Development Management and Urban Design 7
Corridor Planning 8
Examples in Practice 8
Resources and Guidebooks 9
Other Resources 10
District, Sector, and Neighborhood Planning 10
Examples in Practice 11
Other Resources 12
Interchange Area Planning 13
Examples in Practice 13
Resources and Guidebooks 15
Transit Oriented Development and Station Area Planning 16
Examples in Practice 16
Other Resources 17
Transportation Demand Management 20
Parking Management 20
Examples in Practice 20
Resources 23
Ridesharing / Carpooling 23
Examples in Practice 23
Location Efficient Development Policies and Incentives 25
Examples in Practice 25
Resources 27
Project Prioritization and Funding Strategies 29
State and Regional Land Use and Transportation Capital Grants and Technical Assistance Programs . 30
Examples in Practice 30
State and Regional Project Prioritization/Selection Criteria 33
Examples in Practice 34
State Fiscal and Regulatory Incentives 35
Examples in Practice 35
Transit Corridor and Station Area Development Programs 36
Examples in Practice 37

Parking Benefit Districts 38
Examples in Practice 38
Roadway Design Guidelines and Standards 40
Access Management 41
Examples in Practice 42
Resources 42
Complete Streets/Routine Accommodation 43
Examples in Practice 43
Resources 45
Context Sensitive Design/Solutions 45
Examples in Practice 45
References 47
Urban Freight Design Guidelines and Intermodal Centers 47
Examples in Practice 48
References 49
Local Road Design Guidelines 49
Examples in Practice 50
Resources 52
Pedestrian and Bicycle Facilities Design Guidelines 53
Examples in Practice 53
Resources 54
Road Diets 55
Examples in Practice 55
Resources 56
Road Swaps and Transfers 56
Examples in Practice 56
Public Involvement 59
Community Outreach Toolkits and Facilitation Tools 60
Examples in Practice 60
Visioning Workshops and Charrettes 63
Examples in Practice 63
Resources 65

Visualization and Simulation Techniques 65
Examples in Practice 66
Resources 67
Visioning and Scenario Planning 68
Regional Visioning 69
Examples in Practice 69
Land Use Scenario Development 70
Examples in Practice 71
Scenario Planning Software 73
Envision Tomorrow 74
Examples in Practice 74
INDEX 74
Examples in Practice 74
CorPlan 75
Examples in Practice 75
MetroQuest 76
Examples in Practice 76
PLACE3S 76
Examples in Practice 76
Resources and Guidebooks 77
GIS & Technical Analysis 78
GIS Environmental Mapping and Analysis 79
Examples in Practice 79
Resources 80
GIS Development Opportunity, Housing, and Accessibility Analyses 80
Examples in Practice 81
Rural Traffic Shed Model 82
Examples in Practice 83
Resources 83
Space Syntax 83
Examples in Practice 83
Resources 84

Linking Planning to the Environmental Review Process 85
Environmental Processes 86
Examples in Practice 86
Environmental Permits and Plans 88
Examples in Practice 88
Resources 90
Linking Planning and Public Health 91
Coordination between Planning and Health Departments 92
Examples in Practice 92
Other Resources 94
Health Assessment Tools 94
Examples in Practice 94
Additional Resources 96
Statewide Healthy Transportation Planning and Coordination 97
Examples in Practice 97

The Tools

This page includes brief descriptions of a wide array of approaches and tools practitioners employ to integrate transportation and land use: transportation planning activities and programs, project development and programming, stakeholder engagement and visioning, analytical tools, and coordination with other disciplines. Each item includes short implementation examples and sources for additional information.

Planning Activities and Programs

- **Development Management and Urban Design –** Planners use a wide array of tools in zoning codes to focus development at specific transportation nodes and along corridors.
    - Corridor Planning
    - District, Sector, and Neighborhood Planning
    - Interchange Area Planning
    - Transit Oriented Development and Station Area Planning
- **Transportation Demand Management** – Transportation demand management encompasses a broad set of strategies intended to relieve pressure on the transportation system during peak times.
    - Parking Management
    - Ridesharing/carpooling
    - Location Efficient Development Policies and Incentives

Project Development and Programming

- **Project Prioritization and Funding Strategies –** Funding agencies use capital grants, technical assistance programs, incentives, and funding mechanisms and approaches to integrate land use and transportation decisions.
    - State and Regional Capital Grants and Technical Assistance Programs
    - State and Regional Project Prioritization/Selection Criteria
    - State Fiscal and Regulatory Incentives
    - Transit Corridor and Station Area Development Programs
    - Parking Benefits Districts
- **Roadway Design Guidelines and Standards** – Planners and engineers craft roadway design guidelines and standards to help ensure accessibility for all modes and improve neighborhood livability.
    - Access Management
    - Complete Streets/Routine Accommodation
    - Context Sensitive Design/Solutions
    - Urban Freight Guidelines and Intermodal Freight Centers
    - Local Road Design Guidelines
    - Pedestrian and Bicycle Facilities Design Guidelines/Programs
    - Road Diets
    - Road Swaps and Transfers

Stakeholder Engagement and Visioning

- **Public Involvement** – Planners use a variety of public involvement techniques to help the public understand the implications of decisions and make more informed choices based on community preferences.
    - Community Outreach Toolkits and Facilitation Tools
    - Community Visioning Workshops and Charrettes
    - Visualization/Simulation Techniques
- **Visioning and Scenario Planning** – Planners host processes with stakeholders to develop regional visions and conceive of and pursue possible land use and transportation scenarios.
    - Regional Visioning
    - Land Use Scenario Development
    - Scenario Planning Software

Analytical Tools

- **GIS & Technical Analysis** – Planners uses a variety of software tools to visualize and analyze land use and transportation connections at multiple scales.
    - Environmental Mapping and Analysis
    - GIS Development Opportunity, Housing, and Accessibility Analyses
    - Rural Traffic Shed Model
    - Space Syntax

Emerging Topics

- **Linking Planning to the Environmental Review Process** – Planners and environmental professionals are increasingly combining planning and environmental review processes to streamline project development.
    - Environmental Processes
    - Environmental Permits and Plans
- **Linking Planning and Public Health** – Professionals from a wide array of fields may collaborate to develop transportation planning tools, policies, and incentives in order to improve public health outcomes
    - Coordination between Planning and Health Departments
    - Health Impact Assessment Tools
    - Statewide Healthy Transportation Planning and Coordination

Development Management and Urban Design

East Washington Avenue Capital Gateway Corridor Plan (Project context map) | City of Madison

Planners engage in various types of development management and urban design activities in order to coordinate transportation investments with private development activity. This page explores how planners use small area planning and zoning ordinances to achieve land use and transportation objectives at a variety of scales. Small area plans (otherwise known as specific plans, subplans, or district plans) are detailed plans for defined areas of a community. With an emphasis on design, participatory process, and detail, they form a specific and solid basis for the commitment of resources to implement proposals, particularly capital improvements. Because they explore fine-grained issues, problems, opportunities, and priorities not usually evident in community-wide land use plans, small area plans are uniquely suited to integrate transportation and land use considerations. These planning activities are often closely coordinated with other approaches listed in this Toolkit.

- **Corridor Planning**
  - Bel-Red Corridor Plan
  - East Washington Avenue Capitol Gateway Corridor Plan
  - New Jersey Future in Transportation Program
- **District, Sector, and Neighborhood Planning**
  - Baltimore Maritime Industrial Zoning Overlay District
  - Downtown Collierville Small Area Plan
  - Five Corners Transportation and Land Use Linkage Study
  - New Jersey Scenic Overlay Districts
  - Portland Central City Management Plan
- **Interchange Area Planning**
  - Northwest Parkway Interchange Area Planning
  - Oregon Interchange Area Management Plans
  - Charlotte I-485 Interchange Analysis
  - I-99 Interchange Overlay District
  - Vermont Statewide Interstate Interchange Planning
- **Transit Oriented Development and Station Area Planning**

- Burlington Transit-Oriented Design Guidelines
- Research Triangle Station Area Planning
- Stapleton Development Plan

Comment [DD1]: Target links

Corridor Planning

Bel-Red Vision | City of Bellevue, WA

Corridor planning is a collaborative process that looks at existing land use and transportation conditions along a roadway corridor and explores opportunities for improvements to meet long-term needs. The process includes discussions of existing and projected travel patterns and social, environmental, and economic issues within the corridor. It requires analysis of potential infrastructure improvements as well as land use and system-management actions.

A corridor plan defines a comprehensive package of recommendations for managing and improving the transportation facilities and services within and along a specific corridor, typically based on a medium- to long-term planning horizon. Recommendations may include a mix of strategies and improvements, and may relate to multiple travel modes.

Examples in Practice

Bel-Red Corridor Plan
City of Bellevue, Washington
The City of Bellevue, Washington's Bel-Red Corridor Plan outlines strategies to convert a 900-acre light industrial and retail area into a mixed-use, transit-oriented neighborhood. The Plan calls for changes to zoning and development regulations to encourage high density and mixed use development in infill areas connected to a future light rail corridor. The City is working with private developers, property owners, and city funds to invest $500 million in strategic infrastructure needs related to the plan, including bicycle and pedestrian facilities, parks and stream enhancements. The Puget Sound Regional Council (PSRC), a regional growth and transportation planning agency, presented its Vision 2040

award to the City of Bellevue for its commitment to transit-oriented planning.

Contact: Paul Inghram, City of Bellevue Department of Planning & Community Development (425) 452-4070.

East Washington Avenue Capitol Gateway Corridor Plan
City of Madison, Wisconsin
The City of Madison, Wisconsin developed a planning framework in the East Washington Avenue Capitol Gateway Corridor Plan to address significant land use and design issues for its Capitol Region. The Plan centers on four core development principles: protect and enhance the iconic view of the Capitol, respect and strengthen existing neighborhoods, establish the corridor as an employment center supported by transit, and create an inviting and vibrant boulevard. To achieve these principles, the Plan outlines recommended techniques involving modification to the existing land use, bulk standards, design guidelines, public facilities, business development, transportation, and parking strategies. The East Washington Avenue Capitol Gateway Corridor Plan is also coordinated with adjacent neighborhood and rail corridor plans.

Contact: Al Martin, City of Madison Department of Planning and Community Development (608) 267-8740.

New Jersey Future in Transportation Program
NJDOT (New Jersey DOT)
As part of its Future in Transportation (FIT) program, New Jersey DOT (NJDOT) is working with communities to integrate land use and transportation issues into corridor-level planning. The DOT-funded studies address issues such as circulation systems, access management, and zoning, as well as multi-modal transportation improvements. On the Route 31 corridor through Raritan Township and Flemington Borough, an NJDOT conceptual study resulted in a "smart growth alternative" to a previously proposed bypass, consisting of local road network improvements, which can be built sooner, at lower cost, and with fewer environmental impacts. The NJ Office of Smart Growth followed up with a grant to Raritan Township to complete the Route 31 Land Use and Transportation Plan to accommodate the proposed roadway system. Following the adoption of the plan in 2008 by the Town, NJDOT continues to work to preserve the alignment of the proposed parkway and develop a street network.

Contact: David Kuhn, NJDOT (609) 530-3855.

Resources and Guidebooks

NCHRP 8-36-86 Corridor Plans Integrating Transportation and Land Use:This research identifies successful innovations in the integration of transportation and land use planning for transportation corridors. This report includes a literature review and synthesis of notable practices by state DOTs and other agencies who are integrating land use and transportation to improve the management and

function of regional transportation corridors and better serve communities, and six case studies on the integration of land use and transportation.

Bluegrass Corridor Planning Management Handbook: The Kentucky Transportation Cabinet (KYTC) developed the Bluegrass Corridor Planning Management Handbook, which describes a comprehensive approach to corridor planning that also addresses land use issues. The handbook outlines a six-step process for conducting a corridor planning study, including getting organized, knowing the corridor, developing choices, selecting a preferred choice, implementation, and sustaining the vision. The handbook's principles have been applied in cities such as Bowling Green, where an overlay district was adopted in conjunction with a planned arterial road realignment.

Other Resources

- The Transportation Research Board Access Management website contains references on corridor planning and corridor preservation.

- The Vermont Corridor Management Handbook (Vermont Agency of Transportation, 2005) is a technical resource for state and regional agency planners and their consultants.

District, Sector, and Neighborhood Planning

Five Corners urban design and access management recommendations | Town of Rotterdam

MPOs and local jurisdictions lead planning processes focused on redeveloping built-up parts of a jurisdiction or managing new urban and suburban development on the urban fringe. Some use small area plans and zoning ordinances to protect natural resources from development. District, sector, or neighborhood plans may include both multi-modal transportation and land use considerations to address issues such as traffic circulation and transit service, parking, downtown

revitalization and urban design, and pedestrian and bicycle access. Plans are implemented through capital improvements, changes to zoning including overlay districts, and other strategies and generally have a strong design element.

Examples in Practice

Baltimore Maritime Industrial Zoning Overlay District
Baltimore, MD
The City of Baltimore's Maritime Industrial Zoning Overlay District (MIZOD) is an example of a zoning tool that preserves waterfront land for industrial uses in the face of a mixed-use real estate boom that has applied considerable pressure to convert waterfront industrial properties to mixed-use. The City enacted the MIZOD in 2004 to preserve maritime properties with deep water, rail and highway access in order to protect maritime-dependent uses and intermodal freight movement. The goal was to balance the needs of both mixed use and maritime shipping, maximizing each to the extent possible without harming the other. The City categorized its waterfront into two general districts: Mixed-Use and Maritime Industrial. In the first, mixed use would be allowed, enabled and encouraged. In the second, the MIZOD would protect maritime uses by prohibiting conversion of land to non-industrial uses. Establishing clearly defined mixed-use and maritime industrial areas streamlined the development by avoiding costly and time-consuming delays associated with site-by-site decision-making regarding changes of use. It is also credited with protecting the integrity of the maritime area by avoiding the "leapfrogging" of mixed uses into maritime areas.

Contact: Tammy Scroggins, City of Baltimore, Department of Planning (410) 396-7526.

Downtown Collierville Small Area Plan
Town of Collierville, TN
The Town of Collierville developed its 2010 plan for Downtown Collierville to create a formal vision for the future of the town's historic square and surrounding neighborhoods. The plan identifies sites for new residential units and retail space strategically connected to the existing downtown train station and historic areas. The plan emphasizes placemaking and wayfinding, through shaping development form, maintaining street and sidewalk connectivity, and encouraging active open spaces.

Contact: Jason Gambone, Town of Collierville (901) 457-2300.

Five Corners Transportation and Land Use Linkage Study
Town of Rotterdam, New York

The Town of Rotterdam's Five Corners area serves as a gateway to the community and a major commercial center, but is unfriendly to both motorists and pedestrians. Most of commercial area was dominated by parking, which minimized the economic opportunity available in the area. The town completed a Transportation and Land

Use Linkage Study in 2011 to explore compact development options and transportation interventions that would help ease traffic congestion in the area. The study recommends re-zoning commercial areas to mixed-uses and presents re-zoning strategies to improve access to parcels and shared parking, thereby improving traffic flow in the area. Paired with these land use changes, the study also recommends transit and nonmotorized transportation improvements, including provisions for new sidewalks, crosswalks, bicycle lanes, and bus stops. The Capital District Transportation Committee's Community and Transportation Linkage Planning Program, which funded the study, is designed to assist local governments in aligning their plans and ordinances with the regional long-range transportation plan, *New Visions 2035*. The Five Corners study helps support several of the program's TDM-related strategies for the region.

Contact: Vince Romano, Rotterdam Public Works

New Jersey Scenic Overlay Districts
New Jersey DOT
The New Jersey DOT (NJDOT) is working with municipalities along Route 57 to develop Scenic Overlay Districts, which would help preserve scenic viewsheds from Route 57. The districts would establish standards to reduce visual impact of new development, signs, or other physical construction along Route 57. NJDOT encourages municipalities to adopt form-based versions of a scenic overlay district. The overlay district will not change the existing zoning, but rather, add additional standards to meet an aesthetic goal.

Contact: NJDOT (609) 530-5228.

Portland Central City Management Plan
City of Portland (OR)
The City of Portland's Central City Transportation Management Plan is a policy plan based on the theme of "growth with livability," which calls for concentrated development within the Central City area. The plan uses transportation strategies, such as parking management, transit service, pedestrian and bicycle improvements, and traffic circulation improvements to promote the city's land use objectives. The plan includes "pedestrian districts" and pedestrian safety data collection, special studies, and targeted improvements to the pedestrian network within the Central City.

Contact: Steve Iwata, City of Portland, (503) 823-9904.

Other Resources

- *New Urbanism Model Ordinances:* http://www.smartcodecentral.com/
  *Complete Streets Model Ordinances:*http://www.completestreets.org/changing-policy/model-policy/

- *Growing Smart Legislative Guidebook: Model Statutes for Planning and the Management of Change.* American Planning Association: Chicago, IL, 2002. This guidebook is a compilation of model policies, regulations, and tools to implement Smart Growth practices from throughout the United States.

- *Smart Growth Zoning Codes: A Resource Guide.* Local Government Commission. Based on research of more than 150 "smart growth" zoning codes from across the nation, this guidebook helps planners design a zoning code that encourages the construction of walkable, mixed use neighborhoods and the revitalization of existing places.

Interchange Area Planning

I-485 Interchange recommendations | City of Charlotte

Agencies at various levels develop land use plans and zoning overlay ordinances to guide land development around freeway interchanges. Interchanges often attract significant land development necessitating coordinated land use planning. Unmanaged access can quickly lead to a deterioration of traffic conditions in the vicinity of the interchange, affecting both safety and capacity.

State agencies, community groups, and nonprofits have sponsored the development and adoption of model codes and regulations for interchange areas, while regional agencies and local jurisdictions have sponsored the development of interchange area plans that address access, local circulation, land uses, site design, buffers, and landscaping.

Examples in Practice

Oregon Interchange Area Management Plans
ODOT (Oregon DOT)
The Oregon Department of Transportation (ODOT) creates an Interchange Area Management Plan (IAMP) for every major newly constructed interchange in the state. IAMPs are created to reduce potential conflicts that can result from increased development around interchanges by ensuring that growth and

development can occur without overloading the capacity of the new infrastructure. ODOT develops the IAMPs in collaboration with residents, property owners, community stakeholders, and local government officials. The plans must be adopted by local governments and the Oregon Transportation Commission before a Final Tier 2 Design Environmental Impact Statement will be published. The Oregon Department of Transportation (ODOT) developed an Interchange Management Area Land Use Overlay Zone in order to preserve the capacity of the Woodburn interchange on Interstate 5 by linking land use zoning to specific trip budgets. The Interchange Overlay District can be used by the State as a tool to manage development within the immediate area around the interchange.

Contact: Andrea Bridge, ODOT Planning and Implementation Unit (503) 986-4121.

Northwest Parkway Interchange Area Planning
Cities of Broomfield, Lafayette, and Louisville, and Boulder County (CO)
In Denver's northwest suburbs, four communities came together in the 1990s to preserve open space while addressing common mobility needs. The communities established a nonprofit authority to construct a toll road as a link in Denver's circumferential highway system, while at the same time implementing concerted land use planning and strong land protection measures to ensure that the road would not simply become another conduit for suburban sprawl. Through intergovernmental agreements and funding from anticipated toll revenues, the communities designated and acquired 2,400 acres near the alignment to preserve as open space. The communities revised zoning to focus development in two areas near planned interchanges.

Contact: Dave Shinneman,City and County of Broomfield (303) 438-6297.

Charlotte I-485 Interchange Analysis
Mecklenburg-Union MPO (Charlotte, NC area, MPO)
The Mecklenburg-Union MPO developed an interchange analysis as a framework to guide land use and transportation improvements at interchanges along the I-485 outer loop freeway in Charlotte, North Carolina. At the time the study was undertaken, approximately one-third of the freeway was completed, with the other two-thirds in various stages of planning, design, or construction. The I-485 Interchange Analysis made recommendations to help ensure that future interchanges would function effectively and that the area around those interchanges would develop in accordance with the community vision. Recommendations included: eliminating one interchange and delaying construction of some others; changing the design of some interchanges; constructing roundabouts; improving access management and connectivity; realigning and improving roads near the interchanges; improving conditions for bicyclists and pedestrians; changing adopted land use plans; and completing more detailed area plans for some interchanges. Since the completion of the analysis, many of these recommendations have been implemented, resulting in a transportation facility that will better serve existing and future development.

Contact: Garet Johnson, Charlotte-Mecklenburg Planning Department (704) 336-8364. *See the Charlotte, NC I-485 Interchange Case Study*.

I-99 Interchange Overlay District
ClearWater Conservancy (nonprofit) and local governments in Centre County, Pennsylvania
As part of planning for Interstate 99 in central Pennsylvania, the ClearWater Conservancy, a nonprofit organization, worked with local governments to conduct corridor planning and create and adopt an interchange overlay district ordinance. Local governments within four of six planning districts in the I-99 corridor adopted the ordinance, which maintains the land around the Interstate 99 as natural woodland, preserving the identity of townships, rather than encouraging the development of strip malls. The ordinance covers land within a quarter mile from the center of each lane's right of way.

Contact: Bill Hilshey, Clearwater Conservancy (814) 237-0400.

Vermont Statewide Interstate Interchange Planning
Vermont Department of Housing and Community Affairs
The Vermont Department of Housing and Community Affairs, in coordination with the Vermont Agency of Transportation (VTrans) and other state agencies, has led the development of a state interchange planning policy to manage growth around freeway interchanges. VTrans developed an interchange guidebook which illustrates six interchange types representing different growth contexts, to help municipalities realize their desired growth pattern around interchanges, with recommendations on siting, building, and landscaping development at interchange locations.

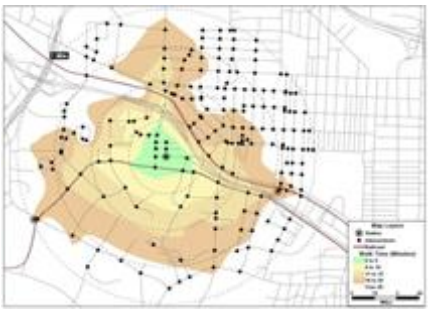
Contact: Sue Minter, Vermont Department of Housing and Community Affairs, Planning Department (802) 828-3211.

Resources and Guidebooks

- Florida Land Development and Access Management Interchange Strategies. Center for Urban Transportation Research. *Land Development and Access Management Strategies for Florida Interchange Areas.* Prepared for Florida Department of Transportation, 2000. Available from the Transportation Research Board Access Management website.

- Georgia Interchange Area Development Model Land Use Management Code. The Georgia Department of Community Affairs has developed a "model code" for Interchange Area Development, as part of a set of model codes for communities that provide an alternative to traditional zoning regulations. The code addresses highway access, buffers and setbacks, architecture, lighting, and signage. The code was based on the interchange model overlay zoning ordinance prepared by the Clearwater Conservancy for communities in Centre County, Pennsylvania.

Transit Oriented Development and Station Area Planning



Station area planning | Triangle Transit Authority

Local jurisdictions, transit agencies, and MPOs lead planning processes and develop design guidelines focusing on existing or planned transit station areas. These processes often involve education and outreach on transit oriented development principles; detailed or conceptual station area planning; market assessment; development and adoption of overlay districts or other zoning changes to facilitate transit-supportive development; and application of other tools and incentives.

Examples in Practice

Burlington Transit-Oriented Design Guidelines
Chittenden County Regional Planning Commission (Burlington, VT area, RPC)
The Chittenden County Regional Planning Commission (CCRPC) in Burlington, Vermont published a Transit-Oriented Design Manual in 2002. The guidelines are intended to show how the development community and municipalities can include transit users in the market it expects to serve with large or small-scale real estate development projects. They also are intended to show planners and designers what elements may be included in their plans to create transit-oriented design including roadway design and sidewalk elements. The manual is appropriate for smaller communities that wish to design for transit.

Contact: Charles Baker, CCRPC (802) 846-4490.

Stapleton Development Plan
City and County of Denver (CO) and the Stapleton Development Foundation
The City and County of Denver adopted the Stapleton Development Plan in 1995, which established a vision of the reuse of the 4,700-acre former Stapleton Airport site in Denver, Colorado. The plan led to the construction of a network of urban villages, employment centers, and open spaces, and extends adjacent arterial and local street block patterns onto the site. The street grid, pedestrian-oriented design, mix of uses, planned connection to light rail, and continuous bikeway system support travel by alternative modes and will reduce vehicle traffic on

adjacent arterials. Construction began in 2001 and will continue over a 15 to 20 year time frame. Denver further demonstrated its commitment to transit-oriented development with its 2006 Transit-Oriented Development Strategic Plan. *See also Federal Highway Administration Domestic Scan Tour I: Land Use and Transportation Coordination.*

Contact: Steve Gordon, City and County of Denver Transit Oriented Development Department (720) 865-2922.

Research Triangle Station Area Planning
Triangle Transit (Cary-Chapel Hill-Durham-Raleigh, NC area, transit agency)
Triangle Transit, the regional public transportation agency for the Cary-Chapel Hill-Durham-Raleigh area in North Carolina, works with local government partners on station area planning. Based on the 2030 LRTP jointly adopted by the region's two MPOs, Triangle Transit is advancing three fixed-guideway transit projects which collectively include 12 commuter rail and 37 light rail stations. The station locations were selected in part on future growth potential, supported by local land use plans which encompass the station areas. Through a TOD assessment, each station was evaluated using 19 qualitative criteria, to determine its existing or potential capacity to support infill and/or new TOD within the station area. The results will be used by local governments to enhance TOD implementation tools and strategies and inform the development community about the opportunities presented by these proposed major transit infrastructure investments. Through a master development agreement, Triangle Transit has secured a private sector partner that will assist in the implementation of TOD.

Contact: Triangle Transit, (919) 485-7425.

Other Resources

- Cambridge Systematics, Inc.*The Role of State Departments of Transportation in Transit-Oriented Development*. Prepared for NCHRP Project 25-25 Task 20, 2006.

- Cervero, Robert, et al. *Transit-Oriented Development in the United States: Experiences, Challenges, and Prospects.* Transit Cooperative Research Program (TCRP) Report 102, 2004. This report discusses issues related to development adjacent to transit including institutional issues, impacts and benefits, implementation strategies, and urban design.

- Dittmar, Hank; Ohland, Gloria. (2004). *The New Transit Town: Best practices in transit-oriented development*. Washington, DC: Island Press.

- Dunphy, Robert; Deborah Myerson and Michael Pawlukiewicz. *Ten Principles for Successful Development Around Transit.* Prepared for Urban Land Institute, 2003. This non-technical handbook describes keys to achieving TOD from a developer/market perspective.

- Lefaver, Scott, et al. *Construction of Transit-Based Developments*. Mineta Transportation Institute report 01-05, September 2001. This report reviews policies and legislative programs that can be adopted at all levels of government to encourage transit-based development.

- Morris, Marya, ed. (1997). *Creating Transit-Supportive Land Use Regulations.* This collection of codes, standards, and designs addresses topics including transit and pedestrian-friendly site design, parking, mixed-use development, densities, and incentives. Planners Advisory Service Report 468, American Planning Association: Chicago, IL.

Transportation Demand Management

Transportation Demand Management (TDM) is a term that encompasses a broad set of strategies intended to reduce or diffuse travel demand among modes, time, or routes within a regional or local transportation system. By providing choices and incentives for travelers to diversify their travel mode or behavior, TDM strategies relieve disproportionate pressures on segments of a transportation system.

Land use patterns can serve as either a source of or a solution to transportation demand. Land use is often incorporated into TDM strategies through the consideration of infrastructure planning, management, and development. TDM strategies that influence land use decisions – such as development incentives, zoning regulations, and alternative transportation programs ranging from carpooling to transit access – are most effective when used in concert with other TDM strategies.

- **Parking Management**
  - Acton Parking Reserve Spaces
  - Glendale Flexible Parking Requirements for New Development
  - Redwood City Market-Rate Curb Pricing
  - San Diego Shared Parking Agreements
- **Ridesharing/carpooling**
  - Metro Transit Van Share and Pooling Programs
  - San Bruno Proposed Mobility Hub
- **Location Efficient Development Policies and Incentives**
  - Massachusetts Commercial Area Transit Node Housing Program
  - Illinois Business Location Efficiency Incentive Act
  - Washington Regional Smart Commute Initiative

Comment [DD2]: Target links

Parking Management

Parking management strategies focus on the utilization of existing parking infrastructure instead of its construction. While many areas or businesses may advertise the availability of parking as an asset, the hidden external costs associated with low-cost, abundant parking are well documented. Land dedicated to paved parking increases stormwater runoff; raises construction costs that contribute to higher housing prices; and creates larger distances between destinations. Excessive or free parking generally decreases the incentive to walk, bike, or take transit by making automobile trips more convenient. By maximizing the use existing parking infrastructure before building more, the demand for vehicle trips in an area can be managed to promote livability.

Examples in Practice

Acton Parking Reserve Spaces
Town of Acton, MA
Developers in the town of Acton, Massachusetts may apply for a site plan special permit that allows land to be set aside but not immediately developed for parking. As stated in Section 10.4.4 (page 152) of the town's zoning code, a reduction of up to 75% of otherwise required parking may be allowed depending on the associated land use. Acton's parking reserve spaces allow time to demonstrate the true amount of parking needed, thus preventing the paving or construction of superfluous parking, which can induce traffic demand and hinder livable development patterns.

Landscaping and low-intensity development (such as playing fields) are often allowed on parking reserves. In some areas, parking reserves may also be allowed in return for other TDM strategies, such as employer-sponsored shuttles and van pools. The benefits of parking reserves include decreased construction costs, more flexibility for future land uses, and reduced environmental impacts. In addition, preserving the increased open space provided by parking reserves may compel neighboring land owners to find ways to keep driving demand from increasing in their area.

Contact: Roland Bartl, Town of Acton

Glendale Flexible Parking Requirements for New Development
Glendale, CA
In 2007 the City of Glendale, California, completed a downtown mobility study as part of its Downtown Specific Plan. The city's goal was to accommodate new mixed-use growth while averting increased congestion. With no plans for major transit investment to accommodate new residents and visitors, the city used its mobility study as a way to create a mixed-use, livable downtown without needing to make expensive capital investments in transit.

The mobility study found that only 53 percent of available parking spaces in city garages were utilized, yet the free downtown parking area was regularly at 90 percent capacity. In response, parking rates were applied downtown while wayfinding signage directed drivers to free parking garages for longer-term parking. In addition, the city adopted new ordinances that allow TDM strategies to fulfill part of the minimum parking requirements for development sites. TDM strategies could include providing bicycle amenities, subsidized transit passes, preferred carpool parking, or sharing parking infrastructure with nearby developments instead. In addition to the more flexible parking ordinances, new residential and commercial developments of certain sizes are required to participate in a downtown Transportation Management Association to support alternative transportation programs and options.

Contact: Michael Nilsson, City of Glendale

Redwood City Market-Rate Curb Pricing
Redwood City, CA

Redwood City, California, created a parking system for its downtown business area that prices parking based on its proximity to surrounding land uses. More "convenient" spots near restaurants and businesses in the central business district are priced higher than parking spots further away. Prices fluctuate throughout the day to respond to rising and falling demand based on the nearby destinations – for example, parking near restaurants will be higher in the evenings and on weekends than during weekday mornings. The higher cost also prompts long-term users (such as employees) to seek lower-priced spaces farther away, leaving more spaces available for shorter-term business patrons.

Pricing zone map of parking in downtown Redwood City, CA | City of Redwood City

The market-based pricing scheme is designed to maintain an 85% occupancy rate of parking spaces, which balances revenue with maintaining consistent parking availability. In addition, the rate hedges against the need to increase parking rates, which can become politically sensitive. All revenue generated is used for improvements to the downtown area.

Contact: Shobuz Ikbal, City of Redwood City

San Diego Shared Parking Agreements
San Diego, California

Shared parking may take two forms. One refers to large, often public, garages in an area that serve as the central parking areas for multiple surrounding uses. The other takes advantage of the differing peak times of adjacent land uses, such as a restaurant and an office building, in order to utilize the same parking infrastructure.

In both cases shared parking uses land more efficiently and discourages multiple, single-use parking lots with multiple curb cuts along a roadway, allowing traffic to flow more smoothly. Removing rigid parking requirements also increases the variety of developments that can be built in closer proximity, creating a more vibrant environment that encourages walking and bicycling.

San Diego adopted an informal shared parking agreements in 2000 that encourages neighboring land uses within 600 feet and different peak activity times to utilize the same parking infrastructure. Shared parking is allowed in all zones of the city, except areas with single-family housing. In order to assist developers in understanding the legal process involved and encourage cooperation, the City created a shared parking template. As a part of its 2009 comprehensive downtown parking plan, the City also is exploring the development of a shared parking database that identifies lots and their peak demand times to encourage more shared parking arrangements.

Contact: Tom Tomlinson, Development Services, City of San Diego

Resources

- *Driving Urban Environments: Smart Growth Parking Best Practices* is a product of Maryland's Office of Smart Growth that looks at parking management, design, and financing.

- *The High Cost of Free Parking*. Donald Shoup. American Planning Association Planners Press; Updated edition (2011). This book builds the case that free parking contributes to auto dependence. The author argues for parking pricing strategies and reducing zoning requirements for off-street parking.

Ridesharing / Carpooling

Ridesharing and carpooling reduces single-occupancy trips by utilizing empty seats in traveling vehicles. Land use patterns influence the physical opportunities available for users to access carpools and transfer to other destinations or modes in the transportation network. Ridesharing can be a key strategy to expand the reach of a region's transit system to lower density area by providing a cost-effective link to areas without regular service. Formal and informal programs as well as technological applications help people connect and communicate about sharing rides.

Examples in Practice

Metro Transit Van Share and Pooling Programs
King County, WA

Commuter take part in King County Metro Transit van pooling | Commute Seattle

In operation since the late 1970s, King County (Washington) Metro Transit's commuter van program is the largest publicly run program in the nation. For a monthly fare that includes vehicle use, maintenance, and insurance, Metro Transit provides vans to groups of commuters that form to either commute to/from their areas of employment (van pooling), or to/from public transit system transfer points within a 10-mile radius (van sharing). In areas where land use patterns do not support regular transit service, a ridesharing service helps commuters access core job centers. Regional congestion is reduced by effectively expanding the reach of the transit system. Van pools and van shares also reduce the amount of land that must be dedicated to parking at employment centers and park-and-ride transit lots.

Metro Transit currently operates approximately 1,150 vans throughout the Puget Sound region, and estimates that the programs kept approximately 5,600 single-occupancy vehicles off the road in 2011. Potential participants can search for commuters with similar origins, destinations, and schedules through the www.RideshareOnline.com website, which is supported by Metro Transit and other transit agencies in the Pacific Northwest. Users that register for the site can also sign up to find carpool companions for special events or other activities.

Contact: Karen Martin, King County Metro Transit

San Bruno Proposed Mobility Hub
San Bruno, California

In areas with wide commute sheds and dispersed job centers, finding a rideshare or carpool opportunity with the same origin and destination can be challenging, especially if schedules must also be consistently synchronized among travelers. To add more flexibility to traditional fixed-route carpooling, a proposed transit hub between San Francisco and the Silicon Valley would provide a fixed physical location for travelers to connect and more easily customize their route. The concept mirrors

other proposals being pursued in Seattle, Washington, and Tysons Corner, Virginia, among other places.

According to a concept paper presented at the Transportation Research Board's 2010 annual meeting by research firm Cities 21, a transfer point located along U.S. 101 outside of San Francisco would allow commuters traveling in carpools from their respective neighborhoods to find and transfer to car or van pools traveling to their individual destinations (such as an employer campus). The mobility hub could potentially link to transit and commuter rail stations, and serve as a dedicated area for employer-provided shuttles as well.

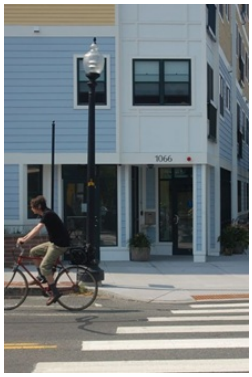
The mobility hub concept is designed to reduce the time necessary to find and organize appropriate ridesharing/carpooling opportunities, and to increase the variety of trips available to travelers. By serving as an easily recognizable and accessible meeting point, the hub also supports the nascent rise of "dynamic ride sharing," which utilizes smart phone and GPS technology to match potential ride- or car-sharers on an as-needed, flexible basis.

Contact: Steve Raney, Cities21

Location Efficient Development Policies and Incentives

Location efficient development policies and incentives refer to programs or initiatives that both promote easy access to desired destinations (schools, stores, job centers, etc.) and affordability. Transportation demand is reduced when residential and commercial uses are planned to be within close proximity to each other, meeting a greater number of a community's everyday needs without requiring a car. Affordability is in turn supported by the reduced transportation costs associated with the location. The resulting density also helps support the implementation of other TDM strategies, such as ridesharing, increased transit service, and shared parking opportunities.

Examples in Practice



Affordable rental homes financed in part with CATNHP funds. | Cambridge CDD

Massachusetts Commercial Area Transit Node Housing Program
Massachusetts Department of Housing and Economic Development

Locating affordable housing near transit service helps reduce transportation costs of households and reduces the demand for driving within an area. The Commercial Area Transit Node Housing Program (CATNHP) is intended to promote affordable housing development in areas served by both transit and community and commercial services statewide. The program is one of several statewide smart growth programs that incentivize municipalities to adopt compact development practices that reduce automobile dependency by providing greater transportation options. Originally passed in 2002, the program's success led to reauthorization in 2008.

CATNHP provides low interest financing for affordable housing developments of 25 units or less in designated commercial nodes, or of 25 units or more within ¼ mile of a public transit node (including bus, subway, ferry, or commuter rail). The projects can be homeownership or rental construction, but half the units must accommodate residents with incomes no higher than 80% of the area median income.

Contact: Rachel Carlson, Massachusetts Department of Housing and Economic Development

Illinois Business Location Efficiency Incentive Act
Illinois Department of Commerce and Economic Opportunity

The Illinois State legislature passed the Business Location Efficiency Incentive Act in 2005. Businesses eligible for corporate tax credits under the State's Economic Development for a Growing Economy Tax Credit Program may receive additional

tax credits if they locate their business near eligible affordable housing options or within a mile of regular transit service with pedestrian access from the job site. A housing or transportation remediation plan may also be submitted to receive the tax credits if the business moves to an area that is not considered location efficient. The Act lapsed in 2011 but was recently submitted to the legislature for renewal.

Contact: John Casey, Illinois Department of Commerce, Office of Business Development

Washington Regional Smart Commute Initiative
Washington, D.C. Metropolitan Region

Fannie Mae's Smart Commute mortgage product program promotes a type of location efficient mortgage in select markets throughout the country, including the Washington D.C. metropolitan area. Location efficient mortgages are home financing instruments that factor in a home buyer's potential transportation costs into the mortgage-to-income ratio. Location efficient mortgages were originally offered to four pilot metropolitan areas (Seattle, Los Angeles, Chicago, and San Francisco) in 2003 through a collaboration between the Natural Resources Defense Council, the Surface Transportation Policy Project, Fannie Mae, and local lenders. Home buyers that select houses or condominiums in areas served by public transportation or employment centers (determined through a location efficient value formula) are eligible for higher mortgage amounts than they would be otherwise, since lower transportations costs leave more disposable income. For example, lenders may offer mortgages of up to 39% of a home buyer's income rather than the typical 28%.

Due to the complexity of the LEM application process and formula, Fannie Mae began promoting Smart Commute mortgages in partnership with State and local agencies and lenders throughout the country. Smart Commute mortgages require home buyers to simply live within designated distances from a public transit station and may include restrictions on car ownership. The Washington Regional Smart Commute Initiative includes discounts on transit passes and free membership to car sharing for program participants through numerous partnerships with area agencies and businesses.

Contact: Metropolitan Washington Council of Governments

Resources

- U.S. Department of Housing and Urban Development and U.S. Department of Transportation - Location Affordability Portal. This tool helps individuals, real

estate professionals, planners, policymakers, developers, and researchers understand transportation costs in the context of housing location.

Project Prioritization and Funding Strategies

State DOTs, MPOs, and other regional planning agencies use project prioritization strategies and a wide range of programs to help determine how to best use limited funds to accomplish goals related to integrating land use and transportation. Agencies can use grants or other funding programs to achieve these goals. They can also develop prioritization criteria for projects that meet specific land use and transportation goals.

- **State and Regional Land Use and Transportation Capital Grants and Technical Assistance Programs**
  - San Francisco Area Transportation for Livable Communities Program
  - Minneapolis-St. Paul Area Livable Communities Grant Program
    Dallas Area Land Use / Transportation Joint Venture Program
  - Atlanta Livable Centers Initiative
  - Albany Community and Transportation Linkage Planning Program
    Charleston Area - Our Region, Our Plan Initiative
  - Washington, DC Area Transportation/Land-Use Connection Program
  - Wisconsin Transportation and Land Use Coordination
    Montana Urban Transportation Districts
- **State and Regional Project Prioritization/Selection Criteria**
  - Denver Area TIP Selection Criteria that Support the Regional Vision
  - Wilmington Area Transportation Investment Areas Prioritize Appropriate Projects
  - Seattle Area Regional TIP Policy Framework Supporting the Regional Vision
- **State Fiscal and Regulatory Incentives**
  - New Jersey Future in Transportation Program
  - Oregon Integrated Investment Strategy
  - Utah Smart Growth Planning Assistance and Funding Priority
  - Maryland Priority Funding Areas
- **Transit Corridor and Station Area Development Programs**
  - New Jersey Transit-Friendly Planning Assistance Program
  - San Francisco Area System Expansion Planning Process
  - Fort Worth Transit Corridor Urban Villages
- **Parking Benefits Districts**
  - Washington D.C. Pilot Parking District
  - Austin Parking Benefit District

Comment [DD3]: Target links

State and Regional Land Use and Transportation Capital Grants and Technical Assistance Programs

Many State and regional agencies develop competitive funding programs, often using Federal and State funds. These programs support capital improvements and planning technical assistance that integrate transportation and land use and promote walkability and transit-oriented development. Local governments or other eligible agencies may apply for assistance through these programs.

Streetscaping in Oakland | Metropolitan Transportation Commission Transportation for Livable Communities Program

Examples in Practice

San Francisco Area Transportation for Livable Communities Program
Metropolitan Transportation Commission (San Francisco, CA area, MPO)
Since 1998, the Metropolitan Transportation Commission's (MTC) Transportation for Livable Communities program has awarded over $200 million to better link land use and transportation decisions made by the region's cities and transit operators. The program provides planning and capital improvement grants for community-based transportation projects that enhance downtown areas, commercial cores, neighborhoods, and transit corridors. The program provides large scale land use planning grants through the Station Area Planning Program, and smaller, local level technical assistance grants through theTechnical Assistance Program. The TLC Capital program also offers incentives for housing development in livable communities. Funding has come from Federal sources including STP, CMAQ, and Transportation Enhancements, as well as from the State Transportation Development Act.

Contact: Therese Trivedi, MTC (510) 817-5767.

Minneapolis-St. Paul Area Livable Communities Grant Program
Metropolitan Council (Minneapolis-St. Paul, MN area, MPO)

The Livable Communities Grant Program, established by the Minnesota legislature in 1995, provides grants to communities in the Minneapolis-St. Paul metropolitan area to develop plans and implement projects to support mixed-use, walkable neighborhoods, Brownfields cleanup, and affordable housing. Administered by the Metropolitan Council, the program has provided over $198 million in funding and is expected to leverage over $3 billion in private investment.

Contact: Linda Milashius, Metropolitan Council, (651) 602-1541.

Dallas Area Land Use / Transportation Joint Venture Program
North Central Texas Council of Governments (Dallas, TX area, MPO)
The Sustainable Development Program, administered by the North Central Texas Council of Governments (NCTCOG), has provided approximately $124 million in STP and CMAQ funds for transportation improvements (such as pedestrian and bicycle improvements) supporting transit-oriented developments, mixed-use, urban developments, and infill developments. Calls for projects are issued every few years (thus far in 2001, 2006, and 2010), to fund sustainable infrastructure, land banking, and planning projects. Approximately $124 million worth of sustainable development projects have been selected for funding through the program, with additional local match contributions of $31 million. The matches come from a variety of sources, including: local governments, municipal funds, tax increment financing districts, and right-of-way land donations. In addition to transportation infrastructure improvements, funds were available for land banking and local sustainable development planning programs. NCTCOG reports that as a result of the first call for projects and in anticipation of the second call, many local governments updated or changed their zoning to include classifications that allow mixed-use sustainable development projects to be built by right. NCTCOG finds creative ways to combine Federal and local funding to streamline and accelerate implementation of small infrastructure projects. NCTCOG has a presentation with more details about the program.

Contact: Karla Weaver, NCTCOG (817) 608-2376.

Atlanta Livable Centers Initiative
Atlanta Regional Commission (Atlanta, GA area, MPO)
The Atlanta Regional Commission's (ARC) Livable Centers Initiative (LCI) provides planning grants for communities located in existing town centers and activity centers to develop plans that enhance livability and mobility. Using Federal transportation funds, since 1999 the program has provided $1 million annually in planning grants, and the region's long-range transportation plan allocates $500 million (approximately $20 Million annually) to implement projects. To date, 92 projects and $182 million in LCI transportation funds have been programmed in ARC's Transportation Improvement Program. Grant recipient communities have adopted LCI studies into their comprehensive plans, designated special LCI zoning districts, and developed policies that focus on housing for seniors and people with special needs. LCI study grants have proven to be innovative ways to generate private investment to develop creative solutions in support of regional visioning that links land use and transportation. To date, LCI has contributed to more than

1,100 new and refurbished developments in more than 100 communities across the Atlanta region.

Contact: Dan Reuter, ARC (404) 463-3305.

Albany Community and Transportation Linkage Planning Program
Capital District Transportation Committee (Albany, NY area, MPO)
The Capital District Transportation Committee (CDTC) initiated the Community and Transportation Linkage Planning Program in 2000 to help integrate land use and transportation decisions. The program provides CDTC staff or private consultant support for local community planning initiatives. CDTC has committed approximately $100,000 annually in staff time and $300,000 annually in consultant resources - approximately 25 percent of its planning work program - to undertake collaborative, jointly-funded local land use and transportation planning studies. Seventy one such studies in 40 municipalities have been undertaken through 2011. The studies are helping to implement key policies of the New Visions regional transportation plan through local adoption of land use plans, highway and transit designs, zoning ordinances, driveway standards, pedestrian and bicycle accommodation, and other activities. The program has proven very successful in engaging the MPO with land use planning issues and generating project candidates for CDTC's transportation improvement program. A regional roundtable of municipal planners (with mandatory participation of Linkage study municipalities) meets quarterly to allow communities to build upon each other's experiences. *See the Albany, NY Case Study.*

Contact: Sandra Misiewicz, CDTC (518) 458-2161.

Charleston Area - Our Region, Our Plan Initiative
Berkeley-Charleston-Dorchester (Charleston, SC area, COG)
The Berkeley-Charleston-Dorchester (South Carolina) COG (BCDCOG) serves as the MPO and regional planning agency. In addition to transportation planning, the COG assists local and county governments with comprehensive plan updates and zoning ordinances. The COG's role in providing planning assistance has allowed it to work with local jurisdictions to incorporate smart growth recommendations from a regional growth options study into local plans and zoning. The BCDCOG is working with the economic and land development communities and general public to identify a preferred 'blueprint' for future growth of the region, along with implementation strategies in the Our Region, Our Plan initiative. Related COG activities to implement the Growth Options study recommendations include updating the long-range transportation plan to address urban and facility design; encouraging a "complete streets" approach to facility design that accommodates all modes; conducting focus groups on multi-jurisdictional land use, connectivity, and transportation coordination at a sub-regional level; partnering with public health, schools, and bicycle and pedestrian organizations to promote bicycling and walking; and partnering with the development community to find ways to address the "how to" get to the vision for the region.

Contact: Kathryn Basha, BCDCOG (843) 529-0400 x210.

Washington, DC Area Transportation/Land-Use Connection Program
National Capital Region Transportation Planning Board (Washington, DC area, MPO)
The National Capital Region Transportation Planning Board (TPB) launched the Transportation/Land-Use Connections (TLC) Program in 2006. The program offers technical assistance to local jurisdictions and a website that acts as a source of information on transportation/land-use coordination and a clearinghouse for TLC's previous technical assistance documents. TLC has distributed over $1 million in small planning grants, used for activities ranging from public involvement facilitation to development of visualizations, streetscape and infill designs, planning documents, and scoping for longer term planning studies.

Contact Sarah Crawford, TPB (202) 962-3237.

Wisconsin Transportation and Land Use Coordination
WisDOT (Wisconsin DOT)
The Wisconsin DOT (WisDOT) provides internal guidance and training for headquarters and district staff on participation in local comprehensive planning activities (WisDOT Transportation and land use). WisDOT also has developed guidance for local jurisdictions on considering local and statewide transportation issues in comprehensive planning activities. As a result, district engineers and planners work closely with municipalities to coordinate the department's corridor planning activities with local land use planning, and to provide input into local comprehensive plans that affect important state travel corridors.

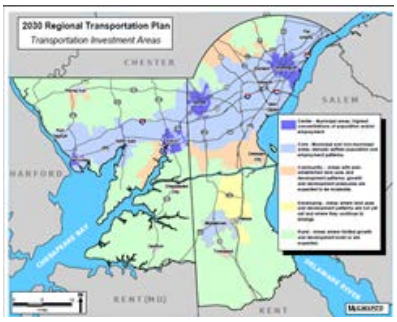
Contact: Aileen Switzer, WisDOT (608) 266-3662.

Montana Urban Transportation Districts
Montana DOT
Counties in Montana use Urban Transportation Districts (UTD) to develop transportation services and facilities within specific areas. The UTDs use government bonds to fund transportation improvements. The revenue to pay for the bonds is raised through increased assessments on properties within the district. In Montana, State law allows counties to designate urban transportation districts and issue bonds to pay for improvements, with an approving vote by county residents.

Contact: Sue Sillick, Montana DOT (406) 444-7693

State and Regional Project Prioritization/Selection Criteria

MPOs and State DOTs use project selection criteria to make decisions related to the long-range transportation plan (LRTP) and the transportation improvement program (TIP). To best promote land use-related goals, agencies can develop specific selection criteria that support land use priorities for certain modal investments, or priority areas in which to target development and transportation investments.



Map of Priority Investment Areas | Wilmington Area Planning Commission

Examples in Practice

Denver Area TIP Selection Criteria that Support the Regional Vision
Denver Regional Council of Governments (Denver, CO area, MPO)
The Denver Regional Council of Governments' (DRCOG) selection criteria for local projects in the 2012-2017 TIP include up to 26 points (out of 100) for implementation projects supporting the regional Metro Vision. Points are awarded for projects located in urban centers, strategic corridors, or within urban boundary areas. Many of these areas are aligned with transit systems.

Contact: Denver Regional Council of Governments (303) 455-1000.

Wilmington Area Transportation Investment Areas Prioritize Appropriate Projects
Wilmington Area Planning Commission (Wilmington, DE area, MPO)
The Wilmington Area Planning Commission (WILMAPCO) designated five categories of "Transportation Investment Areas" throughout the region: Center, Core, Community, Developing, and Rural. Each of the designations is based on current and expected future development patterns. The agency uses the designations to help screen potential LRTP projects, to ensure that projects are appropriate for their local context. An important application of the policy has been to prioritize areas in which pedestrian and bicycle facilities should be routinely included in roadway improvement projects.

Contact: Heather Dunigan, WILMAPCO (302) 737-6205.

Seattle Area Regional TIP Policy Framework Supporting the Regional Vision
Puget Sound Regional Council (Seattle, WA area, MPO)
The Puget Sound Regional Council's 2009 Regional TIP Policy Framework includes project selection criteria for consistency with Vision 2040, a regional transportation and land use vision adopted in 2010. Candidate TIP projects receive points for supporting designated urban centers, manufacturing/industrial centers, and connecting corridors, with specific criteria including circulation/continuity, urban environment, mobility/accessibility, benefit to the

center, and sustainability. See: Puget Sound Regional Council, "Regional Project Evaluation Criteria."

Contact: Puget Sound Regional Council (206) 464-7090.

State Fiscal and Regulatory Incentives

State agencies can provide incentives, such as prioritized capital funds or expedited review and permitting, to projects and programs that support identified land use priorities.

NJ FIT Light Rail Construction | New Jersey DOT

Examples in Practice

New Jersey Future in Transportation Program
New Jersey DOT
The New Jersey DOT (NJDOT) uses the Future in Transportation (FIT) program to target investments toward communities that work collaboratively with NJDOT and other State agencies on land use planning. FIT provides support for planning studies that address transportation and land use, as well as project implementation. The FIT program also supports policy changes, including topics such as: context-sensitive design, network connectivity, roadway design, and community involvement.

Contact: Assistant Commissioner, Capital Investment, Planning and Grant Administration, New Jersey DOT (609) 530-5228.

Oregon Integrated Investment Strategy
Oregon State agencies, including Oregon DOT
The State of Oregon uses an integrated investment strategy to ensure that State programs consistently support growth management objectives. The multi-disciplinary Economic Revitalization Team (ERT) includes staff from the following 10 state agencies: Business Development Department; Department of Transportation; Department of Land Conservation and Development; Department of Environmental Quality; Department of State Lands; Department of Agriculture; Housing and Community Services; Department of Energy; Water Resources; Consumer and Business Services. The ERT provides quick-response technical assistance to communities that have transportation-related land use issues. One important example was working with a major employer to stay downtown instead of moving to a greenfields location.

Contact: Lori Jones, Economic Revitalization Team (503) 378-5690.

Utah Smart Growth Planning Assistance and Funding Priority
Utah State agencies, including Utah DOT
The Utah Governor's Quality Growth Communities Program, established in 2004, offers planning assistance and funding priority to jurisdictions that enact "smart growth" measures. Cities, towns, counties, special districts, transit authorities and other service providers are eligible for the program. Four State agencies - the Departments of Transportation, Natural Resources, Community and Economic Development, and Environmental Quality - collaborate to develop priority funding programs. To be eligible, entities must apply for designation as a "Quality Growth Community" or a "Quality Growth Service Provider." To become certified, a community must be engaged in an enhanced community planning process, including working closely with neighboring communities on areas of common concern.

Contact: John Bennett, Governor's Office of Planning and Budget (801) 538-1027.

Maryland Priority Funding Areas
Maryland State agencies, including DOT
Since 1997 the Maryland Department of Transportation (MDOT) has used Priority Funding Areas to target transportation investments to areas that will best support economic development and new growth. Funding for projects in municipalities, other existing communities, industrial areas, and planned growth areas designated by counties receive priority for State funding over other projects. The criteria have led to multimodal improvements in urban areas and consideration of potential impacts of highway bypass projects on communities.
Contact: Don Halligan, MDOT Transportation & Land Use Planning (410) 865-1294.

Transit Corridor and Station Area Development Programs

Historic McKinney Avenue Trolley | Dallas Area Rapid Transit

State DOTs, MPOs, transit agencies, and cities can provide technical assistance, financial assistance, and outreach to promote transit oriented development along

key transit corridors and in station areas. Programs include elements such as grants, project selection criteria, and strategies for coordinating with developers to promote transit oriented development.

Examples in Practice

New Jersey Transit-Friendly Planning Assistance Program
New Jersey Transit
New Jersey Transit's Transit-Friendly Planning Assistance Program provides technical assistance to communities through on-call consultants with expertise in transportation planning, urban design, market analysis, economic development, downtown revitalization and community outreach. The program has supported development of several consensus-based, transit supportive land use "vision plans" that have been used to guide development at and around surrounding existing or proposed transit facilities. To learn more, visit the New Jersey Transit website and click on "Transit Friendly Land Use."

Contact: Vivian Baker, New Jersey Transit (973) 491-7822.

San Francisco Area System Expansion Planning Process
Bay Area Rapid Transit Authority, San Francisco, CA
In 2002, the Bay Area Rapid Transit Authority (BART) adopted a new system expansion planning process and policy that emphasizes cost-effectiveness, ridership generation, multi-modal access, transit-oriented development, local partnerships, and the use of appropriate transit technologies. The process requires that before BART will approve a system expansion, requesting municipalities must prepare a Ridership Development Plan that includes transit-supportive land use plans, zoning, infrastructure, and services. Jurisdictions not prepared to make the land use changes needed for a high project rating are encouraged to consider lower-cost transit alternatives. The cities of Antioch and Pittsburgh have both adopted Ridership Development Plans that function as comprehensive station area plans, analyzing land use and access to proposed station sites. The eBART project will provide a 10-mile system expansion into Contra Costa County, with stations in Antioch and Pittsburg.

Contact: Ellen Smith, BART (510) 287-4758.

Fort Worth Transit Corridor Urban Villages
City of Fort Worth (Texas)
The City of Fort Worth uses community-based plans, fiscal incentives, and targeted public investments to stimulate private investment and growth in 16 "urban villages" located around historically key intersections along bus corridors and, in some cases, adjacent to planned passenger rail stations. In each village, the city conducted a community-based charrette process to achieve consensus among local stakeholders regarding appropriate types of development. The city offers fiscal incentives to cover financing gaps for innovative and potentially profitable projects, which may be otherwise difficult to finance. In addition, the city requires developers applying for building permits and financial incentives to

meet specific design criteria. As a result, proposed projects better meet pedestrian-oriented, mixed-use, and higher-density urban infill goals. Through this program, over $19 million in public-sector infrastructure investment has directly leveraged $112 million in private development. But the impact of the urban village program has been far more extensive: the City of Fort Worth estimates that the total private investment in urban villages between 2001 and 2010 has been over $1 billion. In 2010, an additional $7.5 million in grant funds were awarded for streetscape and planning projects in urban villages and planned transit-oriented development sites in Fort Worth.

Contact: Eric Fladager, City of Fort Worth (817) 392-8011.

Parking Benefit Districts

The establishment of "parking benefit districts" can serve as a financing tool to support improvements in downtown areas. These districts often help reduce the need for surface parking lots and dampen local traffic congestion while funding local improvements. Within a parking benefit district, public parking spaces (both on and off-street) are charged an hourly rate designed to keep approximately 15 percent of parking spaces vacant at all times. Funds collected from parking charges go directly to improvements that make the district more attractive, such as sidewalks, landscaping, and other amenities or aesthetic improvements. In addition, traffic congestion in the district may be reduced by as much as 30 percent because downtown shoppers and employees will no longer need to circle block-after-block in search of vacant parking spaces. New parking meter technologies have improved customer convenience (customers can pay remotely by credit card or cell phone), increased pricing flexibility (rates can be changed in real-time based on location, time of day, day of week, or level of occupancy), reduced streetscape clutter, and reduced operating costs.

Examples in Practice

Washington D.C. Pilot Parking District
District of Columbia District Department of Transportation
In 2008, the District of Columbia's District Department of Transportation established a pilot parking district program to encourage alternative transportation, increase retail parking availability, reduce congestion and neighborhood spillover parking. The district includes performance based meter rates, which charge higher parking prices for peak periods, and variable parking fines. The variable rates are linked with peak shopping periods among the retail establishments in the area and special events. A portion of the revenue from the parking meters will be used for pedestrian, bicycle, and transit infrastructure improvements.

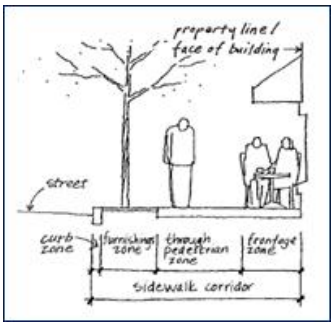
Contact: Terry Bellamy, DDOT at (202) 673-6813.

Austin Parking Benefit District
City of Austin
The City of Austin implemented a Parking Benefit District in 2006 along San

Antonio St, between MLK and West 26th Street, in the "West Campus" area. The district was created in conjunction with an approved zoning overlay for increased residential density. The revenue from the parking meters in the Parking Benefit District is accrued in a Capital Improvement Project (CIP) to fund pedestrian, bike, and transportation improvements in the neighborhood, such as improved sidewalks, curb ramps and street trees. These amenities will support the increased residential density and accommodate multimodal transportation. The parking meters, in addition to collecting revenue, also serve as a vehicle to promote alternative transportation. The meters have decal messages with information about alternative transportation in the area to increase awareness among new residents.

Contact: Katie Larsen, City of Austin (512) 974-6413.

Roadway Design Guidelines and Standards



Sidewalk design diagram | Portland, OR

Good transportation infrastructure design affects the safety, accessibility, and comfort of people using all modes of travel. Planners and designers can use design guidelines and standards to ensure transportation infrastructure is appropriate to the adjacent land use context, promote accessibility for all modes, improve aesthetic quality of neighborhoods, and create opportunities for environmental protection and conservation. Guidelines and standards can also create consistency in infrastructure and signage which help travelers navigate through neighborhoods.

Planners and designers should consider the existing and potential uses of streets, and the surrounding areas to ensure the transportation system meets the needs of all users and appropriately relates to adjacent land uses.

- **Access Management**
  - Martin County Roadway Design Ordinance
  - Vermont Access Management Program Guidelines
- **Complete Streets/Routine Accommodation**
  - Louisiana Complete Streets Policy
  - San Francisco Area Complete Streets Checklist
  - Kalamazoo Pedestrian Mall Conversion to Complete Street
- **Context Sensitive Design/Solutions**
  - Minnesota Context Sensitive Design Policy and Workshop
  - New Jersey Context Sensitive Design Policy
  - California Context Sensitive Solutions Program
  - Vermont State Highway Design Standards
- **Urban Freight Design Guidelines and Intermodal Centers**
  - Boston Restricted Downtown Core Delivery Hours
  - Chicago Area Intermodal Centers
  - Raritan Center Integrated Freight Village

- **Local Road Design Guidelines**
    - Denver Street Classification System
    - Charlotte Urban Street Design Guidelines
    - Kentucky Street Connectivity Zoning and Subdivision Model Ordinance
    - Fort Collins Street Pattern and Connectivity Standards
    - North Carolina Traditional Neighborhood Development Street Design Guidelines
    - Portland Safe and Healthy Streets Standards and Guidebooks
    - Charlottesville Area Design Manual for Small Towns
- **Pedestrian and Bicycle Facilities Design Guidelines/Programs**
    - Chicago Bike Lane Design Guide
    - Florida Walkable Communities Guidebook
    - Washington State Pedestrian Facilities Guidebook
    - Wilmington Area Mobility Friendly Design Standards Program
- **Road Diets**
    - St. Paul Road Diet with Bicycle and Pedestrian Improvements
    - Stoneway Road Diet
- **Road Swaps and Transfers**
    - Montrose Main Street and San Juan Avenue Road Swap
    - Beacon Falls Transfer from State to Local Ownership to Improve Downtown Streetscape
    - Delray Beach Downtown Bypass System
    - Chattanooga Alternative State Highway Route

Comment [DD4]: Target links

Access Management

Access Management diagram | VTrans

State and local agencies can improve traffic flow and safety by controlling access to properties along major roadways. Access management principles include restricting uncontrolled driveway access onto major arterials, restricting left

turns, providing internal connectivity among properties, and providing adequate length on connecting streets to avoid traffic conflicts. Different levels of access management can be applied based on street classifications and/or area land use designations, to ensure that the principles applied are both consistent with the function of the transportation facility and respect the character of the land uses and neighborhood served.

Examples in Practice

Martin County Roadway Design Ordinance
Martin County, FL
Martin County, Florida's Roadway Design Ordinance (no. 561) includes a section on access management addressing the access classification of the roadway and related intersection spacing standards, corner clearance, access among properties, driveway spacing and design, and overlay zones. The ordinance also includes sections on mobility and connectivity, with the intent of discouraging the use of local streets for cut-through traffic while maintaining the overall connectivity of the roadway system for vehicle traffic, bicyclists, and pedestrians.

Contact: Sandy Harkey, Martin County, Growth Management Department (772) 288-5950

Vermont Access Management Program Guidelines
VTrans (Vermont DOT)
The Vermont Agency of Transportation (VTrans) first published Access Management Program Guidelines in 1999. In 2004 and 2005, VTrans updated these guidelines, undertook a significant outreach program, and developed a comprehensive web site; as a result, the agency notes significant interest from developers, consultants, and municipalities. The guidelines establish a six-level access classification system and associated standards in order to ensure consistency in the access permitting process for the State Highway System. Standards cover criteria for granting direct access and for allowing right and left turns, spacing of access points that are or may become signalized, and separation of opposing traffic movements. Criteria for granting access permits include consistency with state land use goals, state agency plans, and regional and local land use plans.

Contact: Susan Clark, VTrans(802)828-2485.

Resources

- The Transportation Research Board's Access Management web site contains numerous resources on access management, including an introduction to access management principles, guides and handbooks, research on benefits and impacts, and model codes and ordinances developed by state and local agencies.

- National Cooperative Highway Research Program (NCHRP) Report 548: A Guidebook for Including Access Management in Transportation Planning offers guidance for implementing access management through the transportation planning process.

- FHWA Office of Operations - Office of Travel Management provides information and resources about Access Management.

Complete Streets/Routine Accommodation

Complete Street | Pednet.org

Complete Streets (also known as Routine Accommodation) is an approach to transportation planning and design that considers all transportation users (bicyclists, pedestrians, transit vehicles, motor vehicles, etc.) in every stage of project development. Rather than a design prescription or, Complete Streets policies change practice. They direct planners and engineers to consider all anticipated users of the right-of-way during every day decision-making. Complete Streets are closely connect with Context Sensitive Design/Solutions (see the Context Sensitive Design/Solutions section below).

Comment [DD5]: Target link

To date, more than 25 states (and Puerto Rico and the District of Columbia) and over 600 regional and local jurisdictions have adopted Complete Streets policies. In many cases, public health organizations and departments supported these policies, which can improve the health and safety of a community by encouraging active transportation, reducing emissions from automobile traffic, and reducing injuries and fatalities from collisions.

Examples in Practice

Louisiana Complete Streets Policy
Louisiana Department of Transportation
In 2010, Louisiana Department of Transportation and Development (LaDOTD) adopted a Complete Streets policy .The policy requires consideration of all modal users when developing projects using state or Federal funding, with the exception of interstate highways. Specifically, the policy goal is to "create a comprehensive, integrated, connected transportation network for Louisiana that balances access, mobility, health and safety needs of motorists,

transit users, bicyclists, and pedestrians of all ages and abilities, which includes users of wheelchairs and mobility aides." The policy was developed as a safety measure in response to a fatal collision between a cyclist and an automobile. LA42, a street widening project in development since the passage of the policy, will include a sidewalk along one side of the street, and a multi-use path along the other side of the street to ensure non-motorized access.

Contact: Brian Parsons, LaDOTD(225) 379-1954

San Francisco Area Complete Streets Checklist
Metropolitan Planning Commission (San Francisco, CA MPO)
In 2006, The Metropolitan Planning Commission (MTC) developed a Complete Streets Checklist to promote the routine accommodation of nonmotorized travelers in project planning and design. Partner agencies are required to complete this checklist, and submit to local Bicycle and Pedestrian Advisory Committees prior to submitting projects to MTC for funding. The checklist is a one page online form, which clearly identifies the complete streets amenities of each proposed project. It is meant to be used in the early stages of project development.

Contact: Doug Kimsey, MTC (510) 817.5790

Burdick Street, Kalamazoo, MI | Google Maps

Kalamazoo Pedestrian Mall Conversion to Complete Street
Kalamazoo City / Downtown Kalamazoo Incorporated
Pedestrian-only streets can foster safe and enjoyable transportation options; however, they are not appropriate in all contexts. Kalamazoo's Burdick Street in downtown Kalamazoo was developed as a pedestrian-only street in 1959. In the 1990s, pedestrian traffic in the area declined, and local businesses began to suffer. The downtown development agency, Downtown Kalamazoo Incorporated, worked with the City of Kalamazoo to develop a plan to convert two blocks of the pedestrian-only street to a one-way street with parking, landscaping, and pedestrian amenities. The speed limit on these blocks is 15 miles per hour, to ensure a safe and comfortable environment for pedestrians. For streets with low levels of activity, introducing automobile traffic can sometimes improve the perception of safety for pedestrians and bolster overall use of the street. Since the project was completed in 1998, the area has been redeveloped, with 90

percent occupancy in retail establishments, and 98 percent occupancy in residential buildings.

Contact: Steve Deisler, Downtown Kalamazoo Incorporated (269) 344-0795

Resources

- *Complete Streets Coalition:* http://www.completestreets.org/
- *Complete Streets Model Ordinances:* http://www.completestreets.org/changing-policy/model-policy/state-legislation-options/
- *National Policy & Legal Analysis Network (NPLAN) Complete Streets Model Ordinance:* http://changelabsolutions.org/publications/comp-plan-language-cs
- *Sacramento Area Council of Governments Complete Streets Toolkit:* http://www.sacog.org/complete-streets/toolkit/START.html

Context Sensitive Design/Solutions

Intersection with bulb-out | Claremont CA

Context Sensitive Design and Context Sensitive Solutions (CSD/CSS) are planning and stakeholder engagement approaches for transportation projects and facility design. CSD/CSS emphasizes that a transportation facility should fit its setting and preserve and enhance scenic, aesthetic, historic, community, and environmental resources, ensuring that they are compatible with a particular community land use pattern and urban or rural environment. CSD/CSS offers many strategies and tools for understanding a street or road's context holistically, which can assist in implementing Complete Streets policies (see the Complete Streets/Routine Accommodation section above).

Comment [DD6]: Target link

Examples in Practice

Minnesota Context Sensitive Design Policy and Workshop
Minnesota DOT
The Minnesota DOT (MnDOT) has adopted a policy on context sensitive design (CSD) and has sponsored workshops for engineers, managers, planners,

landscape architects and other local government professionals who are involved in transportation project development. The Workshop Participant Manual includes case studies of CSD.

Contact: Scott Bradley, MnDOT (651) 366-3302.

New Jersey Context Sensitive Design Policy
New Jersey DOT
The New Jersey DOT (NJDOT) uses context sensitive design (CSD) principles in many NJDOT policies and procedures associated with the project delivery process, and in the long range transportation plan, Transportation Choices 2030. CSD principles are featured in the environmental and linking land use to transportation sections.

Contact: Danielle Graves, NJDOT (609) 530-2733.

California Context Sensitive Solutions Program
Caltrans (California DOT)
In 2001, the California Department of Transportation (Caltrans) implemented an official Context Sensitive Solutions (CSS) Director's Policy. Since then, Caltrans has consistently promoted the use of partnerships in transportation decision-making through a wide range of activities. This includes a CSS Implementation Plan, a permanent module at the ongoing Division of Design's Project Engineer week-long Academy and ongoing CSS training and workshop deliveries to state and local agency partner staff statewide. Other CSS implementation activities have included:

- highway design manual philosophy statement and a project development procedures manual philosophy statement reflecting CSS
- a stakeholder involvement communication handbook for project managers
- handbook for externals explaining how Caltrans builds projects
- several best practices public participation guides
- booklet on livability concepts for planning, design and operations of main streets
- CSS website that includes project case studies

Contact: Carolyn Dudley, Caltrans (916) 654-5505

Vermont State Highway Design Standards
Vermont DOT
In 1997, the Vermont Agency of Transportation (VTrans) adopted a set of revised State highway design standards. The standards were designed to be flexible, and to allow and encourage creative methods to minimize impacts on scenic, historic, archaeological, environmental and other important resources. Contextual and situational issues for each project are identified early in the design process, before geometric values are selected. VTrans applies the flexibility in its standards to reduce the community impacts of improvements to

National Highway System roads through small towns. A key to Vermont's success in implementing these standards was their adoption into law by the State.

Contact: Craig Keller, VTrans (802) 828-2485.

References

- The FHWA Context Sensitive Solutions (CSS) website is a good starting point for general CSS information.

  Context Sensitive Solutions in Designing Major Urban Thoroughfares for Walkable Communities - an Institute of Transportation Engineers (ITE) Proposed Recommended Practice developed in association with the Congress for the New Urbanism (CNU) to advance the successful use of context sensitive solutions (CSS) in the planning and design of major urban thoroughfares for walkable communities.

- Maryland State Highway Administration (revised 2003). *When Main Street is a State Highway: Blending Beauty, Function, and Identity*. This document discusses not only design principles, but also a community-based planning and project development process to integrate land use, transportation, and economic development. The Main Street process has been applied in over 120 roadway projects.

- The National Transit Institute offers a three-day course for transportation professionals and others entitled *Context Sensitive Solutions in a Multi-Modal Environment.*

Urban Freight Design Guidelines and Intermodal Centers

Raritan Center | Google Maps

Freight transportation has specific design needs, such as truck turning radii and areas for loading and unloading. To accommodate goods movement,

policymakers can implement design guidelines and delivery ordinances to ensure freight traffic operates in harmony with other urban traffic and activities. Intermodal freight centers (sometimes called freight villages) are another solution to manage goods movement. These centers are a mechanism for coordinating complimentary uses related to freight, which may otherwise be in conflict with other uses, and they contain distribution centers and support amenities such as hotels, office space and restaurants.

Intermodal freight centers can be developed in undeveloped brownfields or existing industrial areas, helping reduce truck vehicle miles traveled due to the close geographic proximity of different supply chain components (intermodal terminals, distribution centers, etc.). They can accommodate multi-modal freight integration by linking distribution and shipping centers to airports, ferry terminals, and highways. By consolidating freight-related activities, impacts to residential or commercial areas can be minimized. These centers are credited with capturing the economic potential of freight traffic and create employment opportunities and "spin-off" economic activity generated by the supporting land uses, such as banks and restaurants.

Examples in Practice

Boston Restricted Downtown Core Delivery Hours
Boston, MA
The City of Boston offers an example of a management policy that can reduce congestion and limit competition between trucks and automobiles for curb space. Boston prohibits commercial vehicles from using certain downtown streets within the Downtown Crossing area (a high business and commercial area) between 11:00am and 6:00pm. This helps to reduce congestion during the evening peak period of 3:00pm-6:00pm. Exceptions are made for trucks with time-sensitive cargoes, including trucks from Brinks, FedEx, and the U.S. Postal Service.

Contact: Rosemarie Sansone, Downtown Boston Business Improvement District, (617) 482-4312.

Chicago Area Intermodal Centers
Elwood / Joliet, IL
CenterPoint Intermodal Centers in Joliet and Elwood, IL, include warehouses, distribution centers, and container storage, partially developed on a brownfield site. When the centers were developed, CenterPoint donated several areas around the borders of the center to the U.S. Forest Service and local communities to serve as a buffer from the freight traffic in the site. The centers are near major highways leading to Chicago and intersect with the Union Pacific and BNSF railroads. CenterPoint worked closely with the local communities to ensure the intermodal centers would be acceptable with nearby land uses.

Contact: CenterPoint Properties (630) 586-8000.

Raritan Center Integrated Freight Village
Edison, NJ
Raritan Center, NJ, is an example of an industrial complex that has evolved into a Community Integrated Freight Village (CIFV) - a freight hub with an emphasis on community-oriented commercial activities. Trucks have convenient access to Interstate 95, a nationally-important truck corridor, helping to reduce truck volumes on most roadways near the site. Rail traffic in Raritan Center has grown dramatically over the past several decades, from 700 cars per year in 1964, when the center was established, to about 5,000 cars per year in 2007. There are several rail and marine-based initiatives underway to continue growth, including a plan to rehabilitate an existing waterfront terminal to create "Port Raritan." The Port Raritan project would include an ethanol barge/ship-to-rail transfer facility, thus expanding the multimodal opportunities and the center's economic benefits to the area. The complex has a variety of commercial facilities, such as retail shops, restaurants, cafes, and non-freight office buildings used by local businesses. The variety of activities help make Raritan Center a valuable economic contributor to adjacent towns, while helping to buffer the industrial center from residential areas, thereby mitigating the impact of industry and shipping on residents.

Contact: Chip Millard, FHWA Office of Freight Management and Operations (202)366-0408.

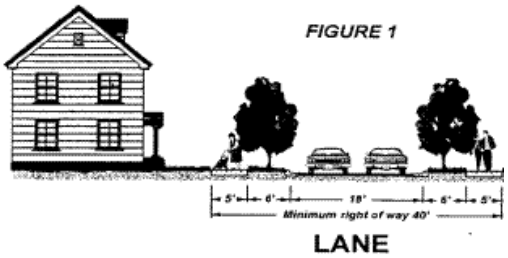
References

- *NCFRP Report: Guide for Understanding Urban Goods Movement:* http://www.trb.org/Main/Blurbs/166828.aspx

- *FHWA Talking Freight Seminar Series:* http://www.fhwa.dot.gov/planning/freight_planning/talking_freight

- *Freight and Livability Presentation:* http://www.ltrc.lsu.edu/ltc_11/pdf/Freight%20and%20Livability%20-%20Sustainability%20Connections.pdf

Local Road Design Guidelines



Context sensitive DOT design Guideline for residential streets | North Carolina DOT

Guidelines or standards developed for local streets can promote safe, walkable, human-scaled communities by specifying widths, street geometry and connectivity, utility placement, and provision of bicycle and pedestrian facilities. Through the Regional Transportation Plan, MPOs can work with member jurisdictions and State agencies to establish road network and facility design policies that support regional and local land use objectives, and to fund projects consistent with these design policies.

Examples in Practice

Denver Street Classification System
City of Denver, CO
In the City of Denver, a street classification system considers multiple modes and surrounding land uses. Multimodal streets are "zoned" as residential streets, main streets, mixed-use streets, commercial streets, industrial streets, landmark streets, and one-way couplets. For more information, see FHWA's case study on Denver, Colorado's Street Classification System.

Contact: Janice Finch Denver Department of Public Works (720) 865-3163

Charlotte Urban Street Design Guidelines
City of Charlotte, NC
The Charlotte Department of Transportation has revised its Urban Street Design Guidelines to support new development and redevelopment goals for the city. The guidelines apply to new construction or reconstruction of major streets as well as local streets (including streets in new subdivisions). They are designed to better match the transportation network to the land uses that lie along the network. Major street typologies include Main Street, Avenue, Boulevard, and Parkway, reflecting various levels of automobile versus pedestrian design priority. The guidelines allow the city to design streets and promote street connectivity appropriate to different types of neighborhoods, including traditional downtowns, transit-oriented developments, urban residential, and mixed-use, and suburban areas. The guidelines are already being applied in locations such as existing and proposed transit stations along the South Corridor light rail corridor.

Contact: Norm Steinman, City of Charlotte (704) 336-3939 or Tracy Newsome, City of Charlotte (704) 353-0778.

Kentucky Street Connectivity Zoning and Subdivision Model Ordinance
Kentucky Transportation Cabinet
In 2009, the Kentucky Transportation Cabinet developed a Street Connectivity Zoning and Subdivision Model Ordinance to help municipalities and Area Development Districts (regional planning organizations) increase street connectivity in new subdivisions or in redevelopment areas. Subdivisions and redevelopments in Kentucky built with limited street connectivity were increasing the average daily trips on Kentucky highways and reducing the ability of residents to make short trips easily by car, walking, or biking. The cabinet has held meetings with Area Development Districts, the FHWA Division office, and local

government planners to raise awareness of the benefits of street connectivity and promote the use of the model ordinance, which can be used directly as written, or tailored to fit the unique needs of a community. Since its development, many local governments have expressed interest in the ordinance. The model ordinance is available on the Kentucky Congestion Toolkit, along with other congestion management tools.

Contact: Brent Sweger, Kentucky Transportation Cabinet (502) 564-3280.

Fort Collins Street Pattern and Connectivity Standards
Fort Collins, CO

Zoning ordinances in Fort Collins, Colorado require that the street configuration associated with each parcel within a new development contribute to connectivity with the rest of the neighborhood and surrounding area. These street pattern and connectivity standards limit the maximum space between connector streets to 660 feet, requiring that local streets connect with arterials at least every ¼ mile, requiring multiple non-arterial access points to the development, and prohibiting the development of gated entryways. This promotes shorter trip making and nonmotorized trips in particular. Exceptions to these regulations may be made in the case of existing development and geographical features, where alternative designs that achieve similar connectivity levels are also considered.

Contact: Peter Barnes, City of Fort Collins

North Carolina Traditional Neighborhood Development Street Design Guidelines
North Carolina DOT
In 2000, the North Carolina Department of Transportation (NCDOT) developed Traditional Neighborhood Development Street Design Guidelines. These guidelines are a tool for NCDOT staff for reviewing proposed Traditional Neighborhood Developments (TNDs). They supercede existing standards for subdivision roads for these types of developments. The guidelines include review criteria for NCDOT district engineers that address not only the design of the roadway itself, but also street network connectivity, pedestrian accommodations, interface with State highways, and the orientation of buildings.

Contact: J. Kevin Lacy, P.E., NCDOT (919) 707-2250.

Portland Safe and Healthy Streets Standards and Guidebooks
Metro (Portland area, OR MPO)
The Portland Metro guidebook, "Tools for designing safe and healthy streets," includes street spacing standards that support the Region 2040 Growth Concept. The standards rely on provision of a well-connected local street network to support regional growth and land use objectives of ensuring that centers and neighborhoods are walkable and pedestrian-friendly. The plan also includes

design guidelines for arterial and collector streets to improve access and safety for pedestrians, bicyclists and transit users. A hierarchy of streets is defined, including throughways, boulevards, streets, and roads, with different modal and functional service objectives, and typical cross-sections are provided for each type of street. Metro's Livable Streets Program has produced three handbooks that provide additional guidance for implementing these regional policies. All the handbooks include detailed illustrations and photographs of street designs that successfully integrate streets with nearby land uses to enhance safety and promote community livability. One handbook addresses innovative storm water management strategies.

Contact: Kim Ellis, Metro (503) 797-1617.

Charlottesville Area Design Manual for Small Towns
Thomas Jefferson District Planning Commission (Charlottesville, VA RPC)
In 2004, the Thomas Jefferson District Planning Commission (TJPDC), with support from the Virginia DOT, published a the Design Manual for Small Towns: Transportation and Land Use Strategies for Preserving Small Town Character. The manual is intended for small towns and city neighborhoods coping with traffic problems such as congestion, pedestrian and bicycle safety, speeding traffic, through truck traffic, street noise, and inadequate parking. It is written in a problem-solution format and includes land use as well as engineering and design solutions.

Contact: Bill Wanner, TJPDC (434) 979-7310.

Resources

- *Model Design Manual for Living Streets*. 2011. Los Angeles County. Cities may use this manual to update current practices to balance street design that accommodates cars while ensuring that pedestrians, cyclists and transit users can travel safely and comfortably.

- *Livability in Transportation Guidebook*, FHWA 2010. http://www.fhwa.dot.gov/livability/case_studies/guidebook/

- *Neighborhood Street Design Guidelines: An ITE Proposed Recommended Practice.* Institute of Transportation Engineers, 2003. This document provides guidance in the overall layout and design of transportation elements for new neighborhood developments, where neighborhoods can comprise both residential and mixed residential/commercial subdivision development.

- Burden, Daniel. *Street Design Guidelines for Healthy Neighborhoods.* Local Government Commission, 1999. This 52 page guidebook helps communities implement designs for streets that are safe, efficient and aesthetically pleasing for both people and cars.

Pedestrian and Bicycle Facilities Design Guidelines

Street with bike and pedestrian facilities | Reed Huegerich

State DOTs and MPOs provide technical assistance to county and city governments to develop and implement pedestrian and bicycle facility improvement plans. This assistance can include guidelines, strategies, or primers on land use and site design to support pedestrian, bicycle, and transit access, especially in denser urban environments. In 2010, the USDOT signed a Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations, which notes that all transportation agencies have the responsibility to improve conditions and opportunities for walking and bicycling and to integrate walking and bicycling into their transportation systems.

Examples in Practice

Chicago Bike Lane Design Guide
City of Chicago, IL
The City of Chicago's Bike Lane Design Guide describes design guidelines for bicycle lanes and pavement markings appropriate for different types of streets and neighborhood contexts. The city is working to apply these design guidelines on streets throughout the city as part of the implementation of its overall bicycle program.

Contact: David B. Gleason, City of Chicago (312) 744-3160.

Florida Walkable Communities Guidebook
Florida DOT
Florida DOT's publication, "Walkable Communities: Twelve Steps for an Effective Program" summarizes key planning, zoning, engineering, and development strategies that can make communities more walkable. The document addresses walkway networks, pedestrian crossings, access management, auto- and parking-restricted zones, and walkable scale land use planning.

Contact: Dwight Kingsbury, FDOT (850) 245-1520.

Washington State Pedestrian Facilities Guidebook
Washington State DOT
The Washington State DOT (WSDOT) developed a Pedestrian Facilities Guidebook that provides guidance for State and local staff on designing facilities for pedestrians. The guidebook includes a chapter on site design to support pedestrian travel.

Contact: Paula Reeves, WSDOT (360)705-7258.

Wilmington Area Mobility Friendly Street Design Standards
Wilmington Area Planning Council (Wilmington, DE area, MPO)
The Wilmington Area Planning Council (WILMAPCO) helps local agencies make changes to comprehensive plans to include "mobility-friendly street design standards" as an option for developers in new development. Such standards promote greater use of transportation facilities and service by bicyclists and pedestrians. They include, but are not limited to, the addition of sidewalks, and landscaped areas, narrower pavement widths, and requirements for greater street connectivity. Alternative design standards have been adopted in Cecil County, Middletown, and Chesapeake City.

Contact: Heather Dunigan, WILMAPCO (302) 737-6205.

Resources

- 2012 Integration of Bicycling and Walking Facilities into the Infrastructure of Urban Communities Best Practices Report.

- The Pedestrian and Bicycle Information Center contains numerous references on planning techniques, including land use strategies, to accommodate bicycle and pedestrian travel.

- The National Center for Bicycling and Walking includes bicycle and pedestrian facility guidelines and other resources.

Road Diets

Configuration Post-Road Diet | FHWA

A road diet is a low-cost strategy to improve the efficiency of an existing road or street and improve bicycle and pedestrian access, or to update the design of a road which over time has become inconsistent with local travel needs. Common road diets reduce four lanes of traffic to three lanes of traffic, often adding bicycle lanes or median crossings. The three lanes of traffic include one lane in each direction, and a central lane for turning. Planners can use road markings or medians as a traffic calming device and to keep automobiles out of the middle lane until they approach an intersection. After a road diet, travel speeds can be reduced by about 5-10 miles per hour, and crash rates can be reduced by 10-35 percent.

Examples in Practice

St. Paul Road Diet with Bicycle and Pedestrian Improvements
City of St. Paul, MN
In 2010, the City of St. Paul reconfigured the 4-lane Como Avenue to a 3-lane street with bike lanes. The city reduced the travel and parking lane widths from 15' and 8' unmarked respectively to 10' travel lanes and 7' parking lanes to include 5' bike lanes. The project included several curb extensions, and pedestrian countdown timers at four signalized intersections, and cost $50,000 to implement. Since the completion of the project, bicycling activity has increased by 76 percent. The city is continuing to monitor additional travel behavior changes to the street.

Contact: Transit for Livable Communities|Bike Walk Twin Cities (651) 789-1404.

Stoneway Road Diet
City of Seattle Department of Transportation
As of 2010, Seattle DOT (SDOT) has implemented 24 road diets identified in the 2007 Bike and Pedestrian Plan. In 2010, the City published a report documenting the results of a road diet: Stone Way North, between 34th and 50th streets. The street, located in a mixed use neighborhood, with several local schools, saw a reduction in speed, collisions (including an 80 percent

reduction in pedestrian collisions), and an increase in bicycle traffic. Traffic on parallel streets did not increase and peak hour capacity was maintained, suggesting that local traffic was not simply diverted to nearby streets.
Contact: SDOT (206) 684- 7623.

Resources

- FHWA Publication on Road Diets: http://www.fhwa.dot.gov/publications/publicroads/11septoct/05.cfm

- FHWA Summary Report on Road Diets: http://www.fhwa.dot.gov/publications/research/safety/humanfac/04082/index.cfm

- Road Diet Handbook http://www.oregonite.org/2007D6/paper_review/D4_201_Rosales_paper.pdf

Road Swaps and Transfers

Riverfront Parkway Reconstruction | FHWA

When a State highway also serves as the main street of a traditional downtown, State agency design requirements or needs related to through traffic movement may conflict with local economic development objectives that require calming traffic and creating a more pedestrian-friendly environment. Rather than expanding capacity on downtown arterials, State and local agencies have worked to identify alternative through routes for traffic, and in some cases have transferred or swapped jurisdiction to allow both local and State objectives to be achieved.

Examples in Practice

Montrose Main Street and San Juan Avenue Road Swap
City of Montrose and Colorado DOT
In 2010, the City of Montrose, CO, and the Colorado DOT (CDOT) completed a jurisdictional swap of Main Street and San Juan Avenue. Main Street (U.S. 50), formerly owned by CDOT runs through the center of downtown Montrose, and

San Juan Avenue runs around the perimeter of the city. The move will realign U.S. 50 from Main Street to San Juan Avenue. The move allows Montrose to manage any redevelopment of Main Street, including improvements for bicyclists and pedestrians, as well as other street amenities, which are easier for a municipality to manage than a State DOT. CDOT will be able to more effectively maintain San Juan Avenue, especially during the winter months, when snowplowing is necessary.

Contact: Mark Rogers, CDOT (970) 683-6252.

Beacon Falls Transfer from State to Local Ownership to Improve Downtown Streetscape
City of Beacon Falls and Connecticut DOT
As a key component in a downtown redevelopment plan, the Town of Beacon Falls, Connecticut is taking ownership of its Main Street from the Connecticut DOT (ConnDOT). The transfer of ownership will allow the town to make improvements that the State cannot, such as to install park benches and trees along the right-of-way, in conjunction with the reconstruction and narrowing Main Street from four lanes to two lanes. This reduction in the number of lanes is possible because a freeway bypass of the town was completed in 1983, greatly reducing traffic through the town.

Contact: Roxane Fromson, ConnDOT (860) 594-2038.

Delray Beach Downtown Bypass System
City of Delray Beach and Florida DOT
The City of Delray Beach has demonstrated its commitment to revitalization by simultaneously slowing traffic in key corridors and restoring aging and abandoned buildings within the heart of its downtown. In the early 1980s, the Florida DOT (FDOT) proposed the creation of a hurricane evacuation route on Atlantic Avenue, which would have resulted in a major highway running through the downtown. Delray Beach planning staff worked with FDOT to find an alternative to FDOT's proposal, and the city agreed to create a downtown bypass system by using two local streets that run parallel to Atlantic Avenue. The city also agreed to assume all maintenance responsibilities for Atlantic Avenue. Under the control of the city, the six-block stretch of Atlantic Avenue has been transformed into a pedestrian-friendly corridor lined with vibrant outdoor cafes, shops, and other smaller-scale businesses. See: *FHWA Land Use and Transportation Planning Coordination Domestic Scan Tour II, November 3-7, 2003, (PDF, 276KB).*

Contact: Ron Hoggard, City of Delray Beach (561) 243-7040.

Chattanooga Alternative State Highway Route
City of Chattanooga and Tennessee DOT
In the mid 1980s, the City of Chattanooga made a commitment to reconnect its downtown to the Tennessee River as the keystone of its revitalization efforts. A crucial element of the city's plans has been the reconfiguration of the 7.2 mile, four-lane, limited-access Riverfront Parkway that separates downtown from the

river. The parkway is being reduced from four lanes to two lanes to slow traffic, making it more pedestrian friendly and increasing accessibility to the waterfront. The city worked with the Tennessee DOT to identify an alternate State route that bypasses downtown Chattanooga and connects to I-70, and can be used by freight carriers and other through traffic. In 2004, the Riverfront Parkway alignment and narrowing was complete, with new intersections, two lanes of travel, on-street parking, new attractive sidewalks, newly planted oak trees and state-of-the art lighting along the corridor. See: *FHWA Land Use and Transportation Planning Coordination Domestic Scan Tour II, November 3-7, 2003, (PDF, 276KB).*

Contact: City of Chattanooga Public Works (423) 643-5800.

Public Involvement

Transportation and land use planning decisions are complex and typically involve balancing the interests of multiple constituencies, while supporting underlying goals such as safety, mobility and environmental conservation. Public involvement techniques can help the public and elected officials understand implications of planning decisions and make informed choices. Public involvement tools can also allow planners to more accurately understand community preferences. Planning agencies can use public involvement techniques specifically focused on land use and transportation linkages, such as scenario development games, interactive maps, and animation visualizations.

- **Community Outreach Toolkits and Facilitation Tools**
  - Mobile GIS for Built Environment Audits
  - Virginia Transportation and Housing Alliance Toolkit
  - Brainstorm Anywhere Tool
  - Creating Quality Places Guidebook
  - "How to Link Land Use and Transportation Planning" Publication
- **Community Visioning Workshops and Charrettes**
  - Charlottesville Area UnJAM 2025 and KidJAM Public Workshops
  - Treasure Coast Planning Charrette for a Regional Master Plan
  - Honolulu Livable Communities Visioning Project
- **Visualization and Simulation Techniques**
  - Visualization of the Cuba Le Cueva Project in New Mexico
  - Still and Animated Visualization of Light Rail in Lakewood, Colorado
  - Casewise Visual Evaluation for Transit Oriented Development

Comment [DD7]: Target links

Information on public involvement in scenario planning exercises can be found in the Visioning and Scenario Planning section of this Toolkit. In addition to this Toolkit, the FHWA has a website focused on public involvement for planners.

Comment [DD8]: Link to Regional Visioning and Scenario planning section

Community Workshop in Burtonville, CA | Flickr user Thisisbossi

Community Outreach Toolkits and Facilitation Tools

Planning agencies can develop and distribute toolkits and other information packages to provide information regarding integrating land use and transportation to elected officials, partners, businesses, and community members. These resources raise the awareness of the connections between and decisions regarding land use and transportation planning.

Mobile GIS | University of Oregon

Examples in Practice

Mobile GIS for Built Environment Audits
Oregon Transportation Research and Education Consortium
The Oregon Transportation Research and Education Consortium (OTREC) and the National Center for Biking and Walking (NCBW), and a team of faculty, students and associates developed GIS based software for handheld devices including smart phones, to be used by the general public to assist with mapping the characteristics of a neighborhood's streets, sidewalks, and intersections. Community groups, neighborhood residents, planning teams, or other interested

community members enter observed characteristics into their program, which is linked to a central mapping file. The central file collects all the audit notes by participants to show neighborhood assessments. By enabling citizens to participate in collecting data directly from the field, the "participatory GIS" method engages community members and raises awareness of conditions in the built environment that contribute to biking and walking safety. While the software is an excellent tool to encourage community participation and data collection, it is most useful when used in conjunction with facilitated discussions with community members about their findings. Middle school students in Oregon used the tool in collaboration with University of Oregon faculty to test the tool and to map barriers to walking to school to better understand why many students chose not to walk to school. The research team is also working to update the software to be compatible with smart phones. A report on the tool can be found here:http://pages.uoregon.edu/schlossb/articles/schlossberg_GIS_audits.pdf.

Contact: Marc Schlossberg, PhD, Professor, University of Oregon. (541) 346-2046.

Virginia Transportation and Housing Alliance Toolkit
Thomas Jefferson Planning District Commission (Charlottesville, VA MPO)
The Thomas Jefferson Planning District Commission (TJPDC) developed a Toolkit for planners, which includes information and a checklist to assess housing and transportation needs, project future needs, and identify overlapping issues and opportunities. It is meant to support planning for a variety of community needs, including those of people who face barriers to attending public meetings, including disability and age. The checklist is an Excel tool which helps planners assess the study area through multiple criteria to evaluate the transportation systems and housing stock. One example is a series of questions with a scoring range regarding accessibility for people with disabilities. It includes detailed questions about sidewalk widths and availability of curb cuts, with photo examples and points to be awarded based on the quality of the facilities.

Contact: TJPDC (434) 979-7310

Brainstorm Anywhere Tool
PlaceMatters
Brainstorm Anywhere is a public participation tool developed by PlaceMatters. It is a cloud-based polling tool that facilitators can use to gather and organize public opinions, poll their constituents, and prioritize ideas. An important feature of the tool is that public brainstorming can be conducted and recorded by multiple groups in different locations, allowing real time sharing of ideas. The application can be used with other scenario planning tools as a first step to identify transportation and land use needs and priorities. The City of Albany used this tool in a scenario planning exercise for the 2030 Comprehensive Plan. The tool was used for collecting ideas in small breakout groups during a public charrette, and subsequently used by the entire meeting to prioritize the ideas that came out of the small groups.

Contact: PlaceMatters (303) 964-0903

Creating Quality Places Guidebook
Mid America Regional Council (Kansas City area, MO MPO)
The Mid-America Regional Council's (MARC) Creating Quality Places online guidebook includes case studies and tools illustrating development practices that support improved livability and reduced vehicle-travel. Over 1,900 CDs containing the guidebook were distributed to local government officials, developers and builders, engineers and architects, civic leaders and others in the Kansas City region. The second phases identified tools to facilitate implementation of the twenty principles. Other efforts include a Small Cities Toolkit to help smaller communities manage development issues, and a First Suburbs Coalition, involving 19 post-World War II cities, to focus on residential reinvestment, commercial development, and infrastructure maintenance and improvement. MARC has worked with homebuilders and remodeling industry associations in these efforts and notes that its outreach work has influenced redevelopment projects in several suburbs close to the central city, including Raytown and Gladstone.

Contact: Marlene Nagel, MARC (816)474-424) or Dean Katerndahl, MARC (816)474-4240.

"How to Link Land Use and Transportation Planning" Publication
Stratford Regional Planning Commission (Dover area, NH RPC)
The Strafford Regional Planning Commission in Dover, NH published a briefing titled "How to Link Land Use and Transportation Planning." The briefing provides an overview of land use-transportation relationships and describes basic techniques such as nodal development, walkable communities, access management, master planning, site/subdivision review, and driveway placement. The briefing has been distributed to over 2,000 elected officials, planning board members, conservation commissions, and other interested persons in the region. The SRPC reports receiving considerable positive feedback on the briefing and that it is serving as a background for local governments to address issues such as access management along State Route 11.

Contact: Cynthia Copeland, SRPC (603) 742-2523.

Visioning Workshops and Charrettes

Charrette in Biloxi, MS | Knight Foundation.

Transportation agencies frequently host interactive public workshops, in which community members collaboratively identify community objectives, desired outcomes, specific problem areas and solutions.

More intensive than a workshop, a charrette is a concentrated, multi-day series of creative sessions in which a team of planners focuses on specific design problems with citizens and presents plans and design ideas to the group. These more specific ideas can help planners focus on priority projects in the planning process. While workshops tend to focus more on smaller scale projects with general ideas and recommendations, longer charrettes allow planners and community members to look at bigger picture items or look more closely at planning details.

Workshops and charrettes have been successfully applied to develop plans covering transportation, land use, and other issues for communities, specific neighborhoods, transportation corridors, and transit-oriented development sites.

Examples in Practice

Charlottesville Area UnJAM 2025 and KidJAM Workshops
Thomas Jefferson Planning District Commission (Charlottesville MPO)

Children participating in KidJam | Thomas Jefferson Planning District Commission

The Thomas Jefferson Planning District Commission (TJPDC) conducted a public involvement campaign as part of its planning process to develop UnJAM, the area's long range transportation plan. UnJAM, the United Jefferson Area Mobility Plan, is the long range transportation plan for the Charlottesville-Albemarle Metropolitan Planning Area (MPO). In 2004, the Thomas Jefferson Planning District Commission and the MPO Policy Board adopted UnJAM 2025. The Plan captured local visions for land use and transportation growth and development, while achieving a regional consensus on priority projects and strategies. The public involvement exercises used blueprint sized paper workbooks, which small groups used to record ideas and feedback. The workbooks contained maps, data, and questions about land use and transportation, and are available on pages 15 and 16 of the Planning and Processes section of the 2025 plan. Additionally, TJPDC developed KidJAM, a facilitated workshop for children, serving the dual purpose of providing care for the children of those attending the public workshops and identifying specific land use and transportation needs of children. In May of 2009, the MPO Policy Board approved the UnJAM 2035 plan. UnJAM 2035 will continue as the guiding document for transportation planning throughout the MPO.

Contact: TJPDC (434) 979-7310

Treasure Coast Planning Charrette for a Regional Master Plan
Treasure Coast Regional Planning Council (FL)
The Treasure Coast Regional Planning Council (TCRPC)'s Urban Design Studio provides assistance to its member communities to address land use and transportation planning issues. The studio has sponsored a series of planning charrettes for the communities of Indian River, St. Lucie, Martin, and Palm Beach. More recently, TCRPC has worked with other regional planning councils to host charrettes in Dade, Broward, Flagler and Polk counties. Each charrette lasts seven to ten days, during which residents, landowners, staff, elected officials, and other participating agencies work with a team of designers to produce a master plan for the revitalization and growth of their community. A steering committee is created by the local government in advance of the charrette.

Contact: Dana Little, TCRPC Urban Design Studio, (772) 221-4060.

Honolulu Livable Communities Visioning Project
City and County of Honolulu (Hawaii)
The City and County of Honolulu's Waikiki Livable Community Project was a livability and mobility study that examined the relationship of the Waikiki's street network and transportation environment to Waikiki's residents, stakeholders, businesses, tourists and employees. The project emphasized an extensive public involvement and outreach effort that led to the formulation of a "Pedestrian First" policy to enhance and improve the pedestrian environment while maintaining essential transportation access and services in Waikiki. A unique aspect of the study was the development of "street visions" for the three main arterial street corridors and connecting local street network that traverse Waikiki. The "visions" for the street network revolve around "vision statements" that articulate the desirable character, enhancements and improvements for the street system in Waikiki. See also: "Waikiki Livable Community Project: Livability and Mobility Report" (City and County of Honolulu, 2003).

Contact: Brian Suzuki, City and County of Honolulu (808) 527-6880.

Resources

- Ames, Steven C., ed. (2001). *Guide to Community Visioning*. American Planning Association Planners Press: Chicago, IL.

- The National Charrette Institute is a nonprofit educational institution that helps communities develop new plans through collaborative planning processes. NCI offers a "Charrette Start-Up Kit" that provides an introduction to charrette techniques.

Visualization and Simulation Techniques

Visualizations can help decision makers and communities understand how proposed land use and transportation projects would look, and how they could affect their communities. Animations can be particularly useful in depicting transportation projects and changes to traffic flow. Agencies can also incorporate more advanced modeling tools, such as Casewise Visual Evaluation, which can predict public preferences based on sample visual preferences for different types of land use and transportation designs.

Cuba La Cueva Road Realignment Visualization | Central Federal Lands Highway

Examples in Practice

Visualization of the Cuba Le Cueva Project in New Mexico
Central Federal lands Highway Division
The Cuba La Cueva project involved a road re-alignment and a proposed bridge through a scenic valley. The Central Federal Lands Highways (CFLH) Division used a series of design programs (Microstation, 3D Studio Max and Photoshop) to render a proposed bridge and context sensitive solutions for the project. The simulated photos allowed FLH officials to accept a design concept that would be minimally intrusive to the surrounding scenic area.

Contact: Tom Puto, CFLH (720) 963-3728.

Still and Animated Visualization of Light Rail in Lakewood, Colorado
City of Lakewood, CO
The City of Lakewood used 3-D visualization tools to illustrate two future transportation-oriented developments planned in conjunction with the Denver Regional Transit District's proposed West Corridor light rail transit project. The visualization includes movies as well as still images illustrating proposed station designs, alternatives for the build-out of surrounding neighborhoods, and design treatments for adjacent roadways. The visualization was used to support neighborhood-based station area planning activities and the evaluation of alternative build-out scenarios. This outreach process led to station area plans and the designation of a transit mixed use district around four stations with park and ride facilities.

Contact: Roger Wadnal, City of Lakewood (303) 987-7519.

Casewise Visual Evaluation for Transit Oriented Development
University of Kentucky
The Kentucky Transportation Center at the University of Kentucky used Casewise Visual Evaluation (CAVE) to capture design preferences regarding a roadway or transportation-oriented development as part of a public participation program. CAVE can record and model preferences for various combinations of design

features in a standard public meeting. It has been applied to multiple projects, including a rural highway corridor design in central Kentucky, an urban light rail transit system in Louisville, and a bridge design project in Ohio.

Contact: Ted Grossardt, University of Kentucky Transportation Center; (859) 257-7522.

Resources

Note: The following list of resources is not a comprehensive list and individual resources not directly affiliated with FHWA are not endorsed by FHWA.

- FHWA Visualization in Planning Website. Examples of visualization techniques include sketches, drawings, artist renderings, physical models and maps, simulated photos, videos, computer modeled images, interactive GIS systems, GIS based scenario planning tools, photo manipulation and computer simulation.

- Choosing Visualization for Transportation. Website resource describing visualization methods and techniques that can be used to facilitate and support public participation in transportation planning, with a focus on transit.

- CommunityViz. CommunityViz is a tailored GIS software package that allows users to create and manipulate a virtual representation of a town and explore different land use scenarios.

- MetroQuest. Metroquest is a regional scenario planning/analysis tool developed in Canada. MetroQuest allows agency staff and workshop participants to create regional transportation and land use scenarios on the fly, watch scenarios evolve over time, evaluate key tradeoffs, examine scenarios in detail, and compare scenarios side-by-side. Underlying MetroQuest is a model linking demographics, land use, transportation, the macro economy, infrastructure, air quality, water, and energy.

Visioning and Scenario Planning

Planners use public processes to develop a transportation and land use "vision" for a region or multi-jurisdictional corridor and to evaluate future transportation and land use scenarios. Visioning involves a broad discussion about the future of a community, region, or State, often touching on transportation, land use, economic development, environmental issues, and public health. Scenario planning is a common analytical approach and engagement framework used for visioning. Planners use scenario planning to shake participants from previously held assumptions about the future. Planners typically present detailed scenarios, using software tools to help stakeholders both visualize and evaluate scenarios based on a variety of metrics. From there, stakeholders can weigh the costs and benefits of different alternatives, blend scenarios, and build consensus around policy directions. The results of these processes are typically implemented through the metropolitan transportation planning process and through additional actions to encourage land use changes at the local level.

- **Regional Visioning**
  - Envision Utah
  - Grand Rapids Metropolitan Development Blueprint
  - Seattle Vision 2040
- **Land Use Scenario Development**
  - "Make Your Mark" Scenario Planning Activity
  - Interagency Transportation, Land Use, and Climate Change Pilot Project
  - Interactive GIS-based Scenario Workshop
  - Transit Oriented Development Scenario Workshop
  - Development Allocation Scenario Workshop
  - Binghamton Scenario & Long Range Transportation Planning
- **Scenario Planning Software**
  - INDEX
  - Envision Tomorrow
  - CommunityViz
  - CorPlan
  - MetroQuest
  - PLACE^{3}S

Comment [DD9]: Target links

Regional Visioning

2040 Vision | Puget Sound Regional Council

Regional planners engage the public to develop a "vision" and accompanying policy direction for the future. Visioning involves a broad discussion about the future of a community, region, or State, often touching on transportation, land use, economic development, environmental issues, and public health. MPOs employ a variety of analytical approaches and engagement techniques to build consensus around shared community goals.

Examples in Practice

Seattle Vision 2040
Puget Sound Regional Council (Seattle, WA area, MPO)
In 2009, the Puget Sound Regional Council (PSRC) adopted VISION 2040, a transportation and land use vision for the region. VISION 2040 called for focusing growth in 24 urban centers and eight manufacturing/industrial centers. The urban centers are to include concentrations of population and employment in mixed-use, walkable environments, connected by high-capacity transit service. VISION 2040 is being implemented in a variety of ways, including: local plan development, voluntary regional review of plans for consistency, MPO-led outreach and demonstration programs, policies in the long-range transportation plan, and capital projects in the transportation improvement program.

Contact: Rick Olson, PSRC (206) 971-3050.

Envision Utah
Envision Utah Partnership (Salt Lake City, UT area Public/Private Partnership)
Envision Utah, a public-private community group, partnered with the State of Utah in 1996 to study the effects of growth in the 10-county Greater Wasatch Area in and around Salt Lake City. After three years of scenario planning,

analysis, and public discussion, Envision Utah produced an overall "Quality Growth Strategy" for the region that will significantly reduce the amount of land consumed by housing, traffic congestion and pollution, and public investment in infrastructure. The effort illustrates the value of extensive public outreach and education. See also the Federal Highway Administration Toolbox for Regional Policy Analysis Case Study.
Contact: Peter Donner, Envision Utah, (801) 538-1529.

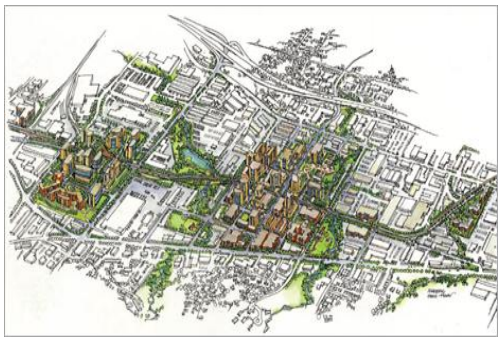
Grand Rapids Metropolitan Development Blueprint
Grand Valley Metropolitan Council (Grand Rapids, MI area, MPO)
Beginning in the early 1990s, The Grand Valley Metropolitan Council (GVMC) led the development of "Blueprint" principles and has since worked to implement these principles through a collaborative process with a series of sub-regional groups. Seven groups were formed around common geography and planning issues. The process included both local charrettes to plan identified "livable areas" in these sub regions, as well as broader planning techniques to address the unique regional qualities of each area. Since 2000, the MPO has given out annual awards recognizing projects and programs - such as the City of Grand Rapids Master Plan, the West Michigan Sustainable Business Forum, and a number of development projects consistent with Blueprint principles: compact, livable communities; regional centers of employment; retention of open lands and well-designed transportation and transit systems.

Contact: Gayle McCrath, GVMC (616) 776-7613.

Land Use Scenario Development

State and regional agencies and non-profit groups sometimes use workshop settings to tap the knowledge of local officials, staff, and the general public to develop future land use scenarios for a region, corridor, or community. The scenarios are developed by participants, within constraints such as policies, budgets, required densities to support retail or transit, and population trends. These scenarios help community members understand options within the community, realistic tradeoffs, and their own preferences. Planners can use this information to guide planning activities. Increasingly, GIS tools are being used for this process, in addition to or instead of printed maps (see the Scenario Planning Section below for more information).

Comment [DD10]: Target



Corridor scenario planning exercise | Envision Utah

Examples in Practice

"Make Your Mark" Scenario Planning Activity
Voluisa Transportation Planning Organization, (Daytona Beach area, FL MPO)
The Volusia County Transportation Planning Organization in Florida developed an innovative scenario planning activity as part of public outreach for its long range transportation plan. The agency held public workshops in which community members divided into small groups to create transportation and land use visions for the region. Participants had to work within given constraints such as funding limits, population, land use, and transportation systems. The process was meant to mimic the sorts of funding decisions that elected officials are faced with every budget cycle. It helped provide the community with information about the planning process and also gathered valuable feedback about community interests and priorities.

Contact: Lois Bollenback, Volusia County Transportation Planning Organization (386) 226-0422.

Interagency Transportation, Land Use, and Climate Change Pilot Project
Cape Cod, MA municipalities and federal resource agency partners
Through federal, state, and local stakeholder coordination, including the Cape Cod Commission, Cape Cod National Seashore, and Cape Cod Regional Transit Authority, and Federal Agencies, such as the Federal Highway Administration (FHWA), National Park Service, the U.S. Fish and Wildlife Service, Environmental Protection Agency, National Oceanic and Atmospheric Administration, Federal Transit Administration, Federal Emergency Management Agency, the Cape Cod Interagency Transportation, Land Use, and Climate Change Pilot Project employed scenario planning to develop and evaluate several potential regional transportation and land use planning strategies. The group evaluated each scenario on a set of indicators, which included greenhouse gas emissions, transport energy use, preservation of natural/existing ecosystems, and accessibility indicators. The study area, which encompasses fifteen municipalities, faces a serious threat from sea-level rise. The project was completed in 2011 with a final report describing the process and preferred scenario. Cape Cod towns have

begun to incorporate the preferred scenario into local comprehensive plans.

Contact: Benjamin Rasmussen, U.S. DOT Volpe Center (617) 494-2768.

Development Allocation Scenario Workshop for Regional Visioning Implementation
Envision Utah (nonprofit)
Envision Utah, a nonprofit organization that assists State and local governments in conducting scenario planning activities, used an allocation workshop approach both to develop a regional Quality Growth Scenario for the State of Utah and to help create community plans throughout the country. The Nebo Community Vision project provides one example. On a workshop map, participants identified areas to be included in a green space network. They were then asked to place the projected 2020 population increase within their community's boundary or annexation declaration. Development was placed by means of "chips," placeholders representing a constant acreage with a population that varied by development type. Development types range from "rural" to "conservation subdivision" to "Main Street." Quality Growth Scenario principles are beginning to be reflected in projects such as Daybreak, a 4,100-acre master-planned community situated adjacent to a proposed light rail station and featuring an extensive network of parks and open space, water-saving and energy-efficient building and site design, and a mixed-use, walkable development plan.

Contact: Kevin Fayles, Envision Utah, (801) 303-1462.

Interactive GIS-based Scenario Workshop
Sacramento Area Council of Governments (Sacramento area, CA MPO)
As part of the development of the Sacramento Regional Blueprint, the Sacramento Area Council of Governments (SACOG) hosted a series of neighborhood workshops for residents and other stakeholders to review and create land use scenarios. SACOG used the interactive GIS-based program I-PLACE3s, in conjunction with the regional land use model and travel demand models, to provide real-time feedback in public workshops on the effects of different land use options on transportation, open space, and other conditions. Participants were able to modify land use and zoning map; scenarios developed at a neighborhood level were then aggregated to the county level and used in county-wide workshops. See also: FHWAs Blueprint Sacramento case study.

Contact: Kacey Lizon, Sacramento Area Council of Governments, (916) 340-6265.

Transit Oriented Development Scenario Workshop
City of Fort Worth,TX
The City of Fort Worth led an effort to identify opportunities for transit-supportive development in 10 urban villages along five significant transit corridors. The City held a series of public meetings and workshops with local property owners, neighborhood association leaders, and other interested parties. At one set of

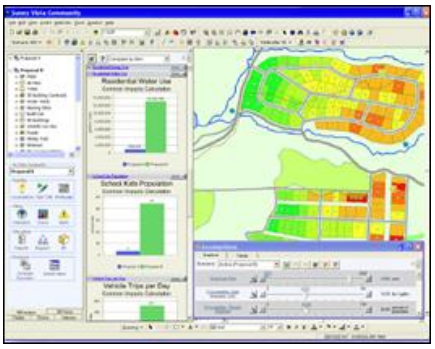
workshops, participants were given game pieces corresponding to different types of land use (e.g., mixed-use, rail station, green space) along with a price tag. This exercise helped participants explore development concepts that would support transit and urban design objectives, while recognizing budget constraints.

Contact: Eric Fladager, City of Fort Worth (817) 392-8011.

Binghamton Scenario & Long Range Transportation Planning
Binghamton Metropolitan Transportation Study (Binghamton, NY area, MPO)
Faced with the challenge of a slowly declining and aging population, the Binghamton Metropolitan Transportation Study (BMTS) used the 2004 update of the long-range transportation plan as an opportunity for a scenario planning process to address transportation, land use, and economic development issues simultaneously, with the objective of linking transportation to regional revitalization. BMTS conducted extensive public involvement to identify community goals, design principles, and growth scenarios. Scenarios included "outward" and "inward" development under "trend" and "growth" conditions. The result was consensus among planners and stakeholders to focus on the revitalization and redevelopment of the urban core communities. The most recent long-range transportation plan (titled Creating a Sustainable Future, adopted in 2010) continues the "moving inward" focus of the region's 2004 long-range transportation plan update.

Contact: Cyndi Paddick, BMTS (607) 778-2443.

Scenario Planning Software



CommunityViz Interface | CommunityViz

Some software applications allow planners to adjust multiple variables to analyze different land use and transportation scenarios. Such programs can be used to create maps or 3-D imagery of proposed plans or scenarios to better illustrate and visualize impacts. Different programs offer a range of analyses, including simple mapping and visualization functions, as well as the ability to analyze economic, environmental, demographic, or safety aspects. The following

examples illustrate some useful software tools for scenario planning. This is neither a comprehensive list, nor an endorsement by FHWA.

Envision Tomorrow

Envision Tomorrow is an easy-to-use, analytical decision making tool for municipalities, regional governments, and private organizations to test and refine transportation plans, produce small-area concept plans, and build scenarios. The software includes a "Scenario Builder," which allows the user to design prototypical buildings and "paint the landscape" with different land uses and development patterns. This software then processes the scenario and evaluates the development's impact on several factors, including land use, housing, sustainability, transportation, carbon emissions, and economic conditions.

Examples in Practice

Imagine Waco
City of Waco, Texas
The City of Waco, Texas, used the Envision Tomorrow software to evaluate different land use scenarios for the metro area. The outputs of the model helped the city determine potential phasing options for increasing density in the central city, and identifying the costs and benefits of implementing a Bus Rapid Transit system.

Contact: City of Waco, Planning and Zoning Department. (254) 750-5650.

INDEX

INDEX is a planning support software tool used to model land use/ transportation scenarios. INDEX is a GIS software extension that helps stakeholders create, implement, and achieve plans informed by indicator measurements to gauge planning actions. The software also includes a new "Cool Spots" module, which planners can use to estimate greenhouse gas emissions from buildings and transportation.

Contact: Eric Sprague, U.S. EPA, (202) 566-2861

CommunityViz
CommunityViz is a GIS software package that allows users to create and manipulate a virtual representation of a town and explore different land use scenarios.

Examples in Practice

Land Use Scenarios for Long Range Transportation Planning
North Front Range Metropolitan Planning Organization
(Fort Collins area, C0 MPO)
The North Front Range MetropolitanPlanning Organization used CommunityViz to develop and compare alternative future land use scenarios and their impacts on the transportation system. Starting with baseline land use and environmental

data for area communities, CommunityViz was used in consultation with local officials to allocate forecasted development. The model was used as part of the "Envision the North Front Range" project, which is now managed by the Envision North Front Range non-profit organization.

Contact: Suzette Mallette, North Front Range Metropolitan Planning Organization (970) 416-2257

Pedestrian Path Analysis
City of Longmont, CO
The City of Longmont used CommunityViz software to help plan the St. Vrain Greenway pedestrian path connecting the city with a newly developed community and district park, both located on the edge of the city. Use of CommunityViz helped the Master Plan Committee to comprehensively analyze social, economic and environmental sensitivities. Citizens and stakeholders were able to compare alternatives through predictive models. The effort resulted in the planning and implementation for a 7.5-mile greenway corridor that was widely supported by neighbors and the community. The last section of the trail was completed in October 2009, and connects to the Colorado Front Range Trail, a regional system.

Contact: Paula Fitzgerald, City of Longmont (303) 651-8448.

CorPlan

CorPlan is a GIS and spreadsheet-based model that creates regional development scenarios for input into travel demand models. CorPlan estimates regional land development potential using prototypical "community elements" as building blocks. Each element represents a quarter-mile diameter area and includes illustrative photographs and diagrams. Each element also has a unique set of socioeconomic and land use characteristics. Elements are manually assigned to different areas and then corresponding data are aggregated using GIS, and used as input to the travel demand model. The model is available through the Renaissance Planning Group.

Contact: Chris Sinclair, (407) 487-0061.

Examples in Practice

Regional Land Use Scenarios for Public Visioning Process
Thomas Jefferson Planning District Commission (Charlottesville area, VA MPO)
The Thomas Jefferson Planning District Commission (TJPDC) used CorPlan to develop and model alternative regional land use scenarios as part of the Eastern Planning Initiative, a public visioning process. Three growth concepts were created through public workshops: core, nodal, and dispersed. The results were modeled to show differences in transportation and other impacts for each alternative. See also FHWA: Land Use and Transportation Modeling Tools - CorPlan Model; TCSP Case Study #5.

Contact: Stephen Williams, Thomas Jefferson District Planning Commission(434) 979-7310.

MetroQuest

MetroQuest is a regional scenario planning and analysis tool developed in Canada. MetroQuest allows agency staff and workshop participants to quickly create regional transportation and land use scenarios, see how conditions under different scenarios evolve over time, evaluate key tradeoffs, examine scenarios in detail, and compare scenarios side by side. Underlying MetroQuest is a model linking demographic, land use, transportation, economic, infrastructure, air quality, water, and energy data.

Examples in Practice

Scenario Visualization Workshops
Idaho Transportation Department
The Idaho Transportation Department (ITD) used MetroQuest in a two-year, scenario-based planning process to support the creation of a statewide transportation vision. The *Idaho's Transportation Future: Getting There Together* process engaged more than 750 people between 2002 and 2004. MetroQuest was used in a three-day workshop to create and visualize scenarios and evaluate the results using a suite of performance measures. The result was a comprehensive Vision Statement for the movement of people, materials, products, and information based on statewide transportation system partners' values and priorities. ITD plans to use MetroQuest in the future for scenario planning.

Contact: Matthew Moore, Idaho Transportation Department(208) 334-8484.

PLACE3S

The PLACE3S model (Planning for Community Energy, Environmental, and Economic Sustainability) is a GIS-based analytical tool to support community land use and transportation planning. Using parcel or polygon level information on existing and/or future land use, the model calculates a range of community indicators including vehicle-travel, return on investment, housing type mix, land consumption, energy consumption, and other environmental impacts. I-PLACE3s is a variation which can be run over the Internet. PLACE3S software is in the public domain.

Examples in Practice

Scenario Visioning Workshops
Sacramento Area Council of Governments (Sacramento area, CA MPO)
The Sacramento Area Council of Governments (SACOG) used I-PLACE3s in conjunction with a regional land use model and travel demand model enhancements to provide real-time feedback in public workshops on the effects of different land use options on transportation, open space, and other conditions.

The model was used to support the Sacramento Blueprint regional planning and visioning project. For more information, see the Sacramento, CA: Blueprint Sacramento case study.

Economic Impact Model for Public Participation
City of San Diego, CA
Community stakeholders used PLACE3S to assess the impacts of alternative zoning and redevelopment plans for the Mid-City neighborhood in San Diego. A unique feature of the application was an economic impact model which shows the viability of new development on each parcel in the study area given existing zoning constraints, development costs, and market conditions.

Contact: California Energy Commission (916) 654-3948. See also TCSP Case Study #6.

Resources and Guidebooks

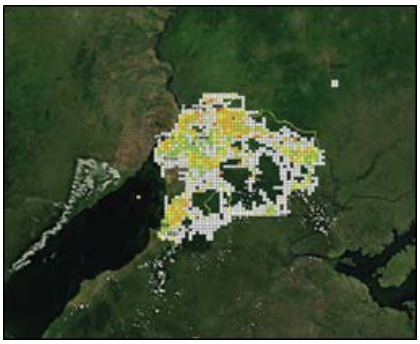
- Federal Highway Administration Scenario Planning Website

- Federal Highway Administration TCSP Program's Case Study #13: Implementing a Regional Vision(2004) Provides descriptions of projects in Charlottesville, Concord, Lansing, and Salt Lake City.

- Surface Transportation Policy Project. "Regional Visioning Projects in California and Nationwide." Contains links to nine projects in California and an additional 14 in other States.

- Southern California Association of Governments: Compass Southern California.

GIS & Technical Analysis



GIS Map of Antelope Densities in Conservation Areas | ESRI website

Planners use geographic information systems (GIS) and other technical tools to visualize and analyze land use and transportation connections. Specific software to develop and analyze scenario alternatives, specific projects, or regional assets and vulnerabilities are available to assist planners with spatial planning. Technical software and applications evolve and improve over time, creating new opportunities for a variety of planning applications (see the Visioning and Scenario Planning section).

Comment [DD11]: Target link

Agencies can use existing software tools, such as those described in this Toolkit, or can work with programmers or in-house staff to develop programs and models tailored to their individual needs.

- **GIS Environmental Mapping and Analysis**
  - Tucson Regional Remote Sensing Project
  - Riverside County Species Habitat Analysis
- **GIS Development Opportunity, Housing, and Accessibility Analyses**
  - California Land Opportunities Tracking System
  - Trip Generation Tool for Mixed-Use Developments
  - Fredericksburg Accessibility Analysis for Communities with People with Disabilities
  - Housing and Transportation Affordability Index
- **Rural Traffic Shed Model**
  - Little Rock Rural Traffic Shed Model Pilot
- **Space Syntax**
  - Oakland Pedestrian Plan using Space Syntax

Comment [DD12]: Link to targets

GIS Environmental Mapping and Analysis

Orthophotography Sample | Pima Association of Governments

State, regional, and local agencies, as well as non-profit organizations, have undertaken database development, mapping, and analysis of land use, community, and environmental features using geographic information systems (GIS). These databases and analysis tools provide information that can help minimize land use, community, and environmental impacts when locating new transportation facilities.

Examples in Practice

Tucson Regional Remote Sensing Project
Pima Association of Governments (Tucson area, AZ MPO)
Through the Regional Remote Sensing project, the Pima Association of Governments (PAG) collects high-resolution digital imagery for use in transportation and land use planning by regional and local agencies. Since 1998, PAG has collected high resolution imagery with sub-meter accuracy. The data are used in transportation corridor studies, preliminary roadway design, hydrology and watershed analysis, floodplain mapping, land use planning, zoning code enforcement, and other applications in the public and private sectors. The data are maintained by PAG on a web-based Regional Data Center.

Contact: Manny Ross, PAG (520) 792-1093. See also the Tucson, AZ: Orthophoto Case Study.

Riverside County Species Habitat Analysis
Riverside County, CA
The Riverside County Transportation Commission (RCTC) uses GIS to analyze data on high-priority conservation areas, identified through a multi-species habitat planning effort. The data are used to select transportation corridors that reduce ecological impacts by avoiding sensitive areas or minimizing habitat fragmentation. RCTC has made use of a comprehensive biological and physical database that includes information on vegetation, species occurrences, wetlands, topography, soils, and aerial photography. Outcomes of the project include adoption of an updated general plan and a Multi-Species Habitat Conservation Plan, which will lead to the protection of 153,000 acres.

Contact: Cathy Bechtel, RCTC (951-787-7141).

Resources

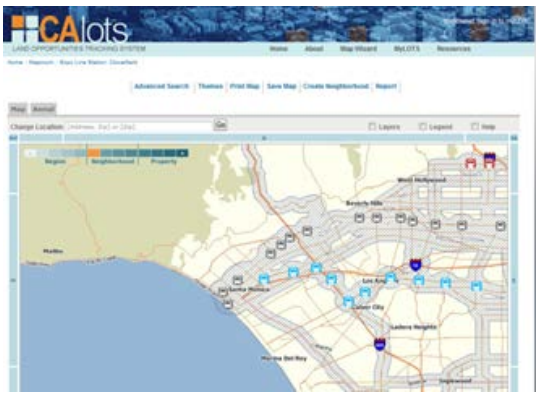
- Federal Highway Administration. Case Studies in GIS. These case studies include examples of the use of GIS for environmental analysis in the selection of roadway alignments in North Carolina and San Diego, California.

- Federal Highway Administration. GIS in Transportation web site. This web site features numerous examples of the use of GIS in transportation planning and project development, including use of GIS to consider land use and environmental factors.

- Shenandoah Mountain Geographics, Inc. (2003). *The Use of Imagery in Transportation Planning: A Guidebook.* Washington, D.C. Published with technical support from the U.S. Department of Transportation, this guidebook presents key concepts in remote sensing, offers examples of the use of imagery in activities supporting transportation planning, and provides information about integrating the imagery and the derived products from geographic information systems.

GIS Development Opportunity, Housing, and Accessibility Analyses

Planners can use GIS and analysis tools for a variety of land use and transportation purposes. Among other uses, these analysis tools can help identify and disseminate information about potential development sites; estimate trip generation and distribution; explore accessibility for people with disabilities; and analyze household costs based on location to transit and services.



CAlots online tool | Southern California Association of Governments

Examples in Practice

California Land Opportunities Tracking System
Southern California Association of Governments
The Southern California Association of Governments (SCAG) developed CA Land Opportunities Tracking System, (CAlots) a web-based information portal and mapping platform designed to support and promote transit oriented development. CAlots aims to help assess and maximize the potential for infill development in strategic development opportunity areas identified in SCAG's regional growth and land use vision. These areas include existing or projected employment centers and transportation (particularly transit) infrastructure, such as light rail, heavy rail, and commuter rail stations. CAlots runs on the following programs: Coldfusion 7, ESRI's ArcIMS 9, and SQL Server 2000. It contains multiple datasets related to density, build capacity, infill estimates, transportation/travel characteristics, and mode choice. The tool allows users to create customized GIS maps for specific neighborhoods, view associated demographic data, and analyze development potential in diameters of 1/4-mile, 1/2-mile, and one mile around transit stations. Users can also access a "drive-through" function to view a specific parcel or street scene.

Contact: Joe Carreras, SCAG(213) 236-1856.

Trip Generation Tool for Mixed-Use Developments
Environmental Protection Agency and Institute of Transportation Engineers
The Environmental Protection Agency (EPA) and the Institute of Transportation Engineers (ITE) developed an analysis tool for planners to estimate the trip-generation impacts of mixed use developments, including walking and biking trips. The spreadsheet based tool is based on research from six metropolitan regions, merging data from household travel surveys, GIS databases, and other sources to create consistent land use and travel measures. The tool has been used in California, Washington, New Mexico, and Virginia. Users enter geographic, demographic and land use information about the development site and surrounding area. There are options to use local parameters for trip generation or to use national data as a default.

Contact: John Thomas at (202) 566-1285, or Christopher Forinash at (202) 566-0518.

Fredericksburg Accessibility Analysis for Communities with People with Disabilities
George Washington Regional Commission (Fredericksburg, VA area MPO)
The George Washington Regional Commission (GWRC), a regional commission representing Fredericksburg, Virginia and surrounding counties, conducted an analysis in 2009 to improve accessibility for communities with high concentrations of people with disabilities. The analysis first identified the locations of communities (i.e. census block group and component subdivisions) with the highest concentrations of residents of people with disabilities, and then conducted

field investigations in those communities to assess mobility patterns and accessibility factors. The study located transportation (and mobility) infrastructure barriers for people with disabilities as they access work, basic retailing and/or services within their community and compiled a list of recommendations for infrastructure or service improvement projects to improve the mobility and accessibility of community members in those locations.

Contact: Kevin Byrnes, George Washington Regional Commission at (540) 373-2890.

Housing and Transportation Affordability Index
Center for Neighborhood Technologies
The Center for Neighborhood Technology's Housing and Transportation (H+T®) Affordability Index is an online tool that examines transportation and housing costs at a neighborhood level. It allows users to view housing and transportation data as maps, charts, and statistics for nearly 900 metropolitan and micropolitan areas. The tool also includes a greenhouse gas factor, which shows urban greenhouse gas emissions associated with household auto use. CNT is currently working to expand and update the H+T Index with 2005-2009 American Community Survey 5-Year Estimates data at the Census block group level. Other model components will be investigated, including separating transportation costs for renters and owners and improving auto cost data. CNT is also collecting a uniform dataset of stops and frequencies for transit agencies in all U.S. metropolitan and micropolitan regions for use in the Index. CNT also developed Abogo, an online tool that quickly compares estimated transportation costs and greenhouse gas emissions based on address inputs.

Contact: Maria Choca-Urban, CNT (773) 278-4800.

Rural Traffic Shed Model

Rural Traffic Shed Map | KendigKeast Collaborative

The rural traffic shed model is a method for allocating development permits based on the capacity of the roadway system. It is most applicable where there is a general flow of traffic towards an urban center. The method requires dividing a rural area into "traffic sheds" based on land served by various collectors and arterials. Trip generation rates associated with various land uses are applied to estimate traffic volumes and compare future volumes to roadway capacity with a

given amount of development. The method includes a market-based system for phasing development concurrent with roadway improvements.

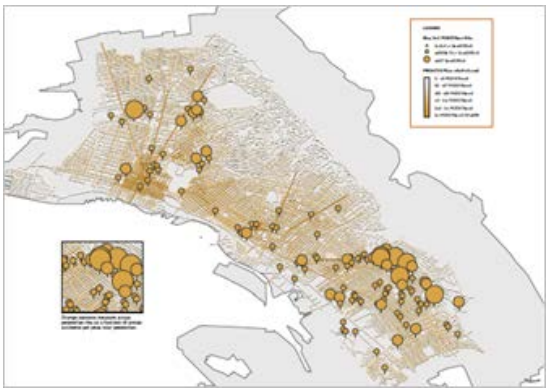
Examples in Practice

Little Rock Rural Traffic Shed Model Pilot
METROPLAN (Little Rock area, AR MPO)
Using a similar approach to that taken in Williamson County, Tennessee, a Rural Traffic Shed Model was developed by METROPLAN, the MPO for Little Rock, and applied on a pilot basis to the rural portions of Pulaski and Saline Counties. A set of sample regulations was developed for each county consistent with the traffic shed analysis.
Contact: Richard Magee, METROPLAN (501)372-3300.

Resources

- "Traffic Sheds, Rural Highway Capacity and Growth Management" by Lane Kendig with Stephen Tocknell, AICP

Space Syntax



Space Syntax Map of Oakland | City of Oakland

Space Syntax is a GIS-based modeling technique used to identify urban locations that have a potential to increase pedestrian use, based on location of pedestrian-oriented land uses and other facilities. The method uses available or readily obtainable data such as: Census data, street networks, major trip generators, and pedestrian count samples to predict pedestrian volumes.

Examples in Practice

Oakland Pedestrian Plan using Space Syntax
City of Oakland, CA
The City of Oakland applied the Space Syntax model to identify locations with a high pedestrian demand and a low supply of facilities, based on data on population, employment, trip generators, and pedestrian facilities. The maps

showed locations of pedestrian/vehicle crashes. The city also solicited community input to identify areas avoided by pedestrians. The results were used to help the city develop the Oakland Pedestrian Master Plan adopted in November 2002. See also the Case Study: Oakland, CA: Pedestrian Plan.

Contact: Eric Angstadt, City of Oakland (510) 238-6190.

Resources

- Local Government Commission. "Geographic Information Systems: A Tool for Improving Community Livability."

- Raford, Noah, and David R. Ragland (August 2003). "Space Syntax: An Innovative Pedestrian Volume Modeling Tool for Pedestrian Safety." U.C. Berkeley Traffic Safety Center, paper UCB-TSC-RR-2003-11.

Linking Planning to the Environmental Review Process

Legacy Parkway Plan | Utah DOT

Transportation planning agencies are increasingly bridging transportation planning and National Environmental Policy Act (NEPA) processes. The approach, known as Planning and Environmental Linkages (PEL), is intended to minimize duplication of effort, promote environmental stewardship, and reduce delays in project implementation by incorporating early stage planning into the NEPA review process. Methods include: Collecting and utilizing regional data on environmental conditions in the long-range transportation planning process; incorporating environmental and community values into transportation decisions early in planning, evaluating combined transportation and land use scenarios; and involving Federal and state resource and regulatory agencies, NEPA practitioners, planning and development partners, legal counsel, and the public in long-range transportation planning (see the Context Sensitive Design/Solutions section).

Comment [DD13]: Target link

- **Environmental Processes**
  - Washington Connected Landscapes Project: Statewide Analysis
  - Florida Efficient Transportation Decision-Making Process
  - Colorado Planning and Environmental Linkages
  - Milwaukee Regional Transportation Corridors, Systems, and Land Use Planning
- **Environmental Permits and Plans**
  - Utah Legacy Parkway and Nature Preserve
  - Charlottesville Area Places 29
  - North Carolina Ecosystem Enhancement Program
  - Colorado I-70 Mountain Corridor Programmatic EIS
  - Seattle WA I-405 Corridor

Comment [DD14]: Target links

Environmental Processes

States and MPOs can achieve significant benefits by incorporating environmental and community values into transportation decisions early in planning and carrying these considerations throughout project development process. PEL is a collaborative and integrated approach to transportation decision-making that considers these values early in the planning process and uses this information to inform the environmental review process. To that end, States and MPOs have developed a variety of tools and resources to share information and collaborate across disciplines to inform projects both at conceptual stage and through the multi-year project development and delivery processes.

Examples in Practice

Washington Connected Landscapes Project: Statewide Analysis
WSDOT (Washington DOT) and Washington Department of Fish and Wildlife

In December 2010, the Washington Wildlife Habitat Connectivity Working Group completed a geographic information system (GIS) analysis of habitat conditions in Washington and portions of adjacent jurisdictions. The statewide analysis incorporated habitat and movement needs for 16 focal species, identified habitat networks of high natural integrity, and produced maps of the largest contiguous habitat blocks and the best linkages for connecting them. In addition to the maps, the Working Group also created a GIS toolkit that planners can use to develop projects that allow for the long-term movements of wildlife while minimizing collisions with the traveling public. The habitat connectivity assessment will reduce time and costs associated with environmental permitting, and can be used as one criterion to determine which highway segments will receive funds for wildlife-friendly improvements. As a result, highway improvement project teams will incorporate options that provide safe passage for wildlife into project plans. The Washington Connected Landscapes Project demonstrates how collaboration can drive the development of tools to help build a transportation system that is sensitive to the needs of wildlife. This project won a FHWA 2011 Environmental Excellence Awards.

Contact: Kelly McAllister WSDOT (360) 705-7426.

Florida Efficient Transportation Decision-Making Process
FDOT (Florida DOT)

The Florida DOT (FDOT) Efficient Transportation Decision-Making Process (ETDM) consists of both a process and a GIS tool that use a PEL approach to bring environmental considerations into the early stages of the statewide transportation planning and project development processes. The ETDM process provides a link between land use, transportation, and environmental resource planning through early and continuous involvement of planning, regulatory and resource agencies. An interagency team reviews projects in the early stages of both the planning and project programming processes. An interactive GIS database assists the team in identifying the potential direct, indirect, and

cumulative impacts of projects. Information about projects screened through the ETDM process is available to the public on the ETDM public access web site. FDOT is collecting performance measures to assess the effectiveness of the process. FDOT issued a progress report titled, "Florida's ETDM Progress Report #4" regarding the effectiveness of the process in 2009.The progress reports are available by searching the FDOT ETDM library.

Contact: Gwen Pipkin, FDOT (863) 519-2375.

Colorado Planning and Environmental Linkages
North Front Range MPO (Fort Collins-Loveland, CO area, MPO)
With the support of FHWA, FTA, EPA, and the Colorado DOT, the North Front Range MPO (NFRMPO) undertook a pilot project to increase consideration of environmental impacts and resource agency involvement early in the transportation planning process. Known as Strategic Transportation, Environmental and Planning Process for Urbanizing Places (STEP UP), this PEL project included a model planning process with early and continuous resource agency involvement and guidelines for environmental review and prioritization of transportation projects; development of a GIS-based tool for identifying environmental impacts of projects; and a cumulative effects assessment for the regional transportation plan. The Transportation Research Board (TRB) has published a case study of STEP UP, Colorado STEP UP: Environmental Collaboration Supported by Web-Based Technology, in 2010 which includes lessons learned. *See also: STEP UP Phase 1 Report (Colorado DOT, 2005).*

Contact: Suzette Mallette, NRFMPO (970) 416-2257.

Milwaukee Regional Transportation Corridors, Systems, and Land Use Planning
Southeastern Wisconsin RPC (Milwaukee, WI area, RPC)
The Southeastern Wisconsin Regional Planning Commission (SEWRPC) serves as both the MPO and regional land use planning agency for the seven-county Southeastern Wisconsin Region. SEWRPC planning activities address transportation, land use, water resources, parks and open space, farmland preservation, and environmental/ natural habitat areas. Transportation planning is based on the regional land use plan, and uses an extensive database of land use and environmental resources to make links to NEPA. The 2035 Regional Transportation Plan was developed with consideration of land use objectives as well as secondary and cumulative impacts of plan alternatives. A key aspect of the process is the involvement of Federal resource agencies to identify critical issues from a regional perspective and to assist in developing transportation and land use projects and policies. SEWRPC expects this involvement to result in streamlined project delivery. *See also: Ken Yunker's Presentation at the 2005 Association of Metropolitan Planning Organizations (AMPO) Annual Conference and the 2010 Interim Review and Update of the Year 2035 Regional Transportation System Plan.*

Contact: Ken Yunker, SEWRPC (262) 547-6721.

Environmental Permits and Plans

Successful project delivery depends on compliance with NEPA. When achieving one project vision depends on the delivery of many small project or when one or when a series of unrelated project cumulatively impact the environment, States and MPOs employ a variety of approaches to coordinate efforts and improve environmental outcomes.

Examples in Practice

Utah Legacy Parkway and Nature Preserve
UDOT (Utah DOT)
The Legacy Parkway is a 14-mile, four-lane, limited access divided highway that provides an important alternate route for Northern Utah commuters to I-15, Veterans Memorial Highway. A collaborative design team working with the public incorporated many unique and innovative features into the final parkway design. Some of the features included observation points and trailheads along with roadside pull-off lots, landscaping with native species, use of vegetated berms for screening, connections to other trails and communities and designing narrower paved portions of the roadway. The project resulted in a unique environmental mitigation project: the Legacy Nature Preserve. The Legacy Nature Preserve prevents future development from encroaching the Great Salt Lake ecosystem and also restores wetland and other natural habitats. UDOT found that they could meet safety standards while designing a roadway that meets aesthetic needs of local communities and protects the environmental integrity of the area. The Legacy Nature Preserve restores and preserves over 2,100 acres of important wetland and wildlife habitat from encroaching development and provides buffers that are important to the survivability of wildlife along the Great Salt Lake. This project was a winner of the FHWA 2007 Environmental Excellence Awards.

Contact: Eric McCulley, UDOT (801) 965-4000

Charlottesville Area Places29
Thomas Jefferson Planning District Commission (Charlottesville (VA) area MPO)
The Thomas Jefferson Planning District Commission (TJPDC), partnered with Virginia DOT and Albermarle County in an effort to combine land use and transportation planning. The resulting project, Places29, incorporated the work done on TJPDC's US29N Corridor Study to establish a vision for accommodating growth along US Route 29, incorporating placemaking and transportation solutions into the MPO and Albemarle County master plans. TJPDC also used an FHWA Eco-Logical grant to integrate transportation planning with environmental resource management. To accomplish this, TJPDC gathered existing resource data and assigned weighted values, resulting in a regional Ecological Value Map, including a "Least Environmental Cost Alignment" analysis for a new roadway proposed in Places29.

Contact: Harrison Rue, TJPDC (434) 979-7310

North Carolina Ecosystem Enhancement Program
NCDOT, NC Department of Environment and Natural Resources, and U.S. Army Corps of Engineers
The Ecosystem Enhancement Program (EEP) is a compensatory mitigation system that was established in 2003 by the North Carolina Department of Environment and Natural Resources (NCDENR), the North Carolina DOT (NCDOT) and the United States Army Corps of Engineers (USACE). The purpose of EEP is to speed project development and delivery while protecting the environment. Rather than focusing on individual highway project impacts, the EEP operates programmatically, using watershed plans and considering cumulative impacts associated with a given watershed. The program funds highway project mitigation activities, such as stream and wetlands protection and restoration, in advance of the actual project work. By taking the watershed level approach, sometimes the mitigation activities take place at other locations within the same watershed and not on the main project site. Funding is provided from Federal and state transportation sources through the statewide transportation improvement program (STIP).

Contact: Bill Gilmore, NCEEP (919) 715-1412.

Colorado I-70 Mountain Corridor Programmatic EIS
CDOT (Colorado DOT)
The Colorado DOT (CDOT) has undertaken a Programmatic Environmental Impact Statement (PEIS) to identify solutions for the I-70 Mountain Corridor between Denver and Glenwood Springs. The PEIS examined the indirect impacts of alternatives, including land use and development patterns, and the resulting impact on various environmental indicators. The project includes as Context Sensitive Solutions (CSS) guidance website designed to support project managers and Project Leadership Teams in guiding a project through the CSS decision-making process. FHWA and CDOT issued a Record of Decision (ROD) in June 2011 which is the final step in this Tier 1 NEPA process. CDOT is currently in the Tier 2 NEPA process.

Contact: Wendy Wallach, CDOT (303) 757-9008.

Seattle WA I-405 Corridor
WSDOT (Washington State DOT)
The I-405 Corridor Program is a partnership among communities, elected officials, agencies, and advocacy groups to define a 20-year transportation vision for the 30-mile I-405 corridor in east suburban Seattle. Led by the Washington State DOT (WSDOT), the program undertook a streamlined EIS approach to reach consensus on a $7 billion transportation package to address mobility and access needs. Obtaining input from permitting agencies at an early stage allowed for timely decision making and generated "buy-in" for a multi-modal mix of solutions with broad-based support. The solution package has "smart growth" principles at its core and includes $95 million for land use strategies. The I-405 Corridor Program was incorporated into the Metropolitan Transportation Plan in 2002. The first funded components of the Corridor Plan are three distinct segments of

general purpose lane additions to I-405, two of which have been completed. Known as the "Nickel Projects," due to their funding source from the five-cent gas tax-to expand highway capacity, these three improvements underwent individual environmental assessments, which involved community meetings to identify areas of particular concern, using the Tier 1 EIS for background. See the *Seattle, WA: I-405 Corridor Program Case Study*.

Contact: Kim Henry, WSDOT (425) 456-8539.

Resources

- Federal Highway Administration Environmental Review Toolkit
- Federal Highway Administration (2011) Guidance on Using Corridor and Subarea Planning to Inform NEPA

Linking Planning and Public Health

How people travel influences health in a variety of ways, due to factors such as air quality, physical activity levels, safety, and access to healthy food and medical care. Land use, transportation, and health-related decisions are made by a range of actors and agencies at different organizational levels. These entities may collaborate to develop effective planning tools, policies, and incentives in order to influence public health outcomes.

- **Coordination between Planning and Health Departments**
  - Columbus Area Complete Streets Toolkit and Checklist
  - Active Living Ramsey Communities Initiative
  - Program on Health, Equity, and Sustainability
- **Health Impact Assessment Tools**
  - Atlanta BeltLine Health Impact Assessment
  - Health Impact Assessment of the TransForm Baltimore Comprehensive Zoning Code Rewrite
  - Sacramento Area Recommended Protocol for Evaluating the Location of Sensitive Land Uses Adjacent to Major Roadways
- **Statewide Healthy Transportation Planning and Coordination**
  - Massachusetts Healthy Transportation Compact and GreenDOT Implementation Plan
  - Tennessee Office of Community Transportation
  - WalkBikeNC

Comment [DD15]: Target links

Linking access to healthy food and active transportation options can lead to better public health outcomes | Flickr user jimforest

Coordination between Planning and Health Departments

By including public health agencies in land use and transportation planning and decisionmaking processes, the resulting policies and development support not only traditional mobility and economic development goals, but the wider range of impacts of transportation on public health.

Examples in Practice

Columbus Area Complete Streets Toolkit and Checklist
Mid-Ohio Regional Planning Commission (Columbus, OH MPO)

The Mid-Ohio Regional Planning Commission (MORPC) adopted a Complete Streets policy and accompanying toolkit in 2010. Complete streets are designed to be accessible to people of all ages and abilities, and support all travel modes, supporting active, healthy lifestyles. They typically include sidewalks, safe crossings, bicycle lanes, automobile lanes, parking, and accommodations for transit (see the Complete Streets/Routine Accommodation section).

Comment [DD16]: Target link

The MORPC toolkit is intended to help elected officials and development teams take a broader approach to how they plan, design, and implement projects. One especially notable element is MORPC's coordination with five local health districts to develop the toolkit, which provides resources for local governments to understand the connection between Complete Streets and healthy communities. The health districts assisted MORPC with surveying local governments and providing local best practice examples, which resulted in new partnerships between local and regional officials and public health districts.

As part of the policy, all projects receiving Federal funding through MORPC must also complete a Complete Streets checklist. Considerations on the checklist include traffic generated by surrounding land uses, transit access, bicycle and pedestrian infrastructure, and connectivity to nearby destinations.

Contact: Kerstin Carr, Mid-Ohio Regional Planning Commission

Active Living Ramsey Communities Initiative
Ramsey County, Minnesota

Active Living Ramsey Communities (ALRC) is a multi-disciplinary initiative that aims to integrate physical activity into the daily lives of residents through the built environment. ALRC is driven by a coalition of representatives from local government agencies, business leaders, community groups, health industry leaders, and local residents. It works to influence programs, projects, policies, design processes, partnerships, and community awareness in order to increase opportunities for daily physical activity.

The coalition works with communities to incorporate active living principles into local comprehensive plans, and has produced several resources that demonstrate

how land use policies can be used to improve public health. For example, the Comprehensive Planning and Active Living Toolkit includes recommendations and model language to develop health-focused parking, mixed-used development, and design guidelines. ALRC's goals and strategies are included in Ramsey County's 2030 comprehensive plan, and Ramsey County voted to incorporate ALRC's active living principles (as found in ALRC's 2008-2012 strategic plan) into all County department work.

Contact: Email, ALRC.

A family walks on a trail amid greenspace in Ramsey County, Minnesota | Ramsey County "Go Ramsey Communities"

Program on Health, Equity, and Sustainability
San Francisco Department of Public Health, San Francisco, CA

The San Francisco Program on Health, Equity, and Sustainability (PHES) is an inter-disciplinary team within the city's Department of Public Health that promotes healthy environments and works to incorporate health considerations into all city policy making. Modeled on the Health in all Policies approach, PHES develops broad partnerships with public agencies, private organizations, and residents.

PHES activities include participating in city-wide and neighborhood-level planning and decisionmaking; providing assessment tools and technical assistance; and conducting research. PHES has played a role in several land use and transportation initiatives, including neighborhood bicycle and pedestrian plans; the incorporation of health analysis into environmental impact reports; the development of a pedestrian safety geodatabase; and community- and project-level health impact assessments.

Contact: Megan Wier, SFPDH-PHES.

Other Resources

- National Association of County and City Health Officials: Brochure on Health in All Policies
- California Strategic Growth Council: Health in All Policies Task Force
- Federal Highway Administration: Metropolitan Area Transportation Planning for Healthy Communities (White Paper)
- Federal Highway Administration: Health in Transportation webpage
- Environmental Protection Agency: Our Built and Natural Environments: A Technical Review of the Interactions Between Land Use, Transportation, and Environmental Quality (2nd Edition)

Health Assessment Tools

Tools and methods to measure the potential health impact of projects, plans, or policies support evidence-based policy making and help incorporate health considerations into a broader range of public policy objectives. Long used in Europe and Australia, health impact assessments (HIA) are increasingly being used in the United States to influence land use and transportation planning and decisionmaking. A HIA is a set of methods and tools to evaluate the health impact of public policy decisions. The methodology for the HIA includes the standard six-step HIA assessment. While HIAs are the most commonly known health assessment tool, there are several other tools that address connections between land use, transportation, and health.

Examples in Practice

Atlanta BeltLine Health Impact Assessment
Center for Quality Growth at Georgia Tech, City of Atlanta, Centers for Disease Control and Prevention, Rollins School for Public Health at Emory University, and Fulton County Department of Health and Wellness

Currently under construction, the Atlanta BeltLine is a 22-mile multi-use trail (primarily located on former rail beds) that encircles the City of Atlanta. Between 2005 and 2007, the Center for Quality Growth at Georgia Tech conducted a Health Impact Assessment (HIA) of the then-proposed BeltLine. Several recommendations focused on coordinating adjacent land uses to improve public health outcomes, including prioritizing the development of parks and greenspace over retail and residential uses.

In 2012, the HIA team and its partners evaluated the impacts of conducting the original HIA on the development of the BeltLine. The 2012 assessment found that the original HIA influenced public policy as well as land use and project decisions for the area adjacent to BeltLine. For example, greenspace was the first

construction activity along the BeltLine. Also, the U.S. Environmental Protection Agency cited the HIA when it awarded $7 million in grant funding for brownfield clean-up and greenspace development. The BeltLine Corridor Environmental Study Team added health and connectivity considerations to the alternative analysis evaluation criteria of both the Federal and State environmental impact statements/reports, and is also adding a health metric to a decision support tool to guide future funding and development decisions. HIA researchers note that public health outcomes have yet to be measured.

Contact: Beth McMillan, Director of Community Engagement, Atlanta BeltLine, Inc.

Atlanta's Historic Fourth Ward Park along the BeltLine opened in 2011. The park doubles as a water retention facility. | Atlanta BeltLine Partnership

Health Impact Assessment of the TransForm Baltimore Comprehensive Zoning Code Rewrite
Johns Hopkins University and the City of Baltimore

In 2010, the City of Baltimore released a draft update to the citywide zoning code; this was the first comprehensive update since 1971. Johns Hopkins University collaborated with the Baltimore City Health Department to perform a health impact assessment of the draft code - one of the first examples in the United States of an HIA of a zoning code. The HIA compared the proposed changes to the 1971 zoning code, and focused on how the updates would influence public health factors such as obesity, pedestrian safety, nutrition, and crime. Goals of the HIA were to influence the final version of the zoning code and to ensure that healthy recommendations were implemented through the appropriate location of zoning districts.

The HIA recommended several changes that relate to land use and transportation, including:

- Incorporating "crime prevention through environmental design" in design ordinances and standards;
- Reducing liquor stores in mixed-use and transit-oriented areas by mapping existing liquor store locations and including public health criteria in the license approval process; and
- Distinguishing between "healthy food store" and "fast food store" uses.

Final revisions to the updated code were completed in 2013, and included proposed requirements that phase out existing liquor licenses in some residential areas.

Contact: Dr. Rachel L.J. Thorton, HIA Project Director, Johns Hopkins University.

Sacramento Area Recommended Protocol for Evaluating the Location of Sensitive Land Uses Adjacent to Major Roadways
Sacramento Metropolitan Air Quality Management District (SMAQMD)

The Sacramento Metropolitan Air Quality Management District (SMAQMD) "Recommended Protocol for Evaluating the Location of Sensitive Land Uses Adjacent to Major Roadways" is a voluntary guidance tool for use by local planners, decisionmakers, and developers to consider the health impacts of development locations. The tool provides a methodology for assessing and disclosing the potential cancer risk of locating sensitive land uses (such as residential developments, schools, etc.) near roadways where particulate levels may be high. The tool uses emissions and traffic data specific to the Sacramento region that can be used to screen a site-specific project to determine the need for a heath impact assessment, and then provides a methodology to conduct these assessments. Strategies to mitigate the health implications of a project's site - including design considerations and vegetative plantings - are also included in the tool.

Contact: Rachel Dubose, SMAQMD.

Additional Resources

- Health Impact Project: About Health Impact Assessments

- Journal of Health Politics, Policy, and Law: Testing the Results of Municipal Mixed-Use Zoning Ordinances: A Novel Methodological Approach

Statewide Healthy Transportation Planning and Coordination

States are increasingly identifying the intersection of transportation and land use as an opportunity to advance State-level public health goals. To that end, States have incorporated public health considerations in their statewide transportation planning and implementation approaches, particularly by promoting active transportation options such as walking and bicycling, and reducing automobile-centric development patterns.

Examples in Practice

Massachusetts Healthy Transportation Compact and GreenDOT Implementation Plan
Massachusetts Department of Transportation (MassDOT)

As part of transportation reform legislation adopted in 2009, the Massachusetts Healthy Transportation Compact (HTC) directs the Massachusetts Department of Transportation (MassDOT) to coordinate with the State Office of Health and Human Services to achieve positive health outcomes by coordinating land use, transportation, and public health policy. The HTC includes directives for State transportation and public health agencies to leverage and coordinate State and Federal programs, increase mobility options, and decrease greenhouse gas emissions.

In response to the HTC, the 2012 GreenDOT Implementation Plan provides a long-range, interdisciplinary framework that directs all MassDOT business activities to improve public health outcomes over the next eight years. The GreenDOT Implementation Plan includes land use strategies to use MassDOT-owned property for transit-oriented development (TOD), and a goal to triple the mode share of bicycling, walking, and public transit (each) by 2030. To measure the progress of the mode share goal, MassDOT is piloting a Personal Miles Traveled metric for pedestrians, bicyclists, and transit users. The PMT data will be collected for one year and include all trips in order to accurately reflect user's daily traveling behavior. The PMT data will be used to better coordinate statewide transportation planning and land use in order to reduce dependence on driving.

Contact: Catherine Cagle, MassDOT.

Tennessee Office of Community Transportation
Tennessee Department of Transportation (TDOT)

The Tennessee Department of Transportation (TDOT) established the Office of Community Transportation (OCT) in early 2013 to better coordinate local land use decisions with State transportation planning. In addition to lower infrastructure costs, TDOT anticipates that OCT involvement in land use decisions will help reduce the automobile-centric focus of future growth, and improve public health by providing opportunities for active transportation such as walking and bicycling.

The OCT will be supported by a current update to the State long-range transportation plan, which will elevate the importance of bicycle and pedestrian facilities in project planning and design.

The Columbia River Pedestrian Bridge in Nashville, Tennessee connects two greenways | Greenways for Nashville

Four satellite offices staffed with planners from the OCT Community Planning section will work with local communities to promote regional considerations in comprehensive plans as they relate to the State transportation system. Considerations include ensuring that future growth is integrated with existing State infrastructure as much as possible, and that new infrastructure is developed in a coordinated, cost-effective manner that reduces sprawling, isolated development patterns. OCT planners assist with articulating the implications of land use and transportation decisions in the planning process as well as with establishing local partnerships, potentially with local public health agencies.

Contact: Angela Midgett, TDOT Office of Community Transportation.

WalkBikeNC
North Carolina Department of Transportation (NCDOT)

Health is one of the five "pillars" of the North Carolina Department of Transportation's (NCDOT) statewide bicycle and pedestrian plan, WalkBikeNC. Currently in draft form, the health section of the plan was developed in collaboration with Active Living by Design, a program of the North Carolina Institute for Public Health at the University of North Carolina-Chapel Hill. The plan focuses on increasing the accessibility to and connectivity of pedestrian and bicycling facilities (such as sidewalks and trails) in communities throughout the State, and improving health outcomes by integrating active mobility in everyday life.

Health-related strategies of WalkBikeNC include the development of performance measures; the incorporation of health impact assessments into transportation projects; and the inclusion of health practitioners in transportation project scoping and development processes.

Contact: Lauren Blackburn, NCDOT Bicycle and Pedestrian Division,