the built environment to public health issues such as obesity is another emerging area that overlaps with transportation system performance. The Centers for Disease Control and Prevention has conducted research that directly links local policies and the physical environment to daily choices that affect people's health. One study, "Recommended Community Measures for Preventing Obesity in the United States," developed 24 strategies to encourage healthy eating and active living, with measures provided for each strategy to help communities track their progress over time.⁸² For example, people living in suburban neighborhoods typically drive to work or drive their kids to school because there are no walkable destinations located nearby. Communities that want to improve public health and reduce levels of obesity can evaluate transportation system performance by measuring how many walkable community patterns exist, or what percent of the population is located within walking distance to a transit route. Geographic Information Systems (GIS) planning tools enhance the ability to quantify and measure the variables of the built environment and relate them to other socioeconomic trends.

EPA recently completed a *Guide to Sustainable Transportation Performance Measures*. The guidebook identifies 10 performance measures (largely already in use by MPOs) that can readily be developed and applied in transportation decisionmaking. For each measure, the guidebook presents possible metrics, summarizes the relevant analytical methods and data sources, and illustrates the use of each measure by one or more transportation agencies.

The 10 profiled measures are:

- Transit accessibility
- Bicycle and pedestrian mode share
- VMT per capita
- Carbon intensity
- Mixed land uses
- Transportation affordability
- Distribution of benefits by income group
- Land consumption

- Bicycle and pedestrian activity and safety

- Bicycle and pedestrian level of service

The Partnership for Sustainable Communities has heightened the need for a set of indicators that can be applied consistently at different geographic scales across the country to track and monitor progress towards creating more sustainable communities. The Partnership is working to develop a preliminary set of outcome-based performance measures tied to the six livability principles. The Federal agencies are working with grant recipients in the areas of livability and sustainability on the use of performance measures and promoting their use among State, regional, and local agencies.

Virtually every effort to expand the use of performance measures in planning faces the challenge of data limitations. In some cases, data are not collected and reported at the geographic scale of interest. For example, there is no way for local governments to accurately measure the VMT of their residents on an annual basis without a household travel survey (which is costly and therefore performed infrequently) or access to vehicle registration data (which is confidential in many States). In other cases, necessary data may exist, but to produce useful metrics, it requires data processing that is beyond the capacity of most local governments. For example, finely grained datasets covering population, income, and transit service exist in most metropolitan areas, but combining these to measure equity in transit access can be challenging. Even when local and regional agencies develop sustainability performance measures, they may do so in ways that are inconsistent with other local and regional agencies, precluding comparisons among peers. Performance measures need to address meso-scale (regional system, watershed) goals for sustainability. Matters like water quality and habitat conservation may be best addressed at this scale.

EPA is currently conducting a research project to evaluate and test sustainable community performance measures. It will focus on identifying and overcoming the data challenges that prevent greater use of sustainability performance measures. It will identify national datasets that are instrumental to implementing performance measures, along with opportunities to apply local and State datasets to fill gaps in national data consistently. The project will then test the use of these datasets in a range of types of communities involved in regional sustainability planning.

Policies and Guidance

Many Federal, State and local agencies are incorporating livability principles into their policies and design guidelines. Nearly all the documents reviewed include guidelines or performance measures for pedestrian and bicycle travel, and several include transit strategies. The local documents tend to encourage more innovative designs that foster placemaking and redevelopment, rather than just balanced multimodal travel. Some of them also incorporate 'green streets' practices to mitigate stormwater impacts. Several State DOTs have developed integrated planning, design, project development, or evaluation criteria. Some notable State DOT examples include:

- Washington DOT's *Understanding Flexibility in Transportation Design* provides conceptual guidance for the application of context-sensitive designs in the project development process.⁸³
- Pennsylvania DOT's *Smart Transportation Guidebook* (developed with New Jersey DOT) is being used to update PennDOT's design manuals.⁸⁴
- Massachusetts DOT *Project Development and Design Guide* includes reduced lane widths, new intersection design options, balanced multimodal LOS, and a range of urban-suburban-rural area types to help frame design context.⁸⁵
- California DOT *Smart Mobility Framework* is applicable to various levels of plans, programs, or projects in all parts of the state (urban, suburban, and rural).⁸⁶

Notable local examples tend to be from larger cities, but the concepts are applicable to smaller cities:

- Charlotte, North Carolina *Urban Street Design Guidelines*.⁸⁷
- New York City *Street Design Manual*.⁸⁸
- San Francisco *Better Streets Plan*.⁸⁹
- Los Angeles *Downtown Design Guide*.⁹⁰
- Seattle *Right-of-Way Improvements Manual*.⁹¹

Tools

Transportation agencies can use a variety of tools to support development and use of performance measures and integrated planning processes. Many of these tools use existing GIS data and mapping capabilities – which most transportation and planning agencies are already adept at using.

Planning and analysis tools

Various low and high tech tools and techniques can help develop, visualize, and evaluate different land use scenarios and their impacts on livability factors. Several publicly available and proprietary software programs have been used successfully at the regional, subarea, corridor, neighborhood, and project level.

- **CommunityViz**, (www.communityviz.com) is a GIS-based scenario planning software tool.
- **INDEX** (www.crit.com) is a GIS-based scenario planning software tool.
- **Box City** (www.cubekc.org) is a community-based planning education workshop.
- **Reality Check** is a regional planning process developed by the Urban Land Institute. (http://commerce.uli.org/Content/NavigationMenu/MyCommunity/RegionalVisioningandCooperation/Regional_Visioning_a.htm),

Innovative transportation system performance tracking and modeling techniques include some of the following noteworthy projects (<http://www.vtpi.org/tdm/tdm125.htm>):

- **Mobile Telephone Location Tracking** at the Massachusetts Institute of Technology allows tracking of real time travel information by mobile phone applications. (<http://senseable.mit.edu>)
- **PECAS** is an integrated urban transportation systems model that considers economic factors, land uses and a network based approach. (www.ucalgary.ca/~jabraham/Papers)
- **Policy Area Mobility Review (PAMR)** is a program developed for Montgomery County, MD that allows for a more dynamic assessment of measuring traffic capacity to assess mobility at the network scale. (www.mcparkandplanning.org/development/agp/agphome.shtm)
- **PROSPECTS** is a project to help European local elected officials identify specific policies for more sustainable transportation solutions. (http://www.lutr.net/cluster.asp?id_cluster=5)

The **FHWA Sustainable Highways Self-Evaluation Tool** (in beta testing) can help transportation agencies balance concerns about the of natural environmental systems capacity with societal developmental needs, both in the present and for the future.⁹²

EPA's NEPAssist is a web-based GIS application that saves agencies time and resources with a standardized, data-driven approach to review scoping notices and preparing NEPA environmental assessments.⁹³

While many scenario modeling resources also present data in easy-to-understand graphics and GIS mapping, there are several other visualization techniques in use by urban planning consultants. One of the most effective of these is photo-simulation, or 'before and after' photographs that show what a community's vision might look like in a specific place (see example in the Executive Summary). The photos of existing places are manipulated with photo editing software to produce photo-realistic visualizations of potential improvements to specific corridors or sites.⁹⁴

Most current applications of travel demand models used to examine interactions between transportation strategies and land use are limited in assessing livability impacts. Most four-step travel models are unable to assess "intrazone" trips – the walk, bicycle, and short driving trips made in compact communities. However, several State DOTs and MPOs are improving travel demand models by

incorporating land use variables, lifestyle considerations, GHG emissions evaluations, economic factors, and other variables. For instance, the Southern California Association of Governments (SCAG) is using scenario planning to reduce regional greenhouse gas emissions in response to California Senate Bill (SB) 375, which requires regional transportation plans to comply with California Air Resources Board emission targets. SCAG will model these emissions using a four-step travel model and a supplementary model of intrazonal travel. The scenario modeling will help the community to visualize development options and support regional analyses of energy, water use, open space, GHG emissions, and costs and revenues to local governments.⁹⁵

While significant progress has been made in scenario analysis and modeling, underlying data needs, performance measures, and visualization, many challenges remain before these innovative approaches are as accepted as the conventional four-step travel modeling process. The challenges of data collection – especially for local walking and bicycling trips – are compounded by integrating transportation analysis with housing, environmental, economic, and energy planning. Performance measures need to be meaningful, understandable, easy to use, and based on readily available data; they also need to measure what matters to the community. Developing an acceptable process for identifying community values, and then establishing such values as part of creating a vision for the future, are critical initial steps in any integrated planning process. The goals, performance measures, data needs, and any visualization required to demonstrate concepts can then be based on issues that people care about. Making sure that agency and elected decisionmakers are involved throughout visioning, scenario building and analysis, selection of measures, and adoption of preferred scenarios will help ensure that related plans and projects get adopted, approved, funded, and built.

4. Conclusion and Next Steps

The research demonstrates that livability principles are being incorporated and embraced in both transportation policy and project implementation in many areas of the country. Livability concepts appear aligned with current trends in community planning relative to creating more efficient land use patterns supportive of walking, bicycling, and transit as viable forms of transportation. States with a history of strong statewide land use planning appear to be the furthest along in adopting approaches that incorporate livability principles, such as tying transportation policies to broader community sustainability and livability goals. States with a strong local land use tradition have developed policies to integrate planning for transportation, land use, environment, and economic development. At the local level, implementation of community-based livability projects is geographically dispersed across the U.S., and often tied to strong local visions. There are several examples of MPOs facilitating regional discussions about livability. In some notable examples, regional agencies are leading the charge by helping communities to better align the prioritization of transportation investments in support of regional growth visions, broader community goals, and implementation policies.

While FHWA's Livability Initiative and related Partnership programs are still in the formative stages, significant results are already evident across the country. DOT is aligning a number of FHWA and FTA regular funding programs and special allocations (such as two rounds of TIGER grants) to focus on livability outcomes. HUD grantees have formed collaborative partnerships – including MPOs, State, and local transportation agencies – to develop and implement sustainable communities plans. FTA and HUD have jointly funded grants for coordinated planning and funding of transit and housing development. EPA is continuing to research and develop guidance on performance measures and related data requirements to monitor the effectiveness of coordinated investments in livability and sustainable

communities. These Federal activities support a variety of regional and local efforts across the country – which incorporate collaborative process, interagency coordination, and integrated planning approaches.

While there are many notable success stories, there are some areas in need of additional focus:

- A common approach to leveraging funding sources to help implement integrated transportation, housing, economic development, and environmental project initiatives.
- A common approach to vertical and horizontal integration of livability policies and initiatives across agencies and at multiple geographic scales.
- An integrated set of planning and analysis tools, coupled with simplified livability metrics and performance measures that can be tailored to local conditions and used by all.
- An understanding of where and how to incorporate livability considerations at each phase of the transportation decisionmaking process.
- A clear definition of what regional livability plans, policies, and project development processes should look like across a variety of geographic contexts.
- A new vision for the interstate highway system that incorporates livability principles and is supported by a more complete multimodal network.
- Additional understanding of the unique challenges and opportunities for rural regions to take advantage of livability initiatives.

Next Steps

Moving forward with implementing livability initiatives requires an “all-hands-on-deck” approach. At the project level, local and regional agencies are often best suited to lead interagency teams. Federal and State agencies can coordinate programs, funding, and technical assistance to support local and regional initiatives. The *Livability in Transportation Guidebook* includes several examples and recommended implementation strategies at different levels: State and regional; corridor and subarea-level; project-level; and operational and funding strategies (see Chapter 7 and Conclusion).⁹⁶ Some of the more effective – and achievable – next steps might include:

- Develop clear guidance or case studies on how to coordinate and leverage multiple funding sources to deliver complex, integrated livability projects, both vertically (Federal, State, local, and private) and horizontally (transportation, housing, community and economic development, environmental, and other sources). Use identified barriers to incorporate more program flexibility over the long term.
- Continue to develop an integrated set of planning and analysis tools, livability metrics and performance measures across transportation, housing, health, environment, and economy. Incorporate testing/refinement by recipients of livability and sustainable communities funding.
- Focus additional funding, research, training, and technical assistance on the challenges faced by rural communities; coupled with the opportunities for implementing livability solutions at the rural and small town scale.

One overarching initiative could be to identify the elements of integrated planning processes and products that can be used to effectively coordinate efforts across agencies, jurisdictions, and issues. A model framework for a comprehensive livability plan at the regional scale could combine the traditional elements of local comprehensive plans and regional long-range transportation plans. Coordinating the planning time horizons, public involvement, and technical analysis conducted for a variety of required plans provides an opportunity to better integrate regional transportation, land use, housing, economic

development and environmental planning to achieve desired community outcomes and create more livable, sustainable development patterns. FHWA could develop a model comprehensive livability plan (or “how-to” guidance from a transportation perspective) that could help regional transportation agencies understand appropriate roles, responsibilities, and processes to deliver more integrated plans. It would be also beneficial to identify strategies for how best to coordinate with other Federal programs such as the HUD Sustainable Communities Planning Grant program to advance livability goals at the regional and local levels. The upcoming FHWA regional livability workshops will provide a forum to explore these issues and solutions, and to develop approaches that will be usable throughout the transportation industry.

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