BUILDING HEALTHY AND PROSPEROUS COMMUNITIES:

HOW METRO AREAS ARE IMPLEMENTING MORE AND BETTER BICYCLING AND WALKING PROJECTS

Transportation for America

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Transportation for America is an alliance of elected, business and civic leaders from communities across the country, united to ensure that states and the federal government step up to invest in smart, homegrown, locally-driven transportation solutions — because these are the investments that hold the key to our future economic prosperity.
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A Introduction

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Providing people with safer options to walk or bicycle can help communities of all sizes — and most importantly the people within them — to thrive. Places where people can comfortably walk or bicycle are attractive to potential customers (and new businessses), and can even help attract talented employees to an area. Business owners — supported by data — are trumpeting the economic benefits of these places where walking or bicycling from place to place are safe, convenient, and enticing choices. Take these business owners with shops along Broad Avenue in Memphis, Tennessee who noted an increase in sales after the addition of new bicycle lanes on the street.

- *"The lanes slowed down traffic and people started noticing the businesses more. Our business revenues have grown on average 30 percent per year — yes, an art-related business in a tough economy."*
  - Pat Brown, co-owner of T Clifton Gallery on Broad Avenue in Memphis.[1]
- *"It [adding bike lanes] was probably one of the best things to happen for my business."*
  - Katelynn Meadows, owner of Sweetly on Broad Avenue in Memphis.[2]

And numerous studies indicate that walking, bicycling, and complete streets improvements lead to an increase in businesses, jobs, and revenue. The evidence is in:

- *Sales increased by 60 percent for businesses in the Valencia Street corridor in San Francisco, CA, which business owners attributed to the addition of a bicycle lane on the street.*
- *The addition of wider sidewalks, traffic calming features, landscaping, and a pedestrian plaza spurred 800 new jobs and a 26 percent increase in sales tax revenue in Lancaster, CA, a city with about 160,000 people.*
- *Creating a safer street–with new bicycle lanes and two travel lanes instead of four–led to growth in the number of businesses by a factor of four, the creation of 560 new jobs, and a forty percent decrease in collisions along Edgewater Drive in Orlando, FL.*

Safer ways to walk or bicycle also lend people the opportunity to walk or bicycle more as part of their regular routine and get the amount of physical activity that science proves they need to reduce their risk of certain chronic diseases. Heart disease is the cause of one out of four deaths in the United States and is the leading cause of death among both men and women. Diabetes is the seventh leading cause of death. Both are significantly more common among people of color. The people who decide which transportation projects to fund — and how — have the potential to help reduce the prevalence of these diseases and others by helping more people walk or ride a bicycle for transportation purposes.

As the gatekeepers of billions of federal transportation dollars, metropolitan planning organizations (MPO) have an influential role in expanding and improving these options for walking and bicycling. They may establish policies, develop plans, direct funding, and help design transportation projects to allow more people to easily

1 Flusche, D. (2012). Bicycling Means Business: The Economic Benefits of Bicycle Infrastructure. Advocacy Advance.

2 Ibid.

walk, bicycle, or ride in a wheelchair. Doing so can help people get the physical activity they need to be healthy and help build an economically prosperous region.

Walking and bicycling infrastructure works. Built in the right places with appropriate density, it makes it possible for greater numbers of people to walk and bike for more trips. With the right design, they are also incredibly effective at keeping people safe. Sidewalks could cut 88 percent of fatalities among people walking along the side of a roadway.[3] Reducing the number of travel lanes on a road (i.e., performing a "road diet") could reduce crashes between 19 and 47 percent, depending on the type of roadway transformed.[4] Protected bicycle lanes could reduce bicyclists' risk of injury by up to 90 percent.[5] With almost 6,000 travelers killed on foot and 840 killed while bicycling in 2016 across the U.S. — an eleven percent increase in pedestrian fatalities over the previous year — thousands of peoples' lives are at risk without these safety features.[6]

But these types of projects aren't just nice to have — they're also extremely cost effective. The Virginia Department of Transportation, for example, found that walking (and transit) projects up for funding consideration in 2016 would yield the greatest return on investment, providing incredible benefits for relatively low costs, compared with expensive roadway projects.

The initiatives spearheaded by the MPOs profiled in this guidebook have resulted in more — and better — walking and bicycling projects in communities across the country. The enclosed case studies, illustrating eight distinct strategies, provide inspiration, ideas, and replicable tactics for MPOs to emulate or consider.

These MPOs achieved success because they based their decisions on feedback from community members, developed solutions for their diverse member jurisdictions, provided a comprehensive suite of resources that helped their members excel, and implemented bold changes. These MPOs and scores of others are excelling, but there's much more that could be done to build the necessary bicycling and walking projects to keep people thriving, safe, active, and connected to the places they need to go.

We hope that your MPO can use the examples in this guidebook to inspire and inform your own efforts, tailor them for your region, and improve upon them to give the people in your region the bicycling and walking projects they demand and deserve.

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3 Federal Highway Administration. (2001). An Analysis of Factors Contributing to "Walking Along Roadway" Crashes: Research Study and Guidelines for Sidewalks and Walkways. Report No. FHWA-RD-01-101, FHWA, Washington D.C.

4 Harkey et al. (2008). "Crash Reduction Factors for Traffic Engineering and ITS Improvements. NCHRP Report 617. Washington, D.C.: Transportation Research Board.

5 Teschke K. et al. (2012). "Route infrastructure and the risk of injuries to bicyclists: A case crossover study." American Journal of Public Health. 102 (12), 2336-2343.

6 National Highway Traffic Safety Administration. (Oct. 2017). "2016 Fatal Motor Vehicle Crashes: Overview." Traffic Safety Facts: Research Note. DOT HS 812 456. Washington, DC: National Highway Traffic Safety Administration.

1 Design guidance for bicycling and walking projects

Metro (Portland, OR)
Corpus Christi MPO (Corpus Christi, TX)

Encouraging investments in walking and bicycling projects with specific designs that increase travel on foot and bicycle and decrease crashes.

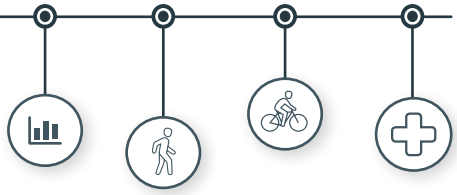
Separating people who travel on foot and bicycle from moving vehicles decreases collisions, injuries, and deaths and leads to greater numbers of people who choose to walk or bicycle than "minimal" active transportation infrastructure (e.g., walking or bicycling elements without separation or distance from vehicular traffic). To encourage the construction of bicycling and walking projects that would have the greatest impact crashes, injuries, and fatalities, as well as people's likelihood to travel on foot or bicycle, some MPOs have developed specific project selection criteria; these criteria or plans make it more likely for the MPO to fund active transportation projects that feature certain designs with proven relationships to those factors, such as protected bicycle lanes, wide sidewalks, pedestrian refuge islands, and more.

After the opening of Seattle's Second Avenue protected bike lane, the rate of bicycle collisions dropped by 82 percent. Photo by Rochelle Carpenter, T4America.

1 – DESIGN GUIDANCE FOR WALKING AND BIKING PROJECTS

METRO (PORTLAND, OR)

Improving the design of walking and bicycling projects to encourage active transportation and keep people safe



THE BOTTOM LINE

Metro, the metropolitan planning organization (MPO) for the Portland, Oregon region, incentivizes transportation projects that would likely result in more walking or bicycling trips. Rather than scoring proposed projects with any kind of walking or bicycling infrastructure equally, Metro awards more points to proposed projects that feature designs such as protected bicycle lanes, wide and buffered sidewalks, curb extensions, and more. The designs that receive more points are proven to result in increased walking or bicycling, fewer crashes, and/or slower traffic in research studies. This methodology is applied to one of Metro's funding programs known as Regional Flexible Funds. Metro staff remain involved through the implementation process to ensure that any advanced bicycling and walking features are built as projects move from planning to construction.

Metro's RFF program supported a new gateway — complete with wide sidewalks, landscaping, bike lanes, and more — to downtown Oregon City, OR along McLoughlin Blvd. Photo courtesy of Metro.

THE CONTEXT

Metro is the first and only directly elected regional government body in the United States. Metro serves 1.5 million people in 24 cities across Clackamas, Multnomah and Washington Counties. The region includes a variety of land uses, from high to low density in urban, suburban, and rural areas. In addition to serving as the MPO for the Portland region, Metro guides land use policy to support economic development and growth while still preserving open space and agricultural land in order to maintain the region's urban growth boundary. Metro is also responsible for several services not typically handled by an MPO, such as maintaining many of the region's parks and trails, managing solid waste and recycling services, and running the Oregon Convention Center and the Oregon Zoo.

THE PROBLEM

Metro has a longstanding history of supporting multimodal street design. The MPO identified best practices in street design in 1997 in its first edition of *Creating Livable Streets Design Guidelines*. Metro established a policy stating that projects funded with Regional Flexible Funds (RFF) would be required to adhere to the design guidelines. However, guidelines last updated in 2002 did not reflect emerging research and modern best practices that suggested how to encourage the highest rates of walking and bicycling.[1] Emerging research from Portland State University found that wider, protected bikeways outperform bicycle lanes in terms of ridership, safety, and comfort for bicyclists.[2] Research done by the City of Portland similarly revealed that 60 percent of Portlanders did not feel safe or comfortable bicycling on existing infrastructure, but that they would bike more if protected cycle tracks were available.

While research and best practices indicated that wider, protected facilities would lead to more walking and bicycling, these types of facilities were not being built consistently. Metro's funding criteria did not address project design and therefore did not prioritize the safer, more comfortable infrastructure.

WHAT THE MPO DID

To encourage better, safer design and more meaningful investments in pedestrian and bicycle infrastructure, Metro took three basic actions. First, the MPO allocated funding specifically for active transportation projects. Second, the MPO restructured Metro's project selection process to prioritize high-quality bicycle and pedestrian project design. Third, Metro staff took on a more active role in project design and implementation.

1 The guidelines will be updated in 2018.

2 Monsere C et al. (June 2014). *Lessons from the Green Lanes: Evaluating Protected Bike Lanes in the US*. National Institute for Transportation and Communities. U.S. Department of Transportation. http://trec.pdx.edu/research/project/583/Lessons_from_the_Green_Lanes:_Evaluating_Protected_Bike_Lanes_in_the_U.S._

Metro allocates funding for the RFF program, which consists of dollars from the federal Congestion Mitigation and Air Quality program (CMAQ), the Surface Transportation Block Grant program (STBG), and the Transportation Alternatives Program (TAP). Metro recently allocated $130 million for the FY2019-2021 RFF program. $25.81 million of this is dedicated to active transportation and complete streets projects. Another $9.87 million is earmarked for transit-oriented development; this set-aside supports active transportation by encouraging dense land use patterns conducive to walking and biking.

Metro aimed to ensure that projects selected for funding were held to a higher design standard. The MPO sought to raise the bar from funding minimal walking and bicycling infrastructure and instead promote modern designs that would facilitate safer, more convenient travel for pedestrians and bicyclists. RFF project selection criteria for active transportation projects award more points to proposed projects with higher degrees of physical separation and/or protection for people who bicycle or walk since research found that these kinds of designs would lead to fewer crashes and encourage people to walk or bicycle, rather than simply accommodate them. For example:

- Several research projects found that the number of people who bicycle on a given street significantly increased after the addition of protected bicycle lanes. These recent studies found increases between 21 percent and 171 percent.[3]
- One study found that protected bicycle lanes reduced injury risk by up to 90 percent.[4]
- Another study found that the greater the number of quality pedestrian infrastructure features in an area (e.g., buffered sidewalks, short pedestrian crossings), the greater the numbers of people who walked.[5]

Metro has a full compendium of research that demonstrates the effectiveness of specific bicycling and walking project designs to change walking and bicycling rates, crash numbers, and traffic speeds.

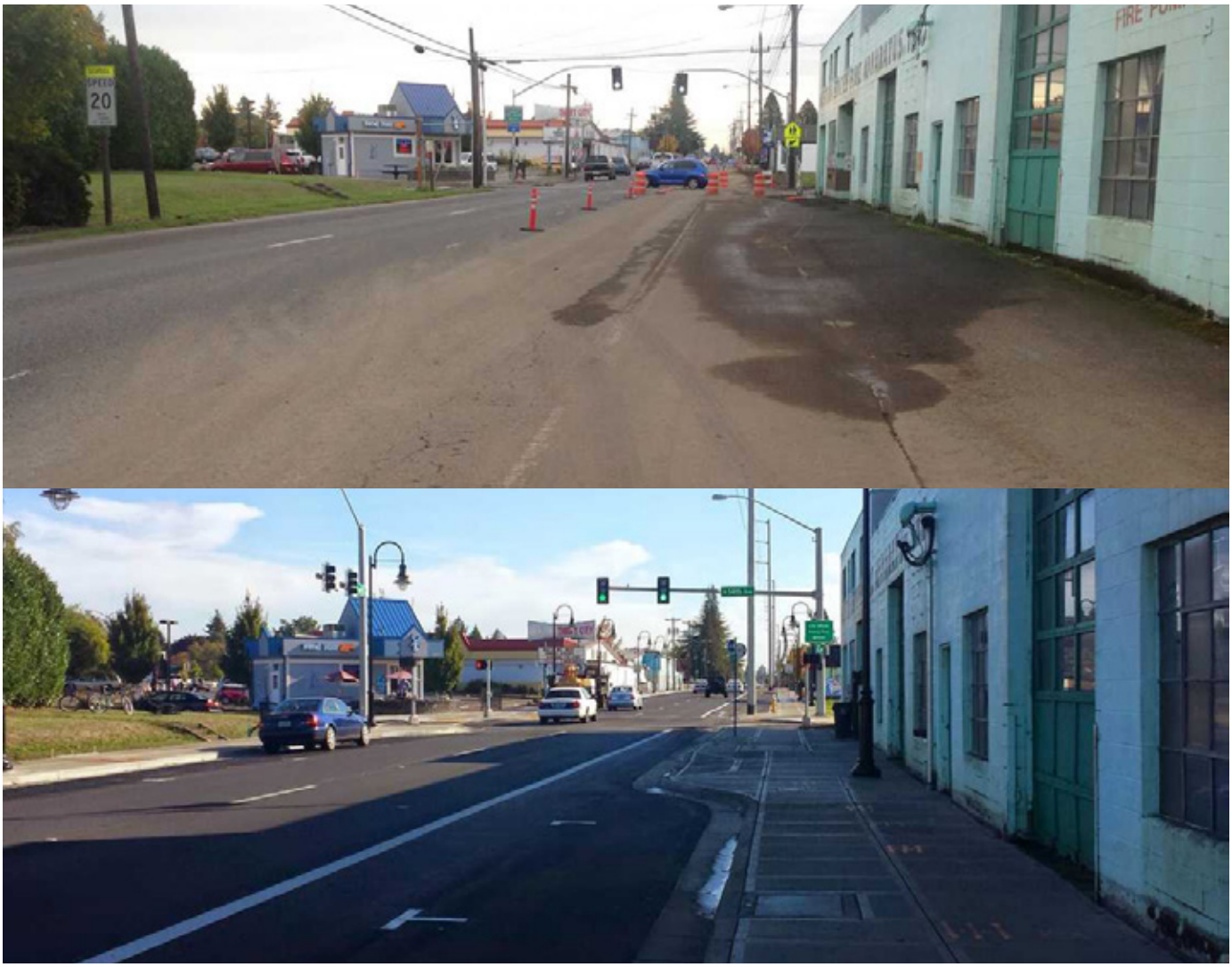
Metro sets a more ambitious standard with the new criteria. The MPO awards more points to proposed projects that would provide more space for walking and bicycling facilities and that would physically separate people traveling on foot and bicycle from traffic. For example, proposed projects with wider, buffered sidewalks are awarded more points than those with standard sidewalks.

A design that calls for a separated bicycle lane, like the Naito Bikeway in Portland, would receive three points, plus benefit from doubled weighting, through Metro's scoring methodology. Photo courtesy of Metro.

3 National Association of City Transportation Officials. (2016). "Equitable Bike Share Means Building Better Places for People to Ride. Available online at: https://nacto.org/wp-content/uploads/2016/07/NACTO_Equitable_Bikeshare_Means_Bike_Lanes.pdf.

4 Teschke K et al. (2012.) "Route Infrastructure and the Risk of Injuries to Bicyclists: A Case-Crossover Study." *American Journal of Public Health.* 102. 2336–2343.

5 Cain KL, Millstein RA, Sallis JF, Conway TL, Gavand KA, Frank LD, et al. (2014.) "Contribution of streetscape audits to explanation of physical activity in four age groups based on the Microscale Audit of Pedestrian Streetscapes (MAPS)." *Social Science & Medicine* 116: 82–92.



The RFF program funded new wide sidewalks, lighting, and safer crossings for people traveling on foot, as well as bicycle lanes, on Baseline St. in Cornelius, OR. Photos courtesy of Metro.

Similarly, projects that would build raised or separated cycle tracks are given higher priority over those that would place bike lanes in the vehicular right-of-way, depending on the speed and volume of the road.[6] The criteria also reward projects that would improve safety and visibility at intersections by giving people walking or biking a head start at traffic lights or introducing clearer signage. This new grading system incentivizes project sponsors (entities that are seeking or receiving funding for transportation projects) to incorporate premium design features for the safety and comfort of pedestrians and bicyclists.

The MPO also facilitates a public commenting process through an online platform where anyone can access information about the projects under consideration and provide their input. Metro then synthesizes these comments and shares them with project sponsors so they can refine their designs to better meet the needs, desires, and concerns of the community.[7]

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6 To view the full application packet, including detailed grading criteria and a comprehensive list of premium design features, visit: http://www.oregonmetro.gov/sites/default/files/RFFA%20Nomination%20packet_2019_FINAL_corrected.pdf.

7 Metro's synthesis of public comments on projects under consideration for funding is available in its Engagement Report: http://www.oregonmetro.gov/sites/default/files/Regional-Flexible-Funds-RFFA-Engagement-Report-120216.pdf.

Once funding is awarded to project sponsors, Metro takes a hands-on role in guiding project design. Metro staff provide ongoing input to ensure that projects meet their goals and requirements as they move through the design process.

HOW THE MPO DID IT

Every three years, Metro allocates RFF to eligible projects throughout the Portland region. Projects are first reviewed by members of the Transportation Policy Alternatives Committee (TPAC), which is a 21-person advisory body that includes technical staff (e.g., engineers and planners) from local, county, and state transportation agencies; six community members appointed by the Metro Council; and staff from the Southwest Washington Regional Transportation Council. TPAC screens and scores proposed projects, which are then released online for public comment.

Next, members of the Joint Policy Advisory Committee on Transportation (JPACT) review the scored projects and consider public feedback. This committee is composed of 17 representatives from local and county governments; elected officials and a few transportation agency staff, listed below, sit on JPACT. JPACT then forwards its list of recommended projects for funding to Metro Council, an elected body with six district representatives and a president. Metro Council either affirms or remands JPACT's decision on the list of projects recommended for funding.

As previously discussed, Metro created a new rubric to design its competitive funding process to prioritize projects that overcome barriers to walking and biking experienced in communities across the region. The rubric includes ten criteria, including serving underrepresented populations, improving safety, filling gaps in the existing active transportation network, and improving access to jobs, schools, and transit. Each proposed project is given a grade based on how well it would address those ten criteria. For each criterion, the rubric provides a clear explanation of what each grade value entails and lists potential data sources to support grading decisions.

"When you put better design in the funding criteria, it elevates the discussion and makes people realize that design — even at the phase of seeking funding — is really important to think about … The way you design facilities really matters in the creation of a network that is accessible to people of all ages and abilities."

-Lake McTighe, Active Transportation Project Manager, Metro

For example, one of the new criteria calls for proposed projects to be assessed for their ability to provide a comfortable experience for pedestrians and/or bicyclists. Proposed projects receive a grade based on their inclusion of premium design features, some of which are listed below. Critically, some of these design guidelines are sensitive to the context of the road in question. Indeed, a street with a posted speed of 35 miles per hour that carries over 6,000 cars per day requires even greater separation of modes than does a slower-speed, lower-volume street.

Some of the design elements that earn proposed projects a higher grade include:

Pedestrian design elements:

- Adding buffered sidewalks 8-17 feet in length, with width requirements determined by road volume and speed;
- Clearing obstructions from sidewalks;
- Adding or re-opening crosswalks;
- Narrowing travel lanes;
- Reducing crossing distances;
- Improving lighting at crosswalks;
- Introducing pedestrian-friendly signal timing and lead pedestrian intervals; or
- Adding benches and transit stops.

Bicycle design elements:

- Adding protected 6-foot bike lanes with 3-foot buffers or raised bikeways on high-speed, high-volume roads;
- Building buffered bike lanes on low-volume roads;
- Creating separate multi-use trails parallel to the road;
- Developing wayfinding signage; or
- Installing bike priority treatments at intersections.

The design of a project like this in downtown Tigard, OR would score well using Metro's proposed transportation project evaluation criteria; it would get more points for the sidewalks, crosswalks, bulb-outs, lights, street trees, and more. Photos courtesy of Metro.

Proposed projects that include at least five premium design elements and provide physical separation from traffic earn the full three points for this criterion. Including only three premium design elements and failing to provide physical separation from traffic is worth just one point. This new grading process ensures that projects with more ambitious pedestrian and bicycle infrastructure that are located where they are most needed, receive the highest grades and are consequently prioritized for funding.

The RFF design criteria are based on guidelines established in the MPO's 2014 *Regional Active Transportation Plan* (ATP). Building off the 2014 ATP facilitated greater buy-in for the design criteria. The design guidelines in the 2014 ATP will also be incorporated into regional street design guidelines in the updated version of the *Creating Livable Streets Design Guidelines*, due in 2018.

Metro's revised RFF application places a great deal of emphasis on public outreach. As part of its application, project sponsors must demonstrate how their proposed project's public engagement process is inclusive of historically underrepresented populations by completing a checklist and submitting supportive documentation.

The checklist includes steps such as developing a public engagement plan, undertaking jurisdiction-wide demographic analysis, and providing timely and accessible forums for public input. Each step on the checklist also requires project sponsors to retain supportive documentation in the form of maps, reports, and notices for Metro Council review.

In addition to enforcing these community engagement requirements, Metro also takes on an active role in facilitating the public comment process. During the public comment period for the FY2012-2021 RFF program funding decisions, Metro received over 3,000 comments.

After projects are screened and scored, an interactive map of all eligible projects is released on Metro's website. Through this online platform, community members provide input and rate their support level for each of the projects under consideration for funding. To spread the word about the comment map, Metro sends email invitations through neighborhood associations and community networks, advertises in local papers, and posts on social media. Metro also holds in-person meetings, such as a public hearing at a Metro Council meeting, to receive public comments. Metro also accepts comments over the phone, via email, and by mail. All materials, including advertisements and the comment map itself, are available in six languages: English, Spanish, Vietnamese, Chinese, Russian, and Korean. A local blog, Bike Portland, amplifies Metro's outreach efforts. Project sponsors have the chance to refine their proposal in response to these comments before final funding decisions are made.[8]

Public input is not just done to fulfill a requirement (in other words, "to check a box"). Indeed, public comments are heard. Once project applications are submitted, community members have 30 days to officially make comments on proposed projects. People may, for example, defend a project that did not receive a high score through Metro's evaluation process. For the FY2019-2021 RFF program allocation, Metro awarded two lower-scoring projects funding because community members proved that the low scores did not convey hidden merits of the projects. The project sponsors dedicated more funding for the projects, added the projects to their list of priorities, and made other adjustments in order to secure funding for these projects.

The last responsibility Metro staff assume is an active role to ensure that projects are constructed with the designs that would most likely facilitate increases in walking and bicycling rates. Metro's engineering staff oversee not only the project selection process, but the project design and implementation processes as well; they serve as both a resource and a watchdog by continuing to oversee projects after funding is awarded. They provide technical assistance, meet with project sponsors to discuss design development, and help overcome challenges that arise along the way. This hands-on involvement ensures projects meet the ambitious design and public engagement goals established in their funding applications.

8 A map of the projects awarded Regional Flexible Funds for the 2019-21 funding cycle can be found here: http://www.oregonmetro.gov/tools-partners/grants- and-resources/regional-flexible-funding.

TIMELINE

1997: Metro identified best practices in street design in its first edition of *Creating Livable Streets Design Guidelines.*
2002: Metro updated *Creating Livable Streets Design Guidelines.*
Fall 2015: Metro developed new criteria to evaluate proposed projects for Regional Flexible Funds (RFF).
January 2016: Metro received public comment on new RFF funding criteria and priorities.
May 2016: Metro adopted new RFF funding criteria to prioritize designs that would most likely lead to increases in walking and bicycling rates.
June – August 2016: Project sponsors applied to receive funding from the RFF program.
September 2016: Metro working groups and committees screened and scored proposed projects.
30 September 2016: Metro's Transportation Policy Alternatives Committee (TPAC) reviewed and discussed the scored project list.
October 2016: Metro released the scored project list for public comment.
November 2016: Metro sent project scores and public comments to counties for prioritization.
December 2016: TPAC made funding recommendations to Metro's Joint Policy Advisory Committee on Transportation (JPACT).
January 2017: JPACT passed RFF funding recommendations to the Metro Council.
February 2017: Metro Council affirmed JPACT's list of recommended projects to fund through RFF.

"I strongly support using transportation design criteria for regionally funded projects. The end result is safer access to transit, jobs and other daily destinations, and more people walking and bicycling."

- Councilor Bob Stacey, Metro Council

KEY PARTNERS

A number of organizations collaborated with Metro to revise the criteria for allocating funds through the RFF program: the municipal, county, and state governments, as well as transit agencies represented on Metro's advisory committees, JPACT and TPAC; transit agencies such as TriMet and SMART as well as the Oregon Department of Transportation; advocates and local community groups, including those representing public health interests and underserved communities (e.g., the Asian Pacific American Network of Oregon), as described in greater detail in the "Involving Public Health Partners" section below. Writers for the local blog Bike Portland helped get the word out to community members during Metro's project selection process.

Partners included:

- Joint Policy Advisory Committee on Transportation (JPACT)
  - Clackamas County
  - Multnomah County
  - Washington County
  - Clark County
  - City of Portland
  - City of Wilsonville
  - City of Beaverton
  - City of Gresham
  - City of Vancouver
  - Oregon Department of Environmental Quality
  - Oregon Department of Transportation
  - Washington State Department of Transportation
  - TriMet
  - Port of Portland
- Transportation Policy Alternatives Committee (TPAC)
  - Southwest Washington Regional Transportation Council
  - Six community members appointed by the Metro Council
  - Technical staff from the same governments and agencies as JPACT
  - Federal Highway Administration (a non-voting member)
  - C-TRAN, Clark County, Washington's Public Transportation Agency (a non-voting member)
- South Metro Area Regional Transit (SMART), a transit agency operated by the City of Wilsonville.
- Bike Portland

BARRIERS ALONG THE WAY

Metro and its partners revised the RFF funding criteria based on the goals established in the 2014 ATP, which was collaboratively produced with wide community input. One concern some jurisdictions had during the creation of the ATP focused on local autonomy and the perception that local governments would be mandated to implement projects in certain ways. The Metro Council convened a large working group and subgroups to work through people's concerns, including concerns about the design of walking and bicycling projects. Thanks to the significant time and attention devoted to addressing stakeholders' concerns, the ATP was successfully adopted.

When it came time to develop the RFF design criteria, resistance was minimal since most points of contention had already been worked through over the course of developing the ATP.

However, stakeholders did raise some concerns about the trade-offs of specific design features. For instance, people raised questions about whether to emphasize quality versus quantity. Was it preferable to implement a more intense design over a shorter distance or to build a more comprehensive network of simpler infrastructure? Similarly, while multi-use, off-road paths would give hesitant bicyclists and pedestrians the most comfort, would more confident users (who might prefer to walk or ride directly on or adjacent to the road) perceive these off-road trails as constraining their movement?

While stakeholders did not come to a universal agreement on the best approach to designing active transportation infrastructure, Metro designed its context-sensitive grading process to partially alleviate disagreements. For example, the MPO took into account the speed and volume of roadways when considering off-road accommodations and prioritized off-road facilities on roads with traffic moving at higher speeds.

These questions and conflicting opinions about specific design features have no one-size-fits-all answer. Issues with the design of transportation projects are resolved on a case-by-case basis by facilitating thoughtful discussion and public feedback to examine each project's individual context. Metro hopes to learn from these discussions to better address concerns with future installments of their long-range plan and upcoming funding cycles.

RESULTS AND BENEFITS

The restructuring of the RFF application process and Metro's more hands-on design guidance for bicycle and pedestrian projects have produced tangible benefits throughout the region. Initial investments have demonstrated how better infrastructure design can be transformative for the safety and comfort of travelers on foot and bicycle. They have helped jurisdictions see that implementing these projects is not only feasible, but also brings a high return on investment. Although Metro has found that ambitious infrastructure design has a higher upfront cost, maintenance costs are lower over time because walking and biking on separated facilities have much less impact on pavement than driving.

By showing local leaders the value of better design for active transportation, Metro has helped spark enthusiasm for and commitment to quality bicycling and walking projects across the region. As a result, local jurisdictions have created better bicycle and pedestrian infrastructure. For example, City of Milwaukie residents recently voted to issue bonds to build more sidewalks. The City of Portland passed a ten-cent increase to its gas tax to support maintenance and safety investments in active transportation in 2016. Metro is optimistic that RFF, coupled with local initiatives, will continue to inspire communities throughout the region to invest in infrastructure for walking and bicycling.

Metro's design-based funding criteria and hands-on involvement in project design and implementation have also led to an increase in the quality of infrastructure. For instance, Metro was closely involved in the design of a Milwaukie project to connect two regional multi-use trails to the street network. Rather than simply funneling the trails onto the road, Metro staff encouraged project sponsors to design a safe, easy transition to and from sidewalks and protected on-street bicycle facilities. This is just one among many examples of how MPOs can take action to promote more and better investments in active transportation.

"Multnomah County Health Department is committed to reducing traffic injuries and fatalities. But we can't reach these goals without changes to street environments such as traffic calming, safe pedestrian crossings, and protected bikeways. Thoughtful street improvements encourage physical activity through walking, biking, and accessing transit. Making these changes are especially critical in neighborhoods where low-income residents and people of color regularly confront streets that lack basic safety features like sidewalks and crosswalks."

- Jae P. Douglas, MSW, PhD, Environmental Health Services Director, Multnomah County Health Department

LESSONS LEARNED

Metro shares the following advice:

1

Start small.

Designing and implementing a complete active transportation network that maximizes safety and comfort will take considerable time. With patience, MPOs can facilitate this process by starting small and building upon their work with each new funding cycle. Begin by agreeing on design concepts or goals and incorporating them into your transportation plan. Next, use this plan as the basis to offer small incentives or extra points in your funding selection process; then implement more ambitious criteria with each new funding cycle. Building just a handful of premium active transportation projects can demonstrate the positive impact of better project design to generate momentum and enthusiasm for additional investments.

2

Strategically allocate flexible MPO funding.

The flexibility of many MPO-controlled funding sources presents a unique opportunity to promote active lifestyles by prioritizing infrastructure that supports biking and walking. And do not stop your work at your own funding programs. Work with your local jurisdictions to pursue additional funding for these kinds of projects in the form of bond programs, ballot measures, and grants.

3

Highlight exemplary design practices.

Active transportation projects yield many returns on investment, including benefits for local businesses, public health outcomes, and safety. Spreading the word about successful active transportation projects helps make the case to decision-makers, developers, and community members about these benefits. MPO staff and leadership can educate local government, advocates, and others about the importance of good design using pictures, case studies, blog posts, and tours of successful local projects. These conversations can generate enthusiasm for active transportation investments and encourage those who construct transportation projects to pursue designs that will keep people safe and foster increases in walking and bicycling from place to place.

INVOLVING PUBLIC HEALTH PARTNERS

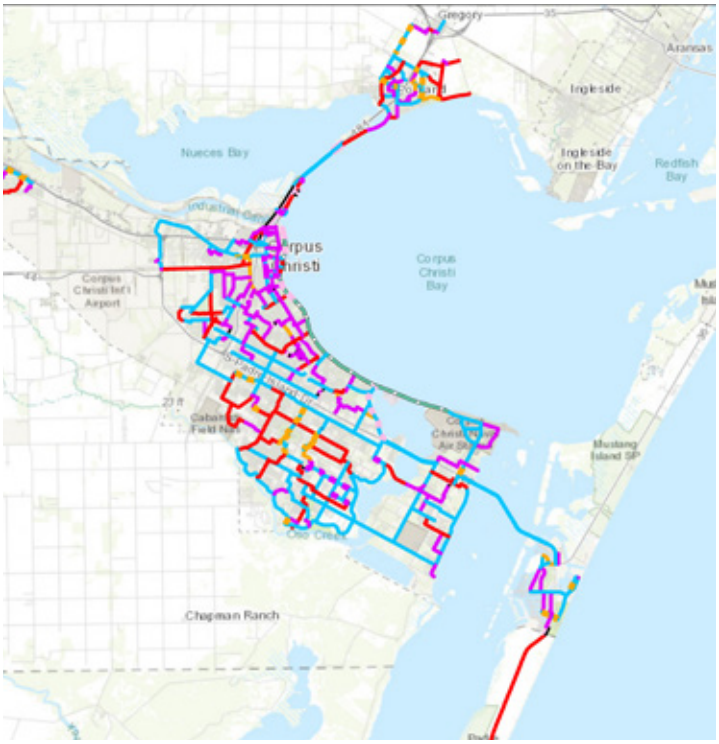
Walking or bicycling for transportation are proven methods to be moderately or vigorously physically active for at least 30 minutes a day, the U.S. Surgeon General's recommendation to reduce the risk of certain chronic diseases. Metro studied the specific kinds of walking and bicycling infrastructure that would most likely lead to increases in walking or bicycling rates and reduce crashes. The MPO prioritized proposed transportation projects that would provide such infrastructure by awarding them more points in the scoring process for the RFF program.

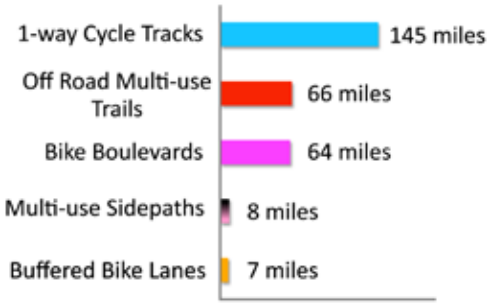
Several public health and social equity organizations provided input on the transportation design guidance developed in the 2014 ATP and the design criteria used to select projects to receive 2019-2021 RFF dollars. For example, the Oregon Public Health Institute, Upstream Public Health, Elders in Action, and many more organizations informed the creation of the ATP. And several organizations concerned about health and social equity, such as the Asian Pacific American Network of Oregon, Safe Routes to School National Partnership, and 1,000 Friends of Oregon, participated in a stakeholder policy work group that guided the development of the RFF policy. What's more, Metro formed a technical work group to help develop the technical evaluation components for RFF projects, including the design criteria. Members of the work group included TPAC community representatives.

Metro regularly convenes workgroups, composed of health, equity, and other organizations, to inform its policy development. Additionally, Metro's TPAC, which provides recommendations to the JPACT, includes representatives from jurisdictions and government agencies throughout the region, as well as organizations such as Upstream Public Health, Oregon Commission for the Blind, Community Energy Project, and RideConnection.

"Completing the regional active transportation network is one of my top priorities. Enabling every child and adult to walk and bike safely and comfortably to school and other destinations is essential to reach regional goals and local aspirations. Applying design criteria so regionally funded projects result in sidewalks, bikeways and trails that people of all ages and abilities can use, helps us achieve the vibrant, livable, and equitable community that we all seek."

- Councilor Kathryn Harrington, Metro Council





The 290-mile Bicycle Mobility Network prioritized off-road connections and physical separations to help satisfy the preferences of community members who largely conveyed a preference for cycling as far from traffic as possible. Graphics courtesy of The Corpus Christi MPO.

1 – DESIGN GUIDANCE FOR WALKING AND BIKING PROJECTS
CORPUS CHRISTI MPO (TEXAS)

Designing a customized Bicycle Mobility Network through accessibility planning and community engagement

THE BOTTOM LINE

The Corpus Christi Metropolitan Planning Organization (MPO) developed a 290-mile Bicycle Mobility Network for its greater metropolitan area. To prioritize investments for the right bicycling infrastructure in the right places and to maximize comfort, convenience, and safety for both bicycle-dependent commuters and casual riders alike, the MPO mapped key destinations, analyzed the road network, and made network design decisions based on stakeholder feedback. Once built, the network will deliver riders within ¼ mile of over 80 percent of all daycare centers, academic institutions, grocery stores, markets, low-income housing units, transit stops, and regional parks. The MPO's plan prescribes specific bicycling infrastructure designs — from buffered bicycle lanes to one-way cycle tracks for every segment of the network. This alleviates uncertainty about where investments in bicycle infrastructure should be made and makes roadway construction costs more predictable.

THE CONTEXT

The Corpus Christi MPO serves the urbanized portions of San Patricio County and Nueces County, which includes the City of Corpus Christi, Texas. The region is experiencing significant growth: from 2005 to 2015, the population of the Corpus Christi metropolitan area grew by 9.1 percent. The majority of developed land in the region is zoned for low-density residential use, which has contributed to sprawling, automobile-centric patterns of development as land consumption has outpaced population growth. Consequently, residents of the region spend a disproportionate amount of their household income on transportation: on average, 26 percent of residents' household income in the region is spent on transportation costs, compared to 17 percent nationwide.

THE PROBLEM

The sprawling growth patterns in the Corpus Christi region have placed a heavy strain on roadway maintenance budgets. In the face of these budget shortfalls in recent years, planned investments in bicycle infrastructure became vulnerable to budget cuts due to uncertainty about where this infrastructure should go, what form it should take, and how much it would cost to build.

The MPO sought to address these problems. MPO staff and leadership wanted to both facilitate construction of planned bicycling infrastructure and address other barriers to cycle in the region. For example, through one of its surveys, the MPO learned that over 70 percent of respondents did not feel safe on existing bike facilities close to vehicles, and more than half believed that drivers were too aggressive toward cyclists.

The MPO knew that these factors combined were making it inconvenient and unsafe for people to get around on a bicycle; this was especially limiting access to jobs, goods, and services for residents with a low income, many of whom had limited or no access to a car. Meanwhile, an over-reliance on driving contributed to low rates of physical activity among the region's population. Studies published that more than 37 percent of adults in Corpus Christi were obese, compared to 29 percent nationwide, and 29 percent of Corpus Christi residents reported getting no leisure-time physical activity.[1] These trends left Corpus Christi with the unpleasant moniker of "the fattest city in America" by *Men's Health* magazine in 2010.

WHAT THE MPO DID

The MPO created a *Strategic Plan for Active Mobility* and the Bicycle Mobility Network to prescribe specific bicycling infrastructure on 290 miles of roadway in the region.[2] This network, once built, would make bicycling a viable and safe transportation option for riders with varying abilities and comfort levels; it would also enhance access to essential goods and services for many more residents. The MPO included extensive design guidance for the 290-mile Bicycle Mobility Network. By recommending clear, prescriptive designs for specific segments

1. A comprehensive overview of Corpus Christi's health behaviors and outcomes can be found at: ftp://ftp.cdc.gov/pub/MAPBOOKS/TX_Corpus%20Christi_MB_508tagged.pdf

2 The Corpus Christi MPO's complete *Strategic Plan for Active Mobility*, including a map of the Bicycle Mobility Network, is available online: http://www.coastalbendinmotion.org

of roadway, the MPO alleviated uncertainty about where bicycling infrastructure should be built and how that infrastructure should be designed and maintained. This has made it easier for municipalities to incorporate bicycle infrastructure into their streets.

> *"The network is about getting people out of their cars and on their bikes, and making that a viable and safe option. To do that, we knew from the onset we needed to make it easier for people to get to the places where they're already traveling by car."*
>
> *-Jeff Pollack, Transportation Planning Director, Corpus Christi MPO*

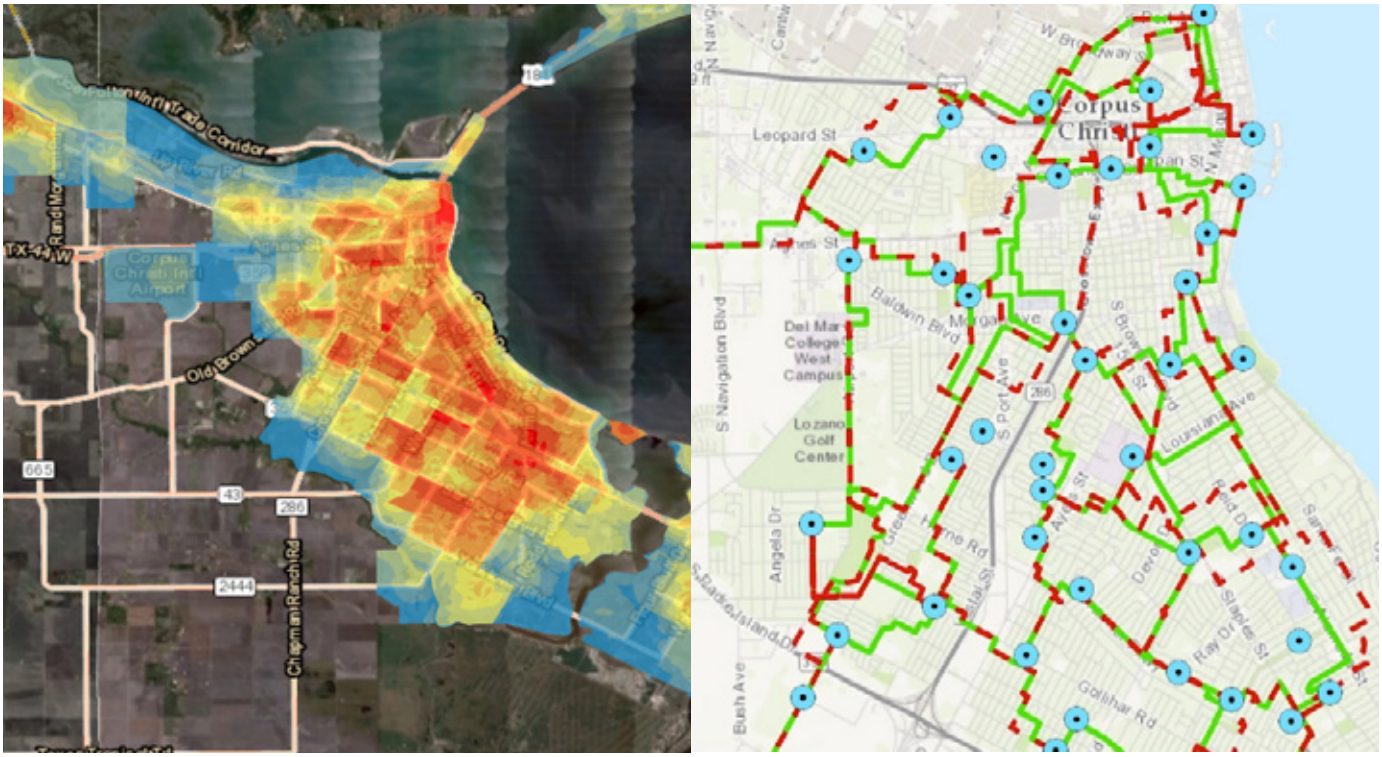
To create the Bicycle Mobility Network, MPO staff and leaders undertook both technical and community feedback efforts. First, MPO staff identified hubs of activity based on land use and places where many people traveled; they also analyzed the physical characteristics of the existing road network. Second, MPO staff and local leaders led a laudable public engagement process by attending events and meetings with residents, conducting interviews, and gathering data on where people currently bicycle and information on where they would like to ride if conditions were to improve with interactive online platforms. The MPO used this information to develop a customized block-by-block design for a holistic network that would bring people to and from their destinations comfortably and safely.

The MPO's finished product, the proposed 290-mile network, recommends 145 miles of protected one-way cycle tracks, 64 miles of bicycle boulevards, and 66 miles of off-road multi-use trails. For each infrastructure type, the *Strategic Plan for Active Mobility* provides cost projections, illustrated dimensions for recommended bicycle infrastructure designs, and references to example projects that meet design and maintenance standards. The plan also specifies treatments — such as sharrows, road diets, parking spots, reduced lane widths, and mid-block crossings — at exact locations. In addition to recommending infrastructure to complete a regional Bicycle Mobility Network, the *Strategic Plan for Active Mobility* also identifies best practices to foster ideas on activities from construction to maintenance to public education. The MPO also suggests lead entities to build recommended bicycling infrastructure and provides reasonable cost estimates. Finally, the plan establishes performance measures and evaluation periods to monitor the implementation of the network.

HOW THE MPO DID IT

By using public feedback and land use analysis to develop the plan, the MPO customized the design of the network based on user preferences, key destinations, and road configurations in the region.

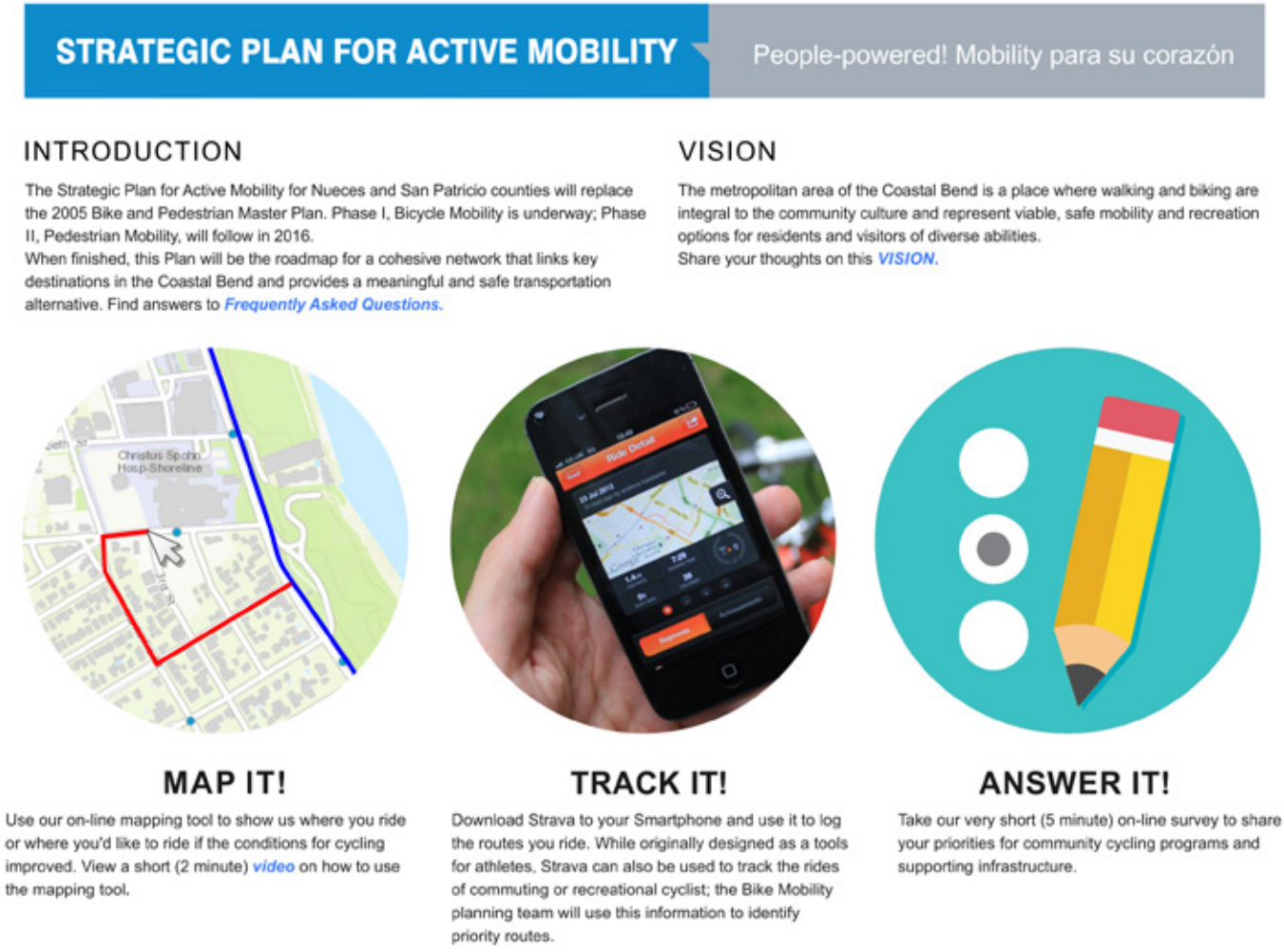
MPO staff used ArcGIS to map the primary destinations that account for the majority of car trips, including schools, daycare centers, parks, grocery stores, transit stops, recreation centers, and low-income housing properties. They then created concentric buffers around these destinations at quarter mile increments and assigned a scoring scheme to create a heat map that illustrated hubs of community activity; areas with the greatest concentration of key destinations were depicted with red and orange coloring; areas with a lower density of these places were colored with blue and green.



Left, the MPO identified hotspots of community activity by overlaying map layers to locate the greatest confluence of key destinations. Right, the MPO identified "network nodes" at key destinations (e.g. schools, regional parks) and then used the Network Analyst extension in ArcGIS to create linkages between the nodes based on community members' stated preference to bicycle on low-stress neighborhood streets and off-road facilities. This demand analysis helped design the Bicycle Mobility Network to improve access to the key destinations within these hotspots. Graphics courtesy of the Corpus Christi MPO.

Once MPO staff identified the location and concentration of popular places that people travel to and from, they used an ArcGIS Network Analyst extension to identify connections between those locations; wherever possible, they identified off-road connections to maximize separation between bicyclists and cars. Public input guided this particular network design concept because community members expressed their strong preference for bicycling on off-road facilities rather than near vehicles. MPO staff reached out to members of the public in person and through interactive online tools to collect feedback on the plan's connectivity network. Individuals mapped either their current bike routes or routes that they would like to take if conditions and infrastructure were to improve using the Map It! tool; the MPO garnered information on 212 routes from 109 users. The MPO also partnered with Strava Metro, ultimately recording 8,353 trips taken by over 750 riders during the planning process using the Strava smartphone app. In addition, the MPO gathered 239 responses about priorities and preferences on its proposed programs and infrastructure to support biking using the Answer It! online survey tool.

To get the word out about these online platforms, MPO staff distributed over 900 leaflets and posters at various locations throughout the area including gyms, parks, bike racks, and pools. Materials were distributed primarily in English, with Spanish translations available upon request. The MPO also gave 25 presentations and attended 15 public events and 30 community group meetings. A consultant specializing in direct engagement conducted 50 supplementary in-person interviews and five focus groups with key stakeholders. This extensive community outreach revealed the public's prevailing concern for safety and a preference for riding on calmer side streets or entirely off the road rather than sharing busy roads with aggressive drivers.



The MPO encouraged residents to use the downloadable Strava SmartPhone app to track their bicycle rides, and the MPO used these data to select routes and to validate network connections identified in the GIS analysis. In some cases, the Strava data helped identify useful connections across city easements or vacant properties that the GIS analysis would not otherwise have found. Graphics courtesy of the Corpus Christi MPO.

Once the optimal network had been defined, the planning team determined exactly what type of bike infrastructure should be installed on each segment of the network to maintain a consistent level of safety and comfort. Whereas higher speed roads would require more ambitious interventions, such as protected cycle tracks, lower cost facilities such as buffered bike lanes or bicycle boulevards would suffice on calmer roads.

MPO staff wanted to produce a resource that would be ready to use and as easy as possible to implement. To this end, they verified that sufficient right-of-way existed on each segment of the network to accommodate the recommended type of bicycle infrastructure. MPO staff used aerial images of roadways and visited some sites to ground truth their recommendations. For example, where the plan called for a buffer between bicycle and vehicular infrastructure, MPO staff measured the exact width of the road to ensure the infrastructure would fit.

In looking ahead toward implementation, the MPO subdivided all of the infrastructure prescribed in the *Strategic Plan for Active Mobility* into two categories: 1) low-cost, rapid-implementation projects that should be undertaken as quickly as possible, and 2) more ambitious strategic capital investment projects that could be implemented opportunistically during roadway reconstruction projects to maximize cost savings. While the MPO itself would not build transportation infrastructure, it would be responsible for helping direct federal funds to the local jurisdictions that would carry out construction.

"Far too often, roads are constructed without considering any other modes of transportation. The Bicycle Mobility Plan develops a prescribed network so planners and engineers can incorporate other modes of transportation into the schematic planning phases. For Portland in particular, having a network designed in advance that provides close access for each and every neighborhood to a hike and bike circuit around the city will help increase the quality of life of our residents."

- Brian DeLatte, Assistant City Manager for City of Portland, Texas

To facilitate implementation of the network, the MPO also revised its scoring rubric for its Transportation Alternatives Program (TAP). The MPO decided to award additional points to proposed projects that would build components of the Bicycle Mobility Network.

In addition to funding the construction of portions of the network, the MPO is using TAP funds to support supplementary programs and projects to encourage bicycling on the eventual network. For example, the Corpus Christi Regional Transportation Authority received TAP funds from the MPO to purchase 1,200 bike racks, 150 freestanding bike pumps, and 65 fix-it stations for strategic distribution throughout the network. While it will take considerable time to fully build out all 290 miles of the network, having a detailed, customized, prescriptive design that reflects local conditions and incorporates the preferences of the community provides local jurisdictions in the MPO region with a clear, defensible, and specific path forward.

TIMELINE

February 2015: The MPO began project scoping.
10 March 2015: The MPO gave its first public presentation.
15 April 2015: The MPO formed the Steering Committee to advise the development of the Bicycle Mobility Network.
16 May-23 July 2015: The MPO conducted public engagement at community events.
October 2015: The MPO largely completed the design of the Bicycle Mobility Network, which it incorporated into multiple Corpus Christ bond projects for which design was underway.
January 2016: The MPO released the *Strategic Plan for Active Mobility*.
February 2016: The Corpus Christi City Council unanimously passed a resolution to adopt and implement the *Strategic Plan for Active Mobility*.
March 2016: The MPO awarded TAP funds to projects that would implement and/or support the Bicycle Mobility Network.
March 2016: The Portland City Council commited to updating its comprehensive plan to incorporate the *Strategic Plan for Active Mobility*.
May 2016: The Corpus Christi City Council unanimously voted to incorporate the *Strategic Plan for Active Mobility* into its Urban Transportation Plan.

KEY PARTNERS

The MPO categorized people who gave feedback on the development and implementation of the *Strategic Plan for Active Mobility* into two distinct categories: facility users and process users. Facility users were members of the community who would actually bicycle on the network once built. Their input was incorporated into the network design through the various community engagement platforms described above. Process users were the entities responsible for building and maintaining the infrastructure prescribed in the plan. These included staff from city and county governments, the Corpus Christi Regional Transportation Authority (CCRTA), and private design and engineering consultants, among others. Individuals from 28 of these organizations, many of whom are listed below, sat on the Project Steering Committee, which met quarterly to vet and guide the development of the *Strategic Plan for Active Mobility*.

The City of Corpus Christi has been instrumental in the development and implementation of the strategic plan. It financially supported the plan's creation by hiring HDR Engineering, Inc. to perform technical consulting for the network analysis and design. With the unanimous support of the City Council, the City has assumed responsibility for signage and branding throughout the network and is actively constructing the network using a combination of TAP funds from the MPO as well as bond and grant funds from other sources. The City is also a key partner in the MPO's performance measurement process: City staff will collect pre- and post-construction bicyclist counts on streets where new bicycle infrastructure will be imminently built.

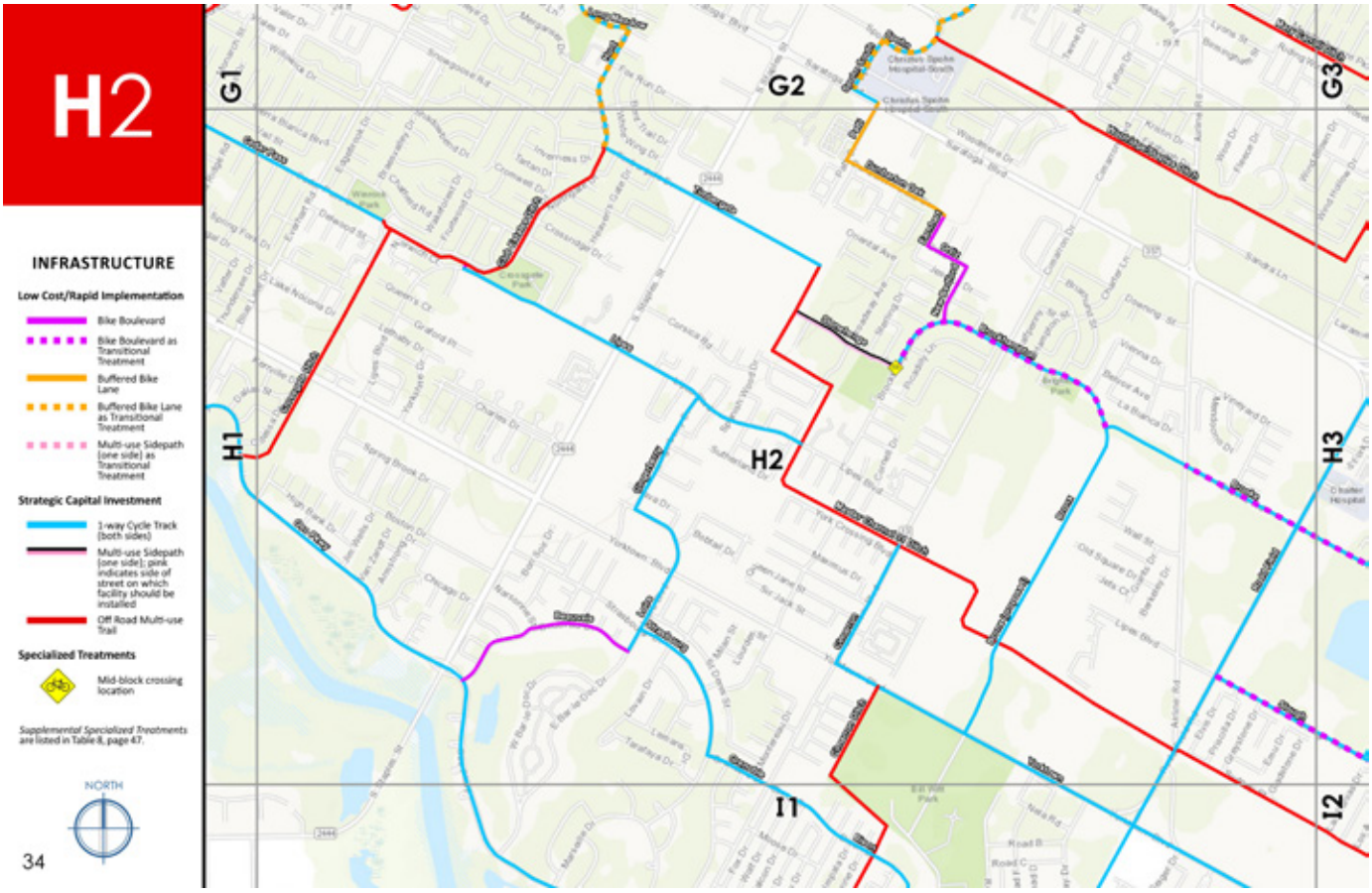
The CCRTA has similarly been indispensable to the plan's development and implementation. Its planning director served as an active, core member of the Steering Committee. CCRTA also contributed financially to the plan's development by hiring a private consultant, Olivarri and Associates; this firm handled direct public engagement by conducting interviews and focus groups, as well as maintaining a database of events and contacts for outreach. Other key partners included the Corpus Christi Downtown Management District and local business owners who collectively financed a bike share pilot program, as recommended in the *Strategic Plan for Active Mobility*.

Key partners included:

- City of Corpus Christi
- Capital Programs
- Development Services
- Parks and Recreation Departments
- Police Departments
- Street Operations Departments
- Traffic Engineering Departments
- Technical Advisory Committee (TAC)
- TAC Hike & Bike Subcommittee
- Corpus Christi Regional Transportation Authority
- HDR Engineering, Inc.
- Olivarri and Associates
- City of Portland
- City of Gregory
- County of Nueces
- County of San Patricio
- Coastal Bend Center for Independent Living
- Corpus Christi Convention and Visitor's Bureau
- Corpus Christi Downtown Management District
- Corpus Christi Housing Authority
- Corpus Christi Independent School District
- Corpus Christi Regional Economic Development Corporation
- Del Mar College
- Island Strategic Action Committee
- North Beach Community Association

- Port of Corpus Christi
- San Patricio Economic Development Corporation
- SEA District Association
- Texas A&M University Corpus Christi
- Texas Department of Transportation

A CLOSER LOOK: BICYCLE MOBILITY NETWORK DESIGN SPECIFICATIONS



BARRIERS ALONG THE WAY

A somewhat surprising group was the source of concern about the unintended consequences of the *Strategic Plan for Active Mobility*: high-speed sports cyclists (who typically ride in the vehicular travel lane). Whereas casual, commuter, or novice bicyclists in the region expressed strong preferences for low-stress infrastructure separated from cars, sports cyclists vocalized that they typically ride at high speeds directly on the road — which only a tiny fraction of potential bicyclists would ever be comfortable doing. While the majority of this group expressed overwhelming support for the new plan, some sports cyclists worried that building bicycle-specific infrastructure away from the road could create an expectation that all bicyclists should exclusively use these new facilities primarily designed for people who would move at a relatively slower pace.

The MPO addressed the sports cyclists' concern in two ways. First, it appended a map of the specific loops used most frequently by sports cyclists. For these identified bike routes on roads, the MPO recommended improvements such as sharrows, widened shoulders, or signs indicating that cyclists may share the travel lane with cars instead of riding on cycle tracks. Second, the MPO appealed to these cyclists by attending their public meetings to highlight universal safety benefits of the Bicycle Mobility Network. At these meetings, MPO staff explained that building protected cycling infrastructure would coax more timid riders onto bicycles. Getting more drivers out on bikes — even infrequently — would increase their awareness of and empathy for cyclists on the road, thereby helping make sports cycling safer. This message, along with the design recommendations, resonated with sports cyclists and ensured their unique needs were considered in the strategic plan.

RESULTS AND BENEFITS

The *Strategic Plan for Active Mobility* includes block-by-block prescriptions for the entire Bicycle Mobility Network. It recommends very specific, ready-to-implement designs. Where it calls for a multi-use side path on only one side of the street, the plan specifies the side of the street on which it should be located. The plan also specifies the exact locations of new mid-block crossings or other specialized treatments as needed to create safe, convenient connections between network segments. Where the plan prescribes longer-term, strategic capital investments, it also provides recommendations for temporary transitional treatments to improve network connectivity in the interim until more ambitious, expensive projects can be completed. Furthermore, the plan delves into design specifications for each type of infrastructure, providing diagrams for the widths of lanes and buffers for a variety of scenarios depending on the width and constraint of the right-of-way.

"The critical strength of the Bicycle Mobility Network is that it addresses accessibility for all road users and prioritizes populations who depend on public transit to get to work, school, and the grocery store. In addition to planning for bike infrastructure, the plan will reinforce theity's ADA plan to achieve accessible paths of travel for individuals with disabilities."

- Judy Telge, Founder of Coastal Bend Center for Independent Living

"The Corpus Christi MPO Bicycle Mobility Plan will make it easier for residents to get around without a car. The Corpus Christi Regional Transportation Authority believes bicycles are a perfect option for reducing first- and last-mile gaps in our transportation network. As a result of the Bicycle Mobility Plan, the CCRTA has increased our investment in bicycle amenities including public bike racks and air pumps throughout the city."

- Curtis Rock, Corpus Christi RTA Chairman of the Board

Implementation of the MPO's *Strategic Plan for Active Mobility* will help local governments and the MPO save a significant amount of money over time. By minimizing uncertainty about what type of infrastructure should go where and how much it will cost, the plan will help prevent future budget overages and expensive change orders.

The recommended bicycling infrastructure should also save money. A full 50 percent of the Bicycle Mobility Network is designed as off-road cycle tracks. These tracks will be built by extending the curb into the road by five feet to make space for a separated bicycle facility directly on the sidewalk instead of using this same space for an on-street bike lane. Building these cycle tracks on the sidewalk rather than on pavement designed and built to support vehicles will dramatically reduce the reconstruction cost of projects by $500,000 per mile. These staggering cost reductions will enable local governments and their partners to build more with less while simultaneously improving safety.

Additionally, the cycle tracks will also make travel safer for pedestrians. The cycle tracks will be built adjacent to ADA-compliant sidewalks and will include enhanced intersection and mid-block crossing treatments. This will make it easier and safer for pedestrians to cross the street, particularly for those using walkers, wheelchairs, or strollers.

The focus on developing the Bicycle Mobility Network has helped decision-makers more quickly and easily award funding to projects. The MPO has already allocated TAP funding to build buffered bike lanes in the City of Portland and bicycle boulevards and off-road facilities in the City of Corpus Christi. The city is also building buffered bike lanes and cycle tracks as part of maintenance and reconstruction through its bond program.

Bicycle Mobility Network Overview

Key Destinations	Description	% within 1/4 mile of Bike Network
Academic	Early education/Daycare centers, grade schools (public and private), higher education campuses	**89%** (158 of 175)
Parks	Greater than 2 aces in size	**85%** (122 of 143)
Food	Groceries, meat and fish markets, bakeries, corner markets	**80%** (104 of 130)
Low-income Housing	Section 8 or Tax Credit properties	**82%** (541 of 657)
Transit	Stops and stations	**83%** (1,088 of 1,319)
Recreation	Pools, senior centers, recreation centers, movie theaters, fitness centers, museums and hotels	**77%** (186 of 242)

The MPO identified six categories of destinations to which residents in its region make most trips on a daily basis; the MPO designed the Bicycle Mobility Network to provide access to these key destinations. When complete, the network will deliver bicyclists within a five minute walk of 89 percent of all academic institutions in the planning area, 82 percent of low-income housing units, and so forth. Graphic courtesy of the Corpus Christi MPO.

Once completed, most residents in the region will be able to reach the network within a two to five minute bicycle ride. Additionally, 82 percent of Section 8 housing units and 83 percent of transit stops will be within a quarter mile of the network, or roughly a five minute walk. This will make it more convenient and safe for people to bicycle for more trips, yielding a wide variety of benefits, such as improved access to jobs and resources for residents of low-income housing, strengthened transit connectivity, and more opportunities to be physically active.

Already, bicycling rates in the region have increased. The number of bike trips recorded with the Strava through the MPO's Track It! app increased by 30 percent from 2015 to 2016. And the bikeshare pilot program, implemented as part of the *Strategic Plan for Active Mobility*, continues to see growth in its ridership every quarter. Nearly four thousand members have joined. In just nine months of operation, people have taken almost 12,000 bikeshare trips while burning over 1.4 million calories. These data highlight the tremendous and growing demand for safe biking options in the Corpus Christi region that the Bicycle Mobility Network will address.

Implementing the *Strategic Plan for Active Mobility* is also expected to lead to improvements in public health outcomes. Not only will people have more opportunities for physical activity, which should reduce the risk of chronic disease, the MPO anticipates less traffic and pollution and fewer respiratory conditions experienced by its residents. This will also help the region meet Clean Air Act requirements and maintain compliant air quality attainment status for ozone as regulated by the U.S. Environmental Protection Agency.

Finally, a completed Bicycle Mobility Network will improve the region's economic competitiveness: having more bikes on the road and more bicycle-friendly infrastructure will make Corpus Christi a more appealing place for visitors and new residents. Local leaders anticipate that this will attract talented workers for businesses in the region and stimulate the local economy.

LESSONS LEARNED

The Corpus Christi MPO shares has the following advice:

1

Make your plan user-friendly for those who will implement it.

The MPO worked closely with the local governments that would ultimately be responsible for building the Bicycle Mobility Network. It organized the plan to meet their jurisdictions' needs and expectations to facilitate the seamless incorporation of its designs into existing transportation planning frameworks. MPO staff also ensured that every bicycle design recommendation would be feasible on a given street by measuring each roadway segment's right-of-way; this has spared implementers from the time-consuming process of verifying or interpreting the plan's specifications, making it far easier and quicker to implement.

2 **Tailor outreach strategies to target distinct stakeholder groups.**

The MPO collaborated closely with local governments, current bicyclists, and future bicyclists. MPO staff worked with the cities, counties, and relevant agencies that would ultimately implement the Bicycle Mobility Network, as well as existing and hopeful bicyclists, to both recommend infrastructure ground in reality and to ensure their commitment to the plan. The MPO's outreach strategy incorporated innovative and interactive online tools and smartphone apps instead of paper surveys. The MPO also intentionally reached out to people at previously scheduled public events and meetings, rather than expecting people to disrupt their routines to attend a separate transportation planning public meeting.

3 **Recommend bicycling infrastructure designs for specific groups of people.**

To design an effective Bicycle Mobility Network, the MPO first needed to define which classes of cyclists it wanted to serve. MPO staff chose to focus on bike-dependent commuters and casual cyclists who preferred the enhanced safety of off-road infrastructure. If a system were to be built designed for them, the region could see significant increases in bicycle riders.

4 **No more infrastructure by default: plan the right infrastructure in the right places.**

The MPO's spatial analysis of key destinations, coupled with its extensive community engagement, allowed it to customize its network to meet the specific needs of the region. Rather than undertaking the expensive and inefficient process of adding one-size-fits-all bike lanes on every roadway by default, the MPO strategically identified specific infrastructure in the safest, most convenient locations based on community preferences and the location of key destinations. This strengthened the utility of the plan, kept cost projections lower, and established a clear, defensible prescription for future investments in bicycle infrastructure.

INVOLVING PUBLIC HEALTH PARTNERS

The original impetus for the development of the Bicycle Mobility Plan came from concerns over public health. *Men's Health* magazine identified Corpus Christi as "the fattest city in the U.S." The region risked not conforming to federal air quality standards, largely due to emissions from vehicles. And residents of the Corpus Christi region expressed concerns that they would be risking their lives bicycling near traffic. To help the region overcome these challenges, MPO staff and leaders developed and began implementing the *Strategic Plan for Active Mobility* and the Bicycle Mobility Network. The plan also promotes health, safety, and wellness by encouraging physical activity in the form of active transportation.

When the City of Corpus Christi reconstructs Rodd Field Rd. in 2017, it will include one-way cycle tracks, constructed with green pigmented concrete on both sides of the street, as illustrated above. Graphic courtesy of the Corpus Christi MPO.

2 Complete Streets policies & programs

Mid-Ohio Regional Planning Commission (Columbus, OH)
Broward Metropolitan Planning Organization (Broward County, FL)

Increasing and improving complete streets throughout a metropolitan region

A "complete street" is one that allows people of all ages and abilities to safely, comfortably, and efficiently walk, bicycle, drive, and use public transportation from place to place. Over the past two decades, government agencies from small cities to MPOs to the U.S. Department of Transportation have adopted complete streets policies to routinely design complete streets in their jurisdiction. There are more than 1,000 such policies across the country, according to the National Complete Streets Coalition. MPOs that have developed, adopted, and implemented exemplary complete streets policies and programs include the Broward MPO in Florida and the Mid-Ohio Regional Planning Commission (MORPC), which operates in the Columbus, OH region. The Broward MPO supports its member jurisdictions in planning and building complete streets projects with funding, technical assistance, tools, and many other resources. MORPC requires that all projects receiving funding from the MPO include bicycle and pedestrian features that are appropriate for the location and the type of roadway.

People bicycle along a street where others are waiting for light rail in downtown Salt Lake City. Photo by Rochelle Carpenter, T4America.

2 – COMPLETE STREETS POLICIES AND PROGRAMS
MID-OHIO REGIONAL PLANNING COMMISSION (COLUMBUS, OHIO)

Encouraging more walking and bicycling through a context-sensitive regional Complete Streets Policy

THE BOTTOM LINE

To serve the needs of everyone who uses the roadways, the Mid-Ohio Regional Planning Commission (MORPC) adopted a regional Complete Streets policy. The policy is designed to drive the implementation of transportation projects to include, improve, and enhance facilities for safe walking and bicycling. The policy requires all projects receiving funding from the Metropolitan Planning Organization (MPO) to include context-sensitive multimodal design features where appropriate, introduce safety enhancements, and ensure that the needs of all users of the road are met, regardless of age or ability. As a result, jurisdictions in the Columbus region have increased investments in pedestrian, bicycle, and transit infrastructure, and some have passed their own local Complete Streets policies.

A multi-use path, landscaping, and a raised island make Northwest Parkway near the Franklin County Fairgrounds in Hilliard, OH much safer for those traveling on foot, bicycle, and wheelchair. These before and after photos were taken in July 2007 and September 2014, respectively.

THE CONTEXT

MORPC is the metropolitan planning organizations serving a population of over 2.3 million residents in five counties centered around Columbus, Ohio. Municipalities in the region range in size from 200 in its rural villages to 860,000 in the City of Columbus.[1] Communities across Central Ohio also represent a spectrum of urban to rural. In fact, agriculture makes up over two-thirds of the land-use in the region. The vast majority of trips in the region are by car: over 90 percent of commuters in Central Ohio travel to work in a personal vehicle, and more than 85 percent drive alone. Central Ohio is the fastest growing region in the state and is expected to gain more than 300,000 new residents by 2030. In this same time period, the number of people over the age of 65 in the region is expected to double.[2]

THE PROBLEM

Residents demanded more safe and convenient options for walking and bicycling, both for recreation and commuting. Communities needed a better active transportation system to help their economies prosper, address inequities faced by underserved residents, and afford more people the opportunity to be physically active. Indeed, public health and census data helped illuminate significant infrastructure gaps in neighborhoods where residents lacked convenient access to both personal cars and transit services. In addition, local leaders recognized that promoting walking and bicycling as environmentally friendly alternatives to driving alone would help meet the region's sustainability goals.

People walking along the street and biking without safe accessibility features in Columbus. Photos courtesy of MORPC.

1 MORPC's metropolitan planning area (the MPO area) includes Delaware and Franklin Counties, and portions of Fairfield, Licking, and Union Counties. A neighboring MPO, the Licking County Area Transportation Study, is the MPO for the Newark area, and covers additional areas of Central Ohio, to the east of Columbus.

2 For a detailed examination of the region's transportation and land use context, consult Chapter 2 of MORPC's 2016-2040 long-range transportation plan: http://morpc.org/Assets/MORPC/files/000MTP_Report_Chapter2.pdf.

However, the projects for which local governments sought funding through MORPC often failed to incorporate sidewalks and bicycle facilities to improve the safety and convenience of walking and bicycling. In order to incentivize member communities to develop a holistic multi-modal transportation system, MORPC developed a regional Complete Streets policy that established requirements for local governments seeking federal transportation funding.

Complete Streets are streets for everyone. *They are designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists, and transit riders of all ages and abilities. Complete Streets make it easy to cross the street, walk to shops, and bicycle to work. They allow buses to run on time and make it safe for people to walk to and from train stations. Creating Complete Streets means transportation agencies must change their approach to community roads. By adopting a Complete Streets policy, communities direct their transportation planners and engineers to routinely design and operate the entire right of way to enable safe access for all users, regardless of age, ability, or mode of transportation. This means that every transportation project will make the street network better and safer for drivers, transit users, pedestrians, and bicyclists — making your town a better place to live. (National Complete Streets Coalition)*

WHAT THE MPO DID

MORPC's Complete Streets policy works in pursuit of three goals:

1. To create a comprehensive, integrated, and connected transportation network that supports compact, sustainable development and provides livable communities.
2. To ensure safety, ease of use, and ease of transfer between modes for all users of the transportation system.
3. To provide flexibility for different types of streets, areas, and users.

To encourage its member organizations to think critically about active transportation, MORPC adopted both a Complete Streets policy and a *Complete Streets Toolkit* with a checklist in 2010. The policy requires all projects that receive funding from the MPO to comply with the principles of complete streets.[3] It sets forth a vision of a transportation system that provides safe, comfortable, balanced, and equitable transportation choices.

All projects for which local governments request funds from the MPO must be designed to meet the needs of all modes of transportation and all users, regardless of age or ability. Crucially, this does not mean every corridor must include infrastructure for all modes of transportation; rather, each project must consider which features are needed depending on the context of the street in question. To drive this commitment into practice and incentivize its member jurisdictions to include bicycle, pedestrian, and transit infrastructure where appropriate in their transportation projects, MORPC integrated compliance of the Complete Streets policy into its funding

3 The full language of MORPC's Complete Streets policy is online at: http://www.morpc.org/trans/CompleteStreets_MORPC_CS_PolicyFIN-AL2010-03-31.pdf.

review process. Project sponsors must include a statement along with their application acknowledging that they have read the policy, understand that it applies to all projects using MORPC funds, and that they must provide details on how the project would accommodate all users to the extent practical. MORPC staff then ensure sponsors adhere to the Complete Streets policy by providing direct technical assistance as projects move forward from design to construction.

A key element of MORPC's Complete Streets program (in this case study, defined as both the Complete Streets policy and checklist) is context-sensitivity. The goal is not for all projects receiving MPO funding to provide every feature listed on the checklist; rather, the checklist provides a starting point for the different kinds of features that could be included, depending on the idiosyncratic needs of the project. MORPC's policy recognizes that not every street needs to comply with universal criteria to be complete, so design requirements must be flexible. For example, MORPC encourages local governments in urban settings to provide separated bike facilities, while in rural neighborhoods with low traffic volumes, a wider shoulder could be sufficient for bicyclists. By providing ongoing feedback throughout the funding, design, and construction processes, MORPC takes on an active role in promoting complete streets implementation throughout the region.

MORPC uses its checklist to guide the implementation of complete streets. The checklist features a comprehensive inventory of design elements such as sidewalks, signalized crosswalks, bike lanes, sharrows, bike parking, sheltered bus stops, and priority bus lanes.[4] The list also includes traffic-calming measures to improve safety such as landscaping, curb extensions, narrower travel lanes, and reduced speed limits. Crucially, this checklist is not a list of tack-on features to turn an otherwise car-oriented corridor into a complete street after the fact; rather, it provides a variety of multimodal elements project sponsors can apply strategically in their initial designs depending on the context of the project and the transportation needs of the local community. In addition to these design features, project sponsors must also confirm whether they conducted speed or parking studies, explain which design guidelines they reference, and list the stakeholder groups engaged in the early stages of the planning process. This checklist provides a formal mechanism to record projects' compliance with the principles of complete streets as project sponsors move forward with design and construction.

"As a 70-year old retiree and a diabetic with a heart condition, exercise is vital to my health, and MORPC's Complete Streets policy has made a tangible difference in making regular exercise safer and more convenient. Thanks to the new policy, when the street that connects my neighborhood was redone, sidewalks and a multi-use path were added. This made it safer for me and everyone in my neighborhood to walk to the movies, dining and shopping. But everyone should have these same opportunities to safely walk or bike to destinations as a part of their daily lives. With both millennials and seniors desiring more bikeable and walkable communities, this Complete Streets policy is making ours more competitive."

- Ira Weiss, Complete Streets Working Group participant

4 To view MORPC's Complete Streets checklist, visit: http://www.morpc.org/trans/CompleteStreets_MORPC_CS_ChecklistFINAL2010-03-31WithAppendices.pdf.

"MORPC's Complete Streets Policy Working Group process succeeded because all of its members appreciated the diverse needs of agencies that cover a mostly urban environment to those that are responsible for infrastructure of a more rural nature. Finding common ground and listening to each others' concerns resulted in an overall policy that was acceptable and useful to the entire range of communities in the region."

– Ted Beidler, Projects Engineer, Franklin County Engineer

HOW THE MPO DID IT

To develop its policy, MORPC started by convening a Complete Streets Working Group of about 30 engineers, advocates, and government staff. The members of this working group participated in four workshops over the course of nine months, during which they drafted and revised the language for the policy and accompanying checklist. To support this work, MORPC staff conducted research on other regional Complete Streets policies. It also convened small focus groups and individual interviews with member jurisdictions that were hesitant about the new policy to answer their questions and incorporate their input into the policy language. This proactive engagement helped generate awareness and support for the regional policy in advance of its adoption.

Adopting its Complete Streets policy was only the first step. Next, MORPC had to ensure that the policy would be implemented and have a tangible impact on the process of designing and building transportation projects.

To achieve this, MORPC staff made agreements with their member jurisdictions that the MPO would provide assistance to project sponsors to determine appropriate facilities that would comply with the Complete Streets Policy when developing the MPO's Planning Work Program (PWP). This would allow MPO staff to routinely provide advice and technical support for prospective projects as well as projects that had already been awarded funding. Today, MORPC staff's support ranges from answering questions over phone or email to attending site visits with project sponsors to conducting reviews of project applications; staff involvement has made a big difference in the quality of projects receiving MPO funding and has built stronger working relationships between the MPO and its member jurisdictions.

An illustrative example of the successful implementation and tangible impact of a project in Central Ohio was on a 2-mile stretch of a busy arterial called Westerville Road. To reduce crashes, the project lead — the Ohio Department of Transportation (ODOT) — was going to add a center turn lane in places, modify interstate ramps, and add turn lanes at intersections. The supportive crash data only pointed to a motor vehicle problem, so the project's scope only addressed motor vehicles. Elected officials and residents of the cities of Columbus and Westerville, and Franklin County raised concerns about bicycle and pedestrian safety. This led MORPC to advocate for the project, add funding to it, and adjust its scope. ODOT constructed the road to include bike lanes, sidewalks, and better pedestrian crossings.

In addition to implementing the regional policy, MORPC staff and board members promote complete streets in two ways.

First, to institutionalize Complete Streets in levels of government beyond the MPO, MORPC encourages its member jurisdictions to adopt complete streets policies of their own, so that transportation projects not funded through the MPO can continue to grow the region's active transportation network. MORPC's Planning Work Program includes provisions related to assisting communities to develop their own complete streets policies.

Second, to educate audiences like city councils and community groups about complete streets, MORPC holds interactive workshops where participants play a Complete Streets Game, developed by MORPC. Participants are given a site and told about the surrounding context (e.g., whether there is a school or senior center nearby and how heavily traffic flows). They then redesign the street using a magnetic board that includes transportation components such as crosswalks, street signs, or landscaping. This activity fosters better understanding and enthusiasm for multimodal street design and Complete Streets policies.

The workshop also features a video, *Rethinking Streets for Successful Communities*, which was also created by MORPC and its partners.[5] This video features a variety of local and national professionals who can speak to the importance of complete streets for creating vibrant built environments, and how various sectors can influence the design and functionality of our communities.

MORPC created the *Complete Streets Toolkit* to give guidance to member jurisdictions on planning, designing, constructing, and maintaining complete streets. The 250-page resource offers everything from examples of infrastructure meant to improve safety for all travelers to model complete streets policies to land use regulations that support complete streets and much more. The toolkit includes helpful information on the benefits and costs of complete streets. For example, below is a list of traffic calming benefits and information on traffic calming measures and their estimated cost.

BENEFITS	DESCRIPTION
Increased road safety	Reduced traffic crash frequency and severity, particularly for crashes involving pedestrians and cyclists.
Increased comfort and mobility for non-motorized travel	Increased comfort and mobility for pedestrians and cyclists.
Reduced automobile impacts	Increased non-motorized travel substitutes for automobile trips, reducing congestion, expenses, and pollution.
Increased neighborhood interaction	More hospitable streets encourage street activities and community interaction.
Increased property values	Reduced traffic speed and volumes increase residential property values.
Improved public health	More opportunities for walking and other physical activity.

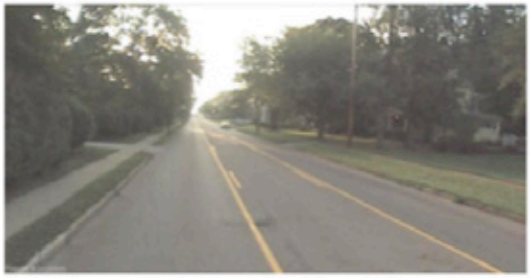
TRAFFIC CALMING MEASURE	TYPICAL COST
Choker	$7,000 for landscaped choker on asphalt street, $13,000 on concrete street.
Chicane	$8,000 for landscaped chicanes on asphalt streets, $14,000 on concrete streets.
Pedestrian refuge island	$6,000-9,000, depending upon materials and conditions.
Center median	$15,000-20,000 per 100 feet.
Raised intersection	$70,000+ per intersection.

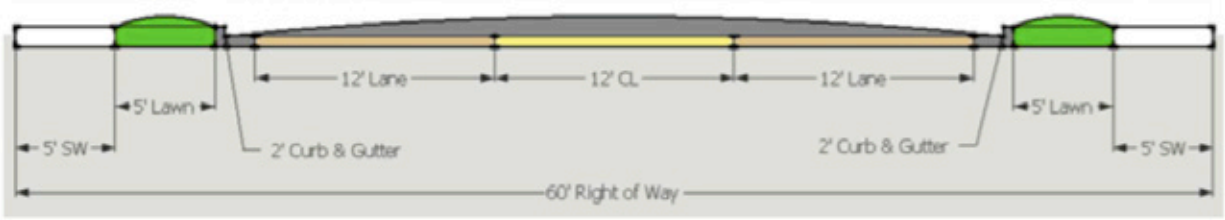
5 Watch the video at: http://www.morpc.org/transportation/complete-streets/index

Example 5 for Complete Streets – Suburban 3-Lane Road (Without On-Street Parking)

Recommended Minimum Accommodations

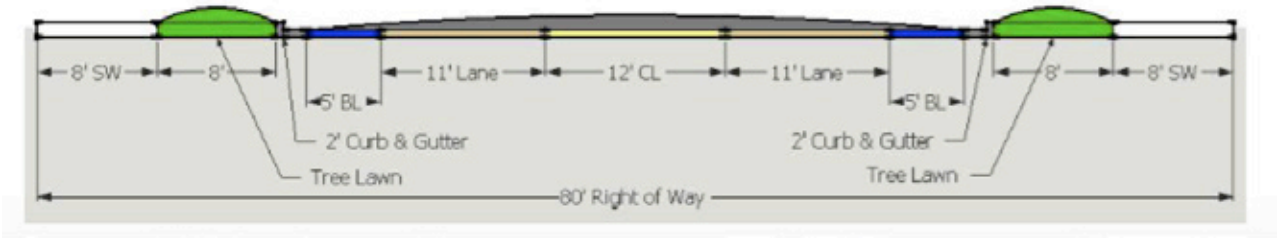
- As per the ODOT L&D Manual (Table 306-1E), sidewalks should be provided wherever there are 1 or more residences per acre.
- Bicyclists can use the travel lanes.
- Shared lane markings (sharrows) can be used if the design speed is 35 mph or less. At speeds above 35 mph, bicycle lanes are recommended.
- Drainage is provided by curb and gutter.





Example for providing additional accommodation

- In this example, sidewalks have been widened, bicycle lanes have been added, and travel lanes have been narrowed to 11 feet (permitted for streets with lower design speed, as per ODOT L&D Manual Table 301-4E).
- Lawns have been widened to 8 feet, allowing space for proper growth of street trees.



MORPC's Complete Streets Toolkit depicts complete street design features for a variety of road types, such as a suburban 3-lane road, in the MPO's five county region.

TIMELINE

June 2009: MORPC held the first Complete Streets Working Group workshop to draft its Complete Streets policy language.
November 2009: MORPC held the second workshop to revise the policy language and begin drafting the checklist.
December 2009: MORPC held the third workshop to finalize the policy language and revise the checklist.
January 2010: MORPC held the fourth workshop to finalize checklist.
March 2010: MORPC adopted the Complete Streets policy and checklist.
April 2010: MORPC applied the Complete Streets policy to projects under consideration for funding by asking project sponsors to provide details on how the project would accommodate travelers using all modes to the extent practical.
April 2012: MORPC published the *Complete Streets Toolkit*.

KEY PARTNERS

The 30-member Complete Streets Working Group represented a broad range of stakeholders including advocacy organizations, public health departments, engineering and design firms, transit agencies, and government agencies. Alongside MPO staff, this group undertook a nine-month process to draft and revise the language of the Complete Streets policy and checklist. Participating organizations included:

- City of Columbus
- Columbus Public Health (the health dept.)
- Columbus Public Service
- Delaware County
- Delaware General Health District (the health dept.)
- Departments of Engineering
- Franklin County
- Franklin County Public Health (Dept.)
- City of Gahanna
- City of Hilliard
- City of Pickerington
- Central Ohio Transit Authority
- Ohio State University
- Ohio Department of Transportation District 6
- Ohio Department of Health
- Federal Highway Administration
- Consider Biking
- Simply Living
- Fairfield Heritage Trail Association
- Parsons Brinckerhoff
- Stantec

"The City of Hilliard adopted a Complete Streets policy in 2012 in response to strong support for pedestrian and bicycle facilities from our community. While Hilliard had been implementing projects for years that contained some of the basic components of complete streets, a formal policy has provided the "teeth" we needed to enforce the inclusion of pedestrian and bicycle facilities, particularly in private development proposals."

- Letty Schamp, Deputy City Engineer, City of Hilliard

BARRIERS ALONG THE WAY

Some of MORPC's member jurisdictions were initially resistant to the idea of a regional Complete Streets policy. Specifically, they were concerned that requiring transportation projects to include additional features such as sidewalks and bicycle lanes would escalate construction and maintenance costs and divert resources away from other critical roadway maintenance funds. To overcome this resistance, MORPC staff met individually with these skeptical jurisdictions to discuss and better understand their hesitations. Through these conversations, MORPC crafted a policy that would benefit different types of jurisdictions in the region, from large cities to rural areas.

MORPC staff and board members also learned how to talk about complete streets in a way that would resonate with leaders of these diverse communities. Even though complete streets may help people walk more, which would help residents be healthier, MORPC did not always proclaim this. Instead, MPO leaders were more inclined to emphasize the economic return on investment by explaining how complete streets and mixed-use development could attract new residents and businesses to a community and raise local tax revenues — for a relatively low cost. By honing in on shared values and tailoring their messages accordingly, MORPC was able to pass its Complete Streets policy with the votes of all but one of its members. MORPC continues to use this strategy to encourage member jurisdictions to pursue Complete Streets policies and projects of their own.

RESULTS AND BENEFITS

As a direct result of the collaborative development and use of MORPC's regional Complete Streets policy, toolkit, and checklist, the region has seen more investment in active transportation. Since adopting its Complete Streets policy, MORPC has almost doubled the number of stand-alone bicycle and pedestrian projects (i.e., those built primarily to improve access for those traveling on foot and bicycle). The MPO has more than quadrupled the number of funded projects that incorporate bicycle and pedestrian infrastructure into larger public works, such as road widening projects or new roadways. Furthermore, thanks to the close involvement of MORPC staff and utilization of the Complete Streets checklist, both the quality and the quantity of these projects have increased. In total, MORPC has funded about 220 miles of multi-use paths and bicycle lanes since the adoption of the regional Complete Streets policy.

Through a combination of funding incentives, policy adoption, and projects that cross municipal boundaries, MORPC's work has encouraged complete streets throughout the region. The policy's reach has even expanded beyond projects funded by the MPO as many city or county projects have incorporated active transportation infrastructure. MORPC's regional Complete Streets policy encouraged five of its largest member jurisdictions to adopt policies of their own. Additionally, as local jurisdictions implement complete streets projects, whether funded through the MPO or other sources, neighboring jurisdictions feel pressure to connect to these projects by building out their own sidewalk and bicycle networks. At this time, however, the MPO does not have data to determine the precise increase in bicycle and pedestrian projects across the region. MORPC continues to integrate active transportation into its products. For example:

- The MPO recently adopted an active transportation plan that identifies the corridors with the highest need for complete streets and prioritizes projects on these key corridors for future funding.
- MORPC created educational tools for member communities, including a Green Infrastructure web tool.
- The MPO partnered with a local nonprofit called Yay Bikes! to take planners and engineers from Central Ohio on bicycle tours across the region. As a result of this program, these practitioners have become more aware of how their work affects vulnerable users of the road and how essential it is to consider the needs and experiences of cyclists when designing streets.
- MORPC conducted a scenario planning study in 2014 called *insight2050*, which confirmed the growing demand for complete streets, as well as the economic, social, and environmental benefits of more compact, mixed-use developments that support walking, bicycling, and public transportation.

LESSONS LEARNED

MORPC shares the following advice:

1

Take the time to understand the reservations and desires of stakeholders.

MORPC's proactive interviews of representatives from jurisdictions that did not initially support complete streets were illuminating. The MPO discovered that leaders of these jurisdictions were not opposed to the idea of safer, more multimodal street design; rather, they had concerns about the impact of new requirements on already constrained budgets. Taking the time to understand communities' resistance allowed MORPC to alleviate these concerns, address misinformation, find shared values, and garner more support for the eventual Complete Streets policy. Crucially, understanding the specific concerns and desires of all its member jurisdictions helped MORPC tailor its messaging to focus on the benefits of complete streets that most closely resonated with each community.

2

Remain focused on the policy's end goals.

While MORPC successfully passed a regional Complete Streets policy, the policy itself was not the MPO's main goal. Rather, MORPC's objective was to create a transportation network that would allow all residents, no matter their background and means, to have equal access to jobs, services, and other amenities. Staying focused on this goal led MORPC to help its member jurisdictions implement the policy with tools, education, and technical assistance.

3

Framing of the purpose is as important as the purpose itself.

The MORPC team took the time to understand the specific values and driving forces of individual communities before working with them to draft the policy and associated toolkit. Effective marketing of the need for a regional Complete Streets policy focused on environmental concerns, public health costs, commute time, and other issues important to people in the region.

4

Ensure cross-sector collaboration.

MORPC engaged stakeholders from a wide variety of sectors such as, but not limited to, public health, planning, engineering, transit providers, real estate professionals, and local elected officials. Stakeholders were involved in the development of the MORPC Complete Streets policy and toolkit by serving on committees, sharing information via interviews, and attending community meetings. The buy-in from champions across the region who were interested in a variety of issues was integral to the successful adoption and implementation of the policy and toolkit.

INVOLVING PUBLIC HEALTH PARTNERS

MORPC benefited from public health partners, who provided support with funding, data, and messaging throughout the process of developing the region's Complete Streets policy and checklist. Columbus Public Health, Franklin County Public Health, and the Delaware General Health District participated in the Complete Streets Working Group to provide a public health perspective when developing the policy and checklist. In particular, the health departments supplied data demonstrating the lack of physical activity among residents and the associated trend of increased obesity rates, especially among children. Additional data highlighted the disproportionate access of pedestrian and/or bicycle facilities between high-income and low-income neighborhoods. Neighborhoods with a higher poverty rate often lacked accessible transportation options. All of these data helped reinforce the need for a Complete Streets policy. To increase support of the Complete Streets policy, MORPC created various messages to resonate with its stakeholders. MORPC staff reviewed the research on the health benefits of active transportation and best practices to increase bicycling and walking. Working with their public health partners and incorporating their findings, MORPC tailored its messaging on complete streets to demonstrate the health benefits. As a result, MORPC was able to garner support from member jurisdictions whose leaders valued public health and healthy living. The Ohio Department of Health also contributed funds to create the *Complete Streets Toolkit* and video. The toolkit helped member jurisdictions understand and develop support for multimodal street design.

Goodale Boulevard, in Grandview Heights, lacking safe access for those traveling on foot, bicycle, and wheelchair in the before photo at left. Goodale Boulevard, right, after the addition of sidewalks and bicycle lanes.

BROWARD MPO

2 – COMPLETE STREETS POLICIES AND PROGRAMS
BROWARD MPO (BROWARD COUNTY, FL)

Healthy, safe & prosperous by design: Building complete streets

THE BOTTOM LINE

Prompted by a need for safer streets, the Broward Metropolitan Planning Organization (MPO) partnered with its member jurisdictions, the Florida Department of Transportation (FDOT) and other non-traditional partners, to plan, design, and build more complete streets projects. The Broward MPO began by working with the Broward Regional Health Planning Council (BRHPC) and other partner organizations to develop Complete Streets guidelines. MPO staff also trained local leaders on the benefits of complete streets and built regional consensus and political support. As a result of these efforts, 16 of the MPO's 31 jurisdictions have adopted resolutions or guidelines of their own. At the same time, the MPO increased funding for active transportation projects. Since 2012, the MPO has programmed approximately 90 individual bicycle and pedestrian projects totaling $120 million.

THE CONTEXT

Located in southeastern Florida and including the city of Fort Lauderdale, the single-county Broward MPO encompasses a population of approximately 1.75 million. Only one-third of the land in Broward County can be developed because of geographic constraints like wetlands, including the Everglades.

THE PROBLEM

Two main problems faced the Broward MPO: the extremely high cost of building new roads and the extreme danger that fast-moving roads pose for people who walk or ride bicycles. With roads primarily designed to move vehicles as quickly as possible, people walking or biking are far more likely to be injured or killed than in other comparable U.S. metro areas. The Miami-Ft. Lauderdale-Pompano Beach metropolitan area (which includes Broward County) ranked as the country's fourth most dangerous metropolitan region for pedestrians in the most recent Dangerous by Design report from Smart Growth America and the National Complete Streets Coalition.[1]

Addressing these two problems required a new approach that sought to better allocate existing roadway capacity through multimodal solutions and streets designed with a focus on moving people.

Loxahatchee Road: current street view, top, and complete streets rendering. Photos courtesy of the Broward MPO.

1 Based on data of pedestrian fatalities from 2008-2012 in Dangerous by Design. www.smartgrowthamerica.org/research/dangerous-by-design.

WHAT THE MPO DID

Supported by a grant from the Centers for Disease Control and Prevention (CDC), the MPO developed, adopted, and promoted Complete Streets guidelines in conjunction with the Broward Regional Health Planning Council (BRHPC).[2] The new guidelines provide the region's cities and county with a robust encyclopedia of options that they can tailor into their own Complete Streets policies. The guidelines also equip local jurisdictions with design guidance to incorporate bicycle, pedestrian, and transit facilities that would meet the Broward MPO's standards when building new streets, retrofitting/modifying streets with new development, or creating new subdivisions.

HOW THE MPO DID IT

When implementing the MPO's *Transformation 2035* long-range transportation plan (LRTP), the MPO grouped bicycle and pedestrian projects by projected high-activity transit corridor, with the intent of prioritizing the projects that would provide first- and last-mile connections to the existing system to boost ridership, while also laying the groundwork for future enhanced transit.

The Broward MPO is responsible for long-range transportation planning, not the construction of projects. As such, to see the completion of planned projects, successful partnerships are crucial. After setting their long-term priorities and goals, it is vital for the MPO to work in close cooperation with the state DOT and the local transportation agencies to ensure that the projects are feasible and designed well to meet everyone's needs. The Broward MPO established a smoother process to move these projects from the planning phase to programming and implementation by utilizing partnerships with local agencies and the Florida Department of Transportation (FDOT). FDOT has been critical to the success of complete streets projects throughout the county. The MPO and its members relied (and will continue to rely) on FDOT to scope, engineer, and construct all transportation projects within the MPO boundary.

Vetting the project with all stakeholders is an important step before it can be programmed for funding. Here's how the relationship works: after the MPO identifies a potential improvement, FDOT, the local municipality, and the roadway owner meet to scope the project to make sure it is feasible. The scoping phase, conducted under the guidance of FDOT engineering staff, gives these projects a strong start.

FDOT provides full service support by offering to facilitate and walk through the entire process of designing and constructing each one of the MPO's projects.

2 http://www.browardmpo.org/index.php/broward-complete-streets-guidelines

TIMELINE

December 2009: The MPO Board adopted *Transformation 2035*, an RTP update that shifted the paradigm from moving cars to moving people in the Broward region and set the foundation for the Broward MPO's Complete Streets Initiative.
2011: BRHPC secured a Community Transformation Grant (CTG) from the CDC to create healthy and safe places in Broward and promote active lifestyles.
2012: BRHPC, Smart Growth Partnerships, and the Health Foundation of South Florida worked with the MPO to develop Complete Streets guidelines as part of the work funded by the CTG grant.
July 2012: The MPO Board endorsed the *Broward Complete Streets Guidelines*, developed by the MPO.
October 2012: The MPO formally established the Complete Streets Technical Advisory Committee to guide the MPO's newly established Complete Streets Initiative, which was created to provide necessary tools and resources for local governments to build complete streets in their communities.
January 2013: The MPO created a model complete streets plan and policy for partner agencies to utilize to advance complete streets.
February 2013: The MPO began working with FDOT to program the Broward region's first two phases of bicycle and pedestrian projects identified in *Transformation 2035*.
May 2013: The Complete Streets Technical Advisory Committee selected two Complete Streets demonstration projects: Hollywood Blvd. (in an urban context) and Sunset Strip (in a suburban context).
June 2013: The MPO finalized its Multimodal Level of Service tool, which offered a more flexible method of measuring roadway level of service than the traditional auto-based level of service tool.
August 2013: The City of Deerfield Beach became the first city in Florida to adopt Complete Streets guidelines (based on the *Broward Complete Streets Guidelines*).
January 2014: The MPO hosted the first Safe Streets Summit to provide technical assistance to local government staff and elected officials interested in building complete streets.
February 2014: Smart Growth America ranked Fort Lauderdale's Complete Streets policy 3rd best in the US.
March 2014: The City of Sunrise, in conjunction with the MPO, hosted the first Let's Go Biking! Event.
July 2014: The MPO successfully programmed over $100 million in bicycle and pedestrian projects in the region over the following five years.
September 2014: The City of North Lauderdale, the City of Coconut Creek, and the City of Lauderhill became the first communities in Broward County to participate in a walking audit to help their communities understand the walking and bicycling needs in their area.
February 2015: Local leaders broke ground on the first phase of bicycle/pedestrian projects funded by the MPO.
August 2015: The MPO published the *Complete Streets Evaluation Toolkit* to guide performance measurement of constructed complete streets projects.
July 2016: The MPO received a Transportation Investment Generating Economic Recovery (TIGER) grant to fund an additional $19 million worth of complete streets projects in the county.
October 2016: The City of Dania Beach hosted the MPO's first Let's Go Walking! Event.
June 2017: Local leaders broke ground on the MPO's first two Complete Streets demonstration projects in the City of Hollywood and the City of Sunrise.
September 2017: The MPO reached the $200 million mark for funded bicycle/pedestrian projects in the 2019 FDOT Tentative Work Program.

KEY PARTNERS

BRHPC and the Broward MPO developed Complete Streets guidelines with funding from the CDC. The MPO then conducted trainings for local leaders in Broward's municipalities and county government; developed tools to help MPO members plan, design, and build these projects; and provided other technical assistance to the municipalities and county. The partnerships extended beyond the usual players as non-traditional partners also contributed to these efforts.

For example, the Florida Department of Health assisted with the development of the MPO's *Complete Streets Evaluation Toolkit* and provided health metrics for measuring the benefits of active transportation. Urban Health Partnerships led components of the Complete Streets Initiative like walking audits and a Safe Streets Summit. The University of Miami WalkSafe program provided educational outreach to elementary schools in the area to promote safe walking behaviors. Finally, FDOT has helped identify opportunities to build complete streets and continues to lend support to local governments to design and construct them.

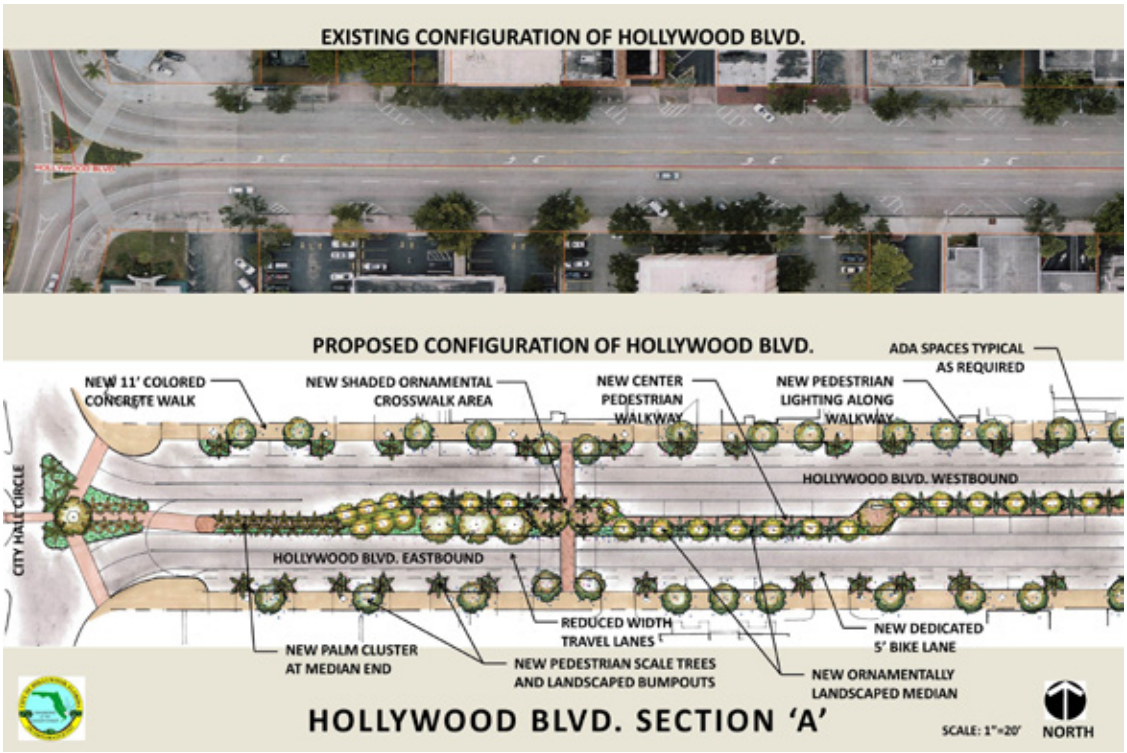
Partners included:

- Florida Department of Transportation;
- Broward Regional Health Planning Council;
- Centers for Disease Control and Prevention;
- Broward municipalities;
- Broward County government;
- Non-traditional partners in the MPO's Complete Streets Initiative, such as:
  - Florida Department of Health;
  - Urban Health Partnerships;
  - University of Miami WalkSafe program;
  - Smart Growth Partnership;
  - AARP.

Broward MPO Board members break ground for the first phase of projects from the MPO's mobility program. Photo courtesy of the Broward MPO.

A CLOSER LOOK: HOLLYWOOD BLVD

The Hollywood Boulevard Complete Streets Demonstration Project in Hollywood, FL will spur economic development with the transformation of an underutilized thoroughfare into a more walkable main street boulevard. Full reconstruction of the existing roadway will provide wider sidewalks, buffered bicycle lanes, buffers with native landscaping, and medians on a portion of the street that has historically been neglected. Above: Hollywood Boulevard existing street view. Below: Complete streets rendering and proposed re-configuration.



BARRIERS ALONG THE WAY

Local partners were concerned that the MPO guidelines had no "teeth" or enforcement measures. In addition, without local agencies' incorporation of the guidelines in their own planning processes, the guidelines might have just sat on a shelf.

To ensure successful implementation, the MPO established a Complete Streets Initiative under the guidance of a technical advisory committee, which included local government representatives and non-traditional partners (noted above). The committee continues to develop tools to help local jurisdictions plan complete streets in their community and provide a platform for municipalities to learn from each other through that process. These tools include a model plan, model ordinance, and model policy for municipalities. Building safer, more complete streets is often not a technical problem but rather a political one. The MPO ensured the guidelines had "teeth" by building political support through a model ordinance, which has had tangible impacts on actual design requirements. For example, the MPO's efforts influenced Broward County to modify its engineering standards and municipal codes to incorporate complete streets.

Through the initiative, Broward MPO staff delivered presentations to inform local leaders and planners about the benefits of complete streets. Their emphasis on the benefits for health and local economies have played a significant role in encouraging approximately 50 percent of Broward's municipalities to adopt their own guidelines or resolutions. Staff also provided technical assistance by conducting community walking audits, assisting peer agencies in identifying internal resources, providing data and template materials like posters, and developing tailored action plans. This has helped local governments conceptualize these projects to better design streets for all users.

Furthermore, MPO staff hosted trainings with experts for elected officials and technical staff from municipalities. The presentations, assistance, and trainings have helped build ownership of the Complete Streets guidelines, making a tangible difference in planning and designing projects.

"The Broward MPO's Complete Streets Initiative has involved non-traditional partners, from the Broward Regional Health Planning Council to AARP, to include health, economic, and environmental factors into our complete streets planning process. Safe and accessible streets can only be created by adopting this multifaceted approach — our 100 million dollar investment has been a testament to our enduring partnership with the community."

– Greg Stuart, Director, Broward Metropolitan Planning Organization

RESULTS AND BENEFITS

As a result of this comprehensive approach, municipalities began building safer, more complete streets. For example, the City of Fort Lauderdale began incorporating Complete Streets strategies into nearly every project and worked across departments to build quality projects. The city has become a successful example to and source of inspiration for peer municipalities. Other jurisdictions took the approach of first adopting a Complete Streets resolution and then incorporating these safer designs into their maintenance projects before making them a part of their newer, more comprehensive transportation projects.

By the end of 2015, 16 of the MPO's 31 jurisdictions had adopted Complete Streets resolutions or their own guidelines, codified through their public works or engineering departments.

Broward County's current regional long-range transportation plan, *Commitment 2040*, allocates 27 percent of all funds to complete streets or to building new bicycle or pedestrian projects — about $571.6 million over the life of the plan and $22.8 million per year. Since 2012, the MPO has funded 90 bicycle and pedestrian projects.

Broward jurisdictions are now more equipped to design and build complete streets projects with state and local funds and 17 cities have incorporated complete street designs into their local investments.

Broward County also developed an evaluation toolkit which allows local municipalities to use publicly available data to measure the positive impact of these projects.[3]

A recently constructed sidewalk funded by the MPO's five-year, $120 million Mobility Program, which has awarded about 90 projects. Photo courtesy of the Broward MPO.

They can evaluate how certain street improvements would lead to increased safety (e.g., fewer crashes, lower vehicle speeds); economic vitality (e.g., increased business revenue, less vacant property, greater property value), health and sustainability factors (e.g., more physical activity, reduced vehicle emissions and less fuel consumption), and balanced mobility (e.g., diverse mode share, more transit ridership, more facilities). To help ascertain the tangible impacts of complete streets, the MPO will also conduct counts of those traveling on foot and bicycle before and after the installation of bicycle and pedestrian improvements.

3 The evaluation toolkit is available at http://browardmpo.org/index.php/broward-complete-streets-evaluation-toolkit.

LESSONS LEARNED

The Broward MPO shares the following advice:

1

Incorporate complete streets designs into the scoping phase.

Scoping is the phase that occurs before engineering commences, before the project is programmed into the Transportation Improvement Program (TIP), and before the project is added to the MPO's work program. As the phase with the most robust public outreach, scoping is the best point at which to incorporate complete streets designs into a project because it allows maximum buy-in from the public, agency staff, and elected officials during an earlier phase of a project.

2

Focus on messages that resonate.

The MPO found that by using the lens of health impacts, the following messages most effectively resonated with elected officials and decision-makers:

- Focus on the benefits that pedestrian and bicycle investments provide for drivers. Sidewalks and bike lanes improve safety for drivers as well as those traveling on foot and bicycle. For example, studies show that when traffic speed decreases, crashes and fatalities among all modes decrease.
- No matter how a person commutes, everyone is a pedestrian at some point.
- A sizable share of the public cannot drive: about a third of the community relies upon other ways to get around.
- Traffic calming and complete streets improvements benefit local businesses. Increases in foot traffic and streets that encourage window shopping are shown to result in increased revenue for businesses.

3

Leverage existing processes and resources.

Political buy-in is key for developing regional support for complete streets. Consider how one can build support through model ordinances, engineering standards, or municipal codes. Work to get local municipalities, advocacy partners, and local groups involved early in the process, and leverage other resources and agencies. For example, the MPO utilized FDOT as its construction arm for its mobility projects.

INVOLVING PUBLIC HEALTH PARTNERS

With infrastructure to safely and easily allow people to walk or bicycle from place to place, complete streets help people be more physically active. As explained earlier, BRHPC received a Community Transformation Grant from the CDC. These funds allowed BRHPC to partner with the MPO, the Smart Growth Partnership and Urban Health Partnerships to develop complete streets guidelines; this was the first step in the development of the MPO's many complete streets initiatives.

"The Broward Regional Health Planning Council (BRHPC)'s TOUCH Initiative is proud to have provided the funding and support for the initial phase of the complete streets movement in Broward County. BRHPC is committed to working with our community partners to promote opportunities for healthier living for our residents and visitors by supporting increased access to multiple modes of transportation and safer, more walkable and bikeable streets. We also commend the Broward MPO for their investment of $100 million to ensure implementation of complete streets in our community."

– Michael De Lucca, President & CEO, BRHPC

Kids are fitted for bicycle helmets at a public event sponsored by the Broward MPO. Photo courtesy of the Broward MPO.

3 Data collection - walking & bicycle counts

Delaware Valley Regional Planning Commission (Philadelphia, PA)

Obtaining better data on walking and biking trips in order to better prioritize infrastructure that can make it safer and more convenient.

Understanding both the behaviors and the proclivities of people traveling from place to place is key to designing a transportation system that meets their needs. Collecting certain types of traffic monitoring data is required by federal and state governments, including vehicle counts, but those data do not convey how many people move about on foot or bicycle. Using data on walking and bicycling trips helps prioritize walking and bicycling infrastructure where it would be most effective; strengthen proposals for future bicycle and pedestrian project funding; assess current conditions of the transportation system and the effectiveness of recent changes in infrastructure; and make a place more suitable to people who typically walk or bicycle there based on observations of their behavior.

The Delaware Valley Regional Planning Commission (DVRPC) in the Philadelphia area operates an impressive program to count travelers on foot and bicycle using three methods: permanent, cyclical, and per project counts. Their bicycle and pedestrian count program is one of the most robust in the country.

A bike counter test in Chicago. Flickr photo by David B. Gleason. https://www.flickr.com/photos/mindfrieze/2600847628/.

3 – DATA COLLECTION
DELAWARE VALLEY REGIONAL PLANNING COMMISSION (PHILADELPHIA, PA)

Counting bicycling and walking trips with permanent, cyclical, and per-project methods

THE BOTTOM LINE

The Delaware Valley Regional Planning Commission (DVRPC) runs a robust program to count how many people walk or bicycle at hundreds of locations throughout the greater Philadelphia region. The data helps decision-makers better track the effects of completed transportation projects, plan and prioritize future transportation projects, and justify the improvement and expansion of bicycling and walking infrastructure. DVRPC uses permanent, cyclical, and per-project count methods. A count program may foster collaboration between public health and transportation professionals in pursuit of a shared objective: creating healthier environments where people can easily walk or bicycle from place to place.

"As a doctor and a public official, I'm passionate about creating healthier communities for our residents. Our county and regional planning commissions are constantly looking at data-driven ways to develop and promote other means of transportation — whether walking, riding a bike, or taking public transportation — that can encourage healthier lifestyles, improve our commutes, and reduce our impact on the environment."

- Valerie A. Arkoosh, MD, MPH, Chair of the Montgomery County Board of Commissioners

THE CONTEXT

DVRPC encompasses nine counties across two states in the Philadelphia region. DVRPC's jurisdiction spans over 3,800 square miles and has a population of 5.72 million. It includes the cities of Philadelphia, Trenton, and Camden, as well as more than 300 surrounding suburban and rural municipalities in both Pennsylvania and New Jersey. Over 300 miles of multi-use trails, called the Circuit Trails, connect throughout the region, and 450 miles of additional Circuit Trails are being planned or constructed. Approximately 40 percent of land in the region is undeveloped, much of which is in the protected Pine Barrens of South Jersey. The largest shares of land use are dedicated to residential and agricultural purposes. The vast majority of new development occurs on land previously used for agriculture, though in recent years vacant and wooded areas have comprised an increasing percentage of new development. The City of Philadelphia is now growing after decades of population loss.

THE PROBLEM

The region has benefited from its extensive multimodal trail network of more than 300 miles; however, DVRPC and its partners have lacked solid, quantifiable data on how people were using the trails and other bicycling and walking facilities. Every five years since 1960, DVRPC has counted all vehicles entering and exiting the Philadelphia Central Business District along 72 principal routes, as well as all transit users traveling to and from this urban core. However, until 2010, these counts did not include any data on people riding bicycles or walking. To get a fuller picture of travel demand and take into account travelers using all modes of transportation, DVRPC's board chose to institute a more holistic counting method.

Around the same time, the City of Philadelphia received a grant from the U.S. Centers for Disease Control and Prevention (CDC) to launch the Get Healthy Philly initiative to promote physical activity through active transportation, among other health-focused objectives.[1] The grant was well-timed, as DVRPC and many of its surrounding municipalities were interested in undertaking more ambitious projects to support and encourage walking and bicycling, including expanding the region's Circuit Trails and improving sidewalks, bicycle lanes, and roadways. In order to evaluate the progress of Get Healthy Philly and justify increasingly expensive active transportation projects as smart investments, the region needed significant data on bicycling and walking.[2]

1 For more information about the Get Healthy Philly initiative visit: http://www.phila.gov/health/ChronicDisease/gethealthyphilly.html.

2 View a map of the Circuit Trails at: http://circuittrails.org/.

WHAT THE MPO DID

DVRPC uses three distinct approaches to count the number of people walking and biking. These methods complement one another to form a robust, comprehensive dataset on active transportation activity over time. When the program first began, the City of Philadelphia asked DVRPC staff to collect and analyze per-project counts of bicyclists and pedestrians in order to track progress on the Get Healthy Philly initiative. DVRPC later expanded their counting program to include permanent and cyclical counting methods, enabled through a partnership with funders, including the William Penn Foundation, to purchase automated counting equipment. All of these count data are available to the public on DVRPC's website. Stakeholders use the data to monitor activity over time, justify investments to improve or extend pedestrian and bicycle infrastructure, and analyze the impact of these investments on bicycling and walking behavior.

HOW THE MPO DID IT

DVRPC's bicycle and pedestrian counting program includes three methods: permanent, cyclical, and per-project.

Permanent counts

DVRPC runs permanent counting with 15 automated pedestrian and bicyclist counters dispersed throughout the Circuit Trails network; the stationary counters track the number of people walking and bicyling on these trails.

One of the permanent counters on the Cynwyd Heritage Trail. Photo courtesy of DVRPC.

This continuous stream of data serves an important purpose beyond collecting information on the numbers of travelers on foot and bicycle. Analyzing data from the permanent counters allows DVRPC staff to calculate seasonal correction factors to account for fluctuations due to temperature and weather (since these conditions affect how many people are willing to walk or bike). They then use the seasonal correction factors to fine-tune the data from the other two counting approaches, which have much shorter data collection windows.

Purchasing and installing equipment for each permanent counting station cost approximately $7,000. Ongoing expenses include:

- Annual modem fees to transmit count data ($440 per station, per year);
- Battery replacement ($400 per station, every other year); and
- Other repair costs as needed due to vandalism, extreme weather conditions, and damage from general wear and tear.

The William Penn Foundation, a funder of the Circuit Trails network, awarded DVRPC a grant to purchase, install, and maintain 12 of the 15 permanent counters. The Pennsylvania Environmental Council funded the remaining three counters. DVRPC also obtained access to data generated by 14 pedestrian-only counters in downtown Philadelphia through a data-sharing agreement with the Center City District, a business improvement district (BID) in downtown Philadelphia. In the future, DVRPC plans to install 15-20 more permanent bicyclist-counting stations on streets in Philadelphia and surrounding suburbs.

Locations of DVRPC's permanent bicycle and pedestrian counters funded by the William Penn Foundation. Graphics courtesy of DVRPC.

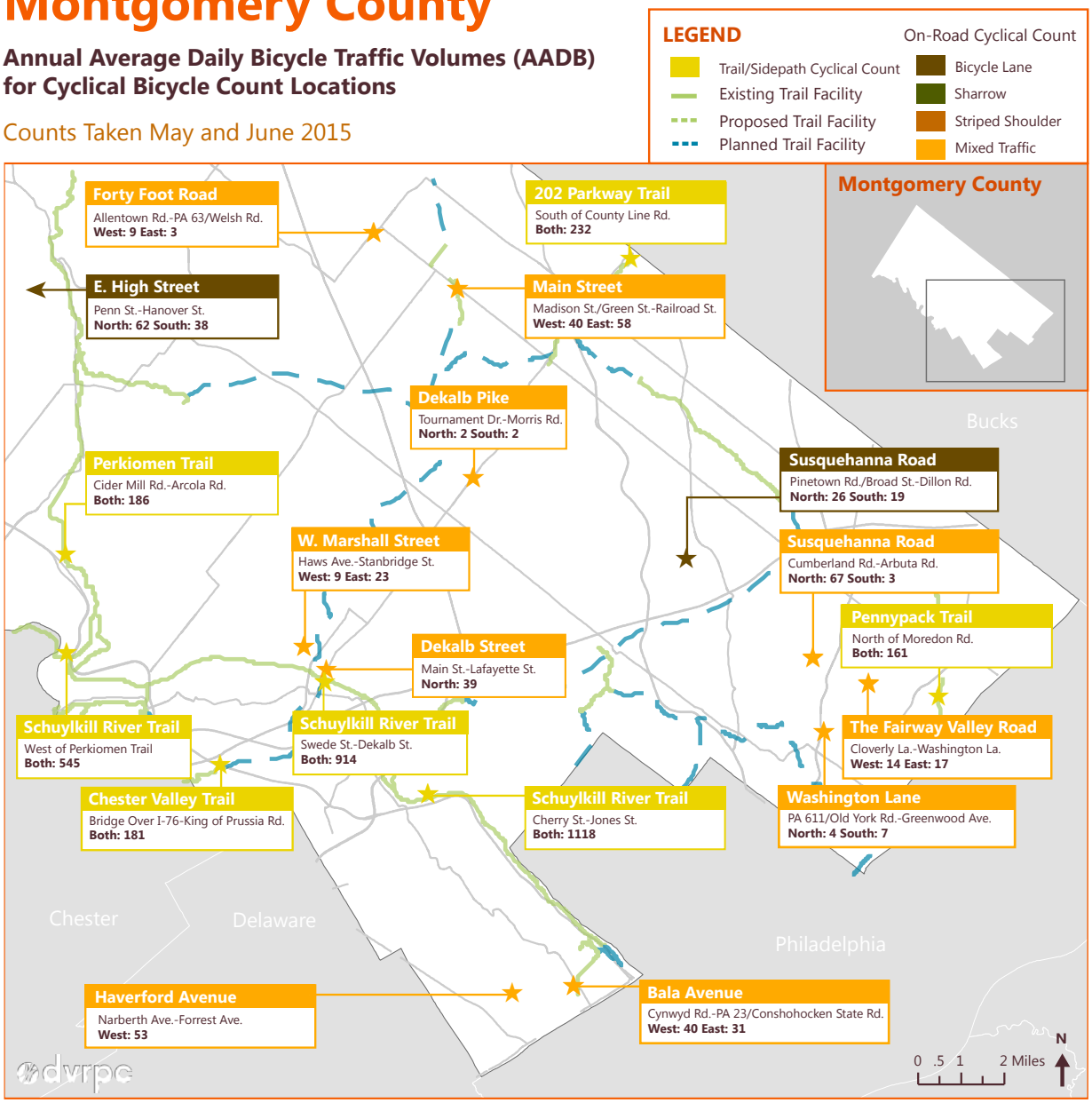
Cyclical counts

Another component of DVRPC's count program is cyclical counting, which began in 2014. Every year, DVRPC uses mechanical counters to capture information on the number of bicyclists at about 50 sites over a seven-day period. The locations where cyclical counts take place rotate on a three-year cycle; in all, cyclical counts are conducted at about 150 sites throughout the region. DVRPC purchased counting equipment for the cyclical counts with available funds in its general travel monitoring program budget. These cyclical data will show trends in active transportation over time. For example, these data could be used to understand whether travelers in the Philadelphia region are benefitting from increased physical activity by bicycling. Data from the permanent counters help calibrate these cyclical counts to more accurately control for weather and other seasonal factors that could affect bicycling rates during the cyclical counts' relatively short collection period. In the future, the cyclical program may be expanded to include a large set of pedestrian count sites.

Montgomery County

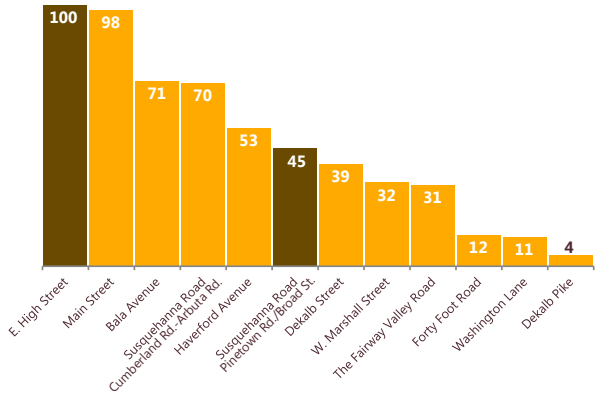
Annual Average Daily Bicycle Traffic Volumes (AADB) for Cyclical Bicycle Count Locations

Counts Taken May and June 2015



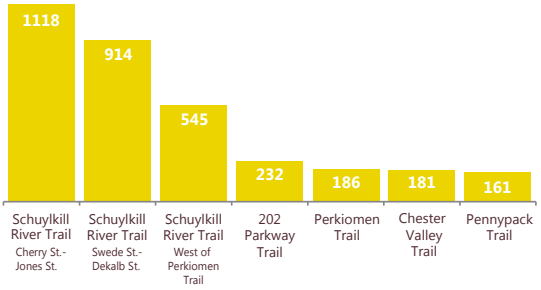
ON-ROAD FACILITIES

Bidirectional Total



TRAIL FACILITIES

Bidirectional Total



DVRPC runs a cyclical bicycle count program to collect data on people bicycling in set locations every three years. Cyclical counts are done with tubes over a duration of seven days. Results from a cyclical count done in Montgomery County (which has a mix of urban to rural locations) show that people travel on facilities from off-road trails to a number of on-road bicycle lanes at relatively high levels. Graphics courtesy of DVRPC.

Per-project counts

DVRPC also performs bicyclist and pedestrian counts on a per-project basis to inform planning processes and more clearly understand the need for walking and bicycling infrastructure, such as crosswalks or bicycle lanes, and to understand the impacts of new bicycling and walking infrastructure. For example:

- DVRPC participated in the evaluation of a series of new trail and bicycle projects in Philadelphia funded by the federal Transportation Investment Generating Economic Recovery (TIGER) Program.
- The City of Camden requested that DVRPC count travelers on foot and bicycle to study the effectiveness of crosswalks in an area with a cluster of charter schools.

The per-project counting method is versatile, flexible, and can be tailored to individual projects to answer specific questions about active transportation behavior at a given location. Some per-project counts are undertaken only once, such as those that help guide a planning process. Other per-project count efforts, such as for TIGER-funded projects, require as many as four rounds of counting: one before construction and three more over the following three consecutive years.

Method	Timeline	Locations	Purpose
Permanent	Automated collection, 24 hours per day, 365 days per year.	15 pedestrian & bicyclist counters on regional trails. 14 pedestrian counters in downtown Philadelphia.	Collect data continuously. Develop correction factors for seasonal and weather variations; adjust cyclical and per-project count data accordingly.
Cyclical	Annual week-long collection periods.	150 sites (50 per year).	Monitor changes in bicycling activity over time.
Per-project	Varies: may be a one-time count or occur before and after construction.	Varies: at or around new project sites by request.	Provide data for planning. Evaluate success of individual bicycle and/or pedestrian improvement projects.

Counts collected in downtown Trenton, NJ demonstrated a fair amount of growth in bicycling over three years in an area with a large transit center: the annual average number of bicyclists counted per day at this location increased from 44 to 98 between 2012 and 2015. Graphics courtesy of DVRPC.

Counts collected in two locations in Center City, Philadelphia showed a large increase (53% and 57%) in bicycle travel on two buffered bicycle lanes that provided a safer connection between a number of important destinations. The numbers shown represent the annual average of bicyclists counted per day. This is an example of a "per-project" count. Graphics courtesy of DVRPC.

KEY PARTNERS

The Philadelphia Department of Public Health was instrumental in the creation of DVRPC's bicycle and pedestrian count program. The need for active transportation data to monitor progress of the department's Get Healthy Philly initiative provided the impetus for the per-project component of the count program.

The William Penn Foundation contributed funds not only for the expansion of the Circuit Trails network, but also for the equipment and upkeep necessary to install permanent counting stations on them. The Philadelphia Environmental Council similarly provided financial support and guidance on site selection for several permanent counting stations. The Center City District in Philadelphia also contributes data to DVRPC through the BID's 14 permanent pedestrian counting stations.

DVRPC's Healthy Communities Task Force provides a non-transportation user group for the analysis and collection of count data. The task force is an information-sharing forum of both planning and public health partners from city agencies and community organizations; it meets quarterly to discuss issues pertaining to public health, transportation, and the built environment.

The public availability of DVRPC's pedestrian and bicycle count data has also opened the door for a variety of cross-sectoral partnerships and data sharing agreements. New tools and resources are also emerging to supplement DVRPC's bicycle and pedestrian count data. For example, an organization called Code for Philly developed a smartphone app, CyclePhilly, used to survey bicyclists about their route and facility preferences. These survey data help DVRPC better understand and explain travel behaviors observed through the agency's count program.

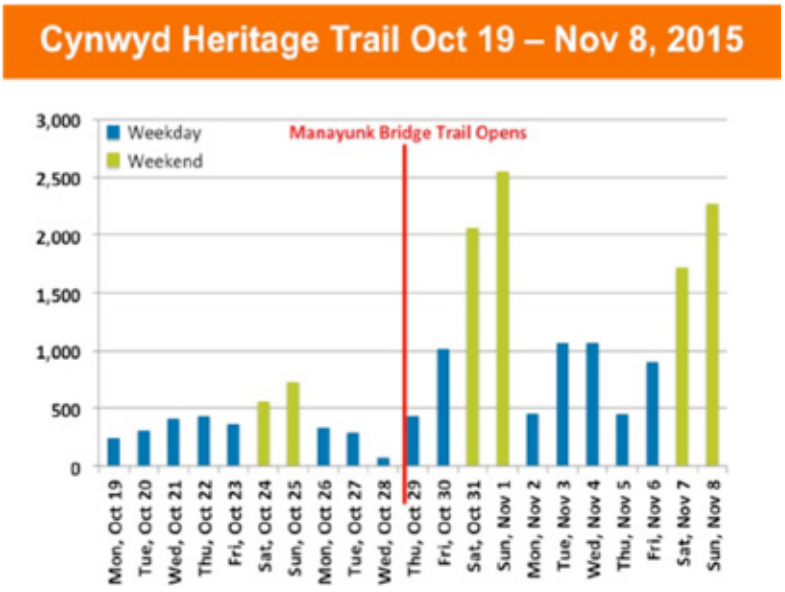
Partners included:

- Philadelphia Department of Public Health
- Centers for Disease Control and Prevention
- William Penn Foundation
- Pennsylvania Environmental Council
- Philadelphia Center City District
- CyclePhilly (Code for Philly)
- Healthy Communities Task Force

A CLOSER LOOK: CYNWYD HERITAGE TRAIL

The Cynwyd Heritage Trail (pronounced "Kinwood") is a two-mile bicycle and pedestrian trail. It runs from Lower Merion, a township just outside the western border of Philadelphia, to City Avenue in Philadelphia, where over 15,000 jobs are located.

Bicycle and pedestrian counts helped justify a connection between Philadelphia neighborhoods on either side of the Schuylkill River. Before the connection, the river separated the dense, residential neighborhoods of northwest Philadelphia from the Cynwyd Heritage Trail, City Avenue and the neighborhoods of Philadelphia on the western side of the Schuylkill. Local leaders and advocates realized that an abandoned commuter railroad bridge, the Manayunk Bridge, could be rehabilitated to connect the two sides on foot and bicycle. However, the cost for the project came to $3.5 million.



Using a permanent counter to measure, the number of people using the Cynwyd Heritage Trail on foot or bicycle significantly increased after the Manayunk Bridge Trail opened. Graphic courtesy of DVRPC.

DVRPC installed a permanent counter on the Cynwyd Heritage Trail to estimate ridership on the future connection. In the first year of counting alone, DVRPC recorded over 100,000 bicycle and pedestrian trips on the Cynwyd Heritage Trail. Critically, they found that after the Manayunk Bridge Trail opened, traffic on the trail during the work week more than doubled. This demonstrated not only the popularity of the trail but also its role in connecting people between their homes and jobs.

With such impressive findings, DVRPC anticipates that these data will help spur more investment in bicycle and pedestrian infrastructure throughout the region.

BARRIERS ALONG THE WAY

Traditional transportation funding entities were initially tepid in their support for bicycle and pedestrian counting equipment because the Federal Highway Administration (FHWA) did not require bicycle and pedestrian counts. DVRPC overcame this by seeking funding from the atypical source of foundations.

DVRPC staff had a hand in revising the FHWA's *Traffic Monitoring Guide*. They helped write a new chapter that provided concrete guidelines and recommendations for collecting active transportation data. This may help other organizations overcome barriers as they launch pedestrian and bicycle count programs, such as resistance from potential funders.

RESULTS AND BENEFITS

DVRPC and its partners have benefited from the count program in many ways. First, of course, DVRPC now has an extensive supply of compelling data on bicycling and walking activity among people in its region. For example,

in just one week, DVRPC counted more than 54,000 bicycling and walking trips on the Schuylkill River Trail at Schuylkill Banks, which was named "America's Best Urban Trail" in 2015 by USA Today.[3] The latest counts show that an average of 2,828 pedestrians and 1,414 bicyclists use the Schuylkill River Trail at this location each day.

Demonstrating such high demand for walking and bicycling helps justify the expansion and improvement of the broader Circuit Trails network, reduces opposition for other bicycle and pedestrian projects, communicates physical activity levels among people using the trail, and sends a signal to local businesses that many potential customers are nearby.

Second, all of DVRPC's pedestrian and bicycle data are publicly available on its website. This allows organizations across the region to make a more compelling, data-based case for transportation funding in their jurisdiction, monitor health-related transportation patterns, or prioritize future transportation or development projects.[4]

Third, project sponsors use count data to strengthen their applications for new walking and bicycling projects. For example, the federal Congestion Mitigation and Air Quality Improvement Program (CMAQ) application requires an estimated impact on air pollution. DVRPC's count data help calculate how a proposed project would lead to a reduction in vehicle trips, an increase in trips on foot or bicycle, and a decrease in air pollutants as a result.

Fourth, DVRPC staff have made presentations at several conferences about the count program, generating widespread media attention to projects such as the region's Circuit Trails network.

Fifth, DVRPC's partners, including those in other sectors, may use the data to inform their work. Transportation planners use these data to quantify the impacts of walking and bicycling projects, better prioritize projects, and identify gaps in the active transportation network. Public health experts may use the data to measure the effectiveness of campaigns designed to increase walking or identify specific neighborhoods where residents should increase their physical activity levels.

Sixth, DVRPC's groundbreaking counting methods are now reflected in the FHWA's 2016 *Traffic Monitoring Guide*.[5] MPO staff helped author a new chapter on active transportation data collection methods. The chapter establishes more rigorous standards for bicyclist and pedestrian count methods. For example, it introduces a longer data collection window to account for weather fluctuations. Walking and bicycling counts should be conducted over seven full days, not 48 hours, which is the standard collection period for motor vehicle counts. DVRPC's count program is a model for states and metropolitan regions nationwide. While FHWA still does not require bicycle and pedestrian counts, the federal agency's publication of standard methods for collecting these data, coupled with DVRPC's exemplary program, may encourage other transportation agencies to launch their own bicycle and pedestrian count programs.

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3 For the complete list of *USA Today*'s "Top 10 Best Urban Trails of 2015" visit: http://www.10best.com/awards/travel/best-urban-trail/.

4 DVRPC's bicycle and pedestrian count data are available online: http://dvrpc.org/Traffic/.

5 U.S. Department of Transportation Federal Highway Administration. *Traffic Monitoring Guide*. October 2016. Available at: https://www.fhwa.dot.gov/policyinformation/tmguide/.

LESSONS LEARNED

DVRPC staff have the following advice for other MPOs and agencies:

1 Build a broad coalition that extends across transportation, public health, and other sectors.

DVRPC's bicycle and pedestrian count program would not have been possible without collaboration between the transportation and public health sectors. It is hard to overstate the mutual benefits of having more, better data on active transportation to guide future infrastructure investments. To ensure the success of future bicyclist and pedestrian count programs, involve advocacy organizations, health professionals, and other stakeholders. Be sure to also involve multiple departments of government from as many jurisdictions as possible.

2 Be transparent and share data and resources publicly.

DVRPC provides free access to all of its data online as a public resource. This increases both the exposure and the effectiveness of the program. Different stakeholders, including universities, public health experts, or advocacy organizations, may perform valuable analyses of count data that an MPO may not be able to undertake, such as studies on exercise, community cohesion, safety, or economic impact.

3 Consult the FHWA's *Traffic Monitoring Guide*.

The Traffic Monitoring Guide is an invaluable source of information for any organization interested in collecting data on bicycling and walking activity. DVRPC staff helped write a chapter, which first appeared in the 2013 edition of the guide. It provides a comprehensive overview of how to design, implement, and analyze active transportation count methods. The chapter explores the advantages and disadvantages of various types of counting equipment (shown in the graphic at right), explains how to account for seasonal and hourly fluctuations, offers advice on site selection, and establishes standard methods for permanent and short-term counts.

FIGURE 4-1 SIMPLIFIED FLOWCHART FOR SELECTING NONMOTORIZED COUNT EQUIPMENT

1. What Are You Counting?

2. How Long?

	Technology	Bicyclists Only	Pedestrians Only	Pedestrians & Bicyclist Combined	Pedestrians & Bicyclist Separately	Cost
Permanent	Inductance Loops[1]	●			◐	$$
	Magnetometer[2]	○				$-$$
	Pressure Sensor[2]	○	○	○	○	$$
	Radar Sensor	○	○	○		$-$$
	Seismic Sensor	○	○	○		$$
	Video Imaging: Automated	○	○	○	○	$-$$
	Infrared Sensor (Active or Passive)	○[3]	●	●	◐	$-$$
	Pneumatic Tubes	●			◐	$-$$
Temporary/ Short Term	Video Imaging: Manual	○	○	○	●	$-$$$
	Manual Observers	●	●	●	●	$$-$$$

○ Indicates what is technologically possible.
● Indicates a common practice.
◐ Indicates a common practice, but must be combined with another technology to classify pedestrians and bicyclists separately.
$, $$, $$$: Indicates relative cost per data point.
[1] Typically requires a unique loop configuration separate from motor vehicle loops, especially in a traffic lane shared by bicyclists and motor vehicles.
[2] Permanent installation is typical for asphalt or concrete pavements; temporary installation is possible for unpaved, natural surface trails.
[3] Requires specific mounting configuration to avoid counting cars in main traffic lanes or counting pedestrians on the sidewalk.

DVRPC's to help agencies choose between types of bicycle and pedestrian count equipment to employ based on data desired, count length, and cost.

INVOLVING PUBLIC HEALTH PARTNERS

DVRPC and the Philadelphia Department of Health have shared a vision of creating environments that foster active living and they worked together on the Get Healthy Philly initiative. The environments in which people live, work, learn, and play shape public health outcomes and City of Philadelphia agencies began working to improve those environments. The city recognized that people of color and people with a low income disproportionately suffered from disease compared with white populations and those with a higher income. For instance, the city knew that African American women were dying at twice the rate as white women from diabetes.[6] To create a healthier Philadelphia, the city began working to make the healthy choice the easy choice using a policy, systems, and environmental framework.

In 2014, DVRPC created a Healthy Communities Task Force that would help integrate planning and public health concerns throughout the region.[7] At times, this multi-sector task force has helped analyze DVRPC's pedestrian and bicycle count data.

"Data from DVRPC's bicycle and pedestrian count program helps the region most effectively plan, prioritize, and target our investments in trails, sidewalks, bikeshare stations, and capital projects. The data is especially helpful in understanding the effectiveness of traffic safety projects, as we are able to measure how many pedestrians and bicyclists are served before and after a project is implemented."

-Jeannette Brugger, Bicycle & Pedestrian Coordinator for the City of Philadelphia

6 Read the *2014 Annual Report Get Healthy Philly: Year In Review* at: http://www.phila.gov/health/pdfs/2014_PDPH_AR_webFINAL.pdf.

7 More information about the DVRPC Healthy Communities Task Force can be found at: http://www.dvrpc.org/Committees/HCTF/.

4 Performance measures

Metropolitan Transportation Commission/Association of Bay Area Governments (San Francisco, CA)
Chattanooga-Hamilton County/North Georgia Transportation Planning Organization (Chattanooga, TN)

Using performance measures and targets to evaluate proposed transportation projects and fund high-performing projects

Transportation affects nearly every aspect of people's lives and a place's economy, from a person's health status to a family's quality of life to a business's access to talented employees. Performance measures and project selection criteria may provide information on proposed transportation projects' impacts on any of those factors, and many more, to the people who choose which transportation projects to fund. They help decision-makers weigh the costs and benefits of funding certain projects with limited dollars and understand the impacts of proposed projects on a range of factors that are important to their constituents.

When choosing projects to fund, the MPOs profiled in this section take into account proposed projects' anticipated impacts on access to jobs, public health, underserved populations, safety, connectivity, the environment, and much more. These MPOs analyze and score proposed transportation projects and rank those projects according to their ability to meet the region's goals. The performance measures, targets, indicators, or project selection criteria they use prioritize effective walking and bicycling connections.

The Metropolitan Transportation Commission-Association of Bay Area Governments funds transportation projects based on their ability to help the region make progress on thirteen performance targets, including those measuring public health and social equity outcomes.

The Chattanooga Transportation Planning Organization (TPO) in Tennessee evaluates transportation projects at different scales for their relative benefits. This helps smaller, more inexpensive transportation projects — such as bicycling and walking projects — compete more fairly with larger transportation projects. Funding for bicycle and pedestrian improvements doubled in the TPO's last RTP.

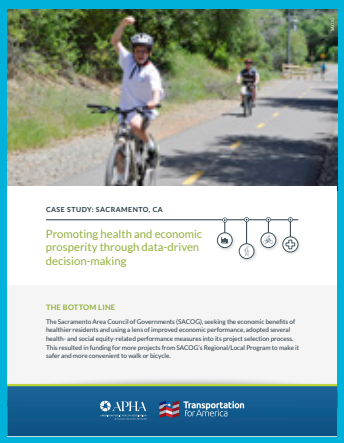
Additional case studies to explore

In 2016, in partnership with the American Public Health Association, T4America produced a similar package of case studies that showcases a range of strategies that metro area planning agencies can use to strengthen the local economy, improve public health outcomes for all of their residents, promote social equity, and better protect the environment. Three similar profiles in that set provide additional information on using performance measures and project selection criteria to shape and select better projects. Each has been updated to include a timeline of the work and a new section on how public health partners were involved.
They are available at http://t4america.org/maps-tools/mpo-case-studies/.

Sacramento, CA
The Sacramento Area Council of Governments (SACOG) uses performance measures to award funding to the transportation projects that best meet the region's goals. Now, up to 50 percent of SACOG's projects funded through the state's Regional/Local Program promote biking and walking, doubling the number of projects funded in the previous regional transportation plan.

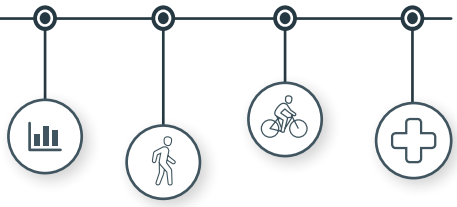
Nashville, TN
The Nashville Area MPO is choosing to fund transportation projects based on selection criteria that largely relate to public health, safety, and social equity. In the MPO's last long-range transportation plan, 77 percent of the funded projects included a component to make walking or bicycling safer and more convenient.

Greensboro, NC
The Greensboro MPO in North Carolina is choosing active transportation projects that will promote connectivity, public health, social equity, and safety. As a result, the MPO was recently awarded funding for the second highest number of projects through North Carolina's Transportation Alternatives and Safe Routes to Schools Programs, ahead of several larger metropolitan areas.



Plan Bay Area 2040 funds the 14th Street Safe Routes in the City project to improve pedestrian and bicyclist safety in the City of Oakland. Courtesy of MTC

4 – PERFORMANCE MEASURES AND PROJECT SELECTION: METROPOLITAN TRANSPORTATION COMMISSION (BAY AREA, CA)



Evaluating the health and social equity impacts of proposed projects and funding the most beneficial projects

THE BOTTOM LINE

Bay Area residents struggle with rapid growth and a dearth of affordable housing; record breaking costs of living and income gaps are inflicting long commutes, health problems, and financial hardship on millions of people. A new plan will set up policymakers and planners in the San Francisco Bay Area to better manage the growing strain on roads, transit systems, and budgets. The Metropolitan Transportation Commission (MTC), in collaboration with the Association of Bay Area Governments (ABAG), developed *Plan Bay Area 2040*, the regional transportation plan (RTP) for the San Francisco region that pioneers cross-disciplinary planning and coordination across the transportation, land use, housing, and public health sectors. The plan works to achieve 13 ambitious performance targets established in collaboration with local governments, advocates, community members, and more. MTC/ABAG uses these targets to identify funding priorities for transportation investments that will advance their objectives in a sustainable, cost-effective manner. The plan sets ambitious and aspirational targets to mitigate involuntary displacement risk and deploys data-based tools to better incorporate health considerations in long-range transportation and land use planning.

THE CONTEXT

MTC and ABAG serves the San Francisco Bay Area, spanning 7,000 square miles and encompassing 101 cities in nine counties. The Bay Area is currently experiencing rapid population growth: as of 2017, 7.7 million people resided in the region, but by 2040 the population is projected to increase to 9.6 million. Climate legislation passed in 2008 (SB 375, also known as the California Sustainable Communities and Climate Protection Act of 2008) requires that metropolitan regions throughout the state develop a Sustainable Communities Strategy (SCS); through the development of this document, a metropolitan area plans housing for the region's growing population and strategies to meet reduction targets for greenhouse gas emissions from cars and light-duty trucks.[1] To achieve these targets in the San Francisco Bay Area, planners and local officials are promoting dense, mixed-use development within Priority Development Areas (PDA), which are voluntarily designated by cities and counties. Encouraging new housing in areas where more trips can be taken by transit, walking, or bicycling is part of MTC/ABAG's strategy to reduce per-capita greenhouse gas emissions by a projected 15 percent by 2035.

THE PROBLEM

Population and employment growth are straining the Bay Area's housing supply and transportation infrastructure: between 2010 and 2040, the number of households is expected to increase by 820,000 while the number of jobs is expected to increase by 1.3 million. In a region where the vast majority of low-income households are already spending more than half of their income on housing, this housing shortage will have disastrous consequences for affordability and is indeed already pushing more jobs and homes into outlying counties, increasing the disconnect between the places where people live and where they work. As a result, road congestion and overcrowding on transit systems are increasing significantly across the region. The excess demand, coupled with budget constraints that delay necessary maintenance projects, have diminished the quality of infrastructure in the region. In the coming decades, Bay Area transportation infrastructure will continue to require significant reinvestment to prevent a decline in asset conditions.

To care for its existing transportation assets and save money in the long run, MTC/ABAG reaffirmed its fix-it-first policy to prioritize the repair and maintenance of existing infrastructure before expanding or building new transportation projects. The regional transportation plan, *Plan Bay Area 2040*, allocates 88 percent of federal, state, regional, and local transportation funding to operate, maintain, and modernize the current system, leaving just 12 percent for expansion projects. Applying this limited funding in a strategic, efficient manner is all the more essential considering that about 23 percent of the region's population resides in what MTC/ABAG calls Communities of Concern, defined as areas with a high concentration of people who have a low income, are seniors, are of color, are single parents, have limited English proficiency, lack access to a car, and/or spend more than half of their household income on housing.

1 To view the full contents of Senate Bill 375, including additional requirements for California MPOs, visit: http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200720080SB375.

WHAT THE MPO DID

> *"Plan Bay Area is an unprecedented regional strategy for fostering more sustainable communities throughout the region. The plan calls for 80 percent of new homes and 50 percent of new jobs to be located near transit. By guiding new growth to these areas, we will prevent sprawl and protect our natural and agricultural lands, while meeting the need for housing that's walkable, connected, and affordable."*
>
> *-Jeremy Madsen, CEO, Greenbelt Alliance*

Given the challenge of serving a growing population with an aging transportation system and a constrained budget, MTC/ABAG developed *Plan Bay Area 2040* to more strategically prioritize transportation investments to accomplish critical, clear, and measurable goals.[2] The two regional agencies (MTC, which serves as the region's MPO, and ABAG, which is the council of governments) embarked on a six-month public engagement process to define performance targets; this effort followed several months of updating the robust framework to evaluate the merits of proposed projects previously used in the original Plan Bay Area (adopted in 2013). This process led to the development of seven goals for MTC/ABAG to pursue, all of which support the three core tents of sustainability: economy, environment, and equity. Thirteen performance targets — specific measures combined with quantifiable targets — allow policymakers and the public to understand how far the regional plan does (or does not) move the needle toward each goal.

Plan Bay Area 2040's goals are:

- Reducing greenhouse gas emissions;
- Providing sufficient housing to accommodate population growth;
- Enhancing health outcomes;
- Limiting development to designated growth boundaries;
- Improving regional affordability;
- Supporting economic development and access to opportunity; and
- Maintaining and enhancing the regional transportation network.

Plan Bay Area 2040 takes advantage of innovative new modeling tools, including the Integrated Transport and Health Impact Modeling Tool (ITHIM), to better predict the health impacts of transportation funding scenarios.[3]

MTC/ABAG evaluated the performance of large-scale transportation projects (i.e., those that cost more than $100 million) based on their projected impact on these objectives and on their cost-effectiveness. Through this project evaluation process, each proposed large project received a numeric score that indicated its ability

2 *Plan Bay Area 2040* and supplementary reports are available at: http://2040.planbayarea.org..

3 For more information about ITHIM, refer to the Nashville MPO case study in section 8 of this guidebook on "Understanding the Public Health Impacts of Transportation Behaviors."

to meet the region's performance targets, known as a "targets score." That qualitative analysis was then paired with a quantitative benefit-cost analysis and a calculated benefit-cost ratio. The highest performing projects — those with strong scores on both analyses — were prioritized for future federal, state, or regional funding through *Plan Bay Area 2040* (including future competitive grants that would still need approval, such as New Starts funding for major transit expansion projects). Low-performing projects, which either had a low benefit-cost ratio or a net adverse effect on performance targets, underwent an additional review process. MTC/ABAG ultimately did not fund most of the low-performing projects. However, project sponsors made a "compelling case" for a handful of proposed projects, winning funding for a few projects that did not perform strongly through MTC/ABAG's analysis. Project applicants for a majority of these successful appeals made the case that their project would serve lower-density Communities of Concern; they argued that even though they were not as cost-effective as other regional investments, they still had merit from a social equity standpoint.

MTC/ABAG's proposed project performance assessment allowed the MPO to identify funding priorities, remove ineffective projects from consideration, and better understand the tradeoffs between competing objectives.

In addition to evaluating the performance of individual large-scale transportation projects, MTC/ABAG analyzed the anticipated impacts of potential land use policies (e.g., areas zoned for high-density development or mixed-use development). To do so, the regional agencies conducted comprehensive land use scenario analyses that are among the most sophisticated of any used by MPOs across the country. These scenarios combined packages of transportation investment decisions with a handful of potential land use patterns to model the cumulative impact on the RTP/SCS's performance targets. The scenario analysis allowed MTC/ABAG to identify key findings related to the impacts of transportation and land use decisions. MTC/ABAG then forecasted whether or not the RTP/SCS would likely achieve or fall short of meeting each of its 13 targets.

Under the preferred scenario — which ultimately was adopted as the final RTP — the region is expected to achieve five targets and move in the right direction on four more. However, the policies included in the RTP were insufficient to adequately slow and reverse rising affordability and displacement risk, among other trends.

> *"Evaluating our transportation investments against performance targets has two key benefits. Before making funding allocations, they sharpen our understanding of which projects are most cost effective and align with our broader community goals. And then after investments are made, we're able to compare results against our targets, allowing us to adjust course and bring greater benefits. How we invest in mobility ripples across key qualities of life. Performance measures allow that to be woven into our decisions."*
>
> *- Steve Kinsey, MTC Commissioner*

HOW THE MPO DID IT

Before MTC/ABAG could undertake any sort of project- or scenario-based analysis, it first needed to establish concrete objectives for *Plan Bay Area 2040*. To identify goals that would be reflective of regional priorities, MTC/ABAG gathered feedback from hundreds of stakeholders and residents of the region's nine counties and 101 cities, (e.g., local elected officials, transportation planners, transit operators, and congestion management agencies), Native American tribes, as well as numerous advocacy organizations focused on equity, environment, health, affordable housing, and economic development. MTC/ABAG conducted open houses, workshops, telephone surveys, and meetings to collect public input. The regional agencies also collected feedback through an online comment forum, over e-mail, and via traditional mail. Surveys and information were available in English, Spanish, and Chinese. The engagement process enabled stakeholders to voice their concerns and top priorities for sustained and future growth, ultimately leading to the adoption of the 13 performance targets to guide the funding decisions of *Plan Bay Area 2040*.

Event	Date(s)	Attendance/ Participants
Spring 2015 Open Houses: Nine open houses around the region	April 29, 2015 through May 28, 2015	600
Spring 2016 Open Houses: Nine open houses around the region	May 26, 2016 through June 14, 2016	455
Scenario Concepts Special Workshops: Regional Advisory Working Group and Regional Planning Committee	October 6 and October 7, 2015	130
Housing Forum: Calling the Bay Area Home: Tackling the Affordable Housing and Displacement Challenge	Saturday, February 20, 2016	300
Telephone Survey: Conducted in English, Spanish & Chinese by phoning registered voters in all nine counties	March/April 2016	2,048
Build a Better Bay Area Online Quiz: Online survey on three alternative scenarios; *Includes 204 responses from surveys conducted by community-based organizations*	Data collected between May 26, 2016 and September 16, 2016	921
Scoping Meetings on Draft Environmental Impact Report (DEIR): Oakland, San Jose, Santa Rosa	Three scoping meetings: May 26, May 31 and June 2, 2016	60

Thousands of residents of the Bay Area participated in the development of Plan Bay Area 2040.

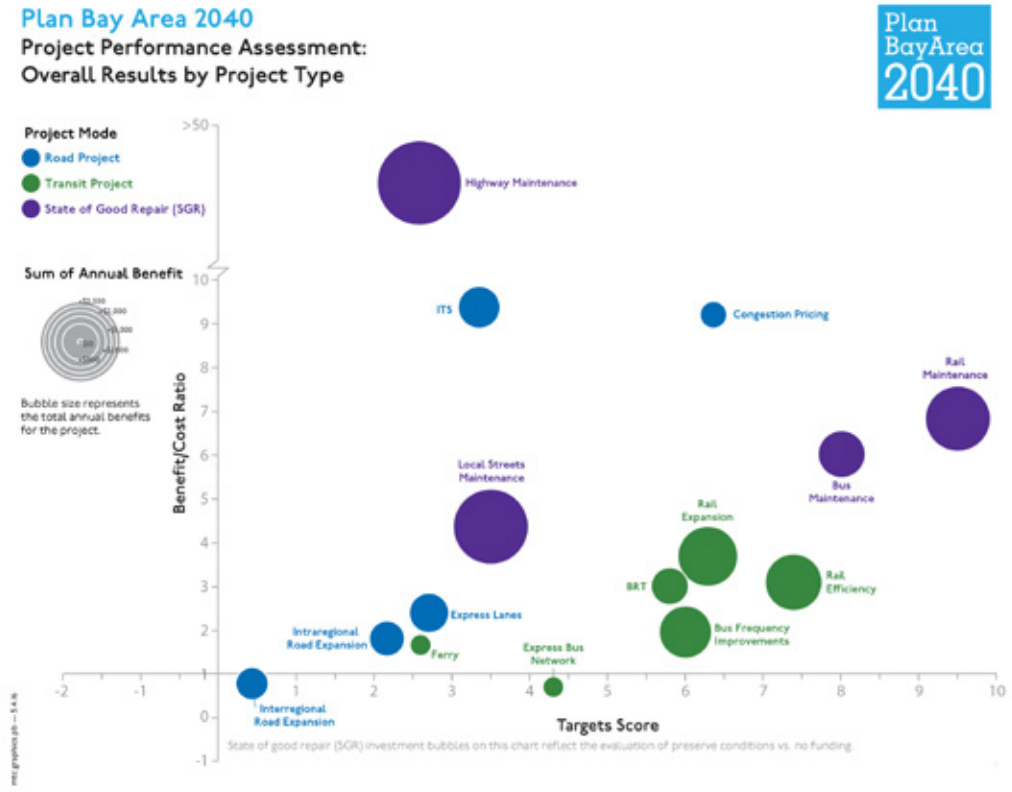
This outreach not only helped the MTC Commission and the ABAG Board — both of which include elected officials from across the region — select the plan's objectives and targets; it fostered support and awareness of the plan's performance assessment process.

MTC and ABAG developed their performance measures in targets based on input from hundreds of community members. Pictured here are community engagement events to hear the public's feedback on the RTP's goals and targets in San Jose and Walnut Creek. Photos courtesy of MTC.

MTC/ABAG used the RTP/SCS's 13 targets to evaluate the anticipated performance of roughly 70 proposed projects that would cost more than $100 million to build; these projects accounted for the vast majority of funding requests. MTC/ABAG staff accomplished this by qualitatively analyzing each proposed large-scale project. They predicted whether projects would advance or detract from each of the RTP's objectives, awarding each project between +1 and -1 points depending on its expected impact on each of the 13 targets.[4] MTC/ABAG staff then added together the scores for each project's impact on each target to generate a total score ranging from -13 to +13. MTC/ABAG awarded all possible points to projects that would advance all of the plan's goals.

The other component of the project assessment for *Plan Bay Area 2040* was a benefit-cost analysis using MTC/ABAG's Travel Model One (the MPO's activity-based regional travel demand model). This model forecasted impacts on a variety of metrics, including travel time and cost, emissions, and noise. It also monetized health care cost savings that could result from averted traffic crashes or increased physical activity from walking and bicycling. ITHIM also allowed MTC/ABAG to more accurately and comprehensively incorporate health benefits by modeling morbidity and mortality changes related to improvements in air quality, physical activity rates, and safety. These benefits were divided by annualized capital construction costs, as well as net operating and maintenance expenses, to calculate each project's benefit-cost ratio.

MTC/ABAG compared all of the evaluated proposed projects to identify the highest and lowest performers. Transit maintenance investments attained the highest scores overall. Highway maintenance projects had the highest cost-effectiveness but advanced fewer of MTC/ABAG's objectives, compared to transit modernization and expansion projects, which had the greatest positive impact on plan goals but were not as cost-effective.



MTC-ABAG examined proposed projects worth more than $100 million to evaluate how they could help the Bay Area meet thirteen performance targets while running a benefit-cost assessment. The y-axis shows projects that would yield the biggest bang for the buck, while the x-axis shows the degree to which types of projects would help the region meet its targets if funded. Graphic courtesy of MTC.

4 The full results of *Plan Bay Area 2040*'s project assessment, including breakdowns of targets scores and benefit-cost analyses is available at: http://bayareametro.github.io/performance/dashboard/.

The highest performing projects were either allocated funding or added to the region's priority list for future federal funding (e.g., New Starts funding for transit projects).

Projects with costs that exceeded their benefits and/or were expected to have a detrimental impact on the plan's targets were identified as low performers. Rather than dismissing these projects outright, MTC/ABAG re-assessed low performing projects through a "compeling case" process. Project sponsors could advocate to receive funding for a proposed project under a set of defined cases which focused either on model limitations or overriding federal considerations. Five compeling cases were ultimately approved, three related to projects serving Communities of Concern, one related to recreational trips not well captured by the travel model, and one due to its cost-effectiveness solely for air quality. MTC/ABAG's board decided not to fund three other projects whose project sponsors attempted to make a compelling case, including a major tollway project and two transit projects with a high cost and a low ridership projection.

After undertaking these project-level analyses to look at the anticipated impacts of individual projects, MTC/ABAG zoomed out to evaluate broader regional scenarios more comprehensively. Scenario performance assessment tested the overall impact of potential land use patterns and various packages of transportation investments on the region's 13 targets. MTC/ABAG analyzed a total of six land use and transportation scenarios for *Plan Bay Area 2040*:

- **No Project:** A baseline scenario where no new transportation projects would be constructed and historic growth patterns would continue going forward;
- **Main Streets Scenario:** Growth would be dispersed in the downtown areas of smaller cities throughout the region and transportation funding would prioritize highway capacity and maintenance as well as suburban bus services;
- **Connected Neighborhoods Scenario:** Growth would be focused in cities with access to existing regional rail services and funding would prioritize transit efficiency and expansion;
- **Big Cities Scenario:** Growth would be focused in the largest cities in the region and funding would link and expand rail and transit services;
- **Environment, Equity, and Jobs Scenario**: Added by stakeholder request during the RTP's environmental impact assessment; growth and investments would be focused in transit priority areas and higher-opportunity areas with low crime and good quality schools, emphasizing bus frequency improvements over other capital investments; and
- **Preferred Scenario:** Growth would be focused in Priority Development Areas across the region with an emphasis on major cities and bayside communities along with a balanced transportation investment package of road and transit projects.

These scenarios demonstrated the potential impact of various land use policies and transportation investment decisions on *Plan Bay Area 2040*'s 13 targets. The scenario analysis was an important component of MTC/ABAG's public workshops. They helped stakeholders visualize the region's potential future and understand how and why transportation projects are prioritized in the RTP.

In this phase of analysis, MTC/ABAG also paid special attention to Communities of Concern by comparing any anticipated disproportionate impacts by analyzing six equity metrics, looking at the sum of impacts within Communities of Concern compared with surrounding areas:

- Health impact of physical inactivity, air quality, and road safety;
- Share of household income spent on housing and transportation costs;
- Availability of affordable housing;
- Displacement risk;
- Access to jobs via car and transit; and
- Availability of middle-wage jobs.

This analysis ensured the RTP/SCS was tailored to benefit the region's historically underserved communities and mitigate disproportionately harmful impacts of rising costs of living on these groups.

Results of Plan Bay Area 2040 Target Assessment

Plan Meets or Exceeds Target			
Climate Protection	Reduce per-capita CO_2 emissions from cars and light-duty trucks by 15%	Plan meets and exceeds target, reducing per-capita CO_2 emissions by 16 percent by 2035.	
Adequate Housing	House 100% of the region's projected growth by income level without displacing current low-income residents and with no increase in in-commuters over the Plan baseline year	Plan meets target, housing 100 percent of population growth without increasing the number of in-commuters.	
Open Space and Agricultural Preservation	Direct all non-agricultural development within the urban footprint (existing urban development and UGBs)	Plan meets target, directing all non-agricultural development within the existing urban footprint and existing growth boundaries.	
Economic Vitality	Increase by 38% the number of jobs in predominantly middle-wage industries	Plan meets and exceeds target, growing the number of jobs in middle-wage industries by 43 percent.	
	Reduce per-capita delay on the Regional Freight Network by 20%	Plan meets and exceeds target, reducing per-capita delay on major freight corridors by 29 percent.	
Plan Makes Progress Toward Target			
Healthy and Safe Communities	Reduce adverse health impacts associated with air quality, road safety, and physical inactivity by 10%	Plan reduces health impacts by 1 percent, but falls short of target.	
Equitable Access	Increase the share of affordable housing in PDAs, TPAs, or high-opportunity areas by 15%	Plan increases the share of affordable housing in key areas by 3 percentage points, but falls short of target.	
Transportation System Effectiveness	Increase non-auto mode share by 10%	Plan boosts non-auto mode share by 3 percentage points, but falls short of target.	
	Reduce per-rider transit delay due to aged infrastructure by 100%	Plan reduces per-rider delay due to aged transit infrastructure by 75 percent, but falls short of target.	
Plan Moves in Opposite Direction From Target			
Equitable Access	Decrease the share of lower-income residents' household income consumed by transportation and housing by 10%	Plan moves in opposite direction from target; share of lower-income household income required for housing and transportation costs is expected to increase by 13 percentage points.	
	Do not increase the share of low- and moderate-income renter households in PDAs, TPAs, or high-opportunity areas that are at risk of displacement	Plan moves in opposite direction from target; share of lower-income households at risk of displacement is expected to increase by 5 percentage points.	
Economic Vitality	Increase by 20% the share of jobs accessible within 30 minutes by auto or within 45 minutes by transit in congested conditions	Plan moves in opposite direction from target; share of jobs accessible within 30 minutes by auto or 45 minutes by transit is expected to decline by less than 1 percentage point.	
Transportation System Effectiveness	Reduce vehicle operating and maintenance costs due to pavement conditions by 100%	Plan moves in opposite direction from target; vehicle operating and maintenance costs due to pavement conditions are expected to grow by 6 percent.	

TABLE 4.9 Results of Plan Bay Area 2040 target assessment.

Source: Metropolitan Transportation Commission, 2016

The MTC Commission and the ABAG Board adopted thirteen performance targets that the Bay Area strives to achieve through transportation and land use strategies and investments. The transportation projects that received funding through Plan Bay Area 2040 will help the region meet or surpass five of MTC-ABAG's performance targets and make some progress on four targets. Conditions measured by the remaining four targets, however, are expected to worsen under the regional transportation plan, including the ability for people to afford housing and transportation costs and residents' risk of involuntary displacement. The MTC-ABAG Board of Commissioners made several commitments to address affordability and displacement risk through an Action Plan, adopted with the RTP/SCS. Graphic courtesy of MTC.

TIMELINE

2001: The MTC Commission adopted an RTP that used transportation targets to fund projects.
2005: The MTC Commission adopted *Transportation 2030*, an RTP that again used transportation targets, as well as a goals-based qualitative project assessment, to choose transportation projects for funding.
22 April 2009: The MTC Commission adopted *Transportation 2035*, a regional transportation plan that enabled leaders to choose projects for funding by using transportation targets, a goals-based qualitative project assessment, and a limited benefit-cost analysis for quantitative project assessment to choose projects for funding.
18 July 2013: The MTC Commission adopted *Plan Bay Area*, an RTP that used integrated transportation and land use targets, a targets-based qualitative project assessment, a rigorous benefit-cost analysis, and, for the first time, integrated transportation and land use scenarios to do scenario planning.
6 January 2015: MTC/ABAG convened the regional Advisory Working Group to kick off *Plan Bay Area 2040*.
25 February 2015: The MTC Commission and ABAG Board adopted the Public Participation Plan.
29 April 2015: MTC/ABAG held the first meeting of the Performance Working Group to discuss performance targets and the transportation project performance assessment process.
29 April – 30 September 2015: MTC/ABAG issued the call for projects to be considered for funding through *Plan Bay Area 2040*. The
29 April - 28 May 2015: MTC/ABAG held open houses in all nine counties to discuss plan goals.
31 May 2015: MTC staff and leadership held virtual open houses to collect comments.
10 June 2015: The Regional Equity Working Group convened to start developing an equity analysis framework.
12 June 2015: MTC staff synthesized and presented public comments from open houses to the MTC Commission and ABAG Board.
September 2015: The MTC Commission and ABAG Board approved *Plan Bay Area 2040* goals.
May - June 2016: MTC and ABAG hosted open houses to discuss scenario analyses.
November 2016: The MTC Commission and ABAG Board adopted the Preferred Scenario (which ultimately did become the final RTP).
Spring 2017: MTC/ABAG opened the draft *Plan Bay Area 2040* for public comment, including through public workshops.
26 July 2017: The MTC Commission and ABAG Board adopted *Plan Bay Area 2040*.

KEY PARTNERS

Partners involved in the development and adoption of *Plan Bay Area 2040* included:

- County transportation authorities
- Alameda County Transportation Commission
- Contra Costa County Transportation Authority
- Transportation Authority of Marin
- Napa Valley Transportation Authority
- San Francisco County Transportation Authority
- San Mateo County Transportation Authority
- Santa Clara Valley Transportation Authority
- Solano Transportation Authority
- Sonoma County Transportation Authority
- Caltrans (California Department of Transportation)
- Bay Area Regional Health Inequities Initiative (BARHII)
- Human Impact Partners, TransForm, and other advocates (via previous work on *Plan Bay Area 2035*)
- National Indian Justice Center

ABAG collaborated closely with MTC throughout the entire process of developing and distributing *Plan Bay Area 2040*. ABAG is primarily responsible for guiding land use and housing policy in the Bay Area and projecting expected changes to population, housing supply, and jobs. Agency staff and board members were heavily involved every step of the way to develop and adopt both *Plan Bay Area 2035* and *Plan Bay Area 2040*. In fact, in July 2017, MTC and ABAG consolidated their staffs. This enabled the agencies to more effectively and efficiently develop an integrated long-range transportation and land use plan.

Other key partners in the development and use of MTC/ABAG's performance measures included the nine county transportation authorities in the region, as well as Caltrans (the state's department of transportation).

Committed advocates and engaged residents abound in the Bay Area. For the RTP/SCS prior to *Plan Bay Area 2040* — known simply as *Plan Bay Area* — Human Impact Partners led a collaboration of public health organizations, social equity advocates, and more to develop recommendations of health equity performance measures that MTC should establish for transportation projects. The nonprofit advocacy group TransForm worked with HIP and other partners to encourage the MTC Commission to adopt these performance measures and targets in the RTP. (The list of their recommended performance measures is included in the appendices.) TransForm also provided feedback on MTC's project evaluation methods, influencing the process to analyze and fund transportation projects. Through the *Plan Bay Area 2040* project evaluation process, MTC staff analyzed more than 1,000 projects worth billions of dollars for their quantifiable impacts on physical activity, air pollution, safety, transportation, housing costs for people with low incomes, housing availability for Bay Area residents, and more.

A number of other organizations were also instrumental in providing feedback, guidance, and support throughout the development of *Plan Bay Area 2040*. For example, the Bay Area Regional Health Inequities Initiative (BARHII), a coalition of county public health experts, collaborated with MTC and ABAG to develop the RTP's health equity indicators and advocated for their inclusion in the plan. BARHII members are concerned about transportation and housing issues that worsen health disparities that are directly correlated with a person's race, income, and/or zip code. BARHII pressed for solutions to help lower-income Bay Area residents, many of whom struggle to pay for housing and transportation while still having enough money to cover basic costs of living.

Finally, a number of local community organizations facilitated components of the public engagement process by conducting surveys and holding focus groups in low-income areas and communities of color. This included the National Indian Justice Center, which hosted a series of meetings between Native American tribal representatives and transportation decision-makers over the course of the plan's development.

BARRIERS ALONG THE WAY

Plan Bay Area 2040's incorporation of health and equity targets in transportation planning was groundbreaking. The MTC Commission and ABAG Board were supportive of adopting goals and specific performance targets to reflect the broad range of regional priorities, including health; however, addressing the region's affordable housing crisis also required the adoption of targets to minimize displacement risk, increase the share of affordable housing, and preserve middle-wage jobs in the region.

At first, some members of the MTC Commission and ABAG Board responded to these proposed targets, particularly the one on displacement mitigation, with significant skepticism. Under this new project evaluation framework, projects that would serve areas with high rates of affordable housing (both existing and projected) would be explicitly prioritized for funding. Some commissioners raised concerns that evaluating transportation projects for funding on the basis of housing performance would be unfair to transportation agencies that have no control over municipal housing policies. Additionally, projects in certain suburban districts would face difficulty competing with those in urban areas, where rates of subsidized housing are higher. The resistance led equity advocates to push for these targets even more aggressively, which brought progress on *Plan Bay Area 2040* to a temporary halt. MTC/ABAG staff overcame this standstill by adopting the goals and targets in two phases, beginning with those that generated little controversy. They ultimately won enough support to incorporate the contentious targets into the plan by:

- Developing a model for displacement risk to give the commissioners a better sense of how its use would actually affect project prioritization; and
- Compromising on the specific displacement mitigation target by designing it to prevent a rise in displacement risk rather than adopting the advocates' proposal of constructing a target to eliminate the risk of displacement altogether.

The pressure from advocates to solve affordability issues for millions of people did not stop there because the results of the performance analysis were deeply unsettling. MTC/ABAG forecasted that conditions would worsen for two relevant issues monitored by the performance targets: involuntary displacement risk and affordability of both housing and transportation costs for residents. Advocates responded by demanding solutions for which they could hold their elected officials and government agencies accountable, as explained in more detail below.

RESULTS AND BENEFITS

Plan Bay Area 2040 creates a promising trajectory for the region in many ways. The plan will guide investments and policies that will lead to the achievement of critical objectives, including reducing per-capita greenhouse gas emissions by 16 percent, increasing the number of middle-wage jobs by 43 percent, and reducing congestion on goods movement corridors by 29 percent. For each of these indicators, the region will surpass MTC and ABAG's targets.

The plan also includes recommendations to meet 100 percent of the region's housing demand within designated growth boundaries, demonstrating the very real possibility of absorbing population growth without resorting to sprawl or infringing upon agricultural or open land. MTC/ABAG's performance-based analysis of proposed transportation projects helped make the case to fund exceptional projects, including:

- The extension of the region's heavy-rail BART system to Silicon Valley;
- A regional express lane network that expands the carpool network and allows single-occupancy vehicles to pay a toll to use the lanes;
- Cordon pricing in downtown San Francisco and nearby Treasure Island, with revenues used to expand transit options; and
- A suite of cost-effective bus rapid transit lines in San Francisco, San Jose, Oakland, and Berkeley.

Plan Bay Area 2040 also allocates $303 billion in funding for transportation projects through 2040, with the majority going towards public transit operations, maintenance, modernization, and expansion. Furthermore, $5.4 billion is committed to stand-alone bicycling and walking projects. However, many more millions — perhaps billions — of dollars will likely fund active transportation features, such as sidewalks and bicycle lanes, that are part of larger roadway and transit projects. Indeed, most arterial projects include active transportation features,

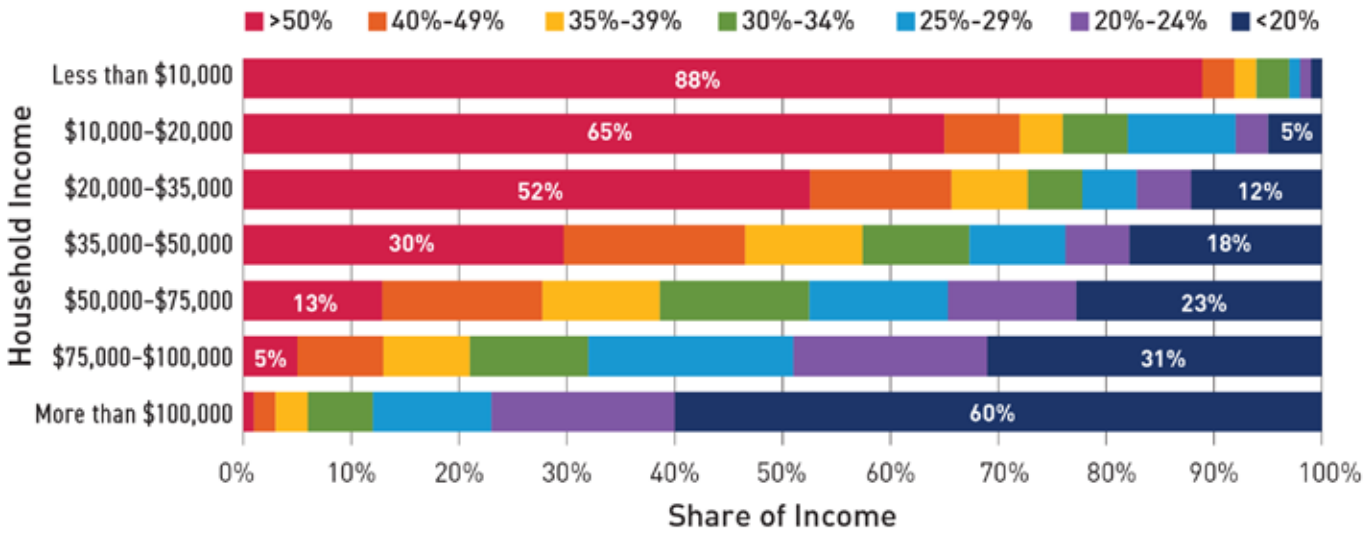
> *"MTC's performance measures have set a new standard for quantifying a wide range of costs and benefits. They've allowed us to determine which projects should absolutely be prioritized for funding and those projects whose costs — once you include potential negative impacts on public health, social equity and other measures — are simply greater than their benefits."*
>
> *- Stuart Cohen, Executive Director, TransForm*

thanks to MTC's regional Complete Streets policy. It is difficult to determine how much funding would precisely cover the costs of these components.

While *Plan Bay Area 2040* does not fully meet all of the region's ambitious goals and performance targets, it does help the region make some progress in addressing a number of the Bay Area's most pressing transportation-related challenges, such as the need to help people be more physically active or reduce residents' dependence on the automobile. Other obstacles persist, with the RTP/SCS predicting worsening conditions for four performance target areas (housing and transportation affordability, displacement risk, access to jobs, and road maintenance). Displacement risk — as high as it currently is — is expected to worsen in the region. Advocates demanded action from their elected officials and agency leaders. In response, MTC and the ABAG Board adopted an action plan to accompany the RTP/SCS, declaring their commitment to accomplishing a set of short- and medium-term tasks to alleviate housing affordability and displacement challenges, the widening income gap, and future threats to the region from global climate change, as further described below.

BEYOND PERFORMANCE TARGETS: ADDRESSING INCOME INEQUALITY AND STAGGERING COSTS OF LIVING IN THE BAY AREA

Housing affordability in the Bay Area is causing a crisis for most residents, especially those with a low income. Rent has nearly doubled since 1970. The region has the highest median home price compared with all other major metropolitan regions in the country. A majority of households in the Bay Area with an annual income of less than $35,000 spend more than 50 percent of their income on housing, as portrayed in the graphic from *Vital Signs*. Only 11 percent of households in the Bay Area could afford a home sold in San Francisco for the median sale price, according to a recent analysis. The minimum qualifying income to buy a home in the city is $254,000, yet median household income is $77,000.



An astonishing number of residents are unable to afford to live in the Bay Area. This chart shows the percentage of households in seven income brackets that spend more than fifty percent of their income on housing. Not pictured are the amounts that households spend on housing and transportation costs combined–also important indicators. Transportation can be incredibly expensive to people the farther they move away from their jobs, schools, and other essential destinations. In fact, for every dollar saved by moving farther away from a region's urban centers, transportation costs increase by an average of 77 cents, according to a study of 28 metropolitan areas in the U.S. Graphic courtesy of MTC.

Why? A number of factors have fueled this crisis, including cuts to state and federal affordable housing funding, a reduction in housing permitting, and regulatory and tax policy limitations (e.g., dismantling of the state's redevelopment agencies).[5] As a result, developers have built only one unit of housing for every two jobs opened in the Bay Area since 1990.

Advocates, professionals, and residents expressed concern about housing affordability in the region as *Plan Bay Area 2040* was developed. They were especially concerned that two of the RTP/SCS's targets — one established to reduce the risk of displacement and another set to enable more people to afford combined housing and transportation costs — showed a regression, not progress. They insisted that their elected officials and leaders of transportation and housing agencies commit to new efforts in the short- and medium-term to address these challenges.

As a result, the MTC Commission and ABAG Board adopted an action plan to accompany *Plan Bay Area 2040*. The action plan is a commitment to the people of the Bay Area by elected officials and accountable agencies that they will undertake specific actions to reverse the economic burdens borne by low- and middle-wage workers and prepare for the impacts of global climate change. It includes a list of strategies to address worsening conditions that are signaled by the performance targets, enumerating actions related to housing, economic development, and resiliency in the Bay Area.[6]

MTC/ABAG's use of performance measures and targets clearly highlighted worrisome trends in housing affordability and income gaps. The agencies' transportation project evaluation results helped improve project selection to use limited resources more effectively to achieve regional goals. Moreover, they helped highlight the benefits of projects that would narrow disparities in economic achievement and health outcomes among Bay Area residents.

> *"When people are forced to find housing farther from their jobs, community centers, families, and friends, they spend more money on transportation, tend to be less physically active, have less time to spend with those they love, and lose touch with their important social networks. MTC and ABAG's Action Plan is a step in the right direction to alleviating those consequences. Elected officials and the leaders of housing and land use agencies are now faced with the challenge of how to accomplish each task they committed to. Accomplishing the goals in the action plan are imperative for keeping residents of the Bay Area from spending too much of their income on housing and transportation, leaving them with money to spend on healthy food, medical expenses, and other necessities to stay healthy. "*
>
> *- Melissa Jones, Executive Director, Bay Area Regional Health Inequities Initiative (BARHII)*

5 http://2040.planbayarea.org/the-bay-area-today

6 http://2040.planbayarea.org/sites/default/files/2017-07/Plan%20Bay%20Area%202040_Adopted_07.26.17.pdf

LESSONS LEARNED

MTC/ABAG shares the following advice:

1 **Start small**.
MTC/ABAG's project evaluation process is incredibly ambitious and more complex than most regional agencies can manage, but MPOs can also generate momentum for similar processes by first evaluating only a limited number of important projects. Similarly, agencies that find MTC/ABAG's robust performance measurement daunting should narrow their focus to a limited number of specific measures; the more measures an MPO uses to evaluate proposed transportation projects, the more resources may be strained. Starting small helps increase understanding of the performance measures process among stakeholders, build support from the public and elected officials, and allow MPO staff to troubleshoot their analytic process.

2 **Instead of just prioritizing high-performing projects, do not fund low-performing ones.**
However performance is measured, it is equally effective, important, and necessary to not fund projects that fail to move the region forward as it is to prioritize funding for high-performing projects. Transportation agencies should ensure that they are not only recommending promising investments, but that they are also weeding out counterproductive ones.

3 **Measure what matters.**
MPOs should evaluate impacts on issues that matter to community members, such as public health outcomes, not just what traditional transportation models measure, such as mobility.

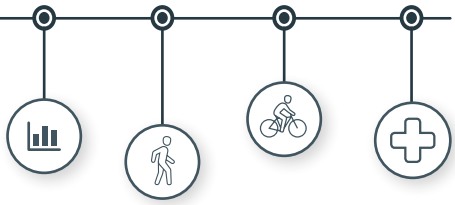
INVOLVING PUBLIC HEALTH PARTNERS

Performance measures and targets used to select transportation projects for funding may be designed to address public health and social equity concerns. As explained in the key partners section above, organizations focused on improving public health recommended performance measures for MPOs in California in order to prioritize funding for transportation projects that would help the region meet public health and social equity targets. HIP led a coalition of groups to develop the recommendations and organizations like TransForm advocated for the inclusion of these measures in the MPO's proposed project evaluation and selection processes for the first *Plan Bay Area*, adopted in 2013. Organizations like BARHII provided feedback, guidance, and support throughout the development of *Plan Bay Area 2040*, particularly on MTC/ABAG's health equity indicators and affordable housing strategies.

A mother and daughter ride on a neighborhood greenway. Photo courtesy of the Chattanooga Department of Transportation.

4 – PERFORMANCE MEASURES AND PROJECT SELECTION: CHATTANOOGA-HAMILTON COUNTY / NORTH GEORGIA TRANSPORTATION PLANNING ORGANIZATION (CHATTANOOGA, TN)

Performance-based planning and project evaluation



THE BOTTOM LINE

To enable more investment in small-scale multimodal projects, the Chattanooga-Hamilton County / North Georgia Transportation Planning Organization (CHCNGA-TPO) established a new performance-based project selection process that enabled smaller projects — and those more likely to encourage bicycling and walking — to compete with much larger, conventional roadway capacity projects for funding. Using a new "Community to Region" framework that recognizes how small-scale projects such as neighborhood roads and large-scale projects like interstate highways have distinct but important roles, the TPO heard public input about regional priorities to create a weighted scoring system that prioritizes investment in the highest-performing projects — regardless of scale, mode of transportation (bicycling, walking, riding transit, or driving), or which of the region's objectives proposed projects strive to achieve. Multi-modal transportation projects better serve the residents of the Chattanooga region. The TPO's innovative performance measures framework help elected officials analyze the myriad benefits of walking, bicycling, and taking transit (in addition to driving or transporting goods) and prioritize multi-modal projects for federal funding.

THE CONTEXT

The CHCNGA-TPO serves a population of just under a half million people. The TPO covers 15 municipalities in four counties: Hamilton County in Tennessee, and the northernmost parts of Dade and Walker Counties and all of Catoosa County in northwest Georgia. Much of the region is constrained by topographical features such as rivers or mountainous terrain that complicates the construction of transportation infrastructure. Consequently, access to public transportation in the region is limited, and residents of the region spend an average of 32.4 percent of household income on transportation, which is more than double what is considered to be affordable. Over the next two decades, the population of the region is expected to increase by 23 percent and jobs are expected to grow by 30 percent.

THE PROBLEM

Although jurisdictions in the TPO region were submitting bicycle, pedestrian, and transit projects for funding consideration prior to the 2040 plan, these projects received a disproportionately small share of regional funding. The TPO consistently awarded roadway capacity projects with around 90 percent of its funding each funding cycle, while walking, bicycling, and transit projects competed amongst themselves for the remainder. This occurred for three main reasons. First, building roadways was the norm at the time and, often, a default project for which elected officials would seek funding. The board did not hear a strong desire among constituents for multi-modal projects, nor did they fully understand the benefits of non-roadway projects.

Second, previously, the TPO evaluated proposed projects in silos, so that the TPO only compared roadway projects with roadway projects, transit projects with transit projects, and so forth. This rigidity created a cycle in which no matter how many high-performing transit, bicycle, or pedestrian projects were submitted for funding, investment within each modal silo would not increase, leaving the TPO without a mechanism to shift the balance of funding toward more multimodal projects.

Third, the TPO's previous set of evaluation criteria inherently favored roadway projects. The TPO's previous project selection process rewarded large-scale investments (such as highways) that would increase capacity and reduce congestion.

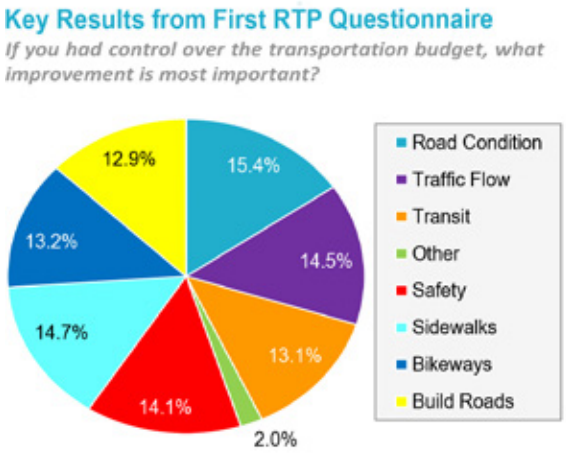
The TPO's methodology neither set up transit, bicycling, and walking projects to directly compete with roadway projects, which were in the spotlight during RTP funding negotiations, nor used a set of evaluation criteria that favored non-roadway projects (not unlike peer MPOs and state DOTs across the country). This allowed proposed roadway projects to compete more favorably over transit, bicycling, and walking projects.

When the TPO established regional objectives for transportation — those that would broaden the primary purpose of transportation projects from traffic congestion mitigation to a wider range of goals like safety improvements — it needed new project selection criteria to fairly compare projects that were radically different in scope, scale, or type. The TPO needed to find a way to balance these large-scale projects with other needs to improve safety, increase access to essential destinations, and improve residents' quality of life. TPO staff, board members, and community members sought to develop a more comprehensive project evaluation process to

recognize these distinct goals and allow bicycle, pedestrian, and transit projects to more favorably compete for funding against roadway projects. The TPO's new performance measures did just that: help promote bicycling, walking, and transit projects as more and more elected officials realized that their jurisdictions needed non-single-occupancy vehcicle projects to meet their constituents' transportation needs and demands.

WHAT THE MPO DID

CHCNGA-TPO needed to shift its funding allocation to provide more balanced, multimodal transportation options. To guide this work, the TPO conducted an online survey of transportation investment priorities. About 600 people from around the region, from diverse zip codes, answered the survey. Staff conducted the survey in both English and Spanish; a community group called La Paz also encouraged Latino residents to complete the survey.



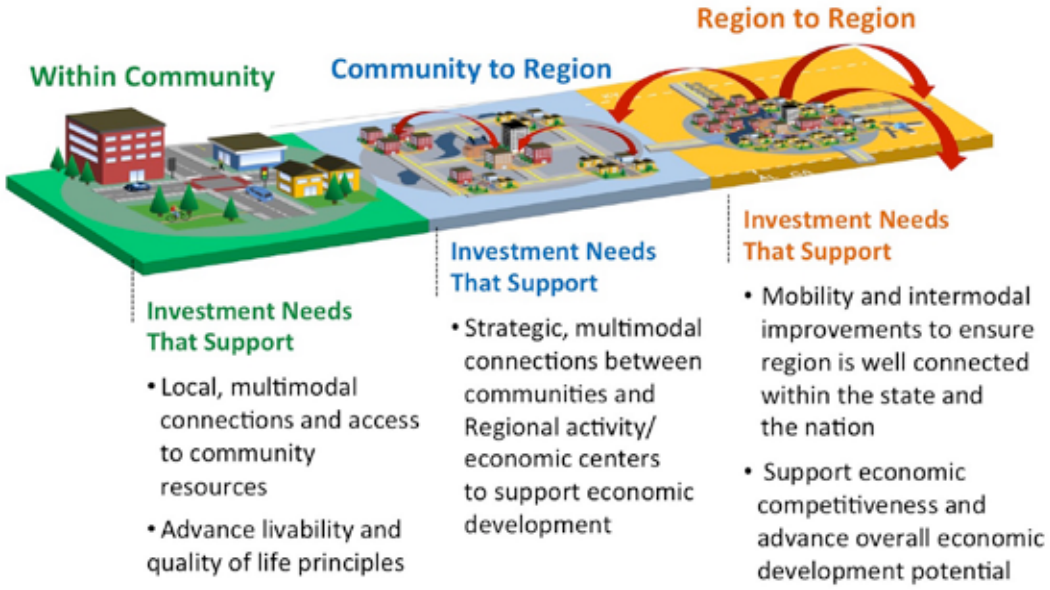
The survey results demonstrated community preferences for an evenly split prioritization of road condition, congestion reduction, sidewalks, safety, transit, and bikeways. Recognizing that its current project evaluation and selection practices did not provide a mechanism to meet this balanced demand, the TPO overhauled its funding process beginning in 2012 for its *2040 Regional Transportation Plan*.

COMMUNITY TO REGION FRAMEWORK: PROJECT SCALES

Within community	Community to region	Region to region
Goal: Build and maintain healthy communities • Emphasize safe, multimodal connections • Provide access to community resources • Advance livability and quality of life	**Goal:** Connect communities in the region • Provide travel options to activity and economic centers • Support strategic, multimodal connections between communities	**Goal:** Grow economic opportunity • Invest strategically in critical regional infrastructure • Advance economic growth through mobility improvements

Rather than continuing to evaluate transportation projects in modal silos, the CHCNGA-TPO established a "Community to Region" performance-based evaluation framework that recognizes how projects at different geographic scales meet distinct needs. For example, small-scale "within community" projects serve to connect residents to community and neighborhood-serving resources such as schools and grocery stores. The next scale of projects provides "community to region" connections to regional resources including employment centers. The largest scale of projects, such as highways and interstates, provide connections from "region to region" and improve economic competitiveness.

Evaluating projects according to these separate geographic scales allows the TPO to customize its evaluation process in recognition of the different purpose served by each of these scales. In contrast to traditional project evaluation processes, where all projects — regardless of size or purpose — are held to the same rigid criteria, the CHCNGA-TPO's innovative approach provides maximum flexibility. This context-sensitive framework makes it much easier for projects designed to serve different purposes to compete favorably for funding and in turn enables the TPO to better allocate their funding to diverse projects that advance the region's goals.



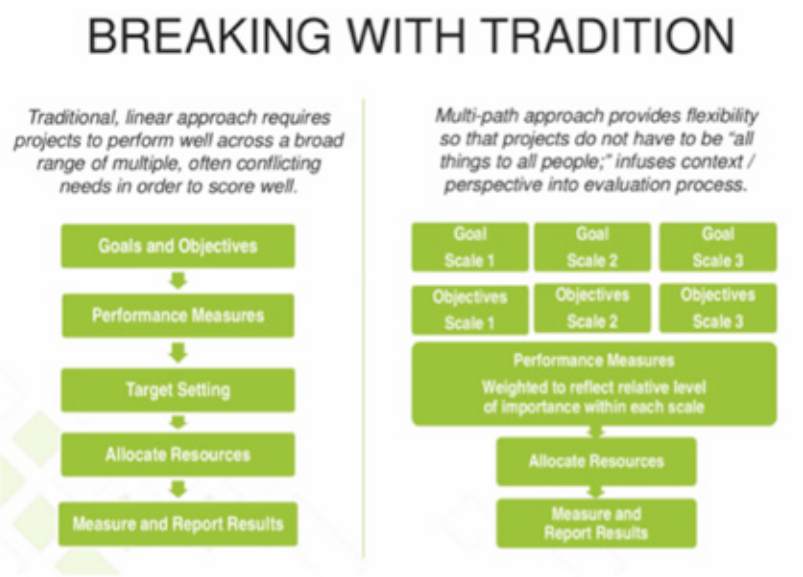
The Chattanooga TPO categorized each proposed transportation project by one of three geographic scales shown above. The TPO then evaluated those proposed projects using a weighted system to more consistently account for the realistic benefits of transportation projects at each scale. Source: Selin, T and Taylor, M. "Chattanooga 2040 RTP Performance-Framework: Balancing Regional and Community Needs." Transportation Research Board Tools of the Trade Conference Publication (2015).

"The Community to Region framework, with its range of performance measures, has allowed for a greater diversity of projects. The framework process was essential in determining the goals of our community and has allowed for these goals to be achieved through a better balance of projects. Our region is now able to provide better options and connectivity for our citizens and communities."

- Lisa Maragnano, Executive Director for Chattanooga Area Regional Transportation Authority

HOW THE MPO DID IT

To more fairly evaluate transit, bicycling, and walking projects, the TPO needed to develop new performance measures that fairly and accurately evaluated those types of projects. Because different projects serve different purposes and help the Chattanooga region achieve its agreed upon goals in different ways, each scale of proposed project (i.e., at what geographic scale a project would function) would need a unique, tailored way to measure its anticipated impact towards the region's goals.



The Chattanooga TPO aimed to stop a pattern of transportation project evaluation that analyzed each proposed project by the same factors and by the same equation, regardless of its ability to have an impact on the region's particular transportation goals. Graphic courtesy of the Chattanooga TPO.

To do this, the TPO collaboratively developed new goals and associated performance measures and established a new way to fairly weigh projects in each scale: region to region, community to community, or within community. This weighted evaluation methodology would allow each proposed project to be assessed appropriately for its potential impact on each individual performance measure. After conducting this evaluation, the MPO funded the highest-performing projects in each scale.

Here's how the TPO accomplished each step:

The TPO consulted a broad range of stakeholders to establish the region's goals and "weighted" performance measures (again, performance measures tailored to each of the TPO's three scales of proposed projects). The TPO formed two advisory committees to guide this work. The Core Technical Team (CTT) provided technical assistance and oversight throughout the development of the new performance-based framework and assisted with scoring the first round of projects. The CTT is composed of 20 transportation planners, engineering officials, public works staff, designers, and other practitioners.

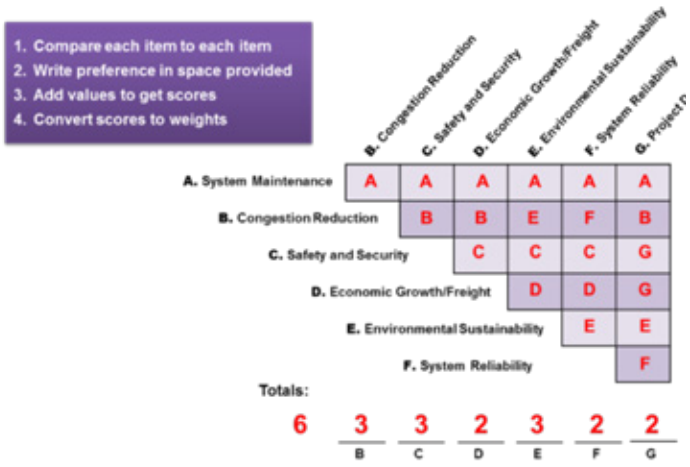
> *"Performance-based planning should be about the best performing projects … but you have to define what performance is intended to address."*
>
> *-Melissa Taylor, Strategic Long Range Planning Director, CHCNGA-TPO*

The second committee is the Citizen Advisory Committee (CAC), which is made up of 40 representatives from community groups, including underserved people. These committees guided the development of the Community to Region framework from its conception to the selection of projects for funding in the *2040 Regional Transportation Plan*.

In addition to these advisory bodies, the TPO also reached out to the general public for their feedback. TPO staff and board members held a number of public events including a leadership symposium, discussion groups, public meetings, and several workshops on climate change, transit, and the call for proposed transportation projects. An online questionnaire supplemented this outreach, collecting feedback from over 500 respondents. TPO staff, board members, and advisory committee members spread the word about these events and the questionnaire through multiple channels, including placing ads in local newspapers, advertising on their website and social media account, and distributing flyers at public events.[1]

This public engagement effort helped the TPO identify seven regional priorities for transportation projects:

- System maintenance;
- Congestion reduction;
- Safety and security;
- Economic growth/freight movement;
- Environmental sustainability;
- System reliability; and
- Project delivery.



The TPO worked with stakeholders to develop a formula that analyzed proposed projects' impact on factors based on their geographic scale with the use of weighted measures. Graphic courtesy of the Chattanooga TPO.

While the Chattanooga region's residents valued each of these priorities, it was clear that not all transportation projects could have a significant impact on each one. A transportation project that is designed to reduce automobile traffic congestion would likely not improve residents' quality of life, at least not in the same way or in the same period of time. To address the variation, the TPO developed a weighted performance measures system that allowed the evaluation of different scales to better align with the kind of objective that a project serving that particular geographic scale should be contributing to the region.

The TPO used a pairwise survey to guide this conversation. Pairwise surveys are useful for helping people examine trade-offs and make decisions when a project cannot "do it all." Members of both the CAC and CTT used the pairwise survey to decide how important each of the seven priority areas are for each of the three geographic project scales. For example, they chose whether congestion reduction or safety is a more appropriate goal for a project at the "within community" scale or whether a project's impact on environmental sustainability or safety and security should have more weight when scoring a "region to region" project.

1 A more detailed overview of the TPO's community engagement process can be found in the *2040 Regional Transportation Plan* Appendices: http://www.chcrpa.org/2040RTP/CHCRPA_2040RTP_Vol1_Appendices.pdf.

Performance Measure Category[a]	2040 RTP Objectives[b]	Systems-Level Measure	Project-Level Measure	Scale 1 Weight Within Community	Scale 2 Weight Community to Region	Scale 3 Weight Region to Region
System Maintenance	Preserve, maintain and improve existing infrastructure	Pavement: Percent Lane Miles in Good/Fair Condition	Project Addresses Pavement Deficiency	15	15	15
		Bridge: Average Health Index	Project Addresses Bridge Deficiency			
Congestion Reduction	Reduce delay on critical regional thoroughfares	Average Commute Trip Time, Auto and Transit	Project Reduces Delay • Interstate/Expressway • Corridor Connection to Key Center	10	15	20
Safety and Security	Improve operations, maintenance, and ADA compliance	Number of Projects (and Total Funding) Addressing RTP Safety Areas	Project Includes Countermeasure(s) to address RTP Safety Emphasis Areas	15	15	15
			Project Addresses Security or Emergency Response Need			
Economic Growth/ Freight Movement	Improve intermodal connections Reduce delay on critical freight corridors	Annual Congestion Costs, Truck and Auto	Project Reduces Delay • Intermodal Connection • Freight Corridor	5	10	20
Environmental Sustainability	Incentive complete streets projects Support desired community character Support healthy, safe communities Promote safe connections to community resources	VMT per Capita	Project Reduces VMT	30	20	10
			Project Promotes Nonmotorized Access to Community Resources			
			Project is in Keeping with Community Character			
System Reliability	Expand set of travel options Encourage connected, multimodal network Improve system operations Incentive corridor protection plans	Mode Split	Project Located on Facility with Corridor Protection Plan	15	15	10
			Project Fills Gap in Existing System			
			Project Improves Efficiency through ITS			
Project Delivery		Percent Projects Completed/ Advanced from Previous Plan	Project Supported by TDOT and Local Jurisdiction	10	10	10

To more fairly ensure that proposed projects would be evaluated for considerations that they should reasonably have an impact on at a regional scale, the TPO devised a weighted evaluation system. Some priorities, like system maintenance, were applied consistently (regardless of the geographic scale of the project). Other priorities, such as congestion reduction or economic growth, were variably applied depending on the scale of a proposed project. For example, congestion reduction was given less weight (i.e., was not considered as significant a factor) when scoring proposed projects at the "within community" scale; congestion reduction was more heavily considered when evaluating "region to region" projects, however. Graphic courtesy of the TPO.

The results of this hands-on exercise formed the CHCNGA-TPO's weighted scoring system. Participants determined that some priorities, like system maintenance, should be applied consistently, or given the same weight, at all three scales. They determined that other priorities, such as congestion reduction or economic growth, should be variably applied depending on the scale of project: congestion reduction should be given less weight for projects at the "within community" scale but should be more highly considered when evaluating "region to region" projects.

The TPO uses these weighted measures to evaluate and select projects for funding. First, they assign each project to one of the three geographic scales depending on its location, purpose, and context within the transportation network. TPO staff then qualitatively or quantitatively evaluate each project using the weighted criteria as determined by each project's scale. TPO staff qualitatively evaluate projects to judge their potential impacts on the following categories: system maintenance, safety and security, and system reliability. Because this is a qualitative analysis, a proposed project either meets the category's objective and gets 100 percent of available points, or it does not meet said objective and gets zero points. For the remaining categories — congestion reduction, economic growth/freight movement, environmental sustainability, and project delivery — projects are quantitatively scored relative to one another. In this case, the best-performing project in each category receives the full number of points available for that category; the worst performing project receives zero points; the remaining projects receive a score somewhere in between depending on their anticipated impact.[2] A project may receive up to 100 points through this evaluation framework.

2 For a step-by-step look into how the TPO evaluates projects for funding using its weighted performance criteria and Community to Region framework, see the *2040 Regional Transportation Plan*: http://www.chcrpa.org/2040RTP/CHCRPA_2040RTP_Vol-1.pdf.

Performance Measures for Systems-Level and Project Level Evaluation

Performance Measure Category	Project-Level Measure	Calculation Detail
System Maintenance	Project Addresses Pavement Deficiency	From January 29 performance measures workshop, project-level condition data is not readily available. Points will be awarded (Yes/No) based on review of project scope to determine if pavement rehabilitation or repaving is included.
	Project Addresses Bridge Deficiency	Points will be awarded (Yes/No) based on review of project scope, along with a cross-check of any structurally deficient bridges on project facility using National Bridge Inventory database.
Congestion Reduction	Project Reduces Delay • Interstate/Expressway • Corridor Connection to Key Center	Vehicle-hours delay within ½ mile buffer of project facility will be calculated for all projects and used to assign portion of point value. Additional points (up to max) will be provided if project falls on either an interstate/expressway or corridor connection to activity or employment center.
Safety and Security	Project Includes Countermeasure(s) to address RTP Safety Emphasis Areas	From performance measures workshop, and follow-up with Tennessee Department of Safety, comprehensive crash data by project location is not readily available. Points will be awarded (Yes/No) based on review of project scope to identify if countermeasures that address RTP safety emphasis areas (Roadway Departure, Aggressive Driving, Intersection Improvement) are included. Note that safety was weighted the highest across all performance measurement categories at January 29 Performance Measures Workshop. Given data limitations, some points were shifted from safety category to other measurement categories that indirectly support safety improvements (e.g., VMT reduction).
	Project Addresses Security or Emergency Response Need	Security points will be calculated (Yes/No) based on project scope, with cross-check to identify if project provides network redundancy or enhances mobility in relation to "critical facilities" in region as identified through Climate Adaptation workshop.
Economic Growth/ Freight Movement	Project Reduces Delay • Intermodal Connection • Freight Corridor	Vehicle-hours delay within ½ mile buffer of project facility will be calculated for all projects and used to assign portion of point value. Additional points (up to max) will be provided for projects reducing delay at either intermodal location or if project falls on freight network.
Environmental Sustainability	Project Reduces VMT	VMT reduction within ½ mile buffer of project facility will be used to assign points for each project. Note that VMT reduction is also used as proxy for air quality and GHG emissions reduction.
	Project Promotes Nonmotorized Access to Community Resources	Points will be calculated (Yes/No) based on review of project scope, along with cross-check to identify if project directly connects or serves: active transportation facility, healthy food location, health care facility, public/private school (K-12) as identified through Accessibility/Health Impact Analysis.
	Project is in Keeping with Community Character	Points will be calculated (Yes/No) based on review of applicable land use plan in place.
System Reliability	Project Located on Facility with Corridor Protection Plan	Points will be awarded (Yes/No) if corridor, access or other demand management plan in place for project facility.
	Project Fills Gap in Existing System	Points will be awarded (Yes/No) if project fills gap or provides connection within existing or planned bike, ped, or transit system as identified through Bicycle Demand/Gap Analysis, Pedestrian Demand/Gap Analysis, and Transit Demand/Gap Analysis.
	Project Improves Efficiency through ITS	Points will be awarded (Yes/No) based on review of project scope.
Project Delivery	Project Supported by TDOT and Local Jurisdiction	Points will be awarded (Yes/No) based on project understanding and availability of local match

The TPO's transportation project evaluation methods for each of its performance measure categories. Graphic courtesy of the TPO.

The scores within each category are then multiplied by their corresponding weight values and added together to generate a complete score for each project. Crucially, this is the point in the evaluation process where projects at each geographic scale are scored differently: for example, a "within community" project receiving a perfect 100 in environmental sustainability receives 30 points for this category in its comprehensive score, while this category is only worth up to 10 cumulative points for "region to region" projects, which have opportunities to score more points in other categories such as congestion reduction instead.

After each project has a comprehensive numeric score, the TPO compiles all scores into a single list of "within community," "community to region," and "region to region" projects. The TPO then categorizes the scored projects into four batches based on 1) clusters and natural breaks in the numeric scores and 2) the degree of priority as deemed by the Executive Board (Rank 1, Rank 2, Rank 3, and Rank 4). All of the projects in "Rank 1" and "Rank 2" categories, and some of the projects in Rank 3, received funding in the 2040 RTP. High priority projects received funding with the most flexible of federal transportation dollars, the Surface Transportation Program (STP).

As a result of this new performance-based evaluation process, investment in bicycle and pedestrian improvements doubled and transit capacity projects increased from 18 to 25 percent while roadway capacity investment decreased from 51 percent to 30 percent, compared with the TPO's previous RTP. In part, this was because of increased focus and concentration on active transportation projects (which resulted in actions like the adoption of Complete Streets policies by local jurisdictions) and because of the TPO's new performance measures that allowed bicycling and walking projects to better compete for funding.

TIMELINE

25-26 July 2012: Inaugural meetings of CTT and CAC
July-October 2012: Public survey open
22-23 October 2012: Second planning meeting of CTT and CAC
24 July 2012: Call for projects opens
23 August 2012: Kickoff public workshop
August-September 2012: Stakeholder focus groups
29 January 2013: Weighting exercise with CTT and CAC
13 March 2013: Second public workshop
5 August 2013: Draft plan submitted to state DOTs for review
5 November 2013: Draft plan released for public comment

KEY PARTNERS

Two TPO advisory committees were closely involved in developing the new performance-based project selection process in the *2040 Regional Transportation Plan*: the Core Technical Team and the Citizen Advisory Committee. Each of these committees convened at the onset of the plan development and shepherded it through its adoption through various means, such as by actively participating in the priority weighting exercise. These committees include representation from a variety of government, transit, and community organizations including:

- Air Pollution Control Bureau
- Active Living and Transportation Network
- Benwood Foundation
- Chattanooga Area Regional Transportation Authority (CARTA)
- Chattanooga Area Chamber of Commerce
- Chattanooga Metropolitan Airport Authority
- Chattanooga Neighborhood Enterprise
- Chattanooga State Community College
- Choose Chattanooga
- City of Chattanooga
  - Office of Sustainability
  - Traffic Engineering
- City of Collegedale Traffic Engineering
- Community Foundation of Greater Chattanooga
- Electric Vehicle Project
- Enterprise Center
- Green Trips Advisory Committee
- Georgia Department of Transportation (GDOT)
- Habitat for Humanity
- Hall & Associates
- Hamilton County
  - Engineering
  - Government
  - Health Department
  - StepONE
- Human Services Transportation Committee
- La Paz Hispanic Community Outreach
- Land Trust for Tennessee
- Lyndhurst Foundation
- National Park Service
- Northwest Georgia Regional Commission (NWGRC)
- Ochs Center for Metropolitan Studies
- Outdoor Chattanooga
- River City Company
- Safe Routes to School
- SE Region Mobility management
- Southeast TN Development District

- Southeast TN Human Resource Agency (SETHRA)/Special Transit Services (STS)
- Southern Adventist University
- TDOT Regional Planning Office
- Tennessee Department of Human Services
- Town of Signal Mountain
- Trust for Public Land
- University of Tennessee at Chattanooga
  - Auxiliary Services Department
  - Engineering Department
- Young Professionals Association of Chattanooga (YPAC)

BARRIERS ALONG THE WAY

Some smaller jurisdictions were initially resistant to the performance-based project evaluation process. Adding another layer to the complex process of project selection, particularly such a technical layer, was perceived as an unnecessary strain on already limited resources and an additional barrier to obtaining funding for projects.

The TPO allayed these concerns by demonstrating how smaller jurisdictions actually stood to benefit from the new framework. Previously, capacity-building highway projects and road projects in the urban core accounted for the majority of the TPO's transportation budget, while community-based projects in small, rural towns were seldom awarded funding. By evaluating projects within communities according to a custom-weighted formula, the new framework placed these small-town transportation improvements in a much more favorable position for acquiring TPO funding. As a result, the new framework elevated the types of projects these small, initially resistant communities would want implemented, a fact that made these jurisdictions more enthusiastic about the new funding process.

A second barrier the TPO faced in implementing their new performance-based project evaluation framework dealt specifically with safety. Initially the safety measure received a higher weight in the grading scheme; however, insufficient geolocated crash data made it difficult to accurately score this criterion. As a result, the weight for safety data needed to be reduced. The TPO is working to overcome this barrier in its 2045 RTP, which is currently in progress. Compared to the 2040 RTP, in which TPO staff were only able to geolocate fatal crashes, TPO staff geolocated 83% of all crashes for the 2045 RTP. Moreover, TPO staff devoted additional time to cleaning and geolocating bicycle and pedestrian crash data. The geolocated data made it possible to include a quantitative crash reduction factor and evaluation of projects that would address bicycle and pedestrian safety issues into the project scoring and selection process.

> *"Our transportation dollars were consistently being spent on projects dedicated to motor vehicle traffic and we knew that would never change unless we changed our funding allocation. While there was some resistance in the beginning, we eventually were successful in shifting some of our local transportation dollars towards alternative transportation projects. This change will improve the safety and health of our residents for years to come."*
>
> *- Bob Colby, Former Executive Board Chairman and current TPO Board member*

RESULTS AND BENEFITS

The CHCNGA-TPO's performance-based evaluation framework illuminated how many of the conventional roadway capacity projects actually were not serving the region as previously assumed by transportation decision-makers. Many of these projects, which the TPO previously would have prioritized for funding, were ranked in the lowest (fourth) tier in the new evaluation framework.

The TPO's new performance measures allowed the TPO to successfully shift resources toward more multimodal projects. In fact, as stated, the TPO doubled its funding for bicycle and pedestrian projects in its 2040 plan compared with its previous plan, the 2035 plan.

Elevating a variety of high-performing multimodal projects had an additional benefit for small jurisdictions. Towns without modeling capabilities sometimes had a more difficult time competing for funding. Now, the TPO's transparent project grading and selection process highlights which small-scale pedestrian, bicycling, and transit projects are successfully competing for funding. Having an example to draw from can help smaller jurisdictions prioritize their own projects moving forward without the need to employ complex statistical models, helping them make better decisions about which projects will be most needed or most successful for their towns in the future.

Physical education instructor Chris Darras assists children walking to school on Long Street in Chattanooga. Designated walking paths like this compete well against roads, bridges, and transit projects in the Chattanooga's TPO project prioritization process. Photo by Carrie Turner Photography/Safe Routes to School National Partnership.

Next, the TPO's tailored public engagement process had the added benefit of facilitating the adoption and implementation of the new framework. Incorporating community input into the new project evaluation framework in the form of an interactive weighting exercise not only helped these stakeholders understand how the new process functions; it also generated support for the change by clearly demonstrating how public feedback and priorities were embedded into the new grading framework.

Finally, this evaluation process gives the Chattanooga region's elected officials credible, agreed upon information for them to conduct negotiations about which projects they should fund. As stated, high-ranking projects (those categorized in the TPO's "Rank 1" and "Rank 2" lists) received funding. But not every project in the "Rank 3" category received funding. TPO board members and technical committee members — not staff — used the information to decide which projects to fund based primarily on merit, not politics.

LESSONS LEARNED

The CHCNGA-TPO shares the following advice:

1 **Tailor public workshops to include meaningful input through hands-on activities.**

The TPO's interactive public engagement was critical to its success at both developing its new project selection process and generating public support for it. Inviting community stakeholders to participate in making difficult decisions about the trade-offs between various goals helped these individuals better understand how performance-based project evaluation works and why it is important. This allowed the TPO to create a new process to choose projects that were more reflective of regional priorities, ultimately funding projects that better address the community's values and needs.

2 **Start small and build on existing work.**

The CHCNGA-TPO recommends keeping project evaluation simple, direct, and focused. Rather than going overboard with performance measures, MPOs should highlight the most vital regional objectives. These measures should then be introduced to stakeholders in a way that is easily understandable. Focus on creating public buy-in for the concept and value of performance measurement in project selection before attempting to dive into the details of the specific processes or indicators.

3 **Choose a variety of performance measures.**

All transportation projects are not designed to accomplish the same things. Adopting mode-neutral performance targets that vary with the context or scale of the project enables MPOs to direct more funding to high-performing multimodal projects. Moving away from a conventional project evaluation process focused on congestion and new capacity toward this comprehensive model can help regions both allocate more funding to bicycle and pedestrian projects as well as clearly justify to community stakeholders why these investments are vital to meeting regional objectives.

INVOLVING PUBLIC HEALTH PARTNERS

TPO staff and leadership learned of the community's strong desire for walking and bicycling infrastructure that would provide safe connections to essential destinations. To this end, the TPO developed three project scales and focused proposed project evaluation criteria on improving quality of life and building and maintaining healthy lifestyles, especially among projects at the "within community" scale. The TPO adopted various goals to promote health in its 2040 RTP, such as the goal to, "Build and Maintain Safe and Healthy Communities," which listed such objectives as encouraging complete streets project design through incentives and improving multimodal systems. The 2040 RTP also highlighted the connection of health, transportation, and environment, as well as acknowledged disproportionate negative health outcomes experienced by vulnerable populations. Additionally, TPO staff created an expert advisory committee, which included a representative from the Hamilton County Health Department, to review land use scenarios. Through its strong public engagement, needs identification process, and collaboration across sectors, the TPO created a plan that would facilitate the creation of healthy and safe communities for the region's residents.

5 Dedicated funding for bicycling and walking projects

Puget Sound Regional Council (Seattle, WA)

Dedicating funding specifically for bicycling and walking projects.

When a metropolitan planning organization (MPO) creates a set-aside funding program, they provide a guaranteed amount of funding for walking and bicycling infrastructure. MPOs also often use set-asides to spur projects that may not otherwise have received funding to demonstrate how to design, fund, and build those projects to transportation agencies and the public. As such, set-asides provide an important funding source for critical walking and bicycling connections, learning opportunities for transportation agencies, and inspiration to continue funding beneficial projects.

The Puget Sound Regional Council in Washington dedicates ten percent of its funding from both the Surface Transportation Block Grant Program and Congestion Mitigation and Air Quality Improvement Program to bicycling and walking projects.

Flickr photo by Places for Bikes. https://www.flickr.com/photos/placesforbikes/31712244886/.

5 – DEDICATED FUNDING FOR WALKING & BIKING
PUGET SOUND REGIONAL COUNCIL (SEATTLE, WA)

Dedicated funding for more and better walking and biking projects

THE BOTTOM LINE

In 1993, the Puget Sound Regional Council (PSRC) dedicated ten percent of two federal transportation funding programs to walking and bicycling projects, guaranteeing reliable funding to improve the infrastructure that today is helping an increasing number of people walk and bicycle to essential destinations throughout the Puget Sound region. But it's not just the quantity that has improved. Recent project selection criteria have also helped improve the quality of that infrastructure, which also increases the visibility of bicycling and walking and makes future high-quality investments more likely. Every funding cycle, PSRC establishes policies and criteria based on the agency's regional long-range transportation plan and the region's vision to support compact growth in regional and local centers, and then allocates this funding through a regional competition and a countywide process.

PSRC funded a phase of the Prairie Line Trail in Tacoma, WA through the agency's dedicated funding program for bicycling and walking projects. Shown here before construction of the trail (above) and a rendering of the final project. Graphics courtesy of PSRC.

THE CONTEXT

PSRC serves a four-county region in northwest Washington that covers King, Pierce, Snohomish, and Kitsap Counties. These four counties encompass 76 local jurisdictions, many of which are small cities, rural villages, or Native American lands, and also larger cities such as Seattle. The Washington State Growth Management Act, passed in 1990, governs much of PSRC's transportation and land use planning work. This state law mandates the adoption of comprehensive plans to preserve natural resources and open space by focusing development in specified urban growth areas.[1] As a result, a full 60 percent of land in the Puget Sound region is designated as a natural resource area.

Shortly after, in 1991, the U.S. Congress and President George H. W. Bush had also just enacted the game-changing Intermodal Surface Transportation Efficiency Act (ISTEA). ISTEA authorized federal funding for surface transportation projects and established several new policies that strengthened support for walking, bicycling, and public transportation projects. For example, for the first time, federal law dedicated funding for bicycling and walking projects in the form of the new Transportation Enhancements (TE) Program. TE provided both a precedent and a duplicable model for PSRC to establish its own practice of setting aside funding explicitly for bicycling and pedestrian projects.

THE PROBLEM

There are many strong walking and bicycling advocates in the region who promote active transportation as a means of recreation and transportation; they have created high demand for these types of projects to support these non-motorized modes. However, bicycle and pedestrian projects in the 1990s were not competing well against larger regional priorities for funding. PSRC needed a mechanism to prioritize investment in active transportation infrastructure to meet this demand.

WHAT THE MPO DID

To guarantee investment in active transportation, PSRC established a dedicated funding set-aside specifically for bicycle and pedestrian projects in 1993. The metropolitan planning organization (MPO) set aside 10 percent of its federal Surface Transportation Program (STP) and Congestion Mitigation and Air Quality Improvement (CMAQ) funding specifically for bicycling and walking projects.

Two key elements make PSRC's dedicated funding program successful. The first is its basis in the MPO's long-range plan. *VISION 2040* is a regional growth plan to encourage compact development through a combination of transportation, land use, environmental, and economic strategies.[2] A key aspect of this plan is a focus on promoting growth in designated regional and local centers. This plan, including its centers-based approach and its regional policy objectives, form the framework of PSRC's project selection process for all of its funding

1 An explanation of the requirements in the Washington State Growth Management Act can be found here: http://www.gmhb.wa.gov/Reader.aspx?pg=About.htm.

2 To learn more about *VISION 2040* and download the plan, visit: https://www.psrc.org/vision-2040-documents.

— including the dedicated set-aside. Tying this funding program to its long-range plan has helped PSRC strategically invest its limited funds. For example, when the dedicated funding program first began, it funded more trails in rural areas than it does today. Now, this set-aside primarily supports multimodal transportation options in dense population centers to improve access to transit, jobs, shops, and other resources. The program funds regional priorities, such as Safe Routes to School projects, sidewalk connections, or off-road multi-use paths, that support the region's compact growth objectives.

PSRC allocates its dedicated funding through both a regional competition and a countywide process; this distribution formula to fund local priorities has helped the set-aside succeed. Through the regional competition, projects must serve designated regional centers. Through the countywide process, PSRC's four-member counties hold a competition to choose the active transportation projects that will support their local and regional centers. Projects funded through this countywide process are required to also support either regional or local centers and, of course, support *VISION 2040*. The PSRC Executive Board ultimately approves funding for projects derived through both the regional competition and the countywide process. While PSRC staff oversee this process, extensively review the members' selection criteria, and require that funded projects advance regional policies adopted by the PSRC board, staff from jurisdictions at and within the county are the ones who actually score and rank the proposed projects. This member-driven process gives local and county jurisdictions more ownership over transportation projects and embraces the diverse needs and contexts of the region.

HOW THE MPO DID IT

PSRC launched its dedicated, multimodal funding program in 1992 following changes to federal transportation policy through the passage of ISTEA in 1991. ISTEA gave PSRC, and all MPOs around the country, much greater control over a portion of federal funding than they had previously by directly sub-allocating dollars to MPOs through the Surface Transportation Program. ISTEA also created the first dedicated federal funds for bicycle and pedestrian projects.[3] This presented an opportunity and a model for PSRC to restructure its own funding allocation policies, leading PSRC to mirror the federal government's approach by establishing its own bicycle/pedestrian funding set-aside.

In the 25 years since it began, PSRC's dedicated funding program has continued to evolve to meet the region's changing needs. Every funding cycle, elected officials and stakeholders who serve on PSRC's boards convene to adopt a policy framework that guides regional and countywide funding decisions. Following the countywide project selection process, PSRC submits each county's ranked list of funding recommendations to the Executive

3 More information about ISTEA is available at: https://ntl.bts.gov/DOCS/ste.html.

"Setting clear criteria for our regional investments helps us keep our eyes focused on making our transportation systems more multi-modal, safe, and accessible to everyone."

- Ryan Mello, Council Member for Tacoma City Council, Executive Director of Pierce Conservation District

Board for funding authorization. In this way, PSRC remains central to the project selection process while still entrusting its members with authority over which projects they choose to implement in their communities. To supplement its dedicated funding program, PSRC provides its members with opportunities for education and training. The MPO holds workshops on health and active transportation with its board members, planners, and engineers from its member jurisdictions. For example, PSRC held a workshop focused on health and transportation in 2014. The agency typically holds workshops on active transportation every two or three years, organizes annual bicycling and walking tours, and hosts many conversations on topics that include health and social equity. These sessions, though not directly tied to the funding set-aside, inform engineers and planners about best practices and help improve the quality of projects that receive funding.

TIMELINE

1 April 1990: The Washington State Legislature passed the Washington State Growth Management Act.
1990: The PSRC Executive Board adopted VISION 2020.
18 December 1991: President George H. W. Bush signs ISTEA into law.
1993: PSRC established its bicycle/pedestrian funding set-aside for active transportation infrastructure.
1995: PSRC began splitting its FHWA funding between regional and countywide project competitions.
1995: The PSRC Executive Board adopted an update to VISION 2020.
2002: PSRC tied funding distribution to regional and local centers.
2008: The PSRC Executive Board adopted *VISION 2040*, the region's transportation, land use, and economic development strategy.
2014: The PSRC Executive Board adopted *Transportation 2040*, a regional transportation plan (RTP) that included the region's first active transportation plan.

"PSRC's multiple grant programs make it easier to obtain funding for multimodal projects. By separating regional funding competitions from local county competitions, PSRC ensures that both regional and smaller local projects are funded."

- David Mach, Engineering Manager, Lynwood Department of Public Works

KEY PARTNERS

As a member-driven organization, PSRC's boards and committees play a central role in guiding its policies and practices. PSRC has four governing boards. Members of the Executive Board approve major planning documents, such as the regional transportation plan (RTP). Members of the Executive Board also may sit on PSRC's Economic Development Board, Growth Management Policy Board, and Transportation Policy Board. These bodies are comprised largely of staff and elected officials from PSRC's member jurisdictions, and they also include non-voting members from advocacy groups and private businesses.

Additionally, seventeen specialized committees, which are generally represented by staff of local jurisdictions and various organizations, inform the work of these boards.[4] For example, the Bicycle Pedestrian Advisory Committee (BPAC) provided guidance on the project selection criteria for PSRC's bicycle/pedestrian funding set-aside, which are revised every funding cycle by the Transportation Policy Board. Most recently, the BPAC steered PSRC to increase its focus on context-sensitivity, safety, and comfort for travelers on foot and bicycle. Members of these boards and committees have been actively involved in guiding the MPO's decisions.

Members of these boards and committees include elected officials or staff from the following organizations:

Transportation Policy Board

- Various cities, towns, tribes, counties
- Port of Tacoma
- Transit agencies
- AAA Washington
- International Longshore and Warehouse Union
- Island County
- League of Women Voters of Washington
- Port of Tacoma
- Public Health – Seattle & King County
- Seattle Metropolitan Chamber of Commerce
- Sound Transit
- Thurston Regional Planning Council
- Transportation Choices Coalition
- University of Washington
- Washington State Department of Transportation
- Senate Transportation Committee
- Transportation Commission
- Transportation Improvement Board

Bicycle Pedestrian Advisory Committee

- Cascade Bicycle Club
- City of Bainbridge Island Multi-Modal Transportation Advisory Committee
- City of Kirkland
- City of Kenmore
- City of Redmond
- City of Seattle
- City of Tacoma
- Community Transit
- Kent Bicycle Advisory Board
- King County Metro
- King County Parks and DOT
- Kitsap Public Health District
- Mountains to Sound Greenway
- Pierce County
- Public Health Seattle and King County
- Snohomish County
- Sound Transit
- Transportation Choices Coalition
- Washington State Department of Transportation
- West Sound Cycle Club

"PSRC has been a strong partner with TCC, willing to embrace cutting-edge approaches to make more investments in sustainable transportation projects that will yield multiple environmental, health, and socioeconomic benefits for the region. By incorporating health and equity goals, PSRC is moving towards a people-centric planning approach that will direct more federal and state transportation dollars towards projects that reduce runoff and emissions as well as improve health outcomes for communities. The recent adoption of a new physical activity performance measure into the 2040 long-range plan will further strengthen selection criteria to incentivize projects that provide options for more people to bike and walk where they need to go."

- Hester Serebrin, Policy Director, Transportation Choices Coalition (TCC)

4 A complete list of PSRC's boards and committees, including current membership, can be found at: https://www.psrc.org/committees.

BARRIERS ALONG THE WAY

No barriers impeded development or adoption of the bicycle/pedestrian funding set-aside in 1992. PSRC has largely averted resistance to its set-aside because of a member-driven approach where all of the MPO's decisions and priorities are extensively vetted through its various committees and boards. As a result, PSRC benefits from the strong support of these bodies, including the elected officials and vocal bicycle and pedestrian advocates represented on them. Many of these individuals and organizations have been instrumental in championing the continuation of PSRC's dedicated funding program.

The cost to build bicycle and pedestrian projects, however, has been a barrier. Even when PSRC, a city, and community members alike want a facility like a separated bicycle track, the cost to build one can be prohibitively expensive in the high-cost Puget Sound region. Limited set-aside funding that is distributed throughout the large region cannot easily support multi-million dollar bicycling projects.

RESULTS AND BENEFITS

Since 1993, PSRC has invested $140 million to improve walking and bicycling infrastructure through the funding set-aside. Through every funding cycle, PSRC has supported several projects. For example, PSRC allocated approximately $20 million in set-aside funding for 27 projects in 2014, and another ~$20 million for 24 projects in 2016.

In addition to this direct investment, PSRC has fostered walking and bicycling infrastructure in two notable ways. First, the MPO has incorporated active transportation into the evaluation criteria for all funding programs. Second, the agency has also supported compact growth, transit-oriented development, and communities where people can walk or bicycle through implementation of its *Regional Growth Strategy* and land use vision. As a result, there has been an increase in multimodal projects throughout the region. In fact, since 1992, 47% of roadway projects funded by PSRC have included bicycle and pedestrian elements, with an uptick in these elements occurring over the past decade.

LESSONS LEARNED

PSRC shares the following advice:

1. **Establish strong regional vision policies that support active transportation; this would help direct funding for walking and bicycling downstream.** As described above, leaders across the Puget Sound region aim to focus growth in designated regional and local centers, a policy adopted in PSRC's long-range regional growth plan. Since this plan guides the MPO's project selection process of all of its funding, the set-aside primarily supports multimodal transportation options to improve access to transit, jobs, shops, and other destinations in the region's population centers.

2 **Highlight successful projects with data and case studies.**

Demonstrating the positive impact of walking and bicycling is a powerful way to generate support for further investment in active transportation. Sharing examples of projects that promote health and livability or reporting on the mobility and safety benefits of active transportation helps make a strong case for continuing to invest in these kinds of projects. Collecting data on the accomplishments of funding programs, including the amount of money invested or the number and type of projects implemented, is also important to maintain momentum and enthusiasm for these programs.

3 **Create a funding program that benefits smaller jurisdictions as well as large cities.**

By distributing dollars at the county level, and developing a program that would support improvements in cities and towns from large to small, the set-aside is structured to provide funding for jurisdictions of all sizes.

4 **Use evaluation criteria that address not only active transportation potential, but also safety and comfort for those who would travel on foot and bicycle.**

This encourages jurisdictions to seek funding for projects that would be more safe and inviting for those traveling on foot or bicycle, such as separated bicycle lanes or buffered sidewalks. Also, keep up to date on evolving best practices for the design of walking and bicycling facilities.

5 **Identify champions who will support policies, plans, programs, and projects that promote walking and bicycling.**

PSRC encourages its board members to learn more about the benefits of active transportation. For example, in 2016, one board member from each of PSRC's four counties participated in Transportation for America's Transportation Leadership Academy. They learned more about how to design and use transportation project selection criteria to prioritize funding for bicycling and walking projects, among other objectives. PSRC also took a board member to the Walkability Action Institute (organized by the National Association of Chronic Disease Directors) in 2017.

INVOLVING PUBLIC HEALTH PARTNERS

Since as early as 2004, PSRC and public health organizations throughout the region have partnered to promote healthy communities. For example, Public Health Seattle and King County (PHSKC) worked with PSRC to incorporate public health considerations into the *VISION 2040* plan. To accomplish this, PHSKC published a paper called, "What's Health Got to Do with Growth Management, Economic Development, and Transportation?", gave a presentation to PSRC's Growth Management Policy Board, and more. Since then, PHSKC has been involved with PSRC's work and a staff representative serves on the Transportation Policy Board. Additionally, PHSKC and Kitsap Public Health serve on the MPO's BPAC. PSRC also works closely with the two other county health departments, the Tacoma-Pierce County Health Department (TPCHD), and Snohomish County Public Health. For example, TPCHD organized PSRC's participation in the Walkability Action Institute.

Public health is interwoven in the regional goals of *VISION 2040* and a section of *VISION 2040* is dedicated to discussing the connection between the built environment and health.

Flickr photo by Oregon Department of Transportation

6 Improving walking and bicycling connections to public transportation and essential destinations

Atlanta Regional Council (Atlanta, GA)
Denver Regional Council of Governments (Denver, CO)

Creating connections to public transportation on foot, bicycle, and wheelchair.

The ability for people to walk, bicycle, or ride in a wheelchair to public transportation is crucial for a high-functioning transportation system. Walking and bicycling connections, coupled with transit-oriented development, boosts transit ridership, generating revenue for a transit system with a great return on investment. Dubbed last-mile or first- and final-mile projects, these connections are needed across the country.

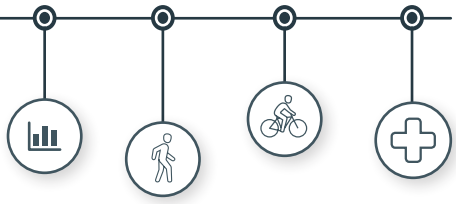
Walking or bicycling to transit may also help people get their heart rate up and lower their risk of chronic disease. In fact, one study found that almost one out of three public transportation riders are physically active for at least 30 minutes a day (the U.S. Surgeon General's recommendation) simply because they walk or bicycle to and from transit stops.[1] Another study showed that people who used Charlotte, NC's new light rail lost 6.45 pounds, on average, after the project opened, thanks to multi-modal public works.[2] In places that were primarily designed for vehicles, government agencies, developers, and residents are grappling with how to get people to transit safely and comfortably on foot, bicycle, and wheelchair. The Denver Regional Council of Governments offers funding to identify first and final mile connections that are needed throughout the region. The Atlanta Regional Commission provides relatively small planning and implementation grants to local governments and nonprofits to promote dense, mixed-use development in transit-accessible areas and activity centers where people could easily walk, bicycle, or use a wheelchair to get to their destinations.

1 LaChapelle U and Frank LD. Transit and Health: Mode of Transport, Employer-Sponsored Public Transit Pass Programs, and Physical Activity. *Journal of Public Health Policy* 30, Suppl. no.1: S73-S94. 2009.

2 John M. MacDonald, Robert J. Stokes, Deborah A. Cohen, Aaron Kofner, Greg K. Ridgeway. The Effect of Light Rail Transit on Body Mass Index and Physical Activity. *American Journal of Preventive Medicine* 39(2). 2010.

6 – IMPROVED CONNECTIONS TO TRANSIT & DESTINATIONS
ATLANTA REGIONAL COMMISSION (ATLANTA, GA)

Integrating land use and transportation planning and improving walking and bicycling connections



THE BOTTOM LINE

In 1999, the Atlanta Regional Commission (ARC) established a new grant program, the Livable Centers Initiative (LCI), to incentivize development and transportation projects that would help the region improve air quality, reduce dependence on personal vehicles, and reduce vehicle miles traveled. With relatively small planning and implementation grants to local governments and nonprofits, ARC began promoting dense, mixed-use development in transit-accessible areas where people could walk, bicycle, or use a wheelchair to get to their destinations — and achieving significant results. Before the creation of LCI, ARC only spent $3 million on about seven bicycling and/or walking projects, on average, per year. After LCI began, the program provided a total of $217 million to fund 109 bicycle and/or pedestrian projects and 237 studies, which amounted to an average of $12 million spent on 19 projects and studies per year. Through LCI, ARC has invested $202 million in 109 projects that support walking and bicycling to date. The program has grown and evolved into a vital and popular economic development tool for the Atlanta metropolitan region.

LCI provided $4.3 million to revitalize the area around MARTA's Decatur Transit Station, above. Local dollars provided a $1.1m match. The project created a larger, more open, and more accessible plaza on top of the station; improved access in front of the station; and expanded walkways adjacent to the station. Photo courtesy of ARC.

THE CONTEXT

ARC serves a population of 5.4 million people in 20 counties. By 2040, the region is expected to be home to 8 million people and the number of people age 65 and older will nearly triple. Population growth in both the city and the region as a whole has accelerated in recent years. For example, in 2016, following decades of population loss in the city, Atlanta gained 7,900 new residents — compared to only 4,800 the previous year — with the help of increased construction of multi-family housing. The region is also forecasted to gain over a million jobs by 2040.

THE PROBLEM

In the 1990s, the Atlanta region struggled to comply with federal air quality regulations; air pollution levels in the region regularly surpassed the legal limits established in the Clean Air Act. Excessive air pollution not only put people in danger, it also threatened the region's access to federal transportation funding. Federal agencies warned the MPO that its Transportation Improvement Program (TIP) and long-range transportation plan (RTP) may be rejected because of their emphasis on roadway expansion projects, which are known to increase air pollution. ARC needed to act fast to diversify its transportation projects to reduce emissions and improve air quality. Not doing so would have left the region with neither an approved plan nor the federal funds to carry it out.

WHAT THE MPO DID

In 1999, ARC launched LCI to strategically invest in plans and projects that would help improve the region's air quality. The MPO created LCI to give incentivizes to communities to adopt land use and transportation plans that would reduce single occupancy vehicle trips and increase multimodal travel choices such as walking, bicycling, and riding public transportation. The MPO also devised LCI to promote dense, mixed-use, and mixed-income development with jobs, shopping, and recreational facilities located within walking distance of homes and transit stations.[1]

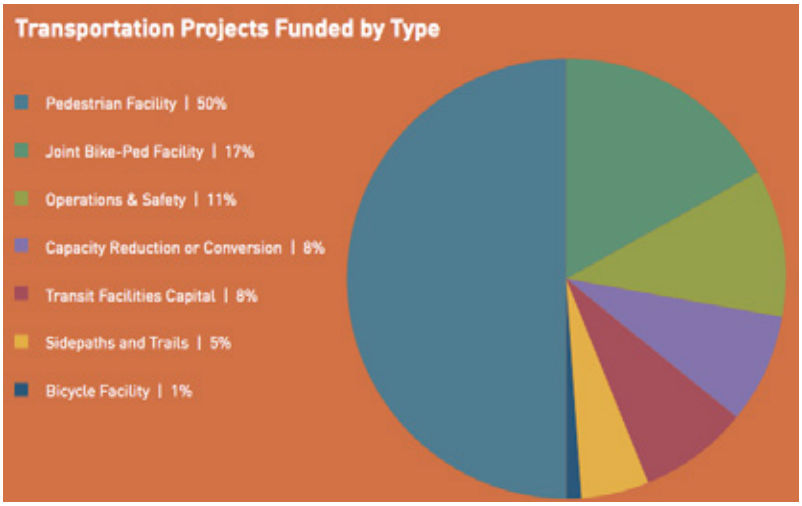
Through LCI, ARC continues to award grants to local governments, nonprofits, and community improvement districts (CID) to conduct transportation and land-use planning studies for multimodal trail networks, bike share systems, and more.[2] These planning studies can be customized to meet the needs and contexts of each community. They often call for making policy changes, such as adopting form-based codes, updating zoning ordinances to include mixed-use development, or adopting new multimodal design guidelines.

What is crucial is that LCI does not just fund planning processes; it also provides funding to implement the projects and policy change recommendations that emerge from these plans.

1 To learn more about LCI, visit: http://atlantaregional.org/livable-centers-initiative/.

2 Explore an interactive map of all the LCI communities here: http://garc.maps.arcgis.com/apps/webappviewer/index.html?id=-c9a0076778594ff99fd102134b8f4b70/.

LCI grants, whether for transportation studies or infrastructure projects, cover 80 percent of the cost; the recipient provides matching funds for the remaining 20 percent.



A breakdown of the kinds of infrastructure projects funded by ARC's LCI program since the program began in 1999.

Since the first round of funding in 2000, ARC has awarded $217 million in LCI grants. This includes $8.6 million to 119 communities to conduct land use and transportation studies, $5.6 million for 118 supplementary studies, and $202 million to fund 109 transportation projects in 62 communities. It is the primary source of federal and state funding for the planning and construction of walking and bicycling connectivity projects for communities across the region. It has become an important economic development tool for the region. And it has helped scores of the small towns and cities within the metro area capitalize on or reinvest in their existing downtowns and streets.

Due to its success and popularity, the program continues to grow and evolve: ARC increased funding for the LCI program from $350 million to $500 million in the RTP, *Mobility 2030*; this allocation was recently extended to the year 2040 through the Atlanta region's current RTP, which was adopted in 2016. Of this total, ARC reserved $1 million for LCI studies and the rest for infrastructure projects.

HOW THE MPO DID IT

The ARC Land Use Task Force first identified the need to develop activity centers and town centers in the region into mixed-use, connected centers through planning and transportation funding. ARC adopted the LCI program in its 2025 RTP to provide resources for projects that would promote travel by public transportation, walking, and bicycling.

Once an LCI community conducts its initial study, it becomes eligible for additional funding from LCI to implement the projects and policy changes proposed in the plan. Of the 109 transportation projects funded through LCI, 100 percent incorporate pedestrian facilities and 38 percent include features to make bicycling safer and more convenient. In the last two LCI funding cycles, held in 2011 and 2015, ARC funded 20 projects, 17 of which featured bicycle facilities and 10 of which reduced the number of travel lanes (i.e., constructed a "road diet"). For example, Juniper St. in Midtown Atlanta — currently a one-way street with four lanes and no bicycle facilities or on-street parking — will be transformed to include a southbound, buffered cycle-track, just two travel lanes, and on-street parking. A northbound cycle track will run on a parallel street. This project will be one mile in length and connect Piedmont Park, Midtown business districts, dense multi-family and single-family residences, and numerous bus routes.

Another example is N. McDonough St. in Decatur, GA, which connects to a high school and a Metropolitan Atlanta Rapid Transportation Authority (MARTA) station. A road diet took the street from four lanes to two. The addition of on-street parking, a buffered two-way cycle track, and wider sidewalks improved safety for those traveling on foot and bicycle. Railroad crossing improvements reduced conflicts between trains and travelers. Connections to a regional trail system expanded access to multimodal options. And new green infrastructure reduced flooding and protected the public's health.

The LCI program provided $3.3 million for the Juniper St. Complete Street project in the Midtown area of Atlanta. The Midtown Alliance/CID supplied a $1.87 million local match. The project will convert four one-way travel lanes to two lanes and construct a cycle track, pedestrian improvements, green infrastructure, and on-street parking. Construction is slated to begin in January 2018. Photo courtesy of the Midtown Alliance.

ARC selects LCI communities on the basis of several factors, including how well a proposed project would advance LCI's goals, the regional significance of the proposal, and the commitment of the applicant to implement a resulting plan. To select projects, ARC considers anticipated impacts on transit connectivity, air quality, equity, and more. To analyze a proposed project's impact on equity, ARC uses an index the MPO developed called the Equitable Target Area (ETA), which is based on an area's poverty level and the racial diversity of its residents. ARC reserves 15 percent of LCI's infrastructure project evaluation points for proposed projects with a high ETA score; the MPO reserves 25 percent of LCI's study evaluation points for proposed studies with a high ETA score.

ARC's commitment to foster dense, transit-oriented development is apparent in its selection of LCI communities: 35 of 38 MARTA rail stations are currently located in LCI areas. To date, 75 projects (of the 109 funded by LCI) are located within ¼ mile of a rail or bus stop; the total cost of these projects amounts to $147 million (of the $202 million of LCI funding that has been allocated). LCI funded MARTA rail station area improvements, specifically, through 41 of these 75 projects.

Immediately after the revitalization of the Decatur Transit Station (pictured on opening page of case study) adjacent restaurants began to expand their seating to the newly expanded walkway that connected to the plaza above the station. Photo courtesy of ARC.

After an LCI project is awarded funding, ARC remains closely involved throughout the design and implementation phases. Many of these projects face resistance from state and federal agencies, so ARC's role as an advocate and shepherd is essential to ensure these projects maintain their integrity as they were envisioned in the initial plan and application. This close involvement also protects projects from being scrapped or watered down following changes in local leadership.

The new plaza above the Decatur Transit Station. Photo courtesy of ARC.

To further advance LCI's goals, ARC also provides education and training on the latest best practices in active transportation. The agency holds annual workshops with its member jurisdictions on a variety of topics including improving the design of walking and bicycling infrastructure, adopting zoning changes and regulations to promote walkable neighborhoods, and implementing affordable housing strategies. ARC also advocates for the adoption of nationally recognized design guidelines and complete streets policies to promote higher quality bicycle and pedestrian projects throughout the region.

A CLOSER LOOK: MEDLINE LIVABLE CENTERS INITIATIVE STUDY

DeKalb Medical Center at North Decatur received a $120,000 LCI grant from ARC in 2013 to establish a "wellness district" and conduct a transportation and land use study. DeKalb and its partners used this grant to develop the *Medline LCI Plan*, which focused on redeveloping underused or vacant properties to incorporate a dense mix of housing, offices, and retail space located within walking distance of the health facilities centered around the medical center.[3] The plan called for improving wellness with more housing options for the people most vulnerable to health disparities, including older residents and people with a low income. It also recommended adding features to make bicycling and walking safer and to improve connectivity to health care centers, jobs, healthy foods, recreation centers, and transit services. The study set forth an action plan to implement transportation improvements, focus development, and overhaul the area's zoning code to improve health and wellness.

3 Read the complete *Medline LCI* study online: https://dnmurphy.uberflip.com/i/327057-draft-medline-report-june.

The *Medline LCI Plan* was conducted by DeKalb County with the support of several consulting firms and in partnership with several local organizations, including the DeKalb County Board of Health and local health nonprofits. This plan is just one example of how LCI grants can be customized to address the unique needs and priorities of recipients. It also demonstrates how the transportation and public health sectors can collaborate in pursuit of communities that allow more people to walk or bicycle from place to place.

Issues identified through the development of the Medline LCI Plan to establish a wellness district and address transportation and land use concerns in the Medline area, which includes DeKalb Medical Center at North Decatur.

"The streetscape improvements and roundabout have greatly improved the public safety for pedestrians. Through the LCI we were also able to improve walking conditions in the surrounding neighborhoods and at Emory University."

- Todd Hill, Past Chairman of Emory Village Alliance

TIMELINE

1999: ARC adopted its *2025 Regional Transportation Plan*, which included the new Activity Center/Town Center Investment Policy Study (ACTIPS) Program, later renamed the Livable Centers Initiative. The RTP provided $5 million for studies over five years and $350 million for transportation projects through the year 2025.
2000: ARC awarded the first ACTIPS grants to fund studies that each cost approximately $100,000, for a total of $800,000 per year. Project sponsors provided a $20,000 local match for an $80,000 grant.
2002: ARC awarded LCI funds for transportation projects for the first time (for funding available beginning in 2003).
2002: ARC added a "supplemental" study as an eligible activity of an LCI grant. Supplemental studies were designed to help communities implement an LCI plan (e.g., by considering zoning regulations, design guidelines, or parking changes). ARC designated only communities with completed and adopted LCI plans as eligible recipients.
2004: The ARC Board adopted *Mobility 2030*, an RTP that increased LCI funding for transportation projects from $350M to $500 million (1% of the RTP) through the year 2030.
2004: ARC allowed studies and projects in "Emerging Centers" to receive LCI funding.
2005: ARC expanded eligibility of project sponsors able to receive LCI grants from those in the 10-county regional commission to the entire MPO area, which consisted of 20 counties.
2005: ARC allowed studies and projects in corridors that met certain criteria to receive LCI funding, broadening eligible places beyond activity centers.
2009: ARC staff assumed direct management of the LCI transportation projects to assist the Georgia Department of Transportation and LCI grantees with project delivery.
2009: ARC incorporated Lifelong Community principles into the scope of work and application for LCI grants.
2012: The ARC Board adopted the RTP, *PLAN2040*, which:

- Extended the agency's $500 million commitment to LCI through the year 2040;
- Created the Unified Growth Policy Map (a map of targeted growth areas in the region) and made LCI grants eligible only in areas identified on the map, making LCI consistent with regional growth policies;
- Eliminated the requirement that LCI studies needed to be ten years old before doing a major plan update;
- Reserved at least 50% of LCI study funds ($800,000 per year) to conduct supplemental studies in existing LCI areas.

2014: ARC transferred LCI funding to Federal Transit Administration funding for transit-related LCI projects for the first time to improve project delivery and make approvals more efficient.

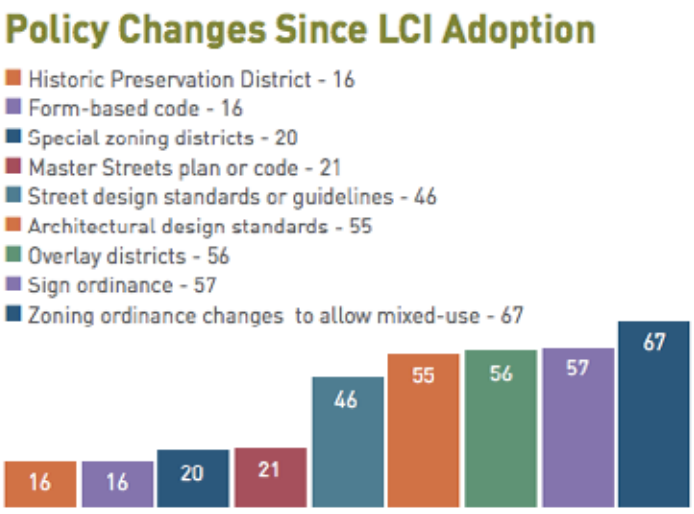
BARRIERS ALONG THE WAY

LCI's emphasis on bicycling and walking, and the inclusion of economic development and land use, have created some resistance from state transportation agencies that have a role in approving ARC's funding, TIPs, or contracts. To secure the support of these agencies, ARC must consistently justify the LCI program and stress the broader transportation benefits of the program, as well as individual projects and studies. ARC approves scope changes to prevent the elimination of bicycling and walking infrastructure during the preliminary engineering or right-of-way acquisition phases. ARC is immersed in the project development process to advocate for an LCI plan's vision, specifically to ensure that critical project elements that improve safety and encourage more bicycling, walking, and transit trips are not stripped away. ARC staff and board members' diligence in advocating for the LCI program and its projects ensures its continued success.

RESULTS AND BENEFITS

A variety of projects have been implemented with LCI funds including green infrastructure, roundabouts, road diets, transformative complete streets, and placemaking projects.

In addition to the exemplary projects that LCI has funded throughout the region, LCI has led to a number of other important changes. Many LCI communities have amended their transportation and land use policies to support dense, walkable development. They have updated zoning ordinances, adopted new design standards or guidelines, created master plans, established historic preservation districts, and more. Local jurisdictions have also created community improvement districts (CID), which are self-taxing districts that generate revenue to provide matching funds for LCI grants and other projects, programs, and planning initiatives.



Local policies adopted since the creation of the LCI program, from form-based codes to zoning ordinance changes that allow mixed-use development.

Quality of life in the Atlanta region has already improved because of multimodal transportation projects built and local land use policies changed. More than half of LCI communities have created new public parks and a third have installed public art on their streets. Parks are known to lead to better physical and environmental health: studies have shown that increased access to parks leads to more physical activity and less chronic disease. [4]

4 Mitchell, R and Popham, F. (2008). "Effect of exposure to natural environment on health inequities: an observational population study." *The Lancet*, 372, 1655–1660.

Another benefit of LCI is increased engagement between ARC and its smaller member jurisdictions. Prior to LCI, cities and towns in the Atlanta region did not work as closely with ARC. Thanks to this initiative, ARC now has a strong working relationship with these communities. Private developers have also become more engaged with the MPO as a result of this program. Through a combination of public and private investment, walkable, mixed-income, and mixed-use developments have blossomed in LCI communities: although LCI areas only constitute 4 percent of ARC's land area, LCI areas now support 69 percent of the region's office development, 29 percent of commercial development, and 7 percent of residential development. And an impressive 36% of jobs in the region are now located in LCI areas.

Comparison Between Development in LCI Areas and in the Region

	LCI Communities*	13-County Region**	LCI Share
Land Area (sq ft)	92,167	2,623,105	4%
Office Development 2000-2014 (sq ft)	46,177,433	66,933,586	69%
Commercial Development 2000-2014 (sq ft)	43,778,376	152,481,928	29%
Residential Development 2000-2014 (units)	76,576	1,160,824	7%

* Data as reported in 2014 Development Inventory.
** Data as reported by Costar.

LCI areas have 69 percent of the region's office development, 29 percent of commercial development, and 7 percent of residential development.

To leverage LCI funding, ARC aligns the program with other policies and programs of the MPO. For example, many communities seek funding from LCI to implement ideas generated through activities like visioning exercises or walking audits supported by ARC's Lifelong Communities/Live Beyond Expectations program. Others seek free technical assistance through ARC's Community Choices Implementation Assistance Program to implement LCI recommendations.

ARC and its partners have also benefited from positive media attention and praise from the public. LCI projects, which tend to be relatively small, are often the most visible, popular, transformative, and high-impact projects in ARC's TIP. Elected officials, community members, and reporters frequently tout new bicycle lanes, transit plazas, or other projects funded by LCI while regionally significant projects, such as interchange realignments, often go unnoticed.

"In 2007, the City of Decatur created the Community Transportation Plan to help us create a more balanced, better connected transportation network. One way it does so is by incorporating a health benefit analysis for our transportation spending. And thanks to the support of the Atlanta Regional Commission through the LCI program, we have received funding to widen sidewalks, install separated bicycle tracks and make signal improvements to help move our 2007 vision forward."

- Mayor Patti Garrett, City of Decatur

The strong dialogue about and support for smart growth and livability — fostered through LCI — have led to other indirect benefits. When ARC highlights best practices and case studies from LCI communities, it inspires other jurisdictions and developers to pursue similar projects and programs.

Additionally, coalitions of nonprofits, developers, and local governments have embraced the principles of LCI in their advocacy work. For example, the TransFormation Alliance (TFA) now works in LCI areas to promote the development of affordable housing in places that are accessible by all modes of transportation. TFA is a partnership between many organizations, including housing organizations, to increase equitable transit-oriented development. In the future, ARC expects that LCI will fund transportation projects, studies, and the development of policies or zoning regulations to meet TFA's explicit goals.

SPOTLIGHT ON MIDTOWN

Leaders of the Midtown district of Atlanta leveraged LCI funding to improve safety and accessibility for those traveling via foot, bicycle, and wheelchair. The Midtown Alliance's master plan Blueprint Midtown, completed in 2000, was the first study "grandfathered" into the LCI program since it met all the criteria. Since then, the Midtown Alliance has received $10.7 million from LCI to conduct four studies and build five transportation projects identified in those studies. The organization has also prepared three plan updates as required by LCI with its own funding.

Study or Project Name	Award Year	LCI funds
Housing Market Study	2002	$16,000
Parking Assessment	2007	$30,000
Greenprint Midtown - Major Plan Update	2011	$42,000
Transit Station Area Enhancement Study	2013	$80,000
Juniper St. Complete Street	2013	$3,347,200
15th St. Extension (incl. bicycle and pedestrian facilities)	2016	$188,625
Peachtree St. Sidewalks	2003	$1,657,188
West Peachtree St. Bike Lanes	2003	$2,923,310
West Peachtree St. Pedestrian Improvements	2005	$2,448,400
	TOTAL	$10,732,222

Midtown Alliance has received $10.7 million from LCI to conduct four studies and build five transportation projects identified in those studies in the Midtown district of Atlanta.

KEY PARTNERS

- Local governments and Community Improvement Districts (CID): Local governments and CIDs, which are self-taxing business districts, receive LCI funds and were ardent supporters and advocates of LCI early on. Without their strong support, the program might not have lasted beyond the region's Clean Air Act conformity issues.
- Metropolitan Atlanta Rapid Transit Authority (MARTA): MARTA has been a strong participant in the LCI planning process in its service areas. MARTA also serves as a project sponsor on behalf of local governments for transit station enhancements and projects that provide access to stations on foot and bicycle. MARTA has also participated in transit-oriented development (TOD) studies and implemented TOD projects funded by LCI, such as parking garages and station improvements needed for mixed-use development.
- The Georgia Department of Transportation (GDOT): As the designated administrator of federal transportation funds in Georgia, GDOT guides projects through the required permitting and approval processes. GDOT also oversees LCI's planning contract while ARC subcontracts with local governments and CIDs to develop individual plans. Especially in recent years, GDOT has reorganized to provide greater support to project sponsors as they implement LCI projects. The department has supported creativity and flexibility within LCI.
- Various nongovernmental organizations (NGO): Many NGOs have provided technical assistance during the LCI planning process, including the Georgia Conservancy, PEDS, and the Atlanta Bicycle Coalition.

LESSONS LEARNED

ARC shares the following advice:

1 **Don't underestimate the importance of land use regulations and policies.**
While building a sidewalk can make a huge difference in a community, amending zoning codes to require that developers provide sidewalks in any new development project has a greater impact in a community. Much of ARC's success results not only from its investment in the physical infrastructure, but also from its support of local plans and policy changes. By incentivizing communities to adopt a vision of walkable, mixed-use neighborhoods, ARC has fundamentally shifted development patterns throughout the region.

2 **Develop grant programs to focus investment on unmet needs.**
Prior to launching LCI, ARC had no designated funding for local planning initiatives or active transportation projects. The program filled a void in the region for highly populated areas and smaller communities alike.

3 **Use flexibility in federal grant programs to create a funding source that meets local needs.**
Federal transportation dollars offer flexibility to fund studies and projects that integrate land use and transportation.

4 **Foster ownership of regional programs among local jurisdictions.**

The local governments and nonprofits that receive LCI funding have a lot of flexibility to customize their study to advance local objectives, whether by focusing on health, multimodal transportation, or economic development. ARC also allows the program to continue evolving to meet the changing needs and goals of the region. Giving LCI communities a high degree of freedom has generated incredible enthusiasm and support both for the program as a whole as well as for individual plans.

5 **Develop long-lasting partnerships.**

The process may be more important than a study or project itself. Through a program like LCI, MPOs may build lasting partnerships, political and public will, and private developer interest that sustains implementation long after a project is built.

INVOLVING PUBLIC HEALTH PARTNERS

Through the Atlanta region's RTP, ARC recognizes the value of healthy, livable communities. ARC formally adopted health-focused policies because creating more places where people can walk, bicycle, and take transit from place to place will help the region attain one of the six goals of the RTP's Policy Framework: "Promoting health, arts, and other aspects of a high quality of life."

The LCI program specifically supports projects that help people walk and bicycle more, which addresses public health concerns by:

- Improving access to social determinants of health, such as jobs and multi-modal transportation options;
- Helping communities build safer ways to walk and bicycle, which should both reduce traffic fatalities and injuries, encourage more trips on foot and bicycle, and reduce the incidence of certain chronic diseases;
- Supporting transportation options beyond driving vehicles, which emit air pollutants;
- Incorporating green infrastructure into projects, which can reduce health impacts related to flooding; and
- Improving mental health.

The MPO may foster connections with public health partners at the local level through the implementation of an LCI grant. LCI grantees can customize their work to address their district's primary concerns, which often include meeting public health goals. As seen in the *Medline LCI Plan*, LCI helped stakeholders plan to address health disparities through future redevelopment of the DeKalb Medical Center in partnership with public health professionals.

ARC recognizes the value of public health benefits but has faced challenges working with public health partners, some of whom have differing expectations from a transportation or development project. For example, when the Georgia Tech Center for Quality Growth and Regional Development conducted a Health Impact Assessment (HIA) on ARC's *PLAN2040* in 2011, several ARC board members had difficulty understanding the relationships between certain health and transportation issues unveiled through the HIA, such as infant mortality, hypertension, and suicide rates. The reaction to the information was mixed, most particularly in suburban and exurban communities that were built in typical post-war development patterns that lack bicycling and sidewalk networks.

ARC advises public health partners to be sensitive to the realities of local governments or other partners when partnering with them to point out public health concerns and develop solutions. The American Public Health Association (APHA) developed guidance specifically for both public health and transportation professionals to talk with each other. The "Transportation and Health Toolkit" offers advice to help both parties understand their shared goals and work together to create environments where people can safely and easily walk or ride a bicycle. For example, APHA recommends not discussing the transportation sector's impact on obesity with most transportation funders, planners, or engineers; rather, focus on issues that these parties are routinely concerned about, such as safety for those traveling on foot or bicycle.[5]

5 https://www.apha.org/topics-and-issues/transportation/transportation-and-health-toolkit.

Livable Centers Initiative Program Goals:

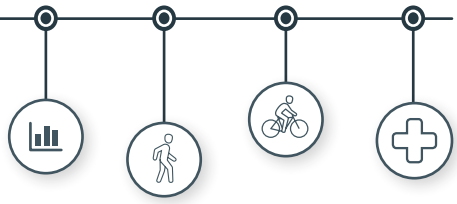
1. Encourage a diversity of housing, employment, commercial, shopping, and recreation land uses at transit stations and activity centers, and make these destinations accessible for people of all ages, abilities and income levels.
2. Enhance access to a range of travel modes including transit, roadways, walking, and biking, and increase roadway connectivity to provide optimal access to destinations within the study area.
3. Foster public-private partnerships and sustained community support through an outreach process that promotes the involvement of all stakeholders, including those historically underserved or underrepresented.

Funding Priorities (for New LCI areas):

- Equitable Target Areas
- Mix of uses and a density of development that support walking, biking, or transit, and a jobs-housing balance
- Mixed-income and workforce housing
- Transit-oriented development and studies that relate to transit accessibility and/or new transit service, including bus service (must have at least one phase funded in the TIP)
- Study areas with existing underutilized infrastructure, brownfield, grayfield, or catalytic redevelopment sites
- Increased street connectivity, complete streets, and travel demand management
- Aging in place and lifelong community concepts
- Creative placemaking strategies
- Historic preservation and context-sensitive infill and development
- Demonstrated commitment and ability to implement the LCI plan and create positive changes at the community level
- Incorporation of smart city transportation technology to improve mobility and congestion

6 – IMPROVED CONNECTIONS TO TRANSIT & OTHER DESTINATIONS
DENVER REGIONAL COUNCIL OF GOVERNMENTS (DENVER, CO)

Planning for first and last mile to transit and urban centers



THE BOTTOM LINE

After voters approved a sales tax increase to fund expanding and improving transit in the Denver region in 2004, the Regional Transportation District and its partners started building an ambitious expansion of the region's transit network. Along the way, local leaders made commitments to ensure that future stations would be well connected to neighborhoods and that they would also encourage walking and biking. These leaders recognized that an effective transit system would need to incorporate effective bicycling and walking connections. In 2007, the Denver Regional Council of Governments (DRCOG) launched a program to help jurisdictions identify necessary improvements that would make public transportation station areas and urban centers more accessible on foot and bicycle. Communities across the Denver region continue to rely on funding from this program, entitled DRCOG's Urban Centers/ Station Area Master Plan Program, to plan for first and last mile to transit projects and walkable urban centers.

THE CONTEXT

Celebrated for its beauty within the Rocky Mountain Front Range and its proximity to world-class outdoor recreation, the Denver, CO region is home to about 3.2 million people and the City of Denver attracts about 16.4 million tourists every year.[1] Denver's development story over the last 10 years is one focused on a multi-generational investment in transit that is helping the region reinvest in their existing downtowns and concentrate residential, commercial, and job centers near transit stations both present and future.

Voters in the Denver region approved a $4.7 billion infusion of their tax dollars in 2004 to expand the existing light rail system and to introduce commuter rail and bus rapid transit (BRT) through a regional transit program called FasTracks.[2] Leaders recognized that these transit investments would not automatically produce success without thoughtful and careful planning to make existing and future transit stations easily accessible by all modes of transportation.

Leaders further recognized that smart growth would make it more efficient and cost-effective for residents to live in and move about the region. Leaders in the region have supported compact, smart growth development for decades, and they saw FasTracks as a way to encourage those patterns of growth. Notably, with the 2017 adoption of the updated version of the regional plan, *Metro Vision*, the DRCOG Board of Directors updated a goal to increase the share of the region's housing and employment located in urban centers from 10 percent of housing and 36.3 percent of employment to 25 percent of housing and 50 percent of employment by 2040.

THE PROBLEM

It is no secret that transit stations need to be well connected to a variety of destinations, a mix of land uses, and a built environment that makes it easy to travel to and from the station by a number of transportation options. These elements are essential for transit agencies to succeed at moving people to the places they need to go and remain financially viable by producing strong ridership. The easier a station is to reach by more people, and the more interesting places there are to reach once there, the better a system functions and the higher the ridership will be.

Leaders in the region knew that they needed to build more infrastructure to help people walk, bicycle, or ride in a wheelchair to future transit stations. Counties, cities, and towns across the Denver region needed a source of funding to study how to fix these gaps in that last mile to reach transit — to identify the walking and bicycling facilities that would connect public transportation stops to job centers, residences, shopping areas, health care centers, schools, and other essential destinations.

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1 Blevins, J. (2016, July 20). Colorado breaks tourism record with 77.7 million visitors spending $19.1 billion. *The Denver Post*. Available online at: http://www.denverpost.com/2016/06/15/denver-tourism-record-2015/.

2 See Transportation for America's profile on voter approval of FasTracks and the impacts the transit system has had on the Denver region's economy and growth, "Denver: Betting on the future and seeing early returns," available online at: http://t4america.org/maps-tools/local-successes/denver/.

Passengers walking near RTD's 16th & Stout Station. Photo by Rochelle Carpenter, T4America.

WHAT THE MPO DID

DRCOG established the Station Area Master Plan (STAMP) program in 2007 to assist local governments and other eligible entities in the development of a small area plan for transit station areas. Later, through the *Metro Vision* adopted in 2011, DRCOG began designating urban centers. In a subsequent Transportation Improvement Program (TIP), DRCOG expanded the STAMP Program to provide assistance to these designated urban centers, forming a joint UC/STAMP Program. This gave recognized urban centers without transit stations a source of competitive funding to plan multimodal projects and better align transportation investments with land use policy decisions in areas identified for focused growth. Today, there are 104 urban centers.

The program continues to fund small area plans around transit stations and urban centers. A small area plan covers a small geographic area, such as the land surrounding a public transportation station, a neighborhood, a planning district, or a special district. It helps communities further *Metro Vision* by developing the solutions needed to create station areas and urban centers that:

- Are active, pedestrian-, bicycle-, and transit-friendly places that are more dense and mixed in use than surrounding areas;
- Allow people of all ages and incomes to access a range of housing, employment, and service opportunities without needing to drive;
- Promote regional sustainability by reducing per capita vehicle miles traveled, air pollution, greenhouse gas emissions, and water consumption; and
- Respect and support existing neighborhoods.

DRCOG structured the program to readily respond to the needs of their member jurisdictions by making four types of planning studies eligible for UC/STAMP:

1) Master planning around a station area or urban center (called the Urban Center Study/Station Area Master Plan)

These plans are created for station areas or urban centers; they can either focus on a single station area or multiple ones at a time. Development of a plan must involve public engagement, especially among those with low to moderate incomes, people of color, older people, or people with disabilities. They must also involve regional partners, including DRCOG and the Regional Transportation District (RTD), the regional public transportation agency.

The plans should propose types and densities of future land uses; locate placement of multi-modal connections (e.g., bicycle, pedestrian, transit, vehicular); identify barriers to desired station area and/or urban center development (e.g., existing parking structures, zoning codes, present infrastructure); and more.

The program's intent is not for communities to produce plans that merely end up in a binder on a shelf; plans should include a clear and realistic action plan that local governments would use as guidance to implement the recommendations.

If the plan recommends policy or regulatory changes, the action plan might specify what zoning codes need to change or what a comprehensive plan should address. If the community points to the need to improve infrastructure, the action plan might list feasible changes and describe what steps should be taken next. If there is a shortage of certain housing stock, the action plan might identify the kinds of housing that are needed. The action plan might also include an implementation strategy that describes the process and personnel — from the community itself and regional partners — to ensure that the recommendations identified in the master plan are built expeditiously.

2) Follow-up planning to refine an idea identified in the master plan (called a Next Steps Study)

A Next Steps Study is conducted to help a community move an existing master plan forward by producing a more refined set of solutions. These studies get communities closer to implementing first and last mile to transit projects.

Eligible concentrations of a Next Steps Study include, but are not limited to, the following:

- Corridor redevelopment strategies;
- Design studies and concepts for multi-modal infrastructure projects;
- Street design standards or manuals;
- Pedestrian facilities plans; or
- First and last mile mobility implementation, financing, or partnership studies.

"The 40th and Colorado Next Steps Study was a collaborative effort to build on great work coming from the Elyria and Swansea Neighborhoods Plan and a robust health impact assessment, which both included significant public engagement. As part of the Next Steps Study, multimodal routes were determined and brought through conceptual design, which included clear pedestrian-priority areas as well as an intuitive bicycle network connecting residents to key destinations such as schools, community centers and a rail line stop. These projects illustrate Denver's commitment to providing safe, healthy options for families to move around their neighborhood and to get to where they need to be."

- Emily Silverman, Technical Program Manager, City and County of Denver

3) A Corridor-wide Study (called a Corridor-wide Plan)

A Corridor-wide Study focuses on improving multimodal connectivity within a transit corridor and at individual stations along the corridor. This kind of study is used to identify barriers to station area development and transit use, such as:

- Current land use;
- Zoning and development standards;
- Parking availability and cost;
- Inadequate bicycle and pedestrian facilities; or
- First and last mile challenges.

Through the development of a Corridor-wide Plan, communities identify solutions such as plan updates, code revisions, or financial or regulatory incentives to overcome challenges that are shared by multiple, contiguous jurisdictions along a corridor.

4) Planning issues that are universal among several partner jurisdictions (called Area Planning and Implementation Strategies)

Local jurisdictions may seek funding to study innovative planning activities that may be replicated throughout the Denver region. Area Planning and Implementation Strategies focus on an issue common among communities across the region while catering to local context. Potential studies could include:

- TOD strategies (e.g., zoning and financing for water, storm water, recreational facilities, parks, or open space infrastructure);
- First and final mile mobility implementation;
- Financing, feasibility, or partnership studies;
- Pedestrian facility assessment and needs plan;
- Roadway corridor revitalization plans, strategies, or design standards; or
- Development of complete streets policies or ordinances.

Local governments and nonprofits, such as transportation management agencies (TMA) and business improvement districts (BID) are eligible to apply to receive funding to conduct a UC/STAMP study. Entities may only receive funding for two studies per fiscal year. Project sponsors pay for 20 percent of the total cost to conduct a study.

The program is funded through a set-aside of funding in DRCOG's TIP, which is adopted every four years. The MPO last allocated $2.4 million for the program over the current four-year (FY16-19) TIP cycle. The MPO solicits UC/STAMP proposals every two years. Even though funding for the program is allocated in the MPO's TIP, the MPO does not actually administer contracts with grant recipients; this is the responsibility of RTD, as described in the following section.

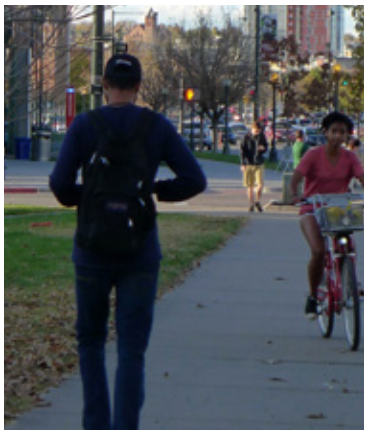
DRCOG has funded about four studies per year since the program started. The last program cycle (FY16-17) funded eight studies with the federal share ranging from $50,000 to $200,000 per project. UC/STAMP does not fund construction of projects.

The UC/STAMP Program is not the only source of DRCOG's support for first- and last-mile projects. In July 2008, the DRCOG Board provided another $60 million to the FasTracks system through the "Second Commitment in Principal" (SCIP). This doubled DRCOG's funding commitment to FasTracks, as the agency first provided $60 million to RTD in 2004. SCIP dollars were proportionally allocated to each corridor based on the overall FasTracks cost in 2011. This meant that if the cost of a corridor amounted to 15 percent of the total cost of FasTracks, said corridor would receive 15 percent of the $60 million.

SCIP provided a source of funding that local governments used to build first and last mile connections to FasTracks projects. It has supported pedestrian bridges, intersection configurations, sidewalks, quiet zones, parking ramps, and more. Local partners along each corridor planned how their allocation of the funds should be spent; these conversations primarily involved local governments with jurisdiction over a portion of the corridor, RTD, and the Colorado Department of Transportation (if CDOT owned the right-of-way in a given area).

HOW THE MPO DID IT

The counties and municipalities of the Denver region have been advancing a shared aspirational vision of the future of the metro area for more than 60 years. Working together to make life better for their residents, that vision has taken various forms over the years — most recently as a regional plan known as *Metro Vision*. The DRCOG Board of Directors adopted the first *Metro Vision* plan (*Metro Vision 2020*) in 1997 and has continued the dialogue about how best to achieve the plan's evolving vision ever since. The most recent *Metro Vision* plan was unanimously adopted by the DRCOG Board of Directors in January 2017.



People walk and bicycle on a multi-use path in downtown Denver. Photo by Rochelle Carpenter, by T4America.

Metro Vision guides DRCOG's work and establishes shared expectations with the region's many and various planning partners. The plan outlines broad

outcomes, objectives, and initiatives and establishes regional performance measures and targets used to track progress toward desired outcomes over time.

The UC/STAMP Program is an example of a regional initiative designed to support local contributions to the region's shared vision. The recently adopted *Metro Vision* plan aims to accommodate a growing share of the region's housing and employment in a network of connected urban centers and multimodal corridors. The program helps local governments create plans to help local governments and other stakeholders navigate the transition to higher-density development patterns, including the identification of infrastructure improvements and other catalytic investments.

The UC/STAMP Program is jointly managed by DRCOG and RTD. The MPO is responsible for most of the initial steps in the administration of the program; RTD handles the initiation and administration of contracts associated with funded studies.

Specifically, DRCOG staff manage the following elements of the UC/STAMP Program:

- Establishing the amount of funding for the UC/STAMP Program and allocating that funding through the TIP;
- Managing and facilitating the development of eligibility and evaluation criteria;
- Issuing and managing the call for study proposals;
- Convening and facilitating a project selection committee, made up of member jurisdictions that did not apply to UC/STAMP for the present cycle;
- Presenting the project selection committee's recommendations of studies to fund to three DRCOG bodies that approve funding, including the Board of Directors.

Once funds are awarded by the DRCOG Board of Directors, RTD steps in and controls the contracting and administration of selected studies. This is done for two main reasons. First, RTD staff routinely conduct this type of business and have the staff capacity to take on this responsibility. Second, the studies are mostly centered around RTD's stations and transit system, making the agency a natural partner.

TIMELINE

May 1992: The DRCOG Board of Directors adopted the "*Metro Vision* Statement, Principles and Policies," which expressed the fundamental elements of a vision for the region.
November 1995: The DRCOG Board of Directors adopted the "Vision Framework," a major milestone in the development of *Metro Vision 2020*. The framework examined alternative growth scenarios as leaders expected the region would add nearly one million people between 1990 and 2020.
March 1997: The DRCOG Board of Directors adopted the first *Metro Vision* (known as *Metro Vision* 2020) to establish regional outcomes and objectives related to growth, economic development, transportation, and more. *Metro Vision 2020* integrated multiple plans into a single vision for the future and took seven years to develop in concert with the public.
August 2000: Five counties and 25 municipalities signed the "Mile High Compact," a landmark

intergovernmental agreement to voluntarily and collaboratively manage the nature and location of growth throughout the Denver region. Additional jurisdictions signed the compact in subsequent years.

November 2004: Voters in the Denver region approved $4.7 billion in funding to expand the existing light rail system and to introduce commuter rail and bus rapid transit (BRT) through a regional transit program called FasTracks.

January 2005: The DRCOG Board of Directors adopted the first major update to *Metro Vision* based on recommendations from numerous working groups.

2007: DRCOG began to allocate funding for station area master planning (and later, in 2011, urban center planning) activities through a TIP set-aside.

2007: The DRCOG Board of Directors adopted *Metro Vision* 2035, which emphasized the importance of development patterns and design features that would meet the needs of residents as they age. The updated plan also established a new target for open space protection.

February 2011: DRCOG updated *Metro Vision* to establish locally identified and regionally designated urban centers, to adopt a goal to locate 50 percent of all new housing units and 75 percent of all new jobs in those urban centers between 2005 and 2035, and to make other amendments. Urban centers are focused centers of growth and, as of the publication of this case study in 2017, there are 104 in the Denver region.

January 2017: The DRCOG Board of Directors adopted an updated *Metro Vision* plan after more than four years of work. Among the highlights of the update, DRCOG incorporated new or expanded topic areas of housing, economy, community health and wellness, and community resilience. The MPO also updated its performance measures, including revised and new targets for the future share of housing and employment centers located in urban centers and near high-frequency transit.

EXAMPLE PROJECTS

Multi-Station Plan and Mobility Study for Colorado Boulevard and University of Denver Stations[3]

One successful UC/STAMP focused on two contiguous light rail stations — one at the University of Denver and another at Colorado Boulevard — in Southeast Denver. Transportation Solutions (TS), a TMA that works to increase transportation choices in Denver, received UC/STAMP funding and led the Multi-Station Plan and Mobility Study for Colorado Boulevard and University of Denver Stations and contracted with a consultant to help carry out the deliverables. TS coordinated the study with the City and County of Denver, the

Proposed improvements at RTD's University Station, including a traffic circle, bicycle lanes, crosswalks, sidewalks, pedestrian refuge islands, median grass strips, grass areas, trees, and more. Photo courtesy of OV Consulting.

3 https://www.denvergov.org/content/denvergov/en/transit-oriented-development/TOD_programs/University-Colorado-Multi-Station-Study.html.

Improvements planned for the area around RTD's Colorado Blvd. Station, including a pedestrian bridge. Credit: OV Consulting.

land owner of parcels directly north of the Colorado station, neighborhood groups, and more. These partners aimed to transform these two stations from commuter stations to walkable, connected, and vibrant station centers — and attractions in and of themselves. The plan made recommendations to make these areas safer for people to walk and bicycle to the stations across wide arterials with high-speed traffic. TS, the University of Denver, and Lincoln Properties (a developer with property at the Colorado Station) each contributed an equal amount of funding to supply the 20 percent match for the UC/STAMP study.

After completion of the first plan and study, the City and County of Denver funded a subsequent study to refine the initial recommendations and further determine what would be needed to implement the UC/STAMP's findings. The City and County and the University of Denver partnered with the Community College of Denver, Lincoln Properties, and others to complete the study. The university contributed funding to study bicycle and pedestrian improvements specifically at one intersection next to its campus.

These planned improvements already have a path for funding. In November 2017, voters will decide whether or not to approve a $937 million general obligation bond (GO Bond) package through which voters in Denver will decide to pay for BRT lines, bicycle lanes, pedestrian bridges, sidewalks, road expansion projects, paving projects, libraries, parks, recreation centers, museums, and more.[4]

4 Denver is retiring debt from previous bond programs, which frees up space to pay off new debt without changing the budget. Also, relying on rising property values to support this bond, the City can collect even more money without changing the tax rate to pay for the debt service. Thus, Denver residents are voting on increasing debt to pay for these projects, not increases in taxes.

"The Colorado Station and University of Denver study engaged the community, determining their needs, and recommended essential improvements connecting the two stations to the surrounding neighborhoods. The Colorado Station, in particular, is a virtual island surrounded by busy streets, a highway and car-oriented businesses. The study's recommendations will help better connect the station to pedestrians and increase transit ridership."

- Councilmember Kendra Black, Denver City Council

The GO Bond includes $8.4 million that would fund critical improvements at, around, and between the Colorado and University Stations. Based on the UC/STAMP, this $8.4 million would fund:

- A two-way cycle track to connect University and Colorado Stations on Buchtel Blvd.;
- The transformation of Colorado Center Drive into a multimodal main street, accomplished in part by the reduction of one lane and the extension of the Buchtel Blvd. cycle track;
- Sidewalks, crosswalks, bulb-outs, safer right turn lanes at four intersections, and more infrastructure to make walking or bicycling the safe, attractive, and easy choice.

The "Multi-Station Plan and Mobility Study" began in the summer of 2016 and citizens will vote on the GO Bond to fund the improvements just over a year later. What made this STAMP so successful and expedient?

First and foremost, there was participation and buy-in from decision-makers, developers, and community members. Two city council members (Paul Kashmann and Kendra Black) participated in the STAMP, became personally and politically invested in the project, and enthusiastically advocated for the placement of the GO Bond on the ballot in order to implement the plan's recommendations. Their actions were crucial to quickly moving planned station improvements to construction.

Second, TS and the City of Denver also effectively co-managed the development of the study and plan. Additionally, TS advocated for capital to turn the plan into a project.

Third, TS engaged sixteen resident groups, half of which were initially concerned about perceived negative impacts (e.g., increased density) of these improvements. TS held more than sixty meetings with neighborhood groups over the course of the study. Their involvement in and support of the study were crucial to generating the community buy-in that would be needed to get projects funded and on the ground.

Lastly, the study would not have happened without leadership from the University of Denver. Their students were not riding transit, even with a free transit pass, and the school recognized that it was because of poor connectivity to the transit station. University leaders brought together elected officials and TS to apply for the UC/STAMP in the hope of creating an integrated, multi-modal station rather than an island rendered inaccessible by students and staff.

"U.S. 36/Northwest Corridor First and Final Mile Study"[5]

Through the U.S. 36/Northwest Corridor First and Final Mile Study, the TMA Commuting Solutions developed recommendations to improve connectivity to six of RTD's BRT stations and activity centers along the auto-oriented, suburban U.S. 36 corridor in the northwest quadrant of the region. U.S. 36 is a highway built for cars and, even with significant investments in multimodal infrastructure along the corridor, it leaves many challenges getting people safely to its BRT stations on foot and bicycle. The U.S. 36 line is one of several Flatiron Flyer BRT lines.

Proposed solutions identified in the study included:

- Providing employer-sponsored passes for unlimited rides on RTD trains and buses;
- Building secure Bike-n-Ride shelters;
- Providing bikeshare options at each station;
- Adopting transit-supportive land use policies; and
- Installing corridor-branded wayfinding signage.

Around the same time, a 2014 grant from the U.S. Department of Housing and Urban Development (HUD) provided $4.5 million in technical assistance for communities across the region that were implementing station area plans at transit stations under construction. Part of this grant supported the development of a study called "The Northwest Corridor Bicycle and Pedestrian Accessibility Study," which built on the "U.S. 36/Northwest Corridor First and Final Mile Study." Through the bicycle and pedestrian accessibility study, four strategies were recommended as priorities local governments and their partners should seek to build: secured bike parking, branded wayfinding, connections to Flatiron Flyer stations, and bikeshare at areas along U.S. 36.

Boulder County and its partners have implemented some of the recommendations from these studies. For example, the County built a Bike-n-Ride shelter at the Table Mesa Station; RTD accepted funding to construct Bike-n-Ride shelters at the Broomfield and Sheridan Stations; and the Town of Superior and Boulder County funded construction of the McCaslin Station's bike shelters.

KEY PARTNERS

- The Regional Transportation District (RTD): As the region's public transportation agency, RTD plans for and operates public transportation in eight counties of the Denver region. The UC/STAMP Program is jointly staffed by DRCOG and RTD. Both entities review and score UC/STAMP applications. After funding is approved by the DRCOG Board of Directors, RTD ensures contracting authority and administers pass through funding to project sponsors.
- Project sponsors: Local governments, business improvement districts (BID), transportation management associations (TMA), and nonprofit organizations (in collaboration with a local government) may apply and receive funding to conduct a UC/STAMP.

5 http://commutingsolutions.org/us-36-projects/us-36-first-and-final-mile-study/.

- Local elected officials: few successful transportation projects get built without strong support from local leaders. The involvement of elected officials is often the most important factor for ensuring that a project moves from plan to implementation. The case of the "Multi-Station Plan and Mobility Study for Colorado Boulevard and University of Denver Stations," for example, demonstrates this. Councilmember Paul Kashmann, whose jurisdiction includes the University of Denver station, and Councilmember Kendra Black closely participated in the plan and study, and strongly advocated that funding for first and last mile projects at the stations come up for a vote in November 2017.

BARRIERS ALONG THE WAY

Tracking the link between study recommendations and future infrastructure projects included in the TIP. DRCOG does not currently have a mechanism in place to track whether or not recommendations from UC/STAMP studies make their way into the TIP. Creating a system to monitor the linkage between studies and the TIP would not only support a stronger argument for the continuation of the set-aside funds, it would also allow DRCOG staff to more easily tout the benefits of planning before construction.

Words matter. In some instances, smaller municipalities and suburban communities had difficulty identifying with the terms "urban" and "station area master plans." Even with 104 urban centers and non-traditional areas that could be considered station areas, the description of the program left many local leaders without an understanding of how their jurisdiction would benefit from the UC/STAMP Program. DRCOG staff have worked with local government leaders throughout the region to highlight the UC/STAMP Program and its availability to all communities to overcome this challenge.

"Over the past couple of years, the prime cause of constituent contacts to our Council office has shifted from concerns about the pace of development to increasing frustration at the volume and speed of auto traffic, as well as the lack of non-auto alternatives in Denver. The Buchtel Blvd. bicycle corridor project will provide the foundation for a long awaited bike path connection from Denver's east side to the underserved neighborhoods west of the S. Platte River. Non-motorized transportation options in Denver can no longer be viewed as an amenity, but rather an essential part of Denver's mobility recipe."

- Councilmember Paul Kashman, Denver City Council

RESULTS AND BENEFITS

The UC/STAMP Program provides resources that allow local leaders to develop strategies that ensure that development patterns and policies, as well as infrastructure investments, contribute to a transit-supportive built environment. The program provides a crucial source of funding and inspiration to jurisdictions, supporting their efforts to make transit station areas and urban centers more walkable, bikable, connected, and vibrant. When voters approved large investments in public transportation through FasTracks in 2004, local leaders knew they would need to improve bicycle and pedestrian connectivity to transit stations to get the greatest return on these once-in-a-generation transit investments. The UC/STAMP Program has helped make this happen.

The City of Westminster invested $5 million in pedestrian and bicycle infrastructure on new roads leading to Westminster Station on the B Line. Municipal, federal, and private developer dollars also funded bicycle and pedestrian connections., and the city also improved the Little Dry Creek multi-use path to help nearby residents reach the station on foot or bicycle. Photo courtesy of the Regional Transportation District.

The MPO responded to a need in the region for quality planning in priority growth areas. The UC/STAMP Program has provided funding to smaller municipalities that very likely would not have had the resources to establish neither a vision nor a plan for informed growth around their transit stations or urban centers. While larger cities like Denver certainly benefit from UC/STAMP, crucial assistance from the program supports smaller jurisdictions that lack these critical financial resources. Following UC/STAMP studies, many cities in the region — such as Denver, Westminster, Aurora, and Lakewood — have invested their own dollars to improve pedestrian and bicycle connectivity to transit stations. These cities made their stations more accessible with bicycle lanes, multi-use paths, and/or sidewalks.

For example, with county and state partners, the City of Westminster invested $5 million for pedestrian and bicycle infrastructure on new roads leading to a new station.[6] Municipal, federal, and private developer dollars also funded bicycle and pedestrian connections to Alto, a new multi-family Adams County Housing Authority development. In addition, the City improved the Little Dry Creek multi-use path to help nearby residents of Westminster neighborhoods get to the station on foot or bicycle.

Denver made improvements at the 38th and Blake Station in Denver's Five Points neighborhood that provide safer and more convenient access to transit on foot and bicycle. The City of Denver transformed Blake Street into a two-way street, added bicycle lanes, built a pedestrian bridge, and built or repaired sidewalks on nearby streets.

Officials in the City of Aurora invested about $27 million to connect their seven R Line stations to the surrounding multi-use path network with pedestrian and multi-use paths.

6 The city also invested much more in other improvements around the station before the start of commuter rail service in July 2016.

LESSONS LEARNED

DRCOG shares the following advice:

1 **Prioritize improvements identified in a station area or urban center plan for an MPO's TIP funding.**
Local and regional agencies should strive to link the recommendations derived from planning studies to projects that are adopted into the TIP. Prioritizing projects in a plan with dedicated funding or effective project selection criteria help ensure that these plans do not just sit on a shelf.

2 **Collect better data, make informed decisions, and communicate your successes.**
Improved collection and use of data are essential for underserved communities. In cities, suburbs, and rural areas across the country, neighborhoods with a higher rate of people of color or people with a low income often have less walking and bicycling infrastructure compared with wealthier neighborhoods. Having access to local data that points out this inequity is important for efforts to improve bicycling and walking connectivity. Without these data, advocates face an uphill battle in convincing anyone about where the greatest need lies for better first and last mile connectivity.

In addition, it is imperative to track funding for constructed projects that are the result of first and last mile plans. Advocates, elected officials, and DRCOG and RTD staff cannot make the case for more money for the UC/STAMP Program if decision-makers are unable to determine if recommendations in a plan were implemented.

Finally, expand data collection to encompass not just public works, but also walking and bicycling infrastructure constructed by private developers.

3 **Choose flexible funding sources.**
DRCOG funds UC/STAMPs with funding from the Congestion Mitigation and Air Quality Improvement Program (CMAQ), which requires particular reporting on how walking or bicycling projects help lower regional air pollution levels. Funding programs like the Surface Transportation Block Grant Program (STBG) may offer more flexibility to MPOs.

INVOLVING PUBLIC HEALTH PARTNERS

DRCOG has a vision of becoming a model for healthy, livable communities. Through *Metro Vision* and UC/STAMP, DRCOG addresses various social determinants of health, such as housing and employment, by working to create a connected multimodal network for its region. Additionally, DRCOG measures progress on the implementation of regional strategies of *Metro Vision* with specific indicators, such as, but not limited to:

- Share of the region's total housing units and total employment located in urban centers;
- Share of the region's population living in areas with housing and transportation costs that do not exceed 45 percent of the annual income of the typical household in the region;

- Total number of traffic fatalities;
- Amount of land protected from development; and
- Levels of air pollution and greenhouse gas emissions.

These strategies are also considered when DRCOG staff and the UC/STAMP review committee evaluate project proposals. For example, 60 percent of the study evaluation criteria focus on a proposed study's potential to align with and contribute to the *Metro Vision* plan. Specifically, the review committee identifies how the proposal would foster pedestrian-, bicycle-, and transit-friendly environments, promote regional sustainability, and provide reliable transportation choices for all users.[7] DRCOG staff and partners recognize that these factors are vital to the creation of healthy, livable communities.

Public health organizations are also invited to participate in the development of UC/STAMP studies, as occurred in Thornton, CO. To plan vibrant, transit-oriented neighborhoods around three future RTD stations, the City of Thornton and its partners developed station area master plans. The three stations will be constructed along the FasTracks North Metro Rail Line.

Seeing an opportunity to recommend improvements in the station areas that would improve health, the Tri-County Health Department (TCHD) funded a health impact assessment (HIA) with support from a Communities Putting Prevention to Work grant from the Centers for Disease Control and Prevention. Community Enterprise conducted the HIA.[8] TCHD operates in the counties of Adams, Arapahoe, and Douglas. The department also joined the technical advisory group to help develop master plans for the areas around 88th and 104th Ave. Stations.

Through these efforts, TCHD encouraged greater connectivity between the stations and existing adjacent neighborhoods and commercial areas; more food outlets with healthy food options (especially at 88th Ave.); affordable housing in the station areas; and more neighborhood services and shops. The health department's work helped lead to the adoption of master plans that set communities up to provide these features. For example, the adopted 88th Ave. master plan recommended improved connectivity for people traveling on foot and bicycle and in vehicles. The master plan also encouraged leaders to attract affordable housing, small grocery stores, and community services that would provide opportunities for education, recreation, health care, and activities for youth.[9]

After completion of the station area master planning process, TCHD worked with the Adams County Housing Authority (ACHA) on a project at 104th Ave. and Colorado Blvd. to assess connectivity to the station area. TCHD also examined how ACHA could create smoke-free housing, community gardens, co-location of health services, adequate shade in common areas, and more physical activity opportunities for residents.

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7 https://drcog.org/sites/drcog/files/resources/FY%2016%20Evaluation%20Criteria_1.pdf.

8 Community Enterprise. (2012). "A Health Impact Assessment of the South Thornton Revitalization Subarea Plan: Addressing Healthy Eating and Active Living in South Thornton, Colorado." Available online at: http://www.pewtrusts.org/~/media/assets/2012/04/cityofthornton_finalhiareport4_10_12.pdf.

9 City of Thornton. (2015). "Original Thornton at 88th Station Area Master Plan". Available online at: https://www.cityofthornton.net/government/citydevelopment/planning/Documents/area-plans/88th-avenue-plan/88th%20STAMP%20Full%20Version_Web.pdf.

Photo coutesy of Ben Carver

7 Grassroots community engagement

Mesilla Valley MPO (Las Cruces, NM)

Fostering community perspectives on transportation plans and projects and informing decisions based on those perspectives.

MPOs that facilitate deep public involvement in the planning and funding of transportation projects may benefit from better project design as well as strong buy-in and enthusiasm from community members for decisions made by MPO leaders. The Mesilla Valley MPO of the Las Cruces, NM region worked closely with a community-based nonprofit to bolster public feedback on the MPO's decisions, resulting in active transportation projects that would not otherwise have been funded.

7 - GRASSROOTS COMMUNITY ENGAGEMENT
MESILLA VALLEY MPO (LAS CRUCES, NM)

Engaging underserved communities to focus on building more complete streets

THE BOTTOM LINE

The Mesilla Valley MPO built trust and public interest in its planning process by engaging constituents through a nonprofit with an active presence in the community. With this familiar channel of communication in place, the MPO successfully improved public engagement by building a community-led process for expanding active transportation infrastructure in the Las Cruces metro area.

Las Cruces High School students cross El Paseo Road at Boutz Road during a lunchtime break. Photo by Anayssa Vasquez/Las Cruces Sun-News.

THE CONTEXT

With a population just over 100,000, Las Cruces is the second largest city in New Mexico, which is the second poorest state in the nation. Located just up the Rio Grande from the U.S.–Mexico border, the region is bilingual and has a significant number of working poor. Nearly 25 percent of the population of the city of Las Cruces lives below the poverty level.

Doña Ana County, where Las Cruces is located, includes 36 colonias — unincorporated, unregulated settlements with limited infrastructure. For these colonias, the county is the only form of local government structure. The Mesilla Valley MPO is responsible for transportation planning in Las Cruces, Mesilla, and part of Doña Ana County, and in this capacity also serves half of these colonias.

THE PROBLEM

Though area jurisdictions passed Complete Streets policies all the way back in 2008, few if any Complete Streets projects were being built — even though scores of residents depend on walking or biking as a daily lifeline to get around on incredibly dangerous streets that are ill-suited for anyone not traveling in a car. Both the Mesilla Valley MPO's Transport 2040 long-range transportation plan and Doña Ana County's unified development code (recently passed by the county commission) included and promoted complete streets principles. However, those policies have not led to the construction of safer streets, because, despite the urgency to make the streets radically safer, the public was not deeply engaged in the effort.

This pedestrian would have to walk more than a third of a mile west along W. Picacho Ave., a fairly typical arterial in Las Cruces, to find the next marked crosswalk from this intersection with Alameda Blvd. Imagery from Google Maps

In 2015, the Mesilla Valley MPO undertook an effort to reach new community members in its transportation planning process. By doing so, the MPO hoped to build up a local (and logical) constituency to support the push to build safer, more complete streets to better serve the needs of the area's residents.

WHAT THE MPO DID

To bolster community engagement, MPO staff partnered with the Empowerment Congress, a regional nonprofit representing underserved populations, and a project of the Ocotillo Institute for Social Justice. Ocotillo's mission is to advance quality of life for the people of Doña Ana County by building on individual capabilities and addressing conditions that create root barriers for escaping poverty. The Empowerment Congress seeks to both empower community members and address any barriers to engagement in local public processes.

Ocotillo has been especially influential in engaging the residents of the colonias in the political process. Ocotillo gives these individuals the confidence to come to their commission and be a voice for their community. Through the Empowerment Congress, community members collectively chose public transportation as the first countywide issue to tackle because of how severely it affects health, economic stability, and access to education and civic activities.

To improve community input, the Mesilla Valley MPO built upon Ocotillo's existing efforts, especially in the colonias. This reinvigorated meetings and changed the trajectory of transportation projects during the planning phase to better address community members' priorities. One example is the extension of Missouri Avenue, which currently ends at the edge of town. Because of community pushback and high turnout at public discussions, the project now includes consideration of a bicycle boulevard instead of an extended roadway.

As part of their partnership with the Empowerment Congress, MPO staff attended a Leadership Academy held by the nonprofit and took part in some of their committees. And instead of holding separate meetings, the MPO integrated its outreach into Ocotillo's ongoing schedule of meetings and went to the people, rather than asking the people to come to them. Bringing the MPO's activities to the community in this way boosted attendance at meetings, garnered more productive conversation and feedback, and strengthened the community's relationship with the MPO.

Photo courtesy of the Mesilla Valley MPO.

HOW THE MPO DID IT

In the spring of 2015, MPO staff participated in the Empowerment Congress's Leadership Academy on collaborative leadership and effective engagement of Spanish-speaking residents. This training covered the following useful principles:

Hold public meetings at times when people will be able to attend. If you know that another group is effective at bringing people together, coordinate your meeting with one that is already happening.
Advertise your meeting through multiple means of communication, especially since a lot of people do not have internet access.
Present problems in an open-ended way, without providing options for how the problem may be solved at the outset. This approach allows the public to arrive at the preferred solution, which creates a sense of ownership and builds trust between the people and the government.
Provide professional interpreters for non-English speakers. Having informal volunteers translating for a group in the back corner of the meeting room only further marginalizes that group. Incorporating professional interpretation into the formal presentation promotes inclusion. It is the presenting agency's responsibility to provide these services, not the community's.
Create an environment that encourages the public to talk with you. Avoid using jargon. Ask people questions about their experience and set up the meeting room so people are facing each other rather than sitting in a classroom or in a lecture style set-up where meeting organizers are talking at the public.

Shortly after participating in this academy, the MPO convened a group of 25 community members to listen to one of Smart Growth America's Complete Streets webinars and led a subsequent 30-minute follow-up group discussion.

That same year, Ocotillo changed the name of its Public Transportation Committee and expanded its scope to be the Complete Streets Committee. This committee has worked to demonstrate the importance of investing in a variety of modes of transportation by taking actions such as getting the public to submit letters to the editor and gathering 15 to 30 people to advocate for safer streets at each relevant public hearing.

Ocotillo's Complete Streets Committee and the MPO collaborate closely. The committee has helped the MPO improve communication with communities. With the committee's support, the MPO keeps a contact list of advocates and contacts who can assist with community engagement to improve and inform the MPO's outreach. The list also identifies community leaders in each neighborhood. Having an asset map that identifies the trusted, respected people in the villages, colonias, and neighborhoods who help disseminate information has helped improve the effectiveness and inclusiveness of the MPO's public communications.

KEY PARTNERS

- The Empowerment Congress, a project of the Ocotillo Institute for Social Justice

The Ocotillo Institute for Social Justice is a regional nonprofit representing underserved populations, especially Latinos. Their Empowerment Congress is partnering with the MPO to identify transportation projects — including complete streets projects — that are priorities of community members. The Empowerment Congress and the MPO then organize community members to advocate for their multimodal priorities.

Meetings conducted by the Empowerment Congress, a project of the Ocotillo Institute for Social Justice.

"Cooperation between the Empowerment Congress and the Mesilla Valley MPO over the past few years has resulted in considerable benefits for both groups. The MPO brought important transportation information to the residents of the rural communities in Doña Ana County and the Empowerment Congress brought greater participation to MPO projects. Reaching out to and participating in local community organizations can have a significant impact on the work of MPOs throughout the United States."

– Sharon Thomas, Mayor Pro Tem Emerita, Las Cruces, New Mexico

RESULTS & BENEFITS

As a result of these efforts, the average number of people attending the MPO's meetings increased, and overall, public awareness of the key functions of the MPO in transportation decisions grew. In addition, between May 2013 and January 2014, nearly 200 people participated in the Empowerment Congress's community meetings and committees on transportation issues. Through these forums councilmembers and local elected officials have been able to identify new ways to help the community, spread the word about existing services and collect feedback from their constituents about their transportation challenges and their ideas to address them. Residents have shaped local transportation projects beyond what the MPO expected. For example, when the MPO recently presented the community with options for a new roadway project, the community responded that they did not want a new roadway project at all. Instead the community was interested in a bicycle boulevard, which the MPO determined would only cost $50,000, significantly less than the roadway project.

Another key win was the addition of complete streets principles to Doña Ana County's recently passed Unified Development Code. This win was made possible in part by the engagement of the Empowerment Congress's members and the increased attention on the need for better implementation of the local Complete Streets policy. This amendment has helped the MPO to improve sidewalk and trail access to bus stops that are being installed by a new rural transit service.

One of the community's top goals is for the MPO to utilize Transportation Alternatives Program (TAP) funds to complete a multi-use path around the city. Another goal is to address connectivity gaps for those traveling on foot and bicycle. Understanding these community-defined priorities helps the MPO to focus their efforts in pursuit of this vision. Staff have developed an online tool showing a map of suitable routes for bikes, which can also help people identify more preferable routes where bike paths may not yet exist. Considerable public interest has developed for this project and there are now several committees working on different aspects of the plan.

Meanwhile, the introduction of a transit ballot measure further demonstrates the power of Ocotillo's community engagement. In 2015, a referendum was held to enact a small tax increase to generate additional revenues for the South Central Regional Transit District. While the referendum did not pass, the Empowerment Congress successfully activated community members in a push to bring transit service back after buses stopped running in rural Doña Ana County. After state representatives provided funding for the purchase of four new buses, the Empowerment Congress helped convince the county commission to provide additional funding for the transit service, securing $500,000 in grant funds for the current fiscal year and an anticpated $750,000 in the next fiscal year. This service will connect several communities that did not previously have access to transit. Improved collaboration with the community via the Empowerment Congress helped make this victory possible.

RESULTS & BENEFITS

Las Cruces shares the following advice to other MPOs:

1. **Dialogue starts in the planning process.**
A plan is a discussion. To make sure that a plan does not sit on a shelf but rather continues to be a guide for development, the entire community needs to be involved in the discussion from the beginning.

2. **Advocate for inclusion.**
Partner with organizations that specialize in community engagement to broaden your MPO's outreach. Make sure that you are interacting, connecting, and networking with many different groups within your community. If certain groups of people are not attending meetings or speaking up, consider why. What could you do (or who could you reach out to) to help engage those groups? Also, speak in a manner that is easy to understand when translated.

3. **Make it more grassroots.**
Work to ensure that you are not overseeing a top-down process. Try to recognize trends and movement of where your community is trying to go and then go along with that natural flow.

8 Understanding the public health impacts of transportation behaviors

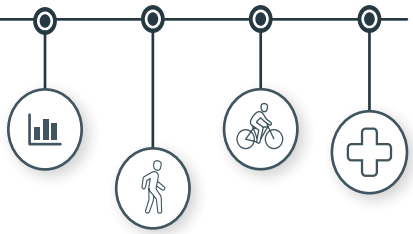
The Integrated Transportation and Health Impact Model (ITHIM)
The Nashville Area MPO (Nashville, TN), with additional examples from the Metropolitan Transportation Commission (Bay Area, CA) and Metro (Portland, OR)

Conveying how walking and bicycling from place to place lowers chronic diseases and respiratory conditions.

Not everyone is convinced that public health is an important consideration when deciding which transportation projects to fund. Innovations in data collection and modeling have given transportation and public health professionals information that conveys changes in specific diseases that could be expected if people walked or bicycled more for transportation. Specifically, the Integrated Transportation and Health Impact Model (ITHIM) is used to predict decreases in twelve classes of chronic diseases and respiratory conditions for a specific population if the average person increased their minutes spent walking or bicycling for transportation. Several MPOs — such as those from the regions of Nashville, the Bay Area, and Portland, OR — are using ITHIM to help policymakers understand the public health impacts of transportation investments when deciding which transportation projects to fund.

8 - UNDERSTANDING THE HEALTH IMPACTS OF TRANSPORTATION BEHAVIORS

NASHVILLE AREA MPO (NASHVILLE, TN)



Conveying the public health and financial impacts of bicycling and walking for transportation

THE BOTTOM LINE

Finding ways to quantify and convey the health benefits of active transportation to decision makers who guide transportation funding can be challenging. Several metropolitan planning organizations (MPOs) have begun to solve that problem by using the Integrated Transportation and Health Impact Model (ITHIM). With this tool, transportation and health modelers can predict decreases of twelve chronic and respiratory diseases based on hypothetical increases in active transportation rates and reductions in air pollution levels. Several MPOs, policymakers, and advocates are using ITHIM to make a compelling case for investing in projects that make bicycling or walking safer and more convenient. For example, the Nashville Area MPO adopted a regional transportation plan that added walking and/or bicycling components to 77 percent of funded roadway projects — using results from ITHIM to make the case for increased funding for active transportation projects. And in two less-detailed examples, The Metropolitan Transportation Commission in the San Francisco Bay Area used ITHIM to help convince the MPO's board to adopt a goal to increase active transportation by 10 percent, and Metro in the Portland, OR area used ITHIM to help implement strategies that would reduce per capita greenhouse gas emissions by 29 percent.

Bicyclists in the Sylvan Park neighborhood of Nashville.

THE CONTEXT

Chronic and respiratory diseases have been ravaging communities of color and people with a low income across the country; populations in the South experience greater rates of chronic disease compared with people living in other places in the U.S. Hundreds of thousands of residents of Middle Tennessee — the region around the geographic and economic center of the City of Nashville — rarely get any physical activity, have limited access to healthy foods, and experience high rates of chronic diseases. To help combat many of these growing health issues, transportation planners and elected officials in Middle Tennessee have created policies that direct more federal transportation dollars toward projects that support walking, bicycling, and public transportation as a means to improve health.

The residents of Middle Tennessee are eager for more sidewalks, bike lanes, and transit options. While some communities across the region are building more infrastructure to help people safely get around on foot or bicycle, they are not doing so fast enough to meet the demand. Only 15 percent of collector or arterial roadways in the MPO's seven-county region have sidewalks, and only 13 percent have bike lanes.[1,2]

Many elected officials on the Nashville Area MPO's Transportation Policy Board have responded to this demand by pursuing funding for such multimodal projects. At the same time, MPO staff have recommended policies that would advance projects aimed to fill in the gaps to create a multi-modal transportation network.

However an enormous amount of funding is needed to retrofit the region's streets with walking and bicycling facilities. In the city of Nashville alone, $591 million would be required to build out the active transportation network detailed in its recently completed bicycling and walking master plan. At current funding levels, it would take 17.5 years to build out the city's priority sidewalk network if the city continued to allocate $30 million per year in its annual budget to build sidewalks. It would take eight years to build a priority low-stress biking network if Metro Nashville continued to allocate $5 million/year for bike lanes. [3]

THE PROBLEM

While the MPO, local advocates, and a few elected officials understood the relationship between active transportation and chronic disease, most state and local elected officials did not believe that building more sidewalks, bike lanes, and transit corridors would be an effective strategy to improve the health status of area residents. Many transportation decision-makers assumed that a person's unhealthy diet or lack of exercise led to her heart disease or diabetes. Many saw no connection between transportation, chronic diseases, and the health disparities among particular socioeconomic groups — or did not think it was the role of transportation projects to help close those gaps. Culture change, especially in a sprawling Southern region where 96 percent of residents commute by driving, required a paradigm shift in the way choices were made about transportation.[4]

1 Data are on roadways that are functionally-classified as arterials or collectors, not including interstates or controlled access facilities that prohibit pedestrian or bicycle use.

2 http://www.nashvillempo.org/docs/bikeped/BicycleAndPedestrianLOS_TechMemoDraft012715.pdf.

3 http://nashvillewalknbike.com/draft-walknbike- plan/.

4 U.S. Census Bureau 2015 American Community Survey 5-Year Estimates for the 7 MPO Counties. 96% of Nashville Area MPO residents commute by car, truck, or van.

The MPO has provided leadership at the regional level to help address these issues. From prioritizing transportation projects that provide walking and bicycling facilities (described in the accompanying profile) to communicating the benefits of active transportation investments, the MPO has accelerated funding for multimodal projects since adopting the agency's landmark long-range transportation plan in 2010.

Despite recent successes in Middle Tennessee, a tremendous amount of work remains to create a complete, safe, walking, and bicycling network. Several jurisdictions in the MPO's seven-county region have begun to create thriving town centers and improve the conditions for people walking or bicycling, but the region overall lacks walkable places, basic connective sidewalk infrastructure, and a wide range of transportation options. How could active transportation advocates make it clearer that investing in this kind of infrastructure could improve the health of the region's residents and save them, their employers, and health care companies money? Advocates, including people concerned about public health outcomes, needed ways to clearly articulate the public health implications of the transportation projects funded by their mayors with the MPO's federal transportation dollars.

To help make the case for the health benefits of walking and bicycling for transportation, the MPO used the Integrated Transportation Health Impact Model (ITHIM).

WHAT THE MPO DID

ITHIM is an Excel or R-based tool that predicts changes in a population's burden of twelve chronic diseases and classes of respiratory conditions, fatalities or serious injuries from crashes, and greenhouse gas emissions resulting from changes in transportation behaviors. The twelve diseases — those with proven associations with a population's active transportation rates and a region's air pollution levels — are:

- Cardiovascular diseases
  - Hypertensive heart disease
  - Ischemic heart disease
  - Inflammatory heart disease
  - Cerebrovascular disease
- Cancers
  - Breast
  - Colorectal
  - Lung
- Dementias (including Alzheimer's)
- Depression (unipolar depressive disorders)
- Classes of respiratory conditions
  - Acute respiratory infections (among children only)
  - Other respiratory diseases (including chronic obstructive pulmonary disease and asthma)

Moderate	Δ Disease Burden	Δ DALYs / Year
Cardiovascular Diseases	-4.0% ↓	1639.3
Diabetes	-3.9% ↓	434.2
Depression	-1.4% ↓	236.1
Dementia	-1.7% ↓	394.4
Breast Cancer	-1.4% ↓	61.7
Colon Cancer	-1.3% ↓	45.3
Total	-0.9% ↓	3004.4

The MPO calculated potential reductions in 12 chronic diseases and respiratory conditions among its population assuming a hypothetical increase in the minutes the average person would spend walking and bicycling for transportation. The changes shown in the above figure were estimated in a scenario that assumed that the average person would walk for 82 minutes and bicycle for 12 minutes per week for transportation.

ITHIM is the most comprehensive and robust peer-reviewed model that yields evidence-based predictions of the public health impacts of projected transportation behaviors in metropolitan regions. Regional agencies, state offices, and academic professionals have used ITHIM to help tell the story of why bicycling and walking from place to place is so important to keep people in good health, curb global climate change, and save people and their employers money. The scenarios that ITHIM is able to analyze range from increased minutes spent walking to destinations to fewer vehicle miles traveled (VMT) by commuters. The Nashville Area MPO used ITHIM to predict reductions in the burden of these chronic diseases and respiratory afflictions that could be expected based on theoretical increases in minutes spent walking or bicycling for transportation and decreases in vehicle miles traveled (VMT).

HOW THE MPO DID IT

The MPO wanted to use ITHIM but knew that running the model in-house would require more staff time and expertise than staff possessed, so they sought external assistance. Staff from the CDC agreed to help run the model. They assigned a post-doctoral fellow with expertise in epidemiology and physical activity to implement ITHIM for the MPO. Calibration of the model and scenario development required approximately one year of half-time work to analyze and manually input data into ITHIM's complex series of spreadsheets.

To run ITHIM, staff first gathered required calibration data from a variety of sources. Many items were available from the MPO's most recent household travel survey, the "Middle Tennessee Transportation and Health Study" (MTTHS). The MTTHS collected travel information from approximately 6,000 households. Additionally, six questions related to health status, physical inactivity, nutrition, height, and weight were asked. In addition to getting data from the MTTHS, data were gathered from state agencies, the U.S. Census, and the CDC. Once all calibration data were analyzed and formatted, the team could run several scenarios in ITHIM to evaluate potential increases in active transportation.

The MPO and CDC continued to run ITHIM to derive the public health impacts from various scenarios. For example, the MPO ran a scenario developed by a team in Oregon to test the impacts of people moving closer to their jobs or other destinations, which would make it easier to walk or ride a bicycle from place to place. The MPO also ran a model that assumed the average person would telecommute one day per week, which would significantly reduce VMT throughout the region — a scenario that predicted no changes in fatalities among bicyclists or pedestrians hit by a vehicle, compared with baseline data.

More information about ITHIM is available on the MPO's website, including a research paper by Geoffrey Whitfield, et al. in the Journal of Transport and Health.[5]

5 Whitfield, Geoffrey P., et al. (2017)."The integrated transport and health impact modeling tool in Nashville, Tennessee, USA: Implementation steps and lessons learned." Journal of Transport & Health, Volume 5, 172-181.

TIMELINE

25 November 2009: After conceptualizing ITHIM and inventing the model, James Woodcock et al. published, "Public health benefits of strategies to reduce greenhouse-gas emissions: urban land transport," which detailed the use of ITHIM. This paper excited public health and transportation professionals across the globe.
2012: The MPO conducted the "Middle Tennessee Transportation and Health Study", which yielded data on current physical activity rates necessary to run ITHIM.
14 February 2013: Neil Maizlish et al. published, "Health Cobenefits and Transportation-Related Reductions in Greenhouse Gas Emissions in the San Francisco Bay Area," sharing results from the first application of ITHIM in the United States.
2014-2016: The MPO partnered with Geoffrey Whitfield and other staff at the CDC to gather data and run ITHIM, yielding projections of expected changes in the burden of disease among Middle Tennessee residents.
June 2017: Geoffrey Whitfield et al. published, "The integrated transport and health impact modeling tool in Nashville, Tennessee, USA: Implementation steps and lessons learned," detailing the use and results of ITHIM in Middle Tennessee.

KEY PARTNERS

The MPO worked with several people to collect necessary data and run ITHIM for the region. Organizations that helped design MTTHS in 2012 included:

- The Centers for Disease Control and Prevention ;
- University of North Carolina at Chapel Hill;
- Westat/Geostats, a research company with experience on geospatial mobility and physical activity data; and
- The Metropolitan Health Department of Nashville/Davidson County.

Expertise and staff time from the CDC also enabled MPO to run ITHIM for the Middle Tennessee region. MPO and CDC staff also worked with the following agencies to collect data needed to run ITHIM:

- Tennessee Department of Health (DOH): MPO and CDC staff obtained mortality statistics from the Tennessee DOH. MPOs should partner with their state health department's chronic disease division to secure these necessary data.
- Tennessee Department of Safety: MPO and CDC staff obtained data on traffic crashes, fatalities, and injuries from this agency. MPOs should partner with a law enforcement office or state safety agency to obtain crash data. These data need to include information on the type of crash (e.g., pedestrian hit by vehicle), type of roadway where each crash occurred, and the modes of travel involved.
- Tennessee Department of Environment and Conservation: This agency provided data on emissions of particulate matter with fine inhalable particles (PM2.5) attributable to light-duty vehicles.
- U.S. Census Bureau: The distribution of the population by age and gender was obtained from the U.S. Census.

Dr. James Woodcock invented the model, releasing results for the first time in 2009.[6]

Dr. Neil Maizlish first implemented ITHIM in the United States for use by the Metropolitan Transportation Commission (MTC), the MPO of the San Francisco Bay Area.[7]

BARRIERS ALONG THE WAY

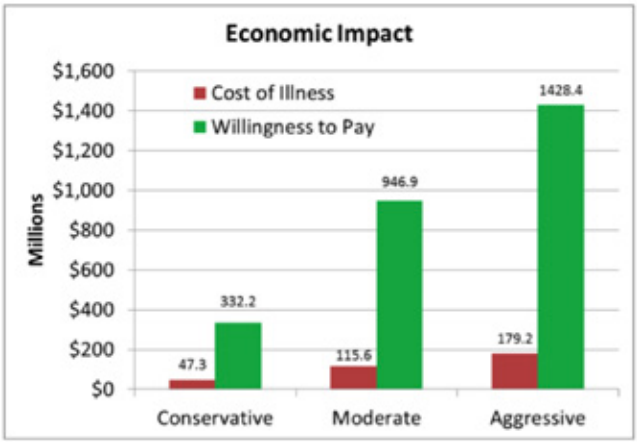
As mentioned above, MPO staff lacked time and expertise to run ITHIM. They partnered with professionals at the CDC to run ITHIM by manually inputting data into the model's spreadsheets.

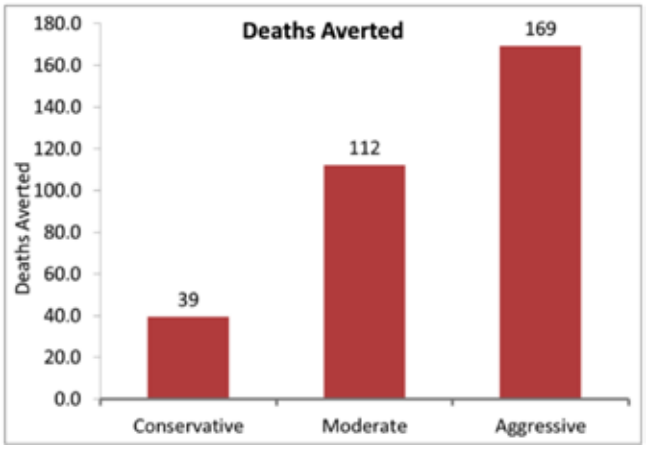
Getting the data from the state agencies listed above took longer than expected. MPO staff recommend giving state agencies ample time to collect and deliver data that are requested of them.

RESULTS AND BENEFITS

Using ITHIM has allowed leaders and advocates in Middle Tennessee to strengthen the case for creating healthier, more equitable communities by providing safe, easy ways for all people to walk or bicycle from place to place. The Nashville Area MPO has strengthened contact with their peer MPOs and together advanced conversations, plans, and policies to address health and transportation.

The MPO's use of ITHIM supplies residents of Middle Tennessee with compelling data to make the case to invest in bicycling and walking pathways. No longer do advocates need to rely on abstract health impacts of increased active transportation. Leaders now have a reliable model that shows how up to 123 lives could potentially be saved per year due to a five percent decrease in selected chronic diseases if the average Middle Tennessee resident walked or rode a bike to get where they are going for 22 minutes a day.





6 Woodcock, James et al. (2009). "Public health benefits of strategies to reduce greenhouse-gas emissions: urban land transport." *The Lancet*, Volume 374, Issue 9705, 1930 – 1943. Available at: http://dx.doi.org/10.1016/S0140-6736(09)61714-1.

7 Maizlish, N., Woodcock, J., Co, S., Ostro, B., Fanai, A., & Fairley, D. (2013). "Health Cobenefits and Transportation-Related Reductions in Greenhouse Gas Emissions in the San Francisco Bay Area." American Journal of Public Health, 103(4), 703–709. Available at: http://doi.org/10.2105/AJPH.2012.300939.

LESSONS LEARNED

The Nashville Area MPO shares the following advice:

1. **Position staff and partners for success when collecting and using data.**
Provide proper training for MPO staff and external partners to either collect or provide necessary data and to effectively run ITHIM. An MPO staff member who is familiar enough with ITHIM to format your agency's travel model is an asset when linking ITHIM to a travel model, which could increase the usefulness of the tool for transportation planners and decision-makers.

2. **It is important to do a sensitivity analysis to avoid miscalculations from errors.**
For example, staff manually inputted data into ITHIM, which made each run vulnerable to human error. Sensitivity analyses may prevent erroneous predictions.

3. **Ensure that any study your MPO conducts will yield valuable results.**
MTTHS cost about $1.5 million and generated useful data; however, the census data used as a proxy were nearly identical. The lesson for other regions is that there are methods to collect and use data without doing an expensive independent study.

4. **ITHIM does not model changes in the built environment.**
The model is only capable of predicting the number of traffic crashes, fatalities, and injuries that would occur with today's transportation infrastructure. For example, traffic crashes would be expected to increase significantly if many more people started walking or bicycling on the region's numerous miles of roads that lack sidewalks, crosswalks, bike lanes, and other features that keep travelers safe.

5. **Couple ITHIM with an activity-based model and land use/scenario planning tool.**
This will allow your region to evaluate the transportation impacts of specific transportation policies and land use regulations. There are many planning tools to choose from; MPOs should choose the technology that meets their forecasting needs within their budgets.

"Providing safe, off-road sidewalks and bicycle lanes for my constituents will improve connectivity to jobs, shops, and other places we need to go. More people will also enjoy the health benefits from physical activity during their regular routines."

- Heidi Campbell, Mayor, Oak Hill, TN

THE FUTURE OF ITHIM

Researchers at the Global Health Institute at the University of Wisconsin-Madison are working with the University of Cambridge and others to adapt and improve ITHIM by:

- Making model runs more efficient by allowing any ITHIM user to have access to widely available statistics (e.g., on non-transportation physical activity and traffic fatalities and injuries) rather than localized data. This will help overcome capacity issues for many MPOs as it will eliminate a laborious search for some unique datasets from different sources;
- Releasing an R version of ITHIM, which will a) provide computational power and increase model run speed, b) ensure that data in all of the cells are populated consistently, c) improve documentation, and d) generate clearer predictions of changes in health outcomes and savings; and
- Making the model simpler to use at the county and city levels.

INVOLVING PUBLIC HEALTH PARTNERS

Recognizing the need to facilitate an increase in physical activity among people in its region, the Nashville Area MPO has strived to fund safe, multimodal transportation infrastructure. The MPO has been a leader in incorporating public health measures in its work, from conducting a transportation and health study in 2012 to integrating public health considerations in its transportation planning. To run ITHIM, the MPO worked closely with staff from health agencies such as the CDC and the TN Department of Health. Its partnership with these organizations allowed MPO staff and stakeholders to make the case for funding transportation projects that would promote walking and bicycling through plans like its most recent RTP, *Middle Tennessee Connected*.

> *"Information on the potential public health benefits of walking and bicycling more for transportation is powerful. ITHIM provided the first quantitative methodology to analyze and monetize the impacts of transportation on the health of a population. This tool is useful to help decision-makers understand how people can lead healthier lives if afforded the ability to walk or bicycle more from place to place."*
>
> *- Leslie Meehan, Director of Primary Prevention, Tennessee Department of Health*

SUPPLEMENT: ITHIM IN THE SAN FRANCISCO BAY AREA

California's Senate Bill (SB) 375 mandated coordinated transportation and land use planning to establish performance targets to reduce vehicle miles traveled in cars and light trucks and associated greenhouse gases (GHG) in metropolitan areas, among other requirements. With this legislation, critical funding came for advanced technology (activity-based models) that allowed MPOs to evaluate more sophisticated transportation and land use scenarios.

Advocates and MPO staff in regions like the Bay Area, San Diego, and Sacramento recognized the opportunity presented by SB 375 to expand the impacts of the state legislation from climate change to public health and social equity. Human Impact Partners, a nonprofit in the Bay Area, led a coalition of organizations to create thirteen public health and social equity performance measures for consideration by MPOs in California, including the Metropolitan Transportation Commission (MTC) and the San Diego Association of Governments (SANDAG).

Coupled with the efforts of expert staff and progressive board members, advocates propelled this list of performance measures from ideas to policy. In its latest RTP update, adopted on July 26, 2017, MTC established thirteen performance targets — and a subset of six equity measures — to identify and fund the most beneficial transportation projects for the region. One of the equity measures is "Healthy and Safe Communities." MTC used ITHIM to estimate the health impacts of proposed transportation projects that would cost more than $70 million.

Even with ITHIM, MTC has struggled with an activity-based model that does not accurately predict mode shifts from driving to walking or bicycling trips. This is because of a similar conundrum that other regions across the country experience: while individual neighborhoods or jurisdictions may be making strides in building bicycle and pedestrian projects relatively quickly, the region as a whole is far behind. Jurisdictions would need to build bicycle and pedestrian infrastructure at an exponential rate to make significant impacts at the regional scale on

SUPPLEMENT: ITHIM IN THE PORTLAND, OR REGION

traffic volume, public health outcomes, access to essential destinations, and more.
In 2009 and 2010, the Oregon Legislature passed its own version of California's groundbreaking law. Not the first (nor the last) bill to be signed into law in Oregon to address rising greenhouse gases, House Bill 2001 (passed in 2009) and Senate Bill 1059 (passed in 2010) focused on the reduction of emissions from the transportation sector. These bills required the development and implementation of strategies to reduce per capita greenhouse gas emissions from cars and small trucks by 2035 and the development of a statewide transportation strategy to reduce greenhouse gases, among other requirements. Since transportation is inextricably linked with land use, the bill also directs these agencies to evaluate the impact that land-use decisions have on greenhouse gas emissions generated from resulting transportation patterns.

As mandated by this legislation, the MPO for the Portland region, Metro, evaluated options to reduce greenhouse gases in its region in order to adopt a Climate Smart Strategy. The Oregon Health Authority (OHA)

used ITHIM to assess how various scenarios would increase physical activity rates, reduce chronic disease rates, reduce air pollution, and decrease traffic collisions. Using ITHIM, OHA concluded that by 2035 the "Draft Approach" (the strategy that policymakers issued for study and public comment during the summer and fall of 2014) would lead to the prevention of 126 premature deaths and a reduction of chronic disease prevalence by 1.6 percent every year. Furthermore, this approach could reduce spending on treating these chronic diseases by 2.1 percent by 2035 (compared with 2010 prevalence), which would amount to $100-$125 million in health care cost savings across the region every year. The Metro Council adopted the recommended strategy — a modified version of the "Draft Approach" based on public comment — in December 2014.

Public health arguments, strengthened by results from ITHIM, were instrumental in persuading many of the policymakers who voted to adopt a strategy that would increase bicycling and walking rates, decrease disease prevalence and deaths, and cut costs across the region. Many elected officials supported the use of ITHIM for the Climate Smart Strategy because they sought to better understand the impacts that their transportation decisions would have on public health outcomes and costs, especially to employers who pay for a significant portion of health insurance and their employees' sick days. OHA prudently led the messaging: communities in the region should invest more in bicycling and walking projects because they would help save businesses and people money and protect lives.

People enjoy the Open Streets Nashville 2016 festival in the Gulch neighborhood. Photo by Rochelle Carpenter, T4America.