

Successes **in** Stewardship

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July 2011

Advancing Transportation-Related Livability Goals with GIS Tools

GIS Supports Livability Goals

In March 2011, the Federal Highway Administration's (FHWA) Office of Planning published a report entitled [Applications of GIS for Livability: Case Studies of Select Transportation Agencies](#). Continuing FHWA's work of investigating agencies' uses of geospatial technologies to improve transportation decisionmaking, the report discusses Geographic Information Systems (GIS) and geospatial data that are used to support livability principles. The report includes four case studies that assess how organizations throughout the country are developing and applying GIS tools to advance livability principles. The report also gives examples of notable national and regional efforts to implement GIS in concepts, such as trip planning, vehicle sharing, and community visualization tools, which are advancing transportation-related livability goals.

The U.S. Environmental Protection Agency (EPA), Department of Housing and Urban Development (HUD), and the U.S. Department of Transportation (U.S. DOT) have advanced six livability principles through their [Partnership for Sustainable Communities](#). Generally, these principles promote the integration of transportation, land use, affordable housing, energy efficiency, and environmental considerations with the goals of protecting the environment, addressing climate change challenges, promoting equitable development, and advancing quality of life. FHWA's report focuses on two of the Partnership's livability principles that are particularly relevant to transportation:

- Promoting transportation choices, and
- Enhancing communities and neighborhoods.

More information about the livability principles and the Partnership for Sustainable Communities is available in the [August 2010](#) issue of *Successes in Stewardship*.

FHWA Identifies Key Findings in Report

The [Applications of GIS for Livability](#) report findings describe three principal ways that GIS can support transportation-related livability:

1. GIS can support transportation decisionmaking by collecting and spatially arranging data and information about the built and natural environments. Spatial information helps the public make better decisions about where and when to travel and by which mode.
2. GIS can highlight connections between built and natural environments, helping stakeholders better understand their interactions with both. GIS can enhance communities and neighborhoods by raising awareness of these interactions and helping citizens identify factors that make livable environments.
3. GIS can help transportation decisionmakers build broad consensus among various entities, including the public, by making information on complex transportation and environmental issues more accessible. Building consensus and making information accessible helps support full community participation in transportation decisionmaking, which contributes to a more livable community.

The report's findings also show that there are many applications of GIS being implemented at the national, State, and regional levels that help to advance transportation-related livability goals. For example, there are tools that promote trip planning, transit tracking, vehicle sharing, neighborhood connectivity, and community visualization. A key component of many of these tools is the manipulation of open data, whereby instead of restricting access to spatial information for staff only, agencies make data readily available to anyone who is interested. Developers can use open data to develop third-party applications that enable users to view open data spatially.



Participants report observations using GIS-enabled mobile devices. (Courtesy of University of Oregon)

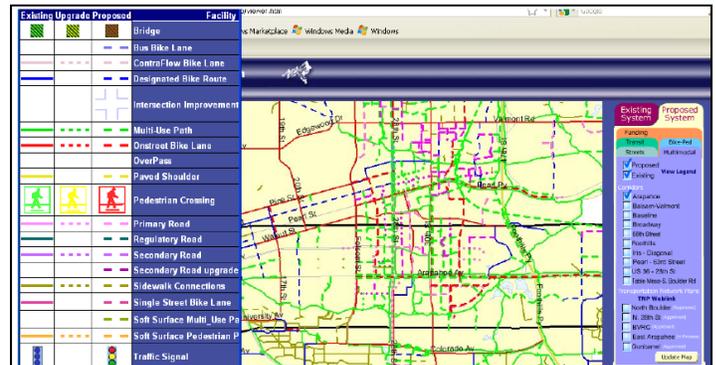
Agencies Showcase Livability Tools

The [Applications of GIS for Livability](#) report presents case studies from four agencies and organizations of how to apply livability tools, which are summarized below.

City of Boulder, Colorado

In 2003, the city of Boulder converted 10 multimodal corridors to GIS format for its Transportation Master Plan. The purpose of this effort was to support city staff in making decisions about how to invest in these corridors. The city also created an online, GIS-based ["Map It" application](#) that uses corridor data to allow the public to visually explore the existing transportation system and over 800 planned projects, including those within the 10 multimodal corridors.

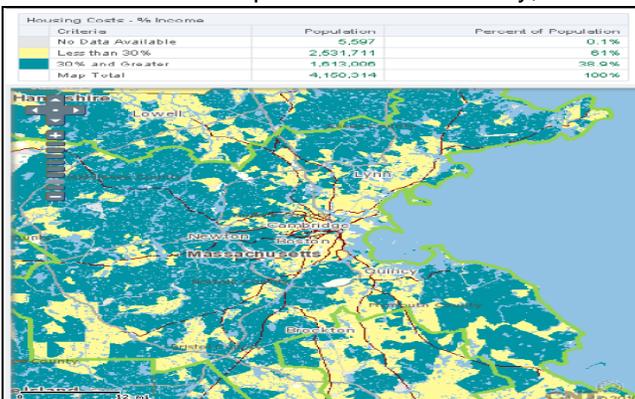
The GIS data and "Map It" have allowed the city of Boulder to address several livability goals. For example, staff can now identify corridors that exhibit complete streets principles, and they can more easily identify characteristics of the built environment that are conducive to planning for alternative transportation. As a result, staff can better assess investment priorities for multimodal corridors and advance livability-related policies.



The city of Boulder's "Map It" application displays the current and future multimodal transportation network. (Courtesy of the city of Boulder)

Center for Neighborhood Technology

The Center for Neighborhood Technology (CNT), a livability- and sustainability-focused research center in Chicago, formulated the concept of "location efficiency," which means that there is an inherent value (of any



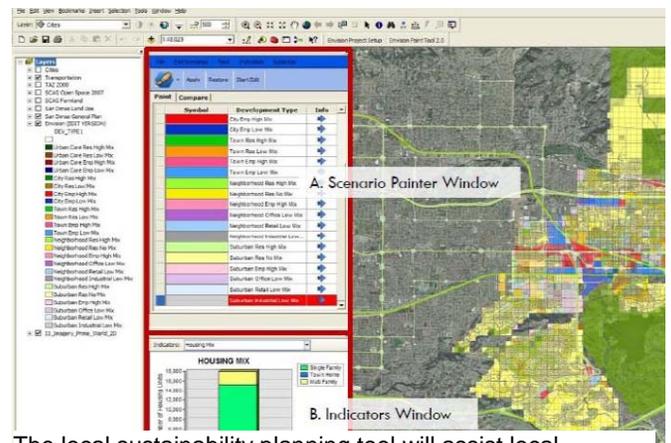
community/neighborhood) stemming from the development patterns of its surroundings. For example, neighborhoods with access to transit, jobs, and a wide variety of services have higher location efficiencies than neighborhoods without these amenities. CNT also measures the affordability of neighborhoods, defining "affordable" as the average combined housing and transportation costs amounting to no more than 45 percent of a household's income.

CNT's Housing + Transportation Affordability Index allows users to analyze housing and transportation costs. (Courtesy of CNT)

CNT's [Housing + Transportation Affordability Index](#) uses GIS capabilities to demonstrate location efficiency and allows users to visualize the impacts of housing and transportation costs on neighborhood affordability. CNT created an interactive mapping website that presents the Index's results at the neighborhood level. Jurisdictions across the country have used the Index's data to support development of transportation plans and policies.

Southern California Association of Governments

The Southern California Association of Governments (SCAG) developed two GIS-based tools to support several statewide and regional livability-related initiatives, and also provided assistance to California in achieving its greenhouse gas (GHG) emission targets. The [California Land Opportunities Tracking System](#) (CALots) is an online information portal and GIS-based mapping platform that provides an array of information, such as land uses, demographics, and transportation infrastructure (e.g., transit stations). Users can create customized GIS maps for specific neighborhoods and analyze development potential in areas around transit stations.



The local sustainability planning tool will allow local governments and stakeholders to create development scenarios and assess their impact on livability-related indicators, such as vehicle miles traveled and GHG emissions. SCAG anticipates using the tool when conducting scenario planning workshops with local jurisdictions to develop a regional vision for coordinated land use and planning.

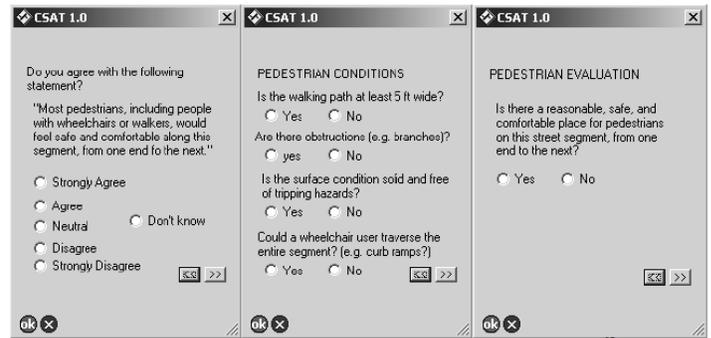
The local sustainability planning tool will assist local governments in creating development scenarios and assessing their impacts. (Courtesy of SCAG)

Oregon's Transportation Research and Education Consortium and the University of Oregon

With support from Oregon's Transportation Research and Education Consortium, University of Oregon researchers developed a series of mobile GIS tools to map a neighborhood's conduciveness to biking and walking. The tools promote "participatory GIS" by allowing the public to assist with mapping the characteristics of neighborhood streets, sidewalks, and intersections using GIS-enabled mobile devices. This effort facilitates citizen engagement in transportation issues, and leverages community investments in livability opportunities.

One such tool is the Complete Streets Assessment Tool (CSAT), which serves as an audit tool in support of

complete streets, which are roads designed to safely accommodate all users. CSAT users load the tool onto a handheld device to collect and enter quantitative and qualitative data on neighborhood streets and intersections, providing input on actual environmental conditions, such as sidewalk width and pedestrian hazards.



CSAT's interface allows users to record information about their perceptions of the built environment. (Courtesy of the University of Oregon)

Applying Livability-Related GIS Tools

Transportation agencies at the national, State, and regional levels can use many types of GIS tools to promote transportation choices, enhance communities and neighborhoods, and achieve other transportation-related livability goals. The use of GIS tools to support these goals has many benefits. One such benefit is a more transparent and collaborative planning process, which fosters citizen engagement in transportation decisionmaking and contributes to a community's livability. Transportation agencies can also use GIS to promote environmental stewardship and streamlining. By showing data spatially, GIS can demonstrate the impacts that projects may have on the natural and built environment. GIS can also showcase the complex relationships between various factors, such as planned and existing transportation infrastructure and sensitive environmental areas. In doing so, GIS can support transportation agencies in making more effective decisions about projects, allowing them to invest more strategically in transportation infrastructure.

Next Steps

FHWA will sponsor a peer exchange on livability-related GIS tools in July 2011 in Boulder, Colorado. The peer exchange will convene individuals who were involved in developing or managing the tools described in the [Applications of GIS for Livability](#) report's case studies, as well as other interested individuals from State DOTs, Metropolitan Planning Organizations, and other organizations around the country. FHWA will provide a report documenting the peer exchange on its [GIS in Transportation website](#) following the peer exchange.

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Look What's New!

- FHWA launched a redesigned homepage for its Environmental Review Toolkit with a new, user-friendly interface. The Toolkit website is located at <http://environment.fhwa.dot.gov>.
- FHWA's Planning and Environment Linkages (PEL) Program is offering an additional session of its *PEL 101: Tools for Adopting and Implementing a PEL Approach* webcast. The webcast will take place on July 20, 2011, from 2:00 to 3:30 p.m. ET. [Click here](#) to register.
- U.S. DOT has completed a draft report that documents the second phase of U.S. DOT's review of implementation of amendments to Section 4(f) enacted under Section 6009 of SAFETEA-LU. [The Phase II draft report](#) provides results of a survey conducted to update the *de minimis* impact provision evaluation conducted under the first phase of the study, as well as an assessment of the application of the new "prudent and feasible" standards.
- U.S. DOT, EPA, and HUD celebrated the second anniversary of the agencies' joint [Partnership for Sustainable Communities](#). EPA and HUD are making available \$5.65 million in grants for the development of sustainable communities. U.S. DOT is making available \$175 million in livability grants aimed at improving transportation options for urban, suburban, and rural communities. For more information, [click here](#).