STATEWIDE TRANSPORTATION DEMAND MANAGEMENT (TDM) STRATEGIC PLAN UPDATE

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NORTH CAROLINA
Department of Transportation



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MISSION STATEMENT

To provide citizens of North Carolina opportunities and strategies for improving sustainable economic growth and quality of life through reduced transportation congestion, expanded mobility options, improved air quality and more efficient use of resources.

VISION

Effectively measure and communicate the benefits of alternatives to driving-alone in communities across North Carolina.

GOALS

Achieve improved accessibility, connectivity, economic growth, environment, public health and safety through enhanced performance of transportation demand management service provisions.

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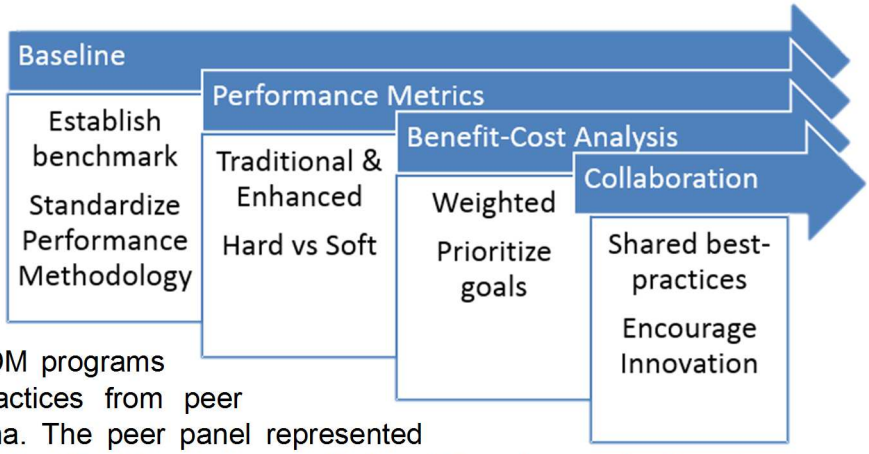
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HISTORY

The North Carolina Department of Transportation (NCDOT) and Gresham, Smith and Partners (GS&P) completed an update of the statewide Transportation Demand Management (TDM) Plan and program of work in 2017 and suggested improvements to the existing state program efforts. GS&P, NCDOT and the TDM Peer Panel that assisted in the study utilized the plan update to encourage performance-based innovation, continue the momentum from current program work, and move from baseline to achievement.

As part of the statewide TDM plan update, NCDOT further supported the state's TDM programs by bringing them into concurrence with the overall strategic focus of the Public Transportation Division (PTD). The strategic planning and development process for the NCDOT PTD Statewide Strategic Plan was aligned with the TDM Statewide Plan Update, including integration of best practices for various agencies across the state.

In addition to aligning plan mission and goals, the statewide TDM plan update included recommendations for enhanced performance metrics to better communicate the impacts of TDM service provisions and reinvigorate program work towards a more results-oriented framework for NCDOT and community leaders.



The initial phase of work included a visioning session completed in partnership with the peer panel to outline the concept of traditional and enhanced benefits of TDM service provisions and gather feedback from service providers from across the state. This was an opportunity to inventory current TDM programs in the state along with best practices from peer programs outside of North Carolina. The peer panel represented three primary areas of emphasis for local TDM programs, including: (1) environment, (2) region-based governmental collaboration, and (3) technology. The visioning session asked service providers to consider auxiliary benefits of their program work in these areas in additional to reducing the growth of vehicle miles traveled (VMT) to reduce congestion and improve air quality.

The second phase of work involved a fact-finding effort in partnership with the WSP consulting team. GS&P and WSP conducted in-person interviews with existing TDM service providers and associated stakeholders in the greater Asheville, Charlotte, Piedmont-Triad, Triangle and Wilmington areas. This included a scan of TDM strategies currently implemented by TDM programs. Program managers and staff were asked to define critical components, major successes and other key elements of their programs. The interviews requested participants to define accomplishments in addition to VMT reductions as the traditional performance metric reported to NCDOT.

Once initial interviews were completed, preliminary ideas for an analysis of strengths, weaknesses, opportunities, and threats (SWOT) were developed. Results of the TDM strategies

scan were also compiled to better understand what gaps may exist in service delivery and what additional opportunities may be available for improved performance across the variety of individual program types operating in the state.

Regional Success Plans were then developed for the greater Asheville, Charlotte, Piedmont-Triad, Triangle and Wilmington areas and reviewed with NCDOT and programs in each region. The Regional Success Plans were designed to summarize TDM activities currently funded by NCDOT in each region and as described by program managers during the initial round of interviews. The regional plans also outlined results of the SWOT analysis and TDM strategies scan, providing a compare/contrast study of the various programs. This was an essential step in the developing the plan update as each program is operating within differing financial, organizational and performance reporting structures. It also provided a unique opportunity for programs to learn about each other including what challenges and opportunities were shared.

CONTEXT

Partnerships between the NCDOT and local governments, regional authorities and other state agencies have been the source of North Carolina's transit success. As evidence of these partnerships, TDM programs have been operating for over a decade, utilizing guidance from the 2003 Statewide TDM Plan.

TDM programs in North Carolina have applied several successful strategies to encourage the use of alternatives to driving alone in communities across the state. Program activities have increased the efficiency of the transportation system by focusing on travel demand instead of supply. They have worked to modify travel behaviors and effectively addressed a variety of transportation issues while providing economic, social and environmental benefits. Continued success will require improved coordination of services and further emphasis on communicating the multiple benefits of alternatives to the single-occupancy vehicle commute.

In 1999, the Ambient Air Quality Improvement Act (Senate Bill 953) targeted a 25 percent reduction in the growth of commuter VMT by July 1, 2009. North Carolina surpassed this goal by reducing the growth of commuter VMT by 25.2 percent. To make this accomplishment possible, the PTD expanded its TDM program. In 2004, NCDOT initiated funding to local TDM programs, awarding 50 percent of their administrative costs.

TDM programs have undertaken several activities to reduce VMT, including holding commuter challenges, creating programs enabling employees of certain organizations to ride public transit for free or at a reduced rate and providing information to commuters about alternative commuting. These programs also promote North Carolina's rideshare matching program, ShareTheRideNC, a web-based platform that allows commuters to identify potential carpool partners and open vanpool seats.

According to complete 2016 figures, the projected growth of commuter VMT has been reduced by 27.8 percent (see Figure 1). This reduction in growth is calculated annually based on commuter trips via public transit, light rail, vanpools, and carpools.

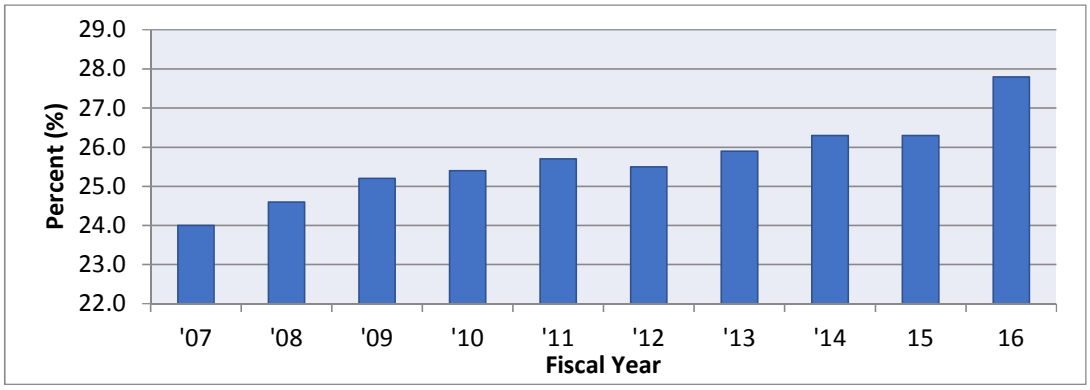


Figure 1. Percent Statewide Reduction in VMT

From 2000 to 2016, with commuters using carpools, vanpools and transit, daily commuter VMT increased to 28.19 million. If commuter trips had not been accommodated using alternative modes of transportation, daily commuter VMT during this time frame would have increased by 35.59

million. This represents a 26.1 percent reduction in projected growth of commuter VMT. This report period saw an increase in the amount of carpool and vanpool participation across the state, providing further proof that TDM measures are successfully lowering VMT.

ASHEVILLE

The economic downturn of the late 2000s resulted in the suspension of a preexisting regional TDM program. That previous program, which was led by the City of Ashville, has been inactive since around 2010. Some TDM-related services have remained in operation for many years, but reestablishment of coordinated TDM services has only just begun. A 2013 study by the French River Metropolitan Planning Organization (MPO) resulted in a TDM plan for the region. The plan recommended that, in the short term, a regional TDM program be housed within the Land of Sky Regional Council (Land of Sky) because the council possesses the ability to "respond to different geographic markets."

Leadership

TDM leadership in the region is provided by the TDM coordinator through the regional MPO, Land of Sky, and regional TDM initiatives are starting to coalesce around this leadership position. The TDM coordinator has spoken to private employers, community groups such as rotary clubs, agency-level transportation committees, and similar groups over the past year and has made several connections with employers and other potential regional partners. Furthermore, the TDM coordinator has offered advising services to several area companies regarding TDM supportive site development, but those services have yet to be utilized. Due to the coordinator's position as part of the regional MPO, the TDM coordinator has been increasingly involved with regional planning activities and has provided input in support of longer-term TDM program deployment. The coordinator spends time each day on messaging and outreach for TDM-related events such as the *Strive Not to Drive Program*, and programs such as *Go Mountain*.

Budget / Funding

Land of Sky supports the TDM coordinator full time through a grant provided by NCDOT-PTD. A small portion of the coordinators' time is also covered via funding from the region's local Congestion Mitigation and Air Quality Improvement (CMAQ) program. In the initial year of work, the TDM coordinator has gained additional familiarity with funding cycles. When opportunities like Job Access Reverse Commute (JARC) Grant funding become available in the future, staff will be ready to respond.

Agencies

Agencies in the Asheville region with either an active or potential role in TDM initiatives include the following:

- **City of Asheville –** The City of Asheville has administered TDM services in the past, including the *Passport Program*, the *Way to Go! Commuter Club*, and an emergency ride home program.
- **French Broad River MPO** – The French Broad River MPO (FBRMPO) represents a partnership between local and state governments to facilitate transportation planning in urbanized areas and meet federal planning requirements for transportation funding.

Local governments belonging to the FBRMPO are Buncombe, Haywood, Henderson and Madison Counties; and the municipalities of Asheville, Biltmore Forest, Black Mountain, Canton, Clyde, Flat Rock, Fletcher, Hendersonville, Laurel Park, Maggie Valley, Mars Hill, Mills River, Montreat, Waynesville, Weaverville, and Woodfin. A study by the FBRMPO resulted in recommendations for the placement of a regional TDM program within the Land of Sky Regional Council. FBRMPO is responsible for the region's Congestion Management Process (CMP).

- **Land of Sky Regional Council** – The Land of Sky Land of Sky is a multi-county, local government planning and development organization. It includes 19 local governments in Madison, Buncombe, Henderson and Transylvania Counties with a total population of almost 320,000. Land of Sky's Transportation Resource Center administers the Mountain Mobility and Non-Emergency Medicaid Transportation (NEMT) services for Buncombe County. Land of Sky also provides transportation planning for five local governments in Haywood County. Land of Sky is the lead planning agency for the Land of Sky Rural Planning Organization (RPO) and the FBRMPO. Therefore, it has primary responsibility for preparing the Rural Planning Work Program (PWP) and Urban Area PWP, and the development of the Metropolitan Transportation Improvement Program (MTIP). Land of Sky is the primary local recipient of state and federal transportation planning funds. The 2013 Long Range TDM Plan identified Land of Sky as the optimal agency for managing a regional TDM. The agency currently houses the regional TDM program coordinator.
- **Transit Providers** – Numerous transit providers are present in the region, but none appears to offer TDM-related services such as vanpooling. However, transit providers would likely be an integral component of future regional TDM initiatives. Asheville Redefines Transit (ART) and Apple Country Transit both provide regional service, but there are still underserved regions. Smaller, and in some cases on-demand-based systems, include Madison County Transportation Authority, Transylvania County Transportation System, and Haywood Public Transit. Mountain Mobility is the public transportation system for Buncombe County and provides services to the clients of human services agencies, departments of local governments, and the public. Services are managed by the Land of Sky Regional Council through a service contract with Buncombe County.

Current State

The Asheville TDM Program has great opportunities for accelerated success by enhancing performance through innovative strategies. The TDM coordinator being within the Land of Sky Regional Council offers efficiencies in coordinating with multiple stakeholders including the FBRMPO. The regional aspect of service delivery will be critical, including how rural communities are connected to multi-modal opportunities. Integrating TDM strategies into the transportation planning process at the FBRMPO will formalize a mechanism for coordinating service delivery across communities in the region through informed decision making.

Targeted TDM strategies for key stakeholders, most notably tourism and mountain resort communities, can be driven by the need for improving accessibility for employees. Transit-based programs created for this target audience through collaboration with cities and towns could offer

incentives for users. Retirement communities could see success in targeted TDM services based on similar needs.

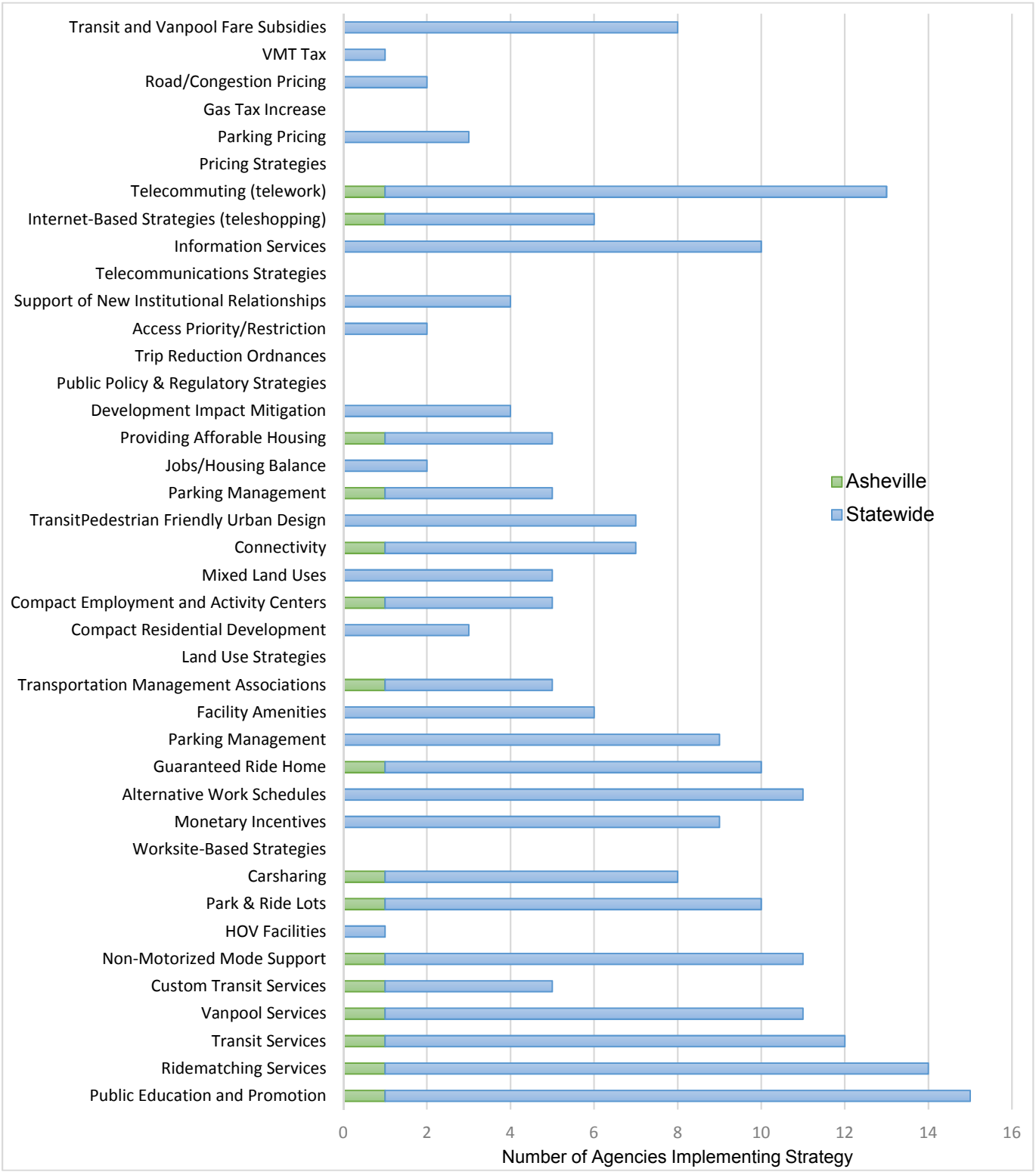


Figure 2. TDM Strategies Currently Being Implemented in Asheville

CHARLOTTE

With the largest population in North Carolina and the most significant congestion issues, the Charlotte metropolitan region could benefit the most from TDM strategies that manage congestion without the need for additional infrastructure investment. Certain strategies are already being utilized, but they are not managed as part of a regionally coordinated and focused initiative. Agencies responsible for regional planning are cognizant of the need to implement TDM as part of a comprehensive and collective vision for regional mobility and have taken steps to integrate TDM in future regional plans. However, these efforts have only recently been initiated, and regional planning appears to focus heavily on infrastructure development and land use. NCDOT might assist the region by providing funding and technical support for establishing dedicated staff at relevant regional agencies who can focus on actively pursuing TDM development and implementation in concert with regional planning and infrastructure development initiatives.

No comprehensive regional TDM program is in place for the region. Various TDM strategies are currently managed by various agencies in the region, most notably the metropolitan transit agency. However, The CONNECT Our Future Consortium, composed of 83 jurisdictions and organizations in North Carolina and 10 in South Carolina, was recently formed to "create a framework for guiding and investing" in the Charlotte region's growth. An overall objective of this consortium is to coordinate long-range planning and development in the region through a unified vision for future growth. In early 2014, several "Alternative Growth Scenarios" were developed based on the results of community workshops and submitted to the public for feedback. A preferred scenario was selected, and recommendations and strategies were developed to help the region achieve its goals. One of the tools recommended for achieving the region's preferred development vision is TDM. Therefore, it is likely that TDM services and programs will, in the long run, be implemented through a yet-to-be-identified regional coordinating agency.

Leadership

In the Charlotte region, public-sector TDM services are offered through the Charlotte Area Transit System (CATS). Charlotte Center City Partners (CCCP) and Sustain Charlotte received pilot-project TDM funding from NCDOT for service provisions during the 2016-2017 fiscal year. These agencies and others have formed effective partnerships in the past, although a structure for regional coordination of funds or workplans has not yet been established.

Throughout NCDOT's funding of TDM services in the Charlotte area, difficulty has occurred in effectively expanding the coordination of partnerships for efficiencies in the use of funds and service delivery. This is due in part to the number of transit agencies in the 12-county area and level of services appropriate to address a variety of needs. In 2017, the Charlotte Regional Transportation Planning Organization (CRTPO) funded the study of best practices as they relate to the coordination of TDM services, although no formal steps in leadership alignment have been made.

Budget / Funding

No dedicated funding sources have yet been identified for TDM programs in the Charlotte region. Specific TDM-related activities appear to be funded through individual agency budgets.

Agencies

Agencies in the Charlotte region with either an active or potential role in TDM initiatives include the following:

- **CATS** – CATS is the primary transit provider in the Charlotte region, offering fixed-route bus and rail service. CATS is also responsible for managing/administering regional TDM services.
- **CCCP** – CCCP is a nonprofit organization with a vision for Charlotte's Center City to be viable, livable, memorable and sustainable. This vision includes the continuation of the city's growth as pedestrian-friendly and walkable. In recent years, CCCP has been specifically focused on making sure that cycling becomes a more viable mode of transportation for residents.
- **CRTPO** – CRTPO is the federally designated MPO for the Charlotte Urbanized Area and consists of 27 jurisdictions within Iredell, Mecklenburg and Union counties. As the federally designated MPO for the region, CRTPO is responsible for the development of the region's transportation plans and administration of the congestion management plan. CRTPO has included TDM approaches as a strategy for addressing the region's transportation needs in these planning documents and recently conducted a study of TDM best practices for future planning considerations.
- **Centralina Council of Governments (CCOG)** – CCOG is a voluntary organization of municipal and county governments serving the Greater Charlotte region, including Anson, Cabarrus, Gaston, Lincoln, Iredell, Mecklenburg, Rowan, Stanly and Union Counties. CCOG serves as a coordinating entity for local governments and provides technical assistance services to governmental members in the areas of regional planning, transportation, energy and environment, local government assistance, and business resources. The Centralina Mobility Management program helps coordinate transit vehicles across county lines to transport older adults and adults with disabilities.
- **Sustain Charlotte** – Sustain Charlotte is a community-based nonprofit organization dedicated to educating, engaging and uniting citizens to solve Charlotte's sustainability challenges. The organization has launched Way2Go CLT, a region-wide transportation initiative with the goal of reducing single-occupancy vehicle commutes by one million between March and October 2017. The regional tracking and incentive program offers individual or teams the ability to log alternative commutes for the opportunity to win monthly prizes and recognition.
- **Transit Providers** – Numerous transit providers are present in the region, but none appears to offer TDM-related services other than CATS. However, these additional transit providers would likely be an integral component of future regional TDM initiatives. Transit agencies operating in the greater Charlotte region in addition to CATS include Anson County Transportation System (ACTS), Cabarrus County Transportation Services (CCTS) & CK Rider, Gaston & Gastonia ACCESS, Iredell – ICATS, Transportation Lincoln County (TLC), Rowan Transit System (RTS), Salisbury Transit, Stanly SCUSA and Union County Transportation. Several volunteer mobility programs are also present, including Volunteer Transportation Services (VTS) who works to fill the transportation gap for older adults, veterans and adults with permanent or temporary disabilities.

Current State

The TDM programs operating in the Charlotte area are poised for continued success through formal coordination of funds and services. Multiple agencies are either formally or informally involved with TDM; however, numerous organization share the desire to meet the goals of program activities, including improved accessibility, connectivity, economic growth, environment, and public health and safety. This provides both challenges and opportunities that a lead agency could work to address through the creation of a regional long-range TDM plan.

The large millennial population in Charlotte offers a unique opportunity to utilize existing lines of communication in the promotion of alternative commute modes. Smartphone apps and other forms of smart city technology could be enhanced through standardization to offer guidance for efficiently coordinating communication with existing services.

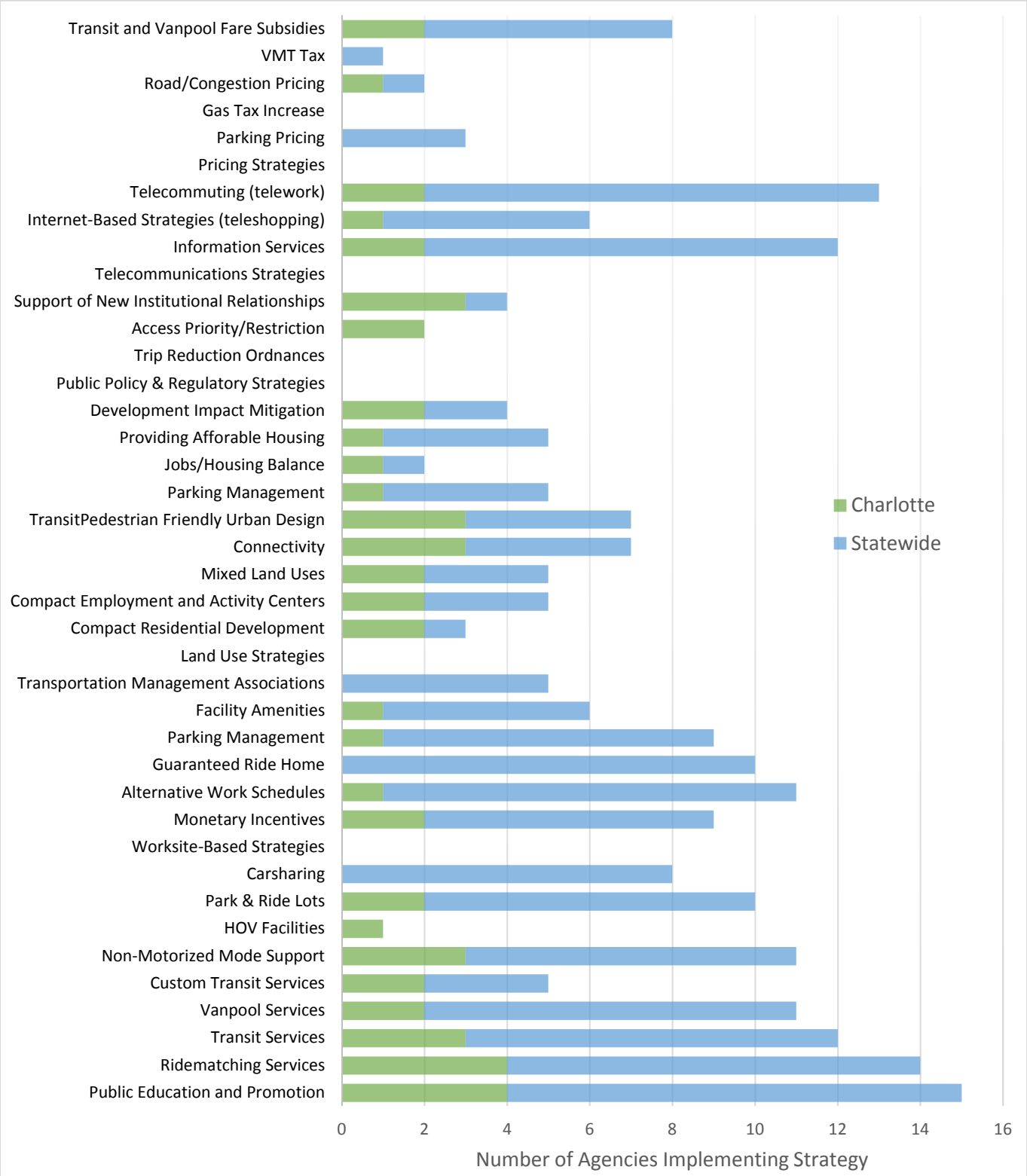


Figure 3. TDM Strategies Currently Being Implemented in Charlotte

PIEDMONT TRIAD

In August 2015, the Piedmont Authority for Regional Transportation (PART) launched the Piedmont Triad Resources Call Center as the newest division of the Commuter Resources team. The four-person call-center team is available to answer questions related to regional transit services, the PART vanpool program, as well as support the promotion of ShareTheRideNC. The call-center team was able to answer over 88,000 calls in its first year.

Seeing the success of the GoPass program offered by Go Triangle, PART worked in coordination with the University of North Carolina (UNC)-Chapel Hill to expand the concept to allow free rides on PART Express Route 4 from Alamance to the Chapel Hill campus and hospitals. The Commuter Resources staff was heavily involved in working with UNC-Chapel Hill to market and promote this new benefit to the university population.

Recognizing the important role that the business community plays in the promotion of alternatives, PART's Commuter Resources program implemented the PARTnership program. The PARTnership is a free full-service resource for major employers in the Triad.

PART's Piedmont Transit Resource Guide provides information on alternative commuting options including vanpooling, carpooling, transit bicycling and walking, and alternative work schedules.

Component Strategies

Strategy 1 – Commuter Resources

The Commuter Resources program seeks to make commuting to and from work in the Triad easier than ever by helping users find the right alternative to driving alone. The program seeks to address rapid growth in the region's communities while addressing traffic congestion and impacts on the environment and air quality.

Strategy 2 – PARTnership Program

The PARTnership is a free full-service resource for major employers in the Triad. It provides a platform to allow businesses the opportunity to work together to improve mobility for employees by identifying alternatives to driving alone, marketing sustainable options, and reporting results. PARTnership member companies have access to several programs and services to develop and implement a customized transportation options program to address the commuting challenges facing workers, including:

- Employee Transportation Surveying
- Customized Reporting
- ExpressPass Transit Discount
- 4-3-2 Vanpool Discount
- Customized Incentive Programs
- Emergency Ride Home
- Marketing and Communications Support
- On-site Events and Webinars
- Bicycle Education & Training
- Preferential Parking Program
- Commuter Tax Benefit Guidance
- Best Workplaces for Commuters Support
- Corporate Recognition

Strategy 3 - Alternative Mode Promotion

PART provides information on several alternative transportation modes and resources in the following categories:

Bus	Carpool	Bike/Walk	Park & Ride
Vanpools	ShareTheRideNC	Telework	

Leadership

As a Regional Public Transportation Authority, PART consists of member municipalities joined through resolutions executed by their respective governing boards. These municipalities include Burlington, Greensboro, High Point and Winston-Salem. The PART Board of Trustees is a 23-member body composed of representatives of the four largest cities (Greensboro, Winston-Salem, High Point, and Burlington), representatives of the four MPOs of the four urbanized areas, a commissioner from each of the ten-member counties, representatives of the two regional airports, and three representatives of the NCDOT Board of Transportation. The region's TDM Commuter Resources Program is both administered and staffed as a program within PART.

Budget / Funding

Funding for existing TDM services in the area do not appear to come from dedicated sources. Congestion Mitigation Plans at the local MPOs do not indicate funding opportunities for future regional TDM services.

Agencies

Agencies in the Piedmont-Triad region with either an active or potential role in TDM initiatives include the following:

- **PART –** PART was created in 1997. The existence of PART is based on regional cooperation and the improvements to the transportation systems in the Piedmont Triad Region of North Carolina.
- **Transit Providers** – Numerous transit providers are located in the region that coordinate through PART's Commuter Resources Program. These include:
  - Greensboro Transit Authority
  - High Point Transit System
  - Winston-Salem Transit Authority
  - Go Triangle
  - Link Transit – Burlington
  - Davidson County Transportation Services

Current State

The TDM efforts led by PART have experienced significant enhancements since the launch of the Piedmont Triad Resources Call Center in late 2015. More recent work more specifically targeting TDM services for local businesses demonstrates a continued progression of program enrichment. The geographic footprint and coordination of service areas will be critical to supporting continued momentum.

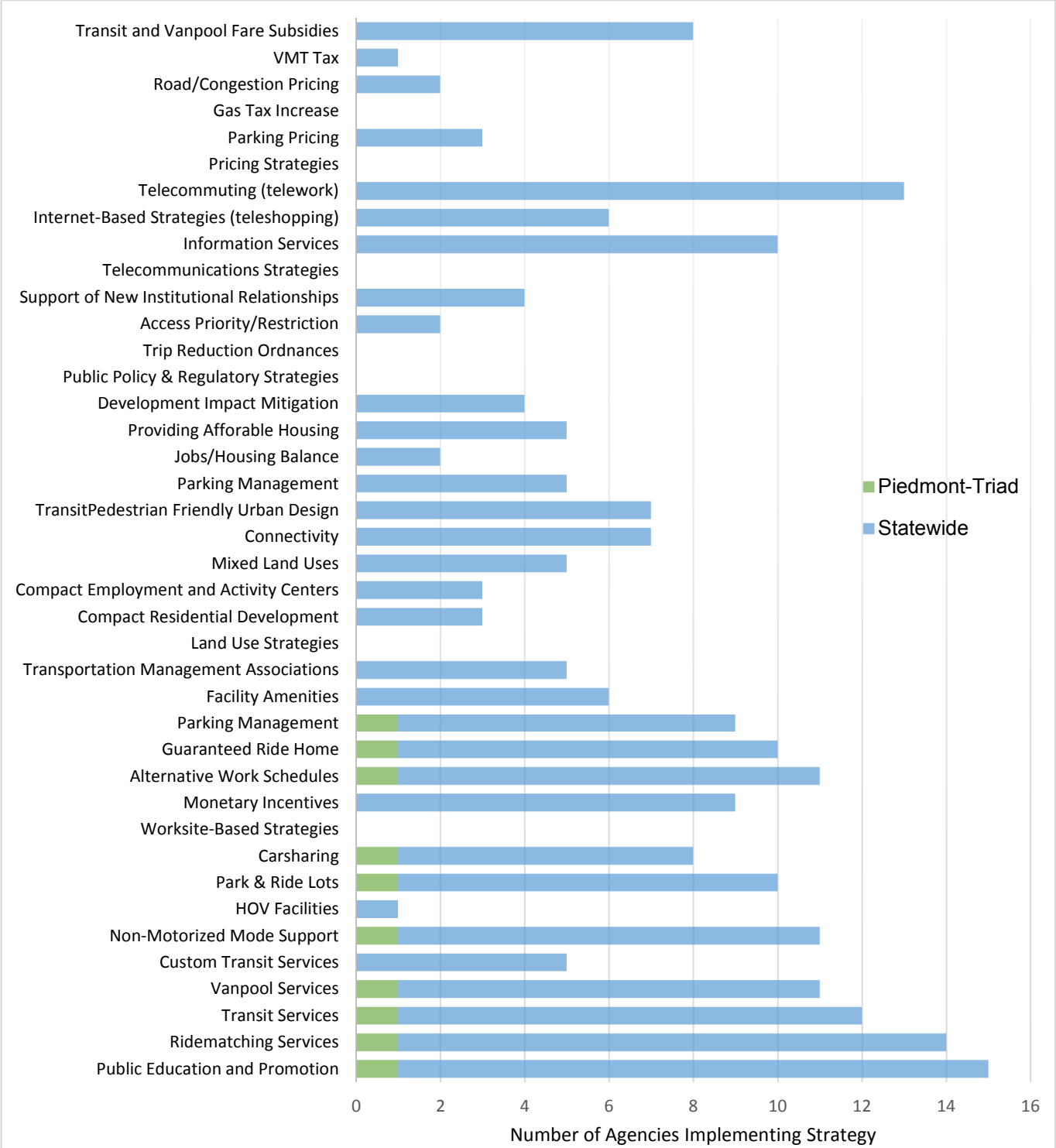


Figure 4. TDM Strategies Currently Being Implemented in Piedmont-Triad

TRIANGLE

In 2007, the Triangle TDM Program brought together the organizations that were currently working on and/or funding TDM in the region to create a long-term plan for improving TDM efforts, including increased funding, evaluation and monitoring. The result was the Triangle Region 7-Year Long Range Travel Demand Management Plan. This plan called for, among other things, the two MPOs and NCDOT to pool their funds and have a competitive call for TDM projects.

The Triangle J Council of Governments (TJCOG) was charged with administering this effort on behalf of the funding organizations. In response, TJCOG developed a TDM program to fund, coordinate, and evaluate regional TDM activities to reduce traffic and air pollution by promoting commute alternatives.

In addition to coordinating funding for marketing activities, TJCOG evaluates the TDM program for effectiveness and efficiency through the Triangle TDM Oversight Committee. Representatives of the committee are from the region's two MPOs, NCDOT, Federal Highway Administration (FHWA) and the NC Department of Environmental Quality (NCDEQ). An annual call for projects targets designated service areas for TDM service provisions as defined by the Triangle Region 7-Year Long Range Travel Demand Management Plan. This prioritization of investments in TDM activities is based on 1) areas of high work-commute trip density and 2) areas with the best opportunities for TDM services.

Currently, a total of 13 service areas have been designated in the region where a single service provider is responsible for responding to requests from employers for TDM services.

Leadership

The Triangle TDM program utilizes a Transportation Demand Oversight Committee, composed of representatives from the Capital Area MPO (CAMPO), Durham-Chapel Hill-Carrboro (DCHC) MPO, NCDEQ, FHWA, NCDOT and non-voting representation from TJCOG. The TDM Oversight Committee meets to provide guidance and recommendations on the development of the TDM program. This includes the annual call for projects and program-impact evaluation studies. The Energy & Environment Planning Division at TJCOG is responsible for staffing the Triangle TDM program.

Budget / Funding

TJCOG combines local CMAQ from participating MPOs (CAMPO and DCHC MPO) with NCDOT PTD TDM Funds, then requires local cost-match from service providers. Funds are allocated through an annual call for projects. The Triangle TDM grant program will fund a maximum of one "core" program grant application per organization or local government. To be eligible for funds, entities must select an identified "hotspot" for service delivery. This distribution is outlined within Table 1 seen below.

Program Type	Reimbursement	Grant Applicant Match*
Regional Core	80%	20%
Local Core	50%**	50%**
Special Project	50%**	50%**

*Note: Local match must come from non-federal funds. In-kind match is **ineligible** as match Core and Special Projects.
**Example: $100 grant reimbursement, $100 local partner match

Table 1. Triangle TDM Program Distribution of Funding.

Agencies

Agencies in the Triangle region with either an active or potential role in TDM initiatives include the following:

- **TJCOG** – In addition to coordinating funding for the regional program, TJCOG has received funding for TDM services that are focused on managing the Best Workplaces for Commuters (BWC) program and the creation of a Telecommuting Handbook.
- **Triangle Transit / GoSmart –** Triangle Transit serves as the Regional TDM Service Provider.
- **Local TDM Service Providers –** The following agencies receive funds to provide TDM services to targeted "hotspots" as identified in the Triangle Region 7-Year Long Range TDM Plan and Triangle TDM FY14 Plan Revision:
    - **Triangle Transit / GoTriangle –** North Raleigh and Central Durham
    - **City of Raleigh** – CommuteSmart Raleigh
    - **RTP Foundation** – **S**martCommute@RTP
    - **UNC Chapel Hill (UNC)** – Commuter Alternative Program (CAP)
    - **North Carolina State University** – Wolftrails
    - **Duke University** – Unpark Yourself
    - **Town of Chapel Hill** – Go Chapel Hill
    - **Wake Technical Community College** – Zoom Water Tech

Current State

The Triangle Region has a strong history of leading TDM service coordination and delivery. Past programs have received national recognition and current work continues to support innovative approaches to shifting modes. Leveraging past success to ensure continued momentum will be critical to supporting program enhancements. Communicating the results of TDM services to local leadership can provide synergistic opportunities around key areas including the deployment of policy and technology based strategies.

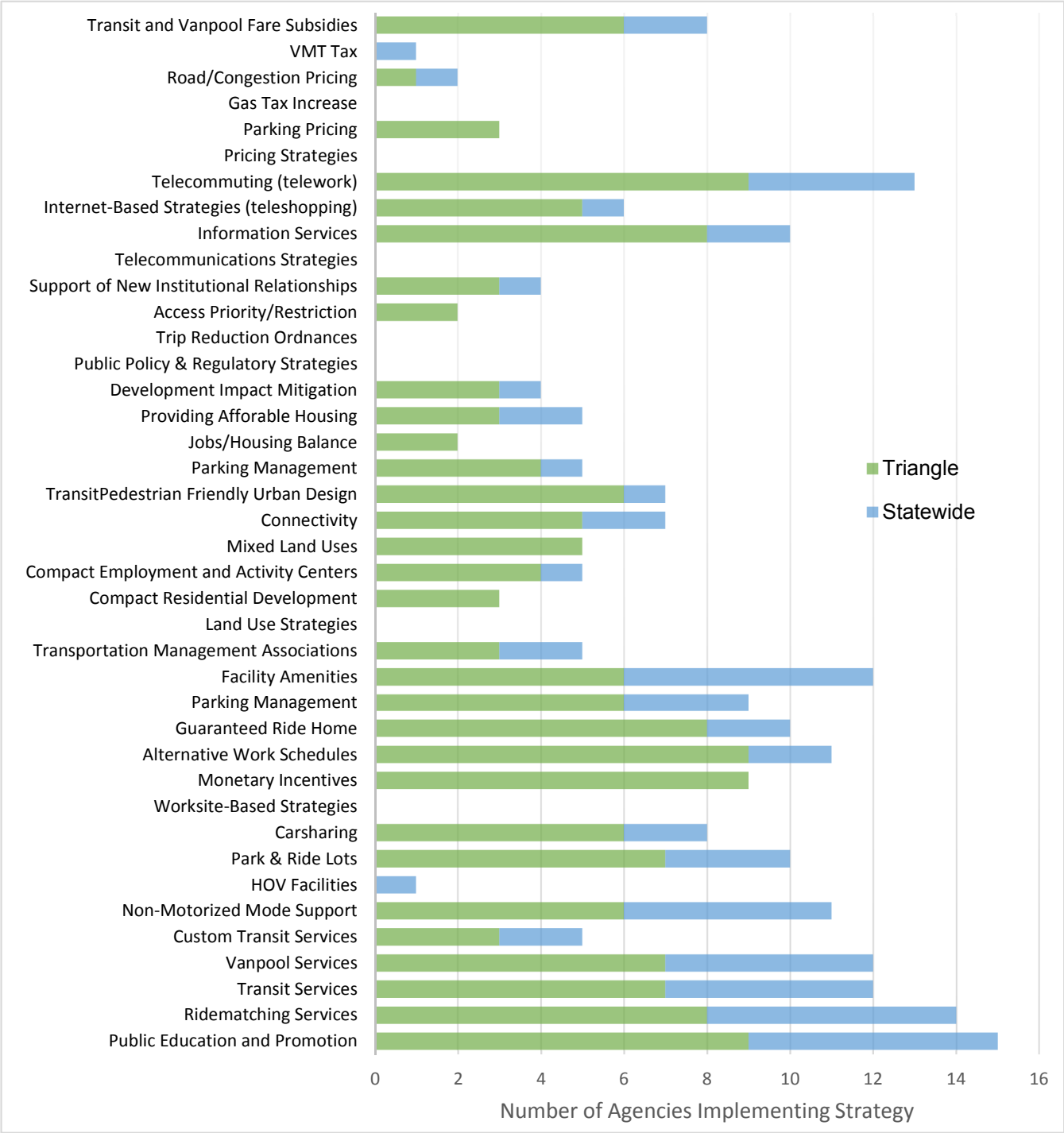


Figure 5. TDM Strategies Currently Being Implemented in Triangle

WILMINGTON

There has not been a TDM program in the Wilmington region since the Cape Fear Breeze program in 2006, which had limited success due in part to a lack of branding and inadequate marketing. This has hindered employer response to TDM efforts. Much of that effort was conducted in-house at the MPO due to a lack of resources for outsourcing activities such as outreach, communications and marketing. Furthermore, there was a lack of performance data that would allow for the assessment of program success and subsequent adjustments to program operations and administration. Therefore, future efforts are likely to need more funding allocated for external program support and marketing.

During the recent economic downturn, funding for the Cape Fear Breeze program was suspended until January 2015 when the Wilmington MPO (WMPO) board adopted a regional TDM plan. Development of the plan began in 2013 and proceeded through 2014. TDM-related grants were already being received in the region starting in around 2010, which had allowed for the concept to get more from attention and generate momentum for the development of a TDM plan and reactivation of a regional program. During 2013, a TDM committee was formed that included regional employers, and regular meetings commenced in 2014. The committee began compiling ideas and developing a regional TDM plan that was eventually submitted to the WMPO board for approval. Once adopted, the plan was submitted to NCDOT for funding as part of the 2016 budget.

In January 2016, a full-time TDM coordinator position was activated to implement the regional TDM plan. A request for proposals (RFP) was recently issued by the TDM coordinator's office for marketing activities such as branding and logo development for the regional TDM program and associated services; proposals are expected soon. Furthermore, a consultant has been retained to provide various support services. Since the formation of the TDM committee in 2013, several initiatives have been launched, including the development of park-and-ride lots to encourage transit use and contributions toward the state Share the Ride NC ride-matching program to encourage carpooling.

The 2013 TDM plan adopted by the WMPO recognizes that TDM programs will be attractive to different employers for different reasons. As such, the WMPO identified four "employer functions" to guide TDM program marketing and deployment. These functions are:

- Campus Style – These employment centers operate like a campus with large numbers of people arriving and departing and employees working variable schedules. These types of employment areas are likely to have a large number of visitors and may have visitors staying overnight. A large medical center is an example of a campus-style employer function.
- Structured Schedule – These employers operate on a standard (or similar) 8:00 am to 5:00 pm schedule and can also include businesses with set predictable shifts. A government office is an example of this type of employer function.
- Multi-Building/Multi-Campus – These employers have many locations as opposed to one central location. A school district or regional hospital system are two examples.
- Unique Schedule – These employers have already implemented alternative work schedules, often in the form of telecommuting.

TDM strategies for the region are prioritized for implementation based on these employer functions, as well as four evaluation factors. For the development of the TDM plan, strategies were graded on a scale of 1 to 3 for each of these four factors, which are described below.

Ease of Implementation – to what extent does the strategy require coordination among other entities, and to what extent does it require additional infrastructure?

- Cost/benefit – How do the anticipated benefits compare to perceived costs?
- Initiative already in place – Is the strategy already in place, are efforts already underway, and/or has preliminary work already been completed?
- Demand/Impact – What is the anticipated demand/desire for the service among the travelling public, and what is the anticipated impact?

This scoring methodology resulted in the TDM strategy prioritization shown in Figure X.

High Priority	Medium Priority	Low Priority
• Alternative Work Schedules • Carpool/Vanpool • Development Review • Park & Ride Lots • Full-Time TDM Coordinator • Bicycle & Pedestrian Infrastructure • Transit Amenities	• Bicycle Sharing Program • Car Share • Employer Transportation Coordinator • Commuter Transit Routes	• Consulting Services for Telecommuting • Employer Shuttles • Transportation Management Districts

Figure 6. Wilmington Region TDM Strategy Prioritization

Many of these strategies have yet to be deployed in the region, but their inclusion as part of an overall TDM plan and implementation represents an initial step in wider deployment.

Leadership

The WMPO utilizes a TDM committee composed of representatives from major regional employers and staff from MPO member jurisdictions. The TDM committee meets to provide guidance and recommendations on the development of the TDM program. Furthermore, beginning in 2015, the WMPO region has utilized a full time TDM coordinator who works with area employers to implement TDM strategies, develop marketing plans for TDM, and conduct public outreach to promote those strategies.

Budget / Funding

The budget for the first year of the TDM program in 2015 was $100,000, which included salary, marketing materials, and funding for conferences and other peer exchange activities. The budget for subsequent years is $120,000 and will likely remain at that amount for the foreseeable future. The TDM budget now includes funds for consulting, and $33,000 has been reserved for marketing

and materials for informational brochures and public service announcements. Funding for the current $120,000 budget is split between NCDOT grants and the WMPO. The WMPO portion is provided by the organization's various constituent agencies in proportion to their population. As such, the City of Wilmington contributes the largest share with additional WMPO cities and counties contributing smaller amounts.

No private source of TDM funding is currently provided, nor is funding provided by UNC Wilmington (UNCW). However, the TDM coordinator is working with UNCW regarding the Share the Ride NC initiative. The WMPO currently provides funding for Share the Ride NC, and the service is free for all the agencies to use. However, UNCW has expressed concerns about the privacy of students that might participate. Additional funds will therefore likely be provided by UNCW to implement the desired privacy safeguards.

Agencies

Agencies in the Wilmington region with either an active or potential role in TDM initiatives include the following:

- **WMPO** - The WMPO is the federally designated MPO for the Greater Wilmington Area which includes all New Hanover County and portions of Brunswick and Pender Counties.
- **Cape Fear Public Transportation Authority (Wave Transit) –** Wave Transit is the primary public transportation service provider for the region and manages the regional vanpool system.

Current State

The Wilmington program has great opportunities to develop a robust, regionally structured program utilizing recently created branding and marketing strategies. Coordinating with primary and secondary stakeholders can serve as an avenue for leveraging existing resources including communication channels already reaching key areas for TDM service provisions. Dedicated staff housed at a regional agency will be critical to this coordinated approach.

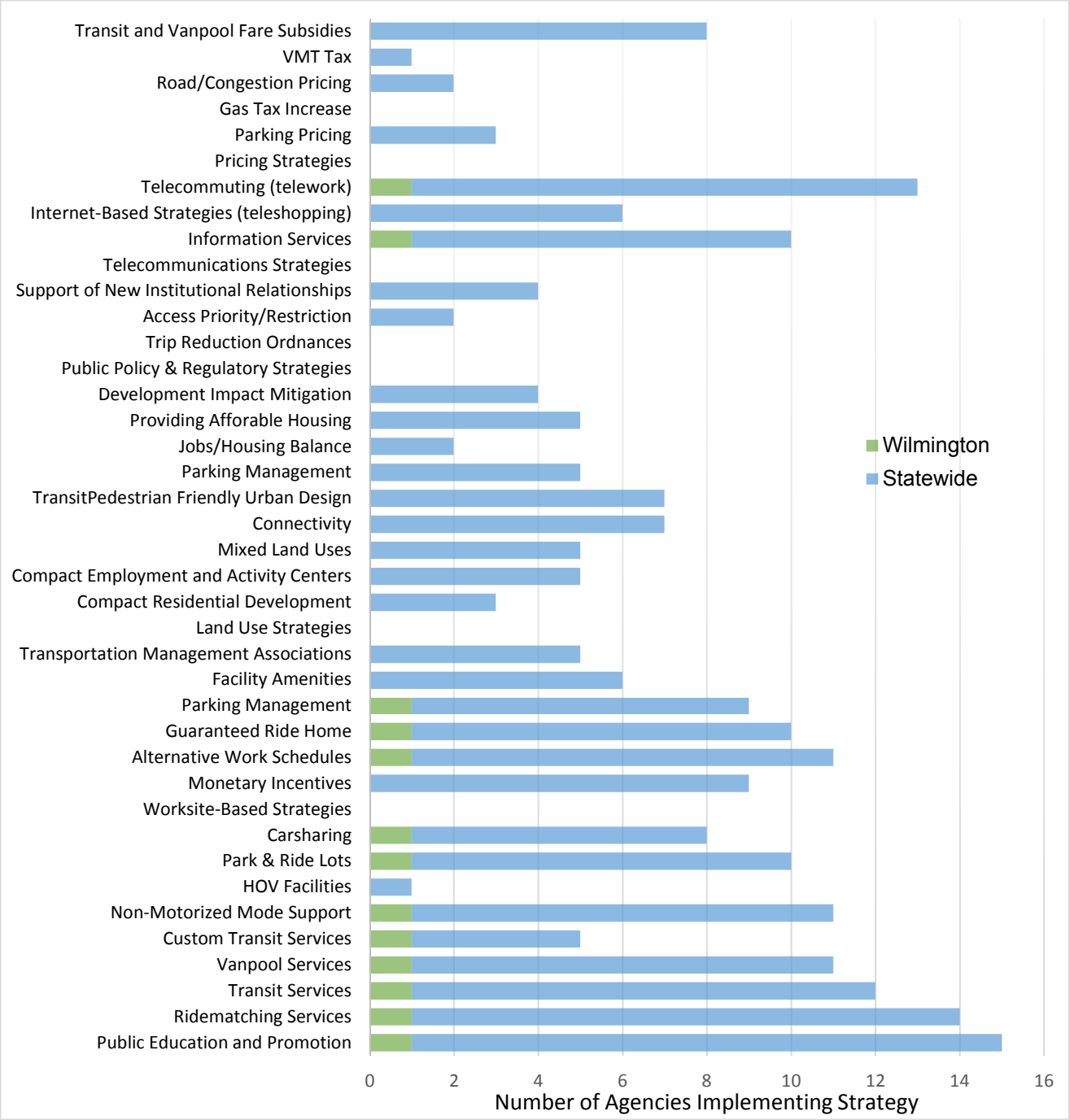


Figure 7. TDM Strategies Currently Being Implemented in Wilmington

PROGRAM CHARACTERISTICS

The leadership, budget and agencies associated with TDM programs across North Carolina each support activities and services unique to their region. Program characteristics are defined by the geographic footprint in which they are implemented, creating a diverse approach to TDM services in the state.

ASHEVILLE

The Asheville region encompasses Buncombe, Henderson, Madison, Haywood and Transylvania Counties, with a 2010 population of almost 465,000. That number is expected to grow to over 634,000 by 2040. The area's main urban centers are Asheville, Hendersonville, Waynesville and Black Mountain. Median household income for the region is $44,460 with a per-capita income of $21,175. In 2014, the largest industries in the region by employment were healthcare and social assistance; the region's largest employer is Memorial Mission Hospital. The number of jobs increased in these two industries by 9 percent between 2010 and 2014. The region has a significant percentage of residents aged 65 years and older (21 percent of the population in 2010) due to the area's attractiveness as a second-home and retirement destination. This has led to a stronger focus on planning and strategic investments to address the mobility needs of older populations.

The Asheville TDM Program organizes around five central strategies for service provisions as described below.

Strategy 1 – General Alternate Mode Promotion

A central strategy for the TDM program coordinator has been discussing the TDM concept and associated strategies with area employers to implement employer-based programs to meet employee mobility needs. For example, the Asheville area has many breweries that have shown a strong interest in TDM. Sierra Nevada is one brewery that has embraced numerous TDM approaches due to an overall company culture that seeks to limit the need to drive to work. The company has proactively explored various options and available programs and has implemented their own approaches such as having employees log trips and receive various incentives for changing their travel behavior.

Strategy 2 – Vanpooling

Ongoing TDM outreach and promotion activities have made progress in establishing a vanpool program for five of the largest hotels in the region. The current model would utilize Enterprise Vanpool for what would essentially be shuttle trips for hotel employees, but other service options may be considered. These vanpool services will be administered by the TDM coordinator but will likely be self-funded by the employers. These partners have indicated that they are motivated to provide funding, but future riders may be required to provide some limited funding themselves in the near term.

Strategy 3 – Alternate Mode Facilitation

Blue Ridge Commuter Connections is a commuter assistance program for Western North Carolina that helps individuals find alternate commuting modes including bicycling, walking, transit

and carpooling. The program provides resources for employers to promote transportation alternatives such as information on employer and tax benefits, information on successful program models, and local resources available for program development and support.

There is interest in the concept of "park and peddle," where travelers can drive and park their vehicle at a specified location of ride a bicycle the rest of the way to their job. Such an approach could be deployed at the edges of congested areas, allowing for drivers to utilize an alternate mode, namely bicycles, to avoid congestion.

Strategy 4 – Ride Matching

The GO Mountain Commuting program encourages the formation of carpools and vanpools and use of transit as an alternative to commuting as a single-occupant vehicle. Participants may submit their email address to receive tips on utilizing these modes and become eligible for discounts meant to assist with ridesharing and active commuting options.

The Asheville region will also be served by the statewide Share the Ride NC service that matches those seeking to join carpools with available drivers within their area.

Strategy 5 - Alternative Mode Promotional Events

Strive Not to Drive (SNTD) is an annual event, typically held in May, that encourages residents to explore transportation alternatives, rather than travel as a single occupant in a personal vehicle. In addition to basic promotion of transportation options, SNTD organizes several events during the week including:

- An effort to secure pledges from employees of area businesses to use alternative modes
- A bicycle ride led by the Mayor of Asheville
- Bicycle corrals in downtown Asheville
- A "multi-modal" fashion show

CITY OF CHARLOTTE (CATS)

CATS has a comprehensive TDM program that encourages public transit, vanpool, carpool, biking, walking and telecommuting as viable and smart alternatives to solo driving. Their TDM program uses multiple tactics to educate the public on the many benefits these alternatives have on the environment and quality of life for the Charlotte community, resulting in reduced VMT.

One of the largest campaigns CATS implements is the annual clean air campaign. This year's campaign, titled "Get On Board with Clean Air," increased awareness and created a sense of personal responsibility for what individuals can do to help improve air quality in Charlotte. By emphasizing the ease and comfort of riding CATS, biking or vanpooling to work, CATS encouraged citizens to adopt some form of alternative transportation at least once a week to make a dramatic impact on air quality in the region. The campaign included the development of a new micro-site (cleanaircharlotte.com), videos highlighting commuter stories, a bus wrap, billboards, a radio spot, digital advertising on Pandora and Slacker, direct mail, social media contest, transportation fairs, and more.

CATS continues to work with the business community to market TDM services in the workplace. An example of this is the Employee Transportation Coordinator (ETC) program, a network of

businesses that partner with CATS to promote alternative transportation within their organizations. Throughout the 2016 fiscal year, CATS worked to build strong relationships with these organizations and grow the program. One tactic used to do this was implementing a quarterly newsletter to update ETCs on CATS projects and ideas to market their ETC program to their employees. CATS held over 44 transit fairs at businesses throughout the 2016 fiscal year to educate employees on the benefits of using TDM.

CATS also focuses on specific audiences who are likely to be the most receptive to the overall TDM messages. CATS partnered with BIKE! Charlotte to reach Charlotte's growing cycling community and to promote cycling as a viable form of alternative transportation. CATS held a promotion where citizens could ride CATS services for free if they racked their bike. CATS also advertised in a special BIKE! Charlotte addition of the Charlotte Observer and on social media. Bike rack usage during this week-long promotion was 2,638.

The student populations at Charlotte area universities or colleges are also an important target audience for CATS. Many of these students are young adults and just beginning to make serious and lasting decisions about how they will commute. Transportation Fairs on campuses allow CATS to engage with students and discuss how they can incorporate alternative transportation into their daily lives. CATS participated in 21 events on various campuses throughout the Charlotte area during the 2016 fiscal year.

PIEDMONT AUTHORITY FOR REGIONAL TRANSPORTATION

Fiscal Year 2016 introduced several TDM-related initiatives for PART, starting with the rebranding of the program to "Commuter Resources." This new name provides a more comprehensive overview of the variety of TDM services offered in the Piedmont Triad area. Through the financial support of the cities of Greensboro, High Point and Winston-Salem, the Commuter Resources program works with commuters and businesses to educate on, advocate for, and provide alternative transportation strategies to reduce single-occupancy vehicle use.

A key component of any successful TDM program is helping commuters navigate through the complexity of the alternatives available to them. In August 2015, PART launched the Piedmont Triad Resources Call Center as the newest division of the Commuter Resources team.

Seeing the success of the GoPass program offered by Go Triangle (described further below), PART coordinated with UNC-Chapel Hill to expand the concept and allow free rides on PART Express Route 4 from Alamance Burlington to the Chapel Hill campus and hospitals. The Commuter Resources staff was heavily involved in working with UNC-Chapel Hill to market and promote this new benefit to the university population.

Recognizing the important role that the business community plays in the promotion of alternatives, PART's Commuter Resources program implemented the PARTnership program. PARTnership is a free full-service resource for major employers in the Triad. The goal of the program is to improve mobility for employees by identifying alternatives to driving alone, marketing sustainable options, and reporting results. As a PARTnership member company, employers have access to several programs and services that are used to develop and implement a customized transportation-options program to address the commuting challenges facing their worksite.

The results of PART's efforts are summarized below.

- Total VMT Reduction FY16 = 22,155,824
- Increase in Reduction from FY15 = 847,925
- Percent Reduction Over Previous Year = 39.79 percent

TRIANGLE J COUNCIL OF GOVERNMENTS

The TJCOG is responsible for administering TDM programs in the triangle area. Partnerships were created with local and regional providers and boast a litany of accomplishments for the 2016 fiscal year. These accomplishments include a total VMT reduction of 4.6 million miles, which equates to 2.6 million gallons of gas saved, 61 million commute miles reduced, 31,921 alternative transportation users supported, and 28 million pounds of carbon dioxide release prevented. These achievements were accomplished with the coordination between TJCOG and their many partners across the triangle. These efforts are described in detail below.

GoTriangle (Regional and Local Services)

GoTriangle acts as both the regional service provider and a local service provider to select hotspots. GoTriangle's regional transportation services include buses, shuttles, and vanpools. GoTriangle also administers Share the Ride NC, the statewide rideshare-matching software that includes tracking and incentive options in the Triangle. GoTriangle also manages the regional call center for many of the area's transit providers. Regional programming promotes other alternative commute modes such as biking, walking, teleworking and carpooling. GoTriangle is the regional TDM umbrella brand, that offers the following services:

- Vanpool, with fares that cover the cost of gas, insurance and vehicle maintenance
- GoPass, a regional discounted transit pass that allows employees or students to ride for free when employers, universities or property managers cover the cost of ridership. From 3,500 to over 5,000 trips are avoided each month due to the success of the GoPass Program.
- Regional marketing campaigns such as Think Transit Week, Telework Week, Bike Month, and more.
- Bicycle use and safety trainings for commuters, provided by Licensed Certified Instructors of the League of American Bicyclists.
- Share the Ride NC (STRNC), a rideshare database that matches commuters interested in carpooling or vanpooling together. Users can also request matches for single trips, track their commutes using the Commute Calendar (which also estimates savings in commuting costs and emissions), and access other resources. Cyclists can also search for other bike commuters with a similar skill level or for mentors.
- Emergency Ride Home (ERH), a service available to employee STRNC registrants who use alternative commute modes. It provides a voucher for a taxi cab or rental car in the event of an emergency that prevents participants from utilizing their regular alternative commute mode for their trip home.
- GoLive Transit Real-Time Predictions System, which allows users to access real-time bus route information through the live.gotriangle.org mobile website, the GoLive TransLoc App, or the GoLive text messaging system.

- GoPerks incentive program, which provides an incentive to start a smart commute or for loyal smart commuters to track trips for smart commuting with the opportunity to earn points. Points can be redeemed as entries in monthly prize drawings.

GoTriangle (Local Service)

GoTriangle conducts TDM outreach in Durham County and portions of Wake County; specifically, the North Raleigh/I-440 Corridor, areas impacted by the I-40/440 road reconstruction project (the Fortify project) and some major employment areas not covered by another local Service Provider. The two main programs that Go Triangle supports are Wake County Hot Spot and Central Durham Hot Spot, which are described below.

- Wake County Hot Spot – The Wake County TDM program serves all municipalities within Wake County. With the population in Wake County topping one million in 2014 and continuing to grow throughout 2016, congestion and the demand on current resources have been a big focus. The Fortify project on I-440 has compounded traffic congestion issues. To help alleviate these issues, the focus has been on reducing VMT through employer-commuter benefits programming and outreach. Along with the efforts to educate residents about the Fortify project, greater working relationships with the employers in North Hills, SAS, Rex Healthcare and other business centers have grown to work toward achievement of reduced SOV rates in Wake County.
- Central Durham Hot Spot – With employment growing rapidly in Durham County, particular attention has been given to congestion levels and associated air quality. Durham employers contribute by committing to sustainable commuter benefits for employees and hosting multiple regional programs promoting sustainable mobility options. These contribute to the growth of transit ridership and reduction in parking demand. Durham's voluntary commute trip reduction program and dedicated outreach has made them champions of TDM.



Go Chapel Hill (Local Service)

The Town of Chapel Hill, in partnership with the Town of Carrboro, provides coordinated TDM services through the Go Chapel Hill program. Chapel Hill's Transportation Management Plan program is designed to assist building owners in incorporating TDM best practices at their building locations while contributing to a reduction in the community's drive-alone rate. Go Chapel Hill offers free membership to its Commute Club, promoting the use of alternative transportation and encourages members to pledge to use alternative commutes.

Chapel Hill and Carrboro promote GoTriangle's vanpool program, ERH, ShareTheRideNC, Go Perks program and other regional services. Chapel Hill Transit provides fare-free transit service to UNC-Chapel Hill, Carrboro and Chapel Hill.

Additionally, Chapel Hill and Carrboro are both Bicycle Friendly Communities. Bicycle commuting is increasing in popularity, and cycling is encouraged by commuting events such as Annual Bike Night, Bicycle Breakfast, Open Streets Day, Bike on Bus, Lighten Up Cruiser Ride, safety workshops and more.

Unpark Yourself (Local Service)

Duke University's Unpark Yourself program offers TDM services to more than 35,000 employees and nearly 15,000 students on the main campus in Durham as well as worksite locations between Duke and downtown Durham. TDM services such as vanpool, carpool, Enterprise CarShare, Zagster bikeshare and transit options are offered through the Parking & Transportation Services department. Two- and three-person carpools are discounted, while four or more people receive free convenient parking. All registered alternative commuters receive occasional parking as needed, and registered bicycle commuters are automatically enrolled in the national Bicycle Benefits program.

Duke offers the GoPass free-of-charge to students and at a low cost of $25 to employees, and they get access to unlimited rides on regional and local transit systems. In addition, Duke Transit operates ten fixed daytime transit routes as well as after-hours transport services within the Duke Vans coverage boundary when transit is not in service. The Bull City Connector is a fare-free bus available to students, staff and faculty living near Duke's campus.

The Unpark Yourself program promotes all of these campus benefits, SharetheRideNC, and more through regular outreach at new employee orientations, partnerships with a variety of Duke departments, and participation in numerous campus events each year.

WolfTrails (Local Service)

The WolfTrails program helps students, faculty and staff at NC State access transportation services such as carpooling, employee vanpooling, bicycling, walking and transit. Full-time students and employees participating in the carpool program receive access to premium parking decks and lots, a discounted parking permit, and free occasional parking passes. Students and employees enrolled in the transit/bike/walk commuter incentive program receive two free parking passes per month. Employees who reside more than 20 miles from campus are eligible to join the vanpool program. Vanpool participants receive a $20 monthly subsidy, free van parking and free occasional parking passes. Employees enrolled in WolfTrails receive access to ERH services.

NC State offers the GoPass program to all students, faculty, staff and Centennial Campus affiliates. GoPasses are free for students and $60 for employees; they can be used on all GoRaleigh and GoTriangle buses. In addition, the WolfLine is the university's transit system that operates ten daytime routes and four evening routes. Other services available include Share the Ride NC, Zipcar carsharing, and the WolfWheels bike-rental program.

CommuteSmart Raleigh (Local Service)

The CommuteSmart Raleigh program aims to reduce the use of single-occupancy vehicles through strategies and policies that promote changes in travel behavior. Strategies can include but are not limited to biking, walking, car/vanpooling, transit, flexible hours and teleworking.

This program is housed in the City's Transportation Operations Division, which also includes GoRaleigh. The program works closely with the Office of Transportation Planning, specifically the City's Bicycle and Pedestrian Coordinator.

The CommuteSmart Raleigh program employs two TDM coordinators who work as a team to oversee the project and serve as the points of contact for two City sectors, Downtown Raleigh and Inside the Beltline, and to regional partners.

The CommuteSmart Raleigh program recently received national recognition at a TDM conference for the success of one of their innovative partnerships with Red Hat.

SmartCommute@RTP (Local Service)

Established in 1999, SmartCommute@rtp is the transportation management association (TMA) for the Research Triangle Park. There are currently 200-member companies in the SmartCommute@rtp program, 29 of which have to identify an internal employee transportation coordinator (ETC) and promote TDM initiatives. Membership is automatic for companies within the Park's boundaries. There are more than 39,000 full-time and 9,000 contract workers in Research Triangle Park.

SmartCommute@rtp promotes employee vanpools, carpools, ERH, bicycle facilities and telework. New transit and vanpool commuters are eligible to apply for one free $25 stored-value bus pass and a 30-day vanpool subsidy. Many companies within Research Triangle Park also have strong telework and compressed workweek policies and internal benefits to employees who choose alternative transportation methods for their commute. SmartCommute@rtp also provides member employers with air quality resources and materials to keep employees informed of local air quality updates.

Commuter Alternative Program - UNC (Local Service)

UNC-Chapel Hill promotes the use of alternative transportation through the Commuter Alternative Program (CAP). The Program is free to employees of UNC and UNC Health Care, and to commuter students living off campus. Alternative modes of transportation and services promoted through UNC include free bus service through Chapel Hill Transit, numerous regional transit systems, ShareTheRideNC ridematching service, Zipcar carsharing program, carpooling, vanpooling, bicycling and walking.

Commuter subsidies include $20 per month off the fare for GoTriangle and PART vanpools, a free bus pass to ride Chatham Transit's Pittsboro Express (PX), and a free GoPass for CAP members living outside Chapel Hill Transit's service area. The GoPass can be used on GoTriangle and PART regional buses, as well as GoDurham, GoRaleigh, and C-Tran buses. Park-and-ride lots are also available in the Chapel Hill/Carrboro area, which allow commuters to shorten their drive-alone distance for a nominal fee.

The services listed above are promoted at various events on campus, the CAP e-newsletter, advertisements, campaigns and welcome packets. CAP helps UNC keep the campus walkable and bikeable by reducing traffic and the need for parking facilities. CAP also supports UNC's goal to be a sustainable campus and a Best Workplace for Commuters.

Zoom - Wake Technical Community College (Local Service)

Wake Technical Community College's ZOOM program (Zeroing Ozone Output Measures) is designed to encourage the use of alternative commute modes such as transit, carpool, bicycling and walking. ZOOM supports Share the Ride NC and works

closely with local and regional transit agencies to improve upon and develop alternative transportation initiatives. Employees and students at Wake Tech can ride the GoRaleigh 40X bus free with their Wake Tech ID card, and curriculum students can get a GoPass to ride any other GoRaleigh bus routes for free. Employees can also take advantage of Wake Tech's compressed summer work schedule, which allows them to work longer days but only four days a week.

SUMMARY OF STATEWIDE PROGRAM AND SWOT ANALYSIS

Individual in-person interviews were conducted with TDM service providers across the state between April 24 and May 9, 2017. Additional interviews were held with associated stakeholders not currently receiving TDM funds from NCDOT. Participants were asked to summarize their program activities by identifying currently implemented TDM Strategies within a standard matrix. This process serves as the baseline for consistently measuring program work and has informed the analysis of strengths, weaknesses, opportunities and challenges cited below. In addition to the TDM Strategies Matrix exercise, service providers were asked to provide potential Enhanced Performance Metrics to provide a more open-ended opportunity to inform the process.

SWOT ANALYSIS

Strengths

Public Education and Promotion: All TDM service providers receiving funds from NCDOT PTD support alternative transportation modes through public education and promotion. This is in addition to non-funded entities providing additional marketing support. Programs have strong local brands and in some regions, coordinate efforts to leverage messaging.

Transit/Vanpool Services: Nearly all TDM service providers and supporting stakeholders offer transit/vanpool services, some of which are customized. Programs identified these services as key elements.

Variety of Program Locations: The statewide program supports TDM services across academic, government and nonprofit sectors, offering a variety of tailored strategies and lessons learned for multiple audiences.

Nationally Recognized and Awarded Programs: Several programs have been recognized by organizations including the Association for Commuter Transportation (ACT) both in the past and present, representing model program concepts for the industry.

Strong Program History: The statewide program has a track record of success throughout nearly 15 years. This includes local programs that are well integrated within communities, supporting numerous longstanding partnerships.

Weaknesses

Inconsistent VMT Calculation: VMT has historically been the primary performance metric for the statewide program, yet regional programs have reported annual reductions through various individual calculations. These inconsistencies make it difficult to determine what strategies are successful, hence weakening the statewide program's ability to share best practices.

Lack of Regional Coordination: Some programs are not coordinating with regional stakeholders to the degree that would offer increased efficiencies in TDM services. Missed opportunities include leveraging funds from organizations with shared interests and the ability to coordinate similar efforts.

Inconsistent Funding: Regional programs do not share a consistent funding structure, making it difficult to relate to peers across the state. Some regions leverage local funds to enhance NCDOT PTD investment, where others do not. In some cases, the availability of local matching funds is limited despite a desire to collaborate.

Lack of Performance Incentives: Many TDM service providers cited a lack of incentive for improving performance. If a greater reduction in VMT is reported from one fiscal year to the next, programs might be studied for justifiable reasons to increase financial support.

Opportunities

Statewide Collaboration: TDM service providers consistently noted the desire to share best practices and lessons learned. In some instances, newer TDM staff were unaware that programs exist in other locations. In addition to opportunities for shared improvements, programs might share resources including commonly branded materials to increase efficient use of funds.

Support New Institutional Relationships: Only four TDM service providers identified this strategy as being implemented by their program. The development of new relationships offers numerous opportunities ranging from additional funding for program activities to shared communication and marketing efforts.

Technology-Based Solutions: Advanced technologies including communication modes offer ever-improving opportunities for public education and promotion of alternative transportation modes. Shared pilots and statewide deployment of appropriate technologies might provide chances to leverage existing openings for enhanced programs.

Shared Resources / Branding: Several TDM service providers cited the ability to leverage shared resources such as the “Go” brand, which has been successfully replicated by communities such as “GoTriangle,” “GoRaleigh,” “GoCary” and others. These opportunities might offer efficient use of resources along with more consistent messaging across the state in disseminating information.

Trip Reduction Ordinances: This strategy has proven successful in the past but is no longer being implemented by any program in the state.

Threats / Challenges

Stagnation: Many local TDM programs have been in existence for nearly a decade. This can cause stagnated program branding, messaging, and general impact in local communities. Maintaining a fresh program image is both critical and challenging for any marketing-based effort.

Funding: Identifying and capturing additional funding requires time and presents several challenges surrounding external investments into programs that are rooted in government funding.

Limitations of Policy Development: A challenge for TDM service providers is to develop and promote policies within their communities. Prioritizing increased communication and support from community leaders and decision makers is difficult for programs while implementing services.

Coordination with Land Use Strategies: Roughly half of TDM service providers are implementing strategies related to land use and development.

Ability to Communicate with Multiple Stakeholders: Coordinating programs across a variety of stakeholders requires diverse tools and resources, creating a challenge in time management and allocation of program funds.

CURRENT STATE

The statewide TDM program demonstrates a variety of programs operating across unique geographic and political climates. The diversity of TDM services needed for enhanced success presents both opportunities and challenges for program development. Baselining existing efforts consistently across each regional program will allow for monitoring and evaluation of achievement in areas of identified opportunity. This will also support shared resources and communication of best practices and lessons learned across North Carolina.

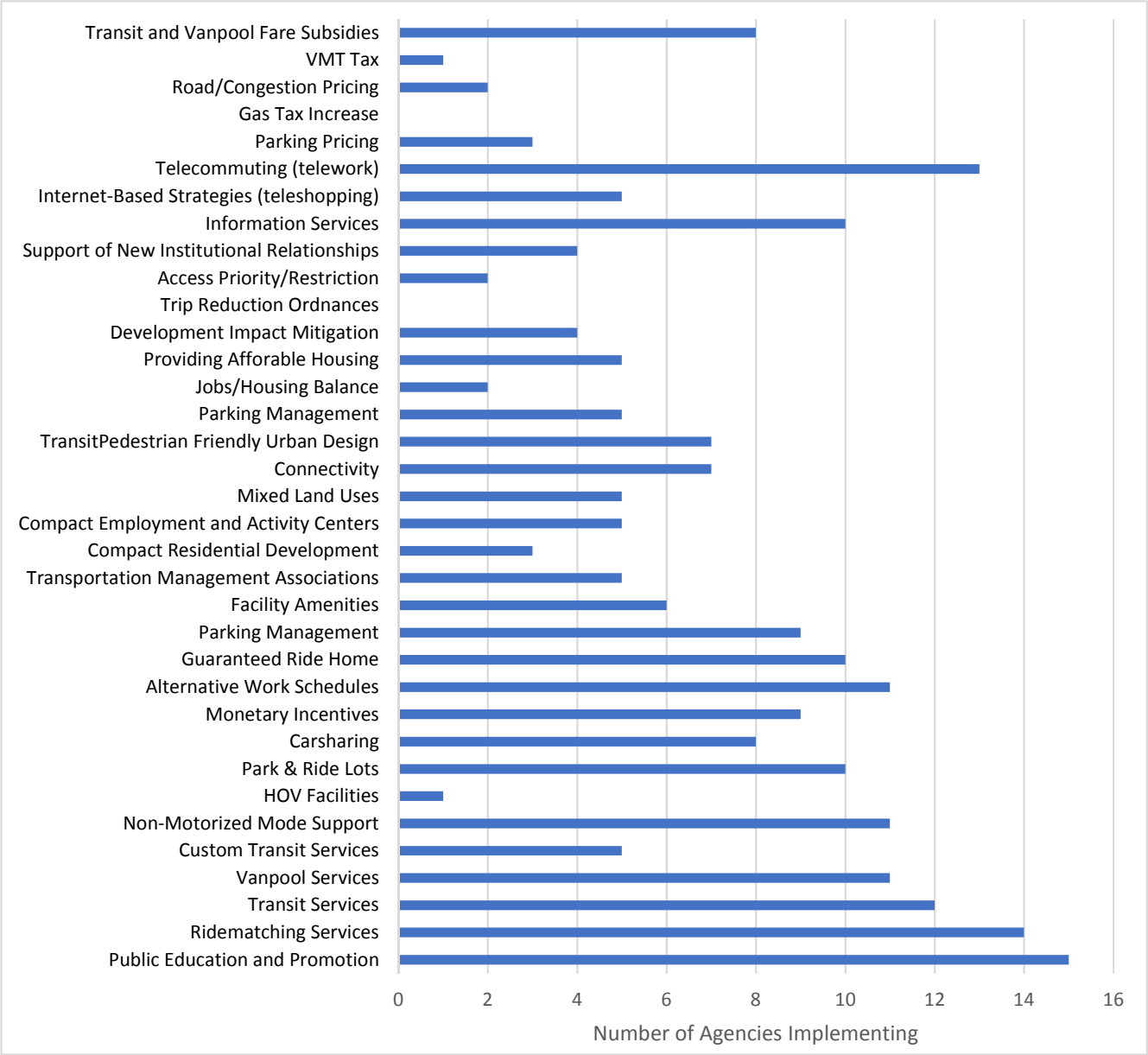


Figure 8. TDM Strategies Currently Implemented throughout North Carolina

DEFINING SUCCESS

Each program represents a fundamental series of positive steps toward performance improvements. Programs have evolved as populations have continued to grow, and new technology-based advancements in communication and services, such as on-demand mobility, have entered the market. It is critical for TDM programs to revisit current strategies to maintain continued success and for the statewide TDM plan update to coordinate activities for increased efficiencies and overall performance.

One of these aspects is the historical reliance on VMT as the primary, if not sole, measurement of success. Beyond being cumbersome in calculating the impact of TDM services for VMT reductions, communicating VMT as a valuable result of activities is equally as difficult. This has resulted in issues for baselining VMT consistently across all programs in the state and gaps in communicating the true value of program activities in areas such as improved accessibility, connectivity, economic development, environment, and public health and safety. Enhanced performance can be achieved by consistently defining traditional and auxiliary benefits of program delivery in order to encourage collaborative innovation.

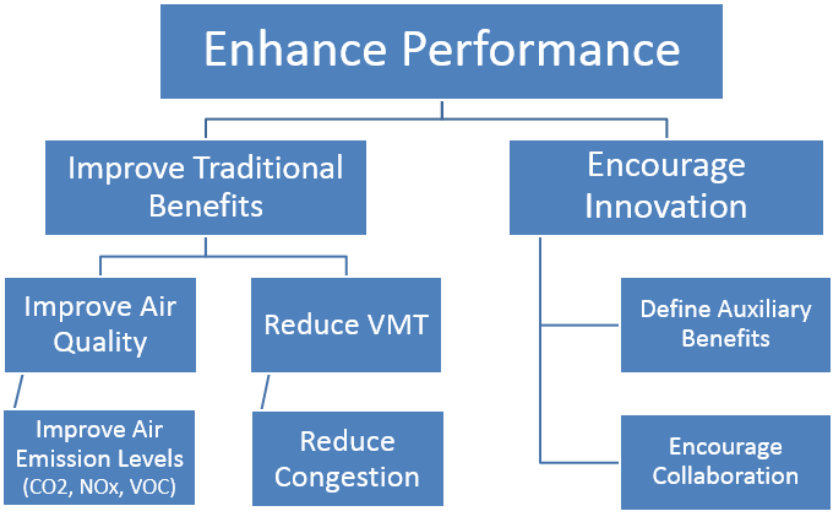


Figure 9. Enhanced Benefits of TDM Program Activities

Communicating the benefits of alternatives to the single-occupancy vehicle commute should be consistently calculated and reported in a way that is meaningful to community businesses, institutions and leadership. Senate Bill 953 served as a formal platform for leadership to support the importance of reducing VMT in the past, but as the legislation has expired and not redirected toward another reduction goal, programs must reconsider what is valuable to current and future partners.

Continued population growth across all major regions in the state indicates another key area of change that programs must address. Better coordination of TDM services allows for increased efficiencies in communicating resources and programs across regions. Formalizing partnerships among organizations best suited to reach groups of commuters can enhance performance and support a systemic approach to aligning mission, vision and goals.

Traditional (NCDOT Motivated)	Enhanced Value
VMT	Economic*
Air Quality	Resiliency**
Congestion and Delays	Healthy Communities
	Accessibility***

Table 2. Traditional and Enhanced Values of TDM Service Delivery

**Economic Benefits (Local Economy and Individual Transportation Cost)*
***Resiliency (Emergency Preparedness, Reduced Strain on Existing Infrastructure)*
****Accessibility (Work, Education, Training, Medical, Shopping and/or Tourism)*

DEFINING INNOVATION

A process for the development of a Three-Year Regional TDM Plan will be informed by the Statewide TDM Plan Update and support the ability to improve current performance while creating a phased approach to plan review, project entitlement and TDM Plan monitoring and reporting. This will also enhance efficiencies, reducing administrative burdens while offering opportunities to align with additional funding cycles.

Additionally, the Statewide TDM Plan Update will support opportunities for NCDOT to provide various forms of technical assistance. Coordinated aid at the statewide level will allow for the sharing of best practices and lessons learned across regional programs. Approaching a Three-Year Regional TDM Planning Process while integrating Enhanced Performance Metrics will support the development of localized specialties with consistent metrics for documenting results.

To better support a living plan update, GS&P and NCDOT requests that TDM service providers consider innovative approaches to the 2019 fiscal year funding applications to continue the process in moving from baseline activities to enhanced performance. Service providers were asked to utilize the Regional Success Plans to identify opportunities for improving programmatic activities and to pilot nontraditional strategies during the transitional year. This further aligns service delivery with plan adoption.

PERFORMANCE SCORECARD

NCDOT PTD has developed a quarterly Performance Scorecard to measure its performance over time and across four strategic areas. Developing a similar scorecard for the Statewide TDM Plan provides a consistent means of assessing regional TDM performance, while maintaining a streamlined and efficient means of reporting performance.

The Performance Scorecard is a recommended model for programs to consistently structure the monitoring and evaluation of TDM service delivery. It includes general goals resulting from the TDM Plan Update process and suggested performance measurements that allow for flexibility in designated specific strategies and tactics best suited for each regional TDM program.

HOW THE SCORECARD FUNCTIONS

The Statewide TDM Plan scorecard assesses regional service provider performance, based upon goals and objectives for the statewide TDM program identified by the regional service providers in February 2017. During that workshop, goals and objectives suggested by the regional partners were synthesized with NCDOT's priorities into four strategic areas:

- **Provide for a well-funded, collaborative TDM program**. Core to TDM services, these objectives pertain to developing a regional strategic plan for TDM services, and then executing upon the strategic plans within their jurisdictions.
- **Develop services that reduce the single-occupancy vehicle commutes in North Carolina**. Objectives under this goal specifically apply to how well the program is affecting single-occupancy vehicle commutes within North Carolina.
- **Leverage technology to enable 21st Century transportation services**. As TDM evolves to meet contemporary commuting needs, the use of advanced technology and methods become more pressing. Objectives under this goal identify success toward innovation in TDM at a regional level.
- **Enhance effectiveness of TDM service delivery.** Cost-effective TDM services are essential for sustaining a program over time. These objectives identify the need to develop specific performance monitoring systems to ensure a cost-effective program.

Within each of these four strategic areas are a series of easily calculable objectives and metrics, weighted broadly by the importance of each of the four areas. Each objective/metric yields a point total based upon achievement of the goal, which cumulatively add to 100 points per quarter if achieving exactly the goals established. Ultimately, the purpose of the scorecard is to inform both NCDOT and the regional partner on where the program is exceeding expectations, and where additional assistance or adjustment may be warranted to achieve the state's overall mission.

In many cases, a numeric annual percentage goal is identified (e.g., 10 percent growth in employer participation per year), wherein quarterly progress in meeting the annual goal is determined. In a few cases, the performance metric is satisfied by a pass/fail criterion – either the measure is conducted, or it is not conducted.

SCORECARD

All 13 performance measures are presented in Table 3.

Table 3. Scorecard Performance Metrics

	Metric	Weight
1	**Provide for a Well-Funded, Collaborative TDM Program**	**20%**
	1.a Collaborate on Regional TDM Services	
	1.b Review and Refine TDM Services through Annual Strategic Plan	
	1.c Integrate TDM Strategies into Regional Transportation Plans	
2	**Develop Services that Reduce SOV Commuting in North Carolina**	**40%**
	2.a Deploy Desirable TDM Strategies for SOV reduction	
	2.b Identify, Fund, Implement, and Operate Cost-Effective TDM Services	
	2.c Develop a Database of Activities (inputs & outputs)	
3	**Leverage Technology to Enable 21st Century Transportation Services**	**15%**
	3.a Conduct Exploratory Use of Innovative TDM Strategies	
	3.b Explore Multimodal Operations Integration	
	3.c Coordinate Services with Technology Providers	
4	**Enhance Effectiveness of TDM Service Delivery**	**25%**
	4.a Develop and Implement Performance Monitoring Plan	
	4.b Implement Quarterly Reporting System	
	4.c Deploy Training for Performance Calculations	
	4.d Develop Enhanced Performance Program	

More information on these metrics is presented below. The scorecard is provided as Table 4.

Provide for a well-funded, collaborative TDM program; consists of three objectives**.** Overall scorecard weight is 20 percent.

- Collaborate on Regional TDM Services. This objective is measured as the percentage increase in new employer partners with the regional TDM program. The percentage is calculated quarterly, as compared to the previous quarter, with an annual goal of 10 percent growth per year in employer partners.
- Review and refine TDM services through annual strategic plan. This objective is measured as an achievement percentage of identified quarterly actions in the regional strategic plan, with a goal of achieving 85 percent of identified actions in the strategic plan per year. For example, if the strategic plan identifies 20 actions for 2018, and the partner completes 15 of them, then the percentage achievement is 75 percent.
- Integrate TDM strategies into Regional Transportation Plans. This objective is measured by the partner's certification that TDM strategies are being actively considered and included within transportation planning activities including but not limited to the Congestion Management Process, Long Range Transportation Plan, Metropolitan Transportation Plan, and strategic corridor/development plans. This is a Pass/Fail criterion.

Develop services that reduce SOV commuting in North Carolina; consists of three objectives**.** Overall scorecard weight is 40 percent.

- Deploy desirable TDM strategies for single-occupancy vehicle reduction. This objective is measured as the percentage increase in new commuter participants in the regional TDM program. The percentage is calculated quarterly, as compared to the previous quarter, with an annual growth goal of 15 percent in new participants.
- Identify, fund, implement and operate cost-effective TDM services. This objective is measured as the percentage reduction in total quarterly budget divided by the quarterly number of all participants in the TDM program. The goal is a 5 percent reduction in the cost for services per year, achievable through increased participation and economy of scale.
- Develop a database of activities. This objective is measured by the regional TDM partner's certification that TDM core data for all identified inputs and outputs within the regional TDM strategic plan are collected and stored for analysis. This is a Pass/Fail criterion.

Leverage technology to enable 21st Century transportation services; consists of three objectives. Overall scorecard weight is 15 percent.

- Conduct exploratory use of innovative TDM strategies. This objective is measured by the TDM partner's certification that a new, innovative strategy has been identified, developed, programmed for demonstration, conducted, evaluated, and reported. This is a Pass/Fail criterion.
- Explore multimodal operations integration. This objective is measured as the percentage of total quarterly incentive budget that is usable by participating commuters on regional transit services. The goal for this measure is 50 percent of all incentive funding eligible for use on regional bus and rail services.
- Coordinate services with technology providers. This objective is measured as percentage of TDM commuter participants that engage with the program via mobile, field-based, or web-based solutions. The goal for this measure is 50 percent of all program participants.

Enhance effectiveness of TDM service delivery; consists of four objectives. Overall program weight is 25 percent.

- Develop and implement performance monitoring plan. This objective is measured as the TDM partner's quarterly certification that the TDM program is successfully conducting its performance monitoring plan. This is a Pass/Fail criterion.
- Implement quarterly reporting system. This objective is measured as percentage improvement in quarterly calculation of benefit to cost, as described by the performance monitoring plan, as compared to previous quarter. The goal in benefit/cost improvement is 5 percent per year.
- Deploy training for performance calculations. This objective is measured as the TDM partner's certification of training and achievement of the quarterly calculation of VMT reduction, as well as other regionally adopted measures. This is a Pass/Fail criterion.
- Develop enhanced performance program. This objective is measured as the TDM partner's quarterly certification that the TDM program is successfully developing and implementing enhanced performance metrics. This is a Pass/Fail criterion.

Table 4. North Carolina Statewide TDM Performance Scorecard

Goals and Objectives		Performance Metric	Performance Assessment					Points Allocation				
			Goal	Q1	Q2	Q3	Q4	Pts	Q1	Q2	Q3	Q4
1	**Provide for a Well-Funded, Collaborative TDM Program**											
1.a	Collaborate on Regional TDM Services	Annual percentage growth in employer and community partners engaged with TDM program.	10%					7				
1.b	Review and Refine TDM Services through Annual Strategic Plan	Documentation of achieving identified actions in strategic plan.	85%					7				
1.c	Integrate TDM Strategies into Regional Transportation Plans	Quarterly certification of achievement.	Pass/ Fail					7				
2	**Develop Services that Reduce Single-Occupancy Vehicle (SOV) Commuting in North Carolina**											
2.a	Deploy Desirable TDM Strategies for SOV reduction	Annual percentage increase in commuter participation.	15%					13				
2.b	Identify, Fund, Implement and Operate Cost-Effective TDM Services	Annual percentage reduction in cost per commuter participating in the program.	5%					13				
2.c	Develop a Database of Activities (inputs & outputs)	Quarterly certification of achievement.	Pass/ Fail					13				
3	**Leverage Technology to Enable 21st Century Transportation Services**											
3.a	Conduct Exploratory Use of Innovative TDM Strategies	Quarterly certification of one demonstration per year of TDM integration with innovative technologies or processes.	Pass/ Fail					5				
3.b	Explore Multimodal Operations Integration	Annual percentage of total TDM incentives that are claimed by use of transit.	50%					5				
3.c	Coordinate Services with Technology Providers	Annual percentage of participants that participate via technology with the TDM program.	50%					5				
4	**Enhance Effectiveness of TDM Service Delivery**											
4.a	Develop and Implement Performance Monitoring Plan	Documentation of achieving performance monitoring plan in strategic plan.	Pass/ Fail					6				
4.b	Implement Quarterly Reporting System	Annual percentage improvement in overall benefit-to-cost ratio for TDM program.	5%					6				
4.c	Deploy Training for Performance Calculations	Annual calculation of performance measures, coupled with a training program.	Pass/ Fail					6				
4.d	Develop Enhanced Performance Program	Documentation of achievement of enhanced performance measures developed.	Pass/ Fail					6				

APPENDIX A. KICKOFF MEETING

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

AGENDA

STATEWIDE TRANSPORTATION DEMAND MANAGEMENT STRATEGIC PLAN

RDU Maintenance Facility
200 Haley's Branch Road, Morrisville, NC 27623

Tuesday, February 7, 2017
11:00 AM – 2:30 PM

1) Welcome & Introductions (20 minutes)

- NCDOT Secretary, James Trogdon

2) Review History of TDM in North Carolina (30 minutes)

- NCDOT Public Transportation Division Director, Debra Collins

BREAK (20 minutes)

3) Peer Review Assessment Workshop (90 minutes)

- David Gilford, Senior Director
  Intersection
- Nicholas Ramfos, Transportation Operations Programs Director
  Metropolitan Washington Council of Governments
- Will Toor, Transportation Program Director
  Southwest Energy Efficiency Project

4) Statewide Strategic Planning (30 minutes)

5) Next Steps (20 minutes)

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Location:
1 SOUTH WILMINGTON STREET
RALEIGH, NC 27601

David Gilford is Senior Director of Client Strategy for Intersection, a technology and design company focused on improving experiences in urban environments. David leads Intersection's Connected Communities practice, helping real estate developers and cities harness technology to improve the quality of life in urban, mixed-use developments. He guides clients as they envision new experiences, develop comprehensive plans, and implement technology to unlock efficiencies and new sources of revenue in areas ranging from transportation to building operations.

Prior to joining Intersection, David held multiple leadership positions with the City of New York, most recently as Vice President for Urban Innovation & Sustainability at the New York City Economic Development Corporation. He authored Green NYC 2025, a long-term strategic plan for sustainability and economic development. As a Director of the Center for Economic Transformation, David worked to catalyze entrepreneurship and innovation across New York City, including developing UrbanTech NYC to provide real estate, equipment, and pilot opportunities to fast-growing companies addressing urban challenges.

Earlier in his career, David worked in strategy and finance at General Electric, McKinsey and the Federal Reserve. He has been recognized nationally among the 40 Under 40 Rising Stars in Economic Development, as well as one of New York State's Top Ten Energy Government Leaders. David holds a BA in Economics from Williams College and an MBA from the Yale School of Management.

Nicholas Ramfos has been a Transportation Demand Management practitioner with over 30 years of program development and implementation at various Metropolitan Planning Organizations. He has developed and implemented various commute alternative programs and policies in the Washington DC, San Diego, Detroit, and Chicago regional markets. Many of the projects have addressed congestion, air quality, energy efficiency, and sustainability issues. Ramfos has also implemented commuter transportation marketing campaigns through traditional media and social marketing.

Ramfos is currently the Transportation Operations Programs Director with the Metropolitan Washington Council of Governments (COG) in Washington, DC and is responsible for the development, implementation and evaluation of regional TDM programs through Commuter Connections and the implementation of JARC, New Freedom, Enhanced Mobility, TIGER, and State Rail Safety Oversight programs in Maryland, Northern Virginia, and the District of Columbia.

Ramfos is currently a Board member of the Transportation Demand Management Institute (TDMI) and served as TDMI's President. He is also a member of the Association for Commuter Transportation (ACT), the Public Relations Society of America, and the US Green Building Council. He has also been a member of the Transportation Research Board's (TRB) Transportation Demand Management Committee, and an ACT national Board member and has served as ACT's national Vice President and national Public Policy Council Chair. Ramfos is a Purdue University graduate.

Will Toor is director of the transportation program at the Southwest Energy Efficiency Project (SWEEP), a Colorado based nonprofit that advocates for energy efficiency in six southwestern states. In this role he works to advance both smart growth transportation strategies and electric vehicles. Prior to working at SWEEP, Will spent 15 years in local government, as mayor of Boulder, Colorado, as Boulder County Commissioner, and as chair of the Denver Regional Council of Governments. He serves on the Colorado Air Quality Control Commission.

He is co-author of the books *Finding A New Way: Campus Transportation for the Twenty-First Century*, and *Transportation for Sustainable Campus Communities*. He received his Ph.D. in physics from the University of Chicago in 1992.

NORTH CAROLINA
Department of Transportation



Statewide Transportation Demand Management (TDM) Strategic Planning

February 7, 2017

Agenda

1) Welcome & Introductions
2) Review History of TDM in North Carolina

Break

1) Peer Review Assessment Workshop
2) Statewide Strategic Planning
3) Next Steps

Welcome & Introductions

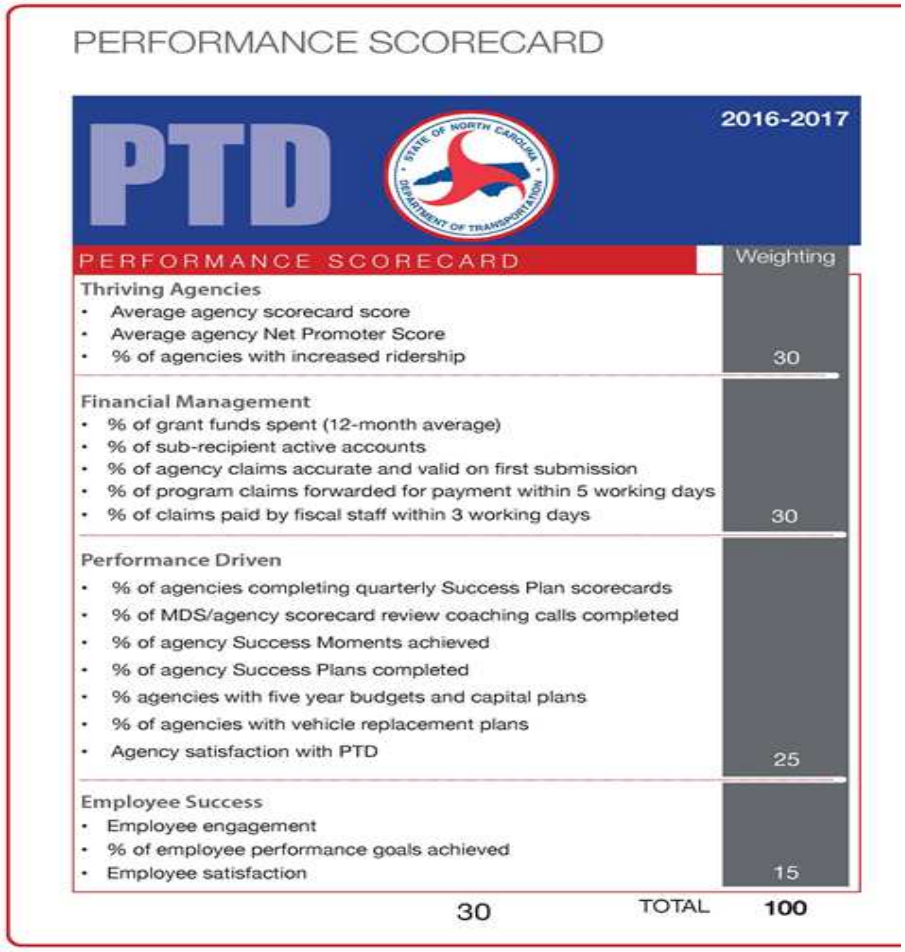
Please share with Secretary Trogdon

- Your name
- Organization
- 3 words that describe your FY16 focus on congestion reduction

Building Success

- **Success Plans**
  - All 81 rural systems focused on defining / measuring success moments

- **Transportation Demand Management**
  - Focus of this effort



PERFORMANCE SCORECARD

PTD 2016-2017

PERFORMANCE SCORECARD	Weighting
Thriving Agencies • Average agency scorecard score • Average agency Net Promoter Score • % of agencies with increased ridership	30
Financial Management • % of grant funds spent (12-month average) • % of sub-recipient active accounts • % of agency claims accurate and valid on first submission • % of program claims forwarded for payment within 5 working days • % of claims paid by fiscal staff within 3 working days	30
Performance Driven • % of agencies completing quarterly Success Plan scorecards • % of MDS/agency scorecard review coaching calls completed • % of agency Success Moments achieved • % of agency Success Plans completed • % agencies with five year budgets and capital plans • % of agencies with vehicle replacement plans • Agency satisfaction with PTD	25
Employee Success • Employee engagement • % of employee performance goals achieved • Employee satisfaction	15
30	TOTAL 100

History of TDM in North Carolina

- Ambient Air Quality Act of 1999, Senate Bill 953
  - Addressed ground level ozone pollution from motor vehicles
  - Increasing vehicle miles traveled (VMT) and NOx emissions
  - Established goal to reduce the growth of VMT by 25% from 2000 – 2009
- NCDOT Public Transportation Division begins funding TDM programs to promote alternatives to the single occupant vehicle commute

History of TDM in North Carolina

- Original Programs
  - Smart Commute @ RTP
  - Triangle Transit Authority
  - NCDOT PTD Ridesharing Program
  - NCDOT PTD Rural Jobs Access Program
  - Piedmont Authority for Regional Transportation (PART)
  - City of Charlotte
  - City of Wilmington

History of TDM in North Carolina

- Smart Commute @ RTP
  - Started in February 1999; hired ½ time person in 2001 and full time person in 2002
  - Mission to provide information, coordinate support and resources to promote alternative commuting at companies in the Research Triangle Park



History of TDM in North Carolina

- Triangle Transit Authority
  - TDM efforts formed in 1980 as part of the National Ridesharing Demonstration Project
  - Vanpool Program started in 1985
  - TTA chartered in 1989 with ridesharing / vanpooling offered as first service starting in 1991
  - Mission to plan, facilitate and promote an affordable, customer-oriented public transportation network for the greater Triangle



History of TDM in North Carolina

- Piedmont Authority for Regional Transportation
  - Formed in 1980 as part of the National Ridesharing Demonstration Project
  - High Point and Greensboro programs merged in 1982, added Winston-Salem in 1995, designated as PART in 1998
  - Oldest vanpool program in NC
  - Mission to enhance quality of all forms of transportation for all citizens



History of TDM in North Carolina

- NCDOT Begins Annual Call for Projects
  - Funds organizations responsible for promotion of TDM activities that may also provide services such as carpool/vanpool matching
  - Program structured with intent to fund one organization per region
  - Funds only administrative costs (no capital projects)
  - Requires 50% cost-share

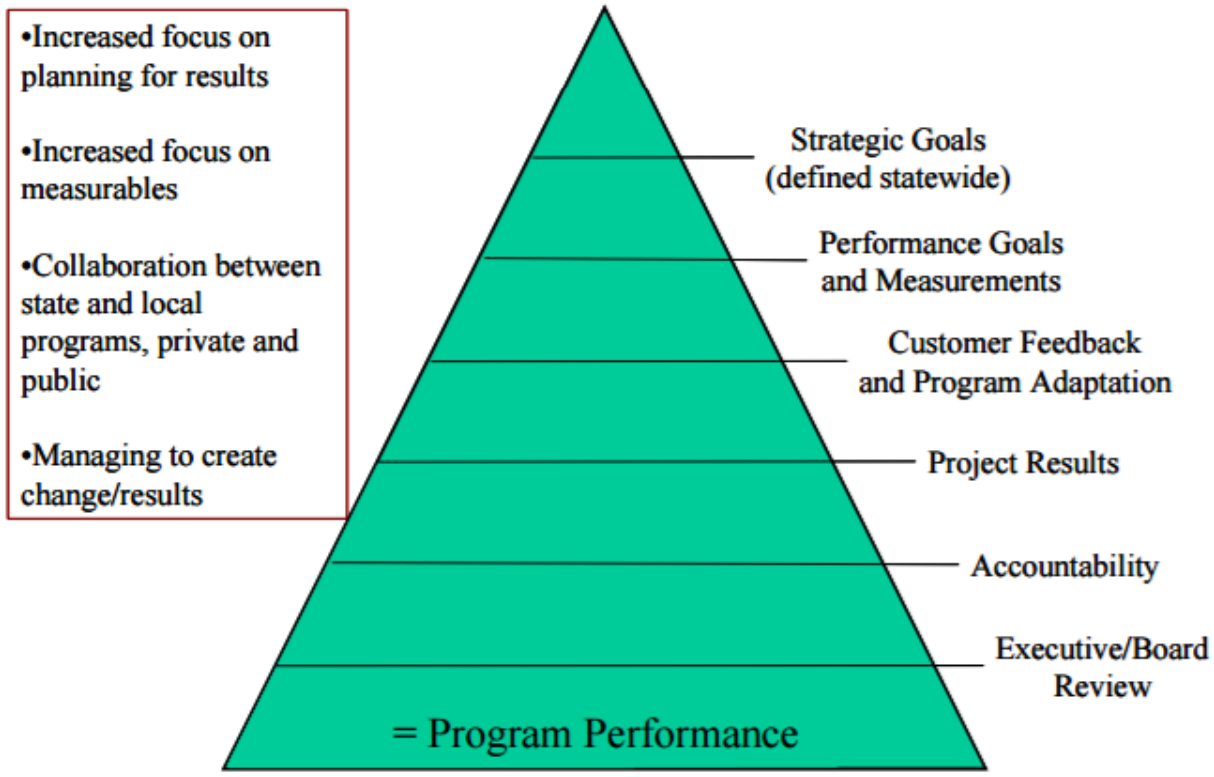
History of TDM in North Carolina

- City of Wilmington
  - Program started in 2001 with coordinator hired in 2002
  - Planned and started operation of transit services for UNC Wilmington and shuttle services
  - Produced TDM video, employer services brochure and employer workgroup
  - Mission to establish on-going employer-based coalition to define and implement TDM initiatives to enhance quality of life

History of TDM in North Carolina

- Statewide TDM Plan
  - Authored August 2003 through NCDOT, NCDENR (NCDEQ), ITRE and additional partners
  - Established process to address requirements of Senate Bill 953 and the Ambient Air Quality Act of 1999
  - Conducted SWOT analysis to gather feedback on existing programs and set baselines
  - Set Guidelines for program improvement, tools, goals and objectives and performance metrics

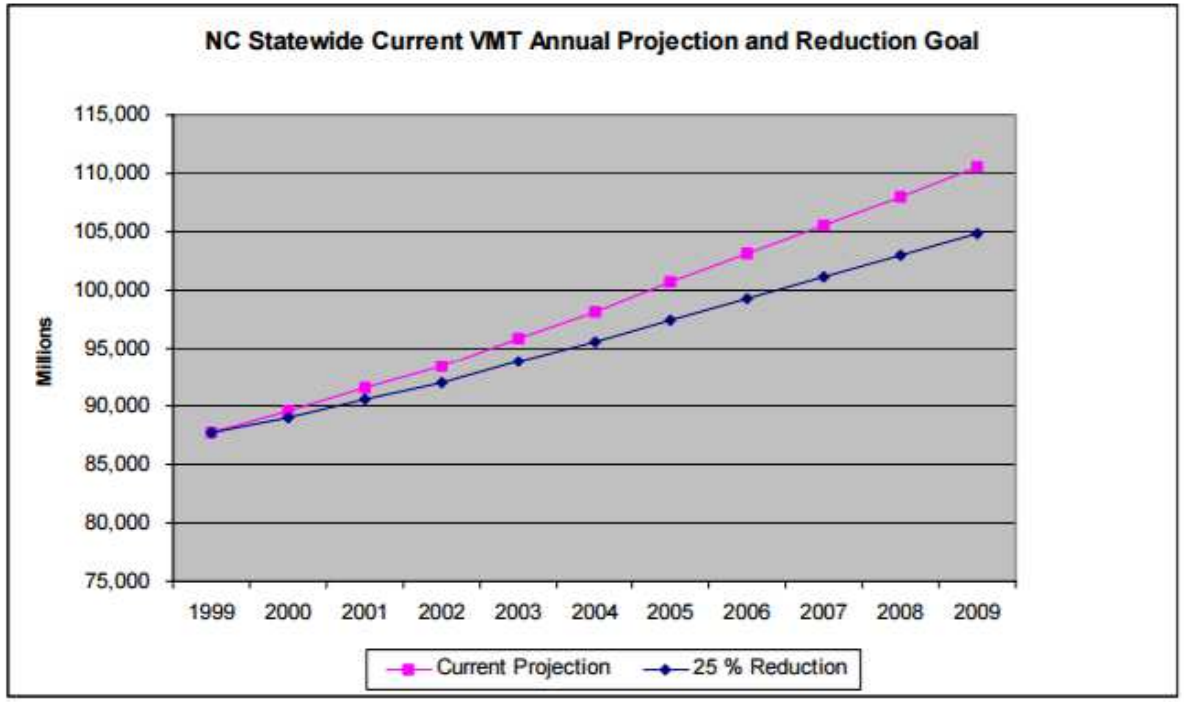
Figure 3: The Paradigm for Commuter Trip Management - Steps for a Successful Statewide TDM Program



History of TDM in North Carolina

- Statewide TDM Plan Results
  - Created new programs and expanded existing efforts
  - Reached VMT reduction goal

Figure 1: Statewide VMT Reduction Goal of 25% By 2009



Current State of TDM in North Carolina

- Current Programs Funded
  - Asheville
  - Charlotte
  - Piedmont-Triad
  - Triangle
  - Wilmington

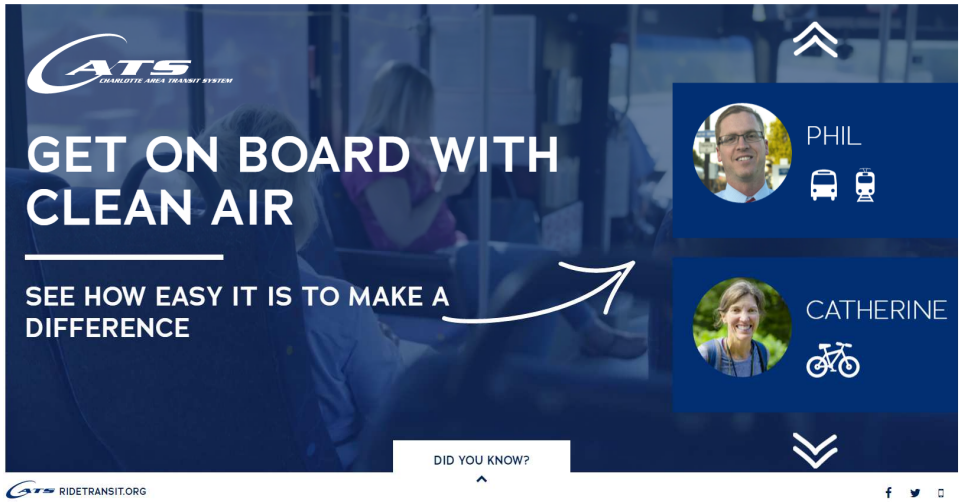
Current State of TDM in North Carolina

- Asheville
  - Housed at Land of Sky Regional Council
  - Supports Buncombe, Henderson, Haywood, Transylvania and Madison Counties
  - Efforts include park & ride counts, active transportation counts, and SharetheRideNC



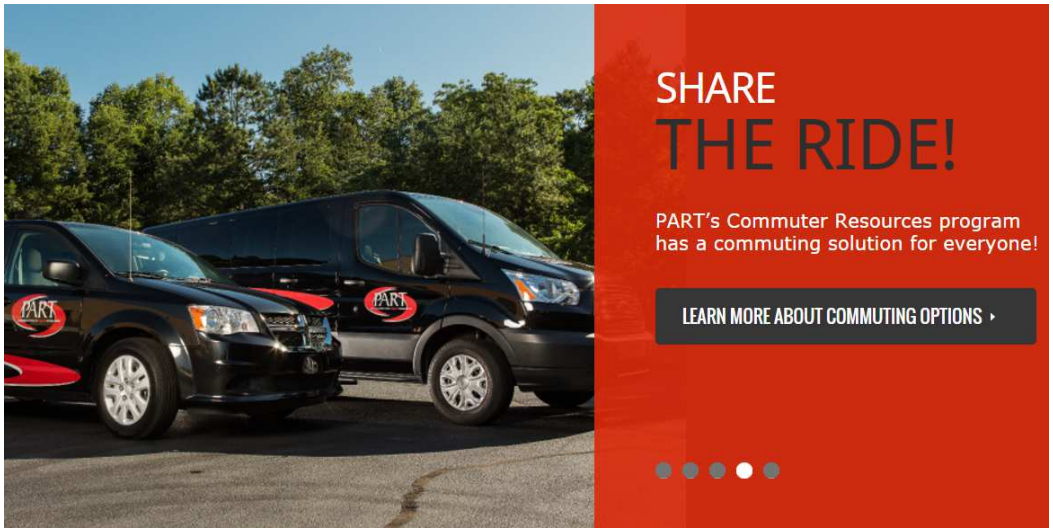
Current State of TDM in North Carolina

- Charlotte
  - Housed at Charlotte Area Transportation System (CATS)
  - Supports greater Charlotte area
  - Works closely with business community
  - Held 44 transit fairs throughout FY16 and 21 events at academic campuses



Current State of TDM in North Carolina

- Piedmont-Triad
  - Housed at PART
  - Supports greater Greensboro, High Point and Winston-Salem area
  - Commuter Resources PARTnership program offers free service resources for major employers



Current State of TDM in North Carolina

- Triangle
  - Housed at Triangle J Council of Governments
  - Supports greater Triangle area
  - GoTriangle serves as regional coordinator with local programs housed across the region (Chapel Hill, Duke, Durham, NC State, Raleigh, RTP, Wake Tech)
  - 31,921 alternative transportation users supported in FY16



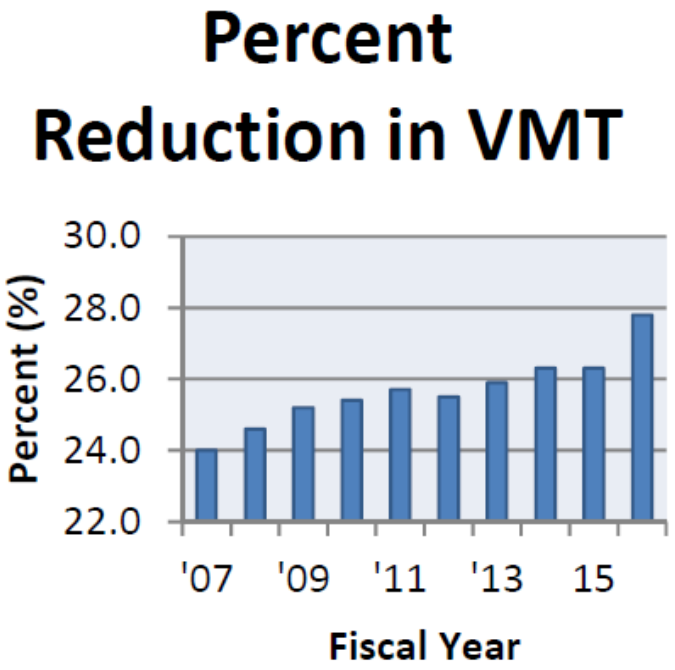
Current State of TDM in North Carolina

- Wilmington
  - Housed at City of Wilmington and supports region
  - Work Cape Fear: Expanding Commuter Options in the Cape Fear Region
  - Partnered with UNC Wilmington, New Hanover Regional Medical Center, Cape Fear Community College and others
  - WavePool vans travel 110 miles round trip each day



Current State of TDM in North Carolina

- Statewide Summary
  - 5 regional programs funded
  - $2,085,000 FY17 Budget
  - Over 38.5M VMT Reduced FY16
  - 26.1% reduced in project VMT growth between 2000 – 2009
  - Numerous additional benefits including air quality improvements, accessibility, economic development and public health





Intersection

Smart Tech, Smarter TDM?

David Gilford, Senior Director

February 7, 2017



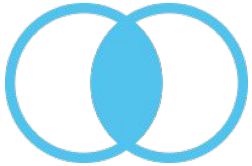
Intersection improves urban life by connecting the digital and physical worlds.

As creative thinkers grounded in technology, data, and analysis, we connect with the right people, in the right place, at the right time.

How we think about technology:



Start with a human-focused approach



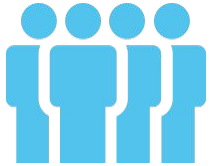
Dovetail digital design with the physical design



Showcase the institution as an innovation hub



Realize untapped value



Work for all users

By aligning digital assets, user needs, and revenue interests, our solutions are designed not just for today, but for relevance decades into the future.

A Unique Moment for Transportation



Fourth Revolution in Urban Technology



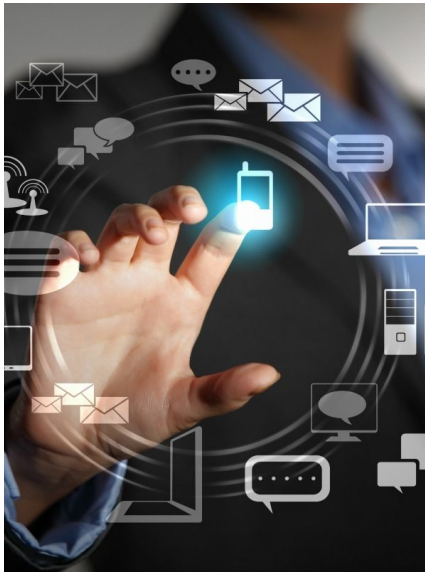
Steam



Electricity



Automobiles

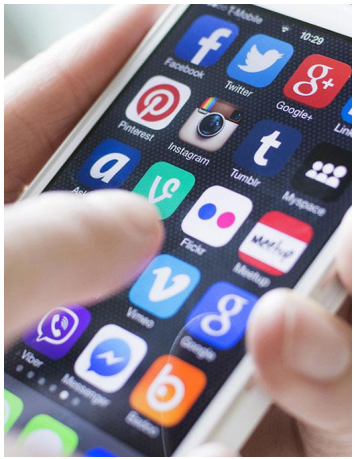


Digital

Five Technologies Are Coming Together to Transform the Urban Environment



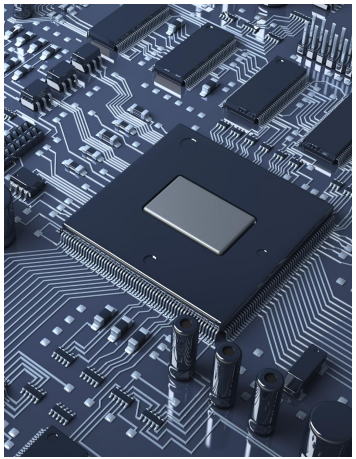
Ubiquitous connectivity



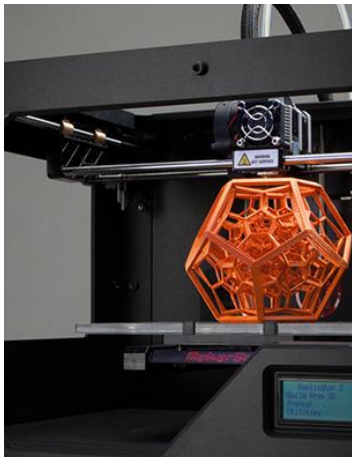
Social networks



Sensors



Inexpensive computing

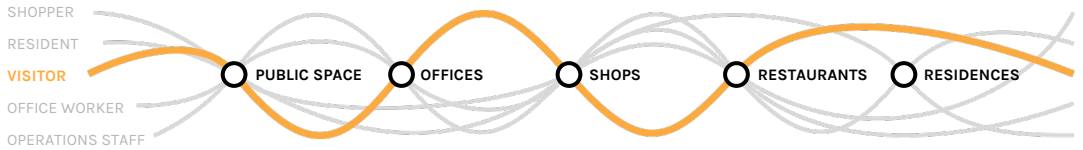


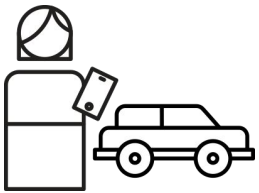
Digital design + fabrication

User Experiences Can Be Coordinated + Seamless



Mapping a Visitor's Journey

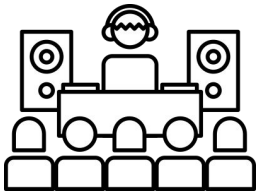




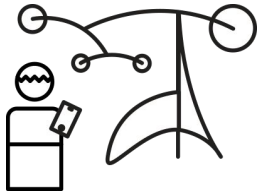
Rideshare Coordination



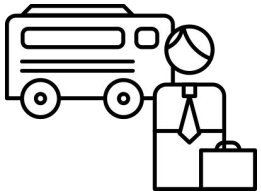
Personalized Wayfinding



Proximity Based Invitations



Landscape Interactions



Real-time Transit Information

Transit Today









Limited

Transit can be a black box. There is limited information on train locations, rider flows, and usage patterns

Cut off

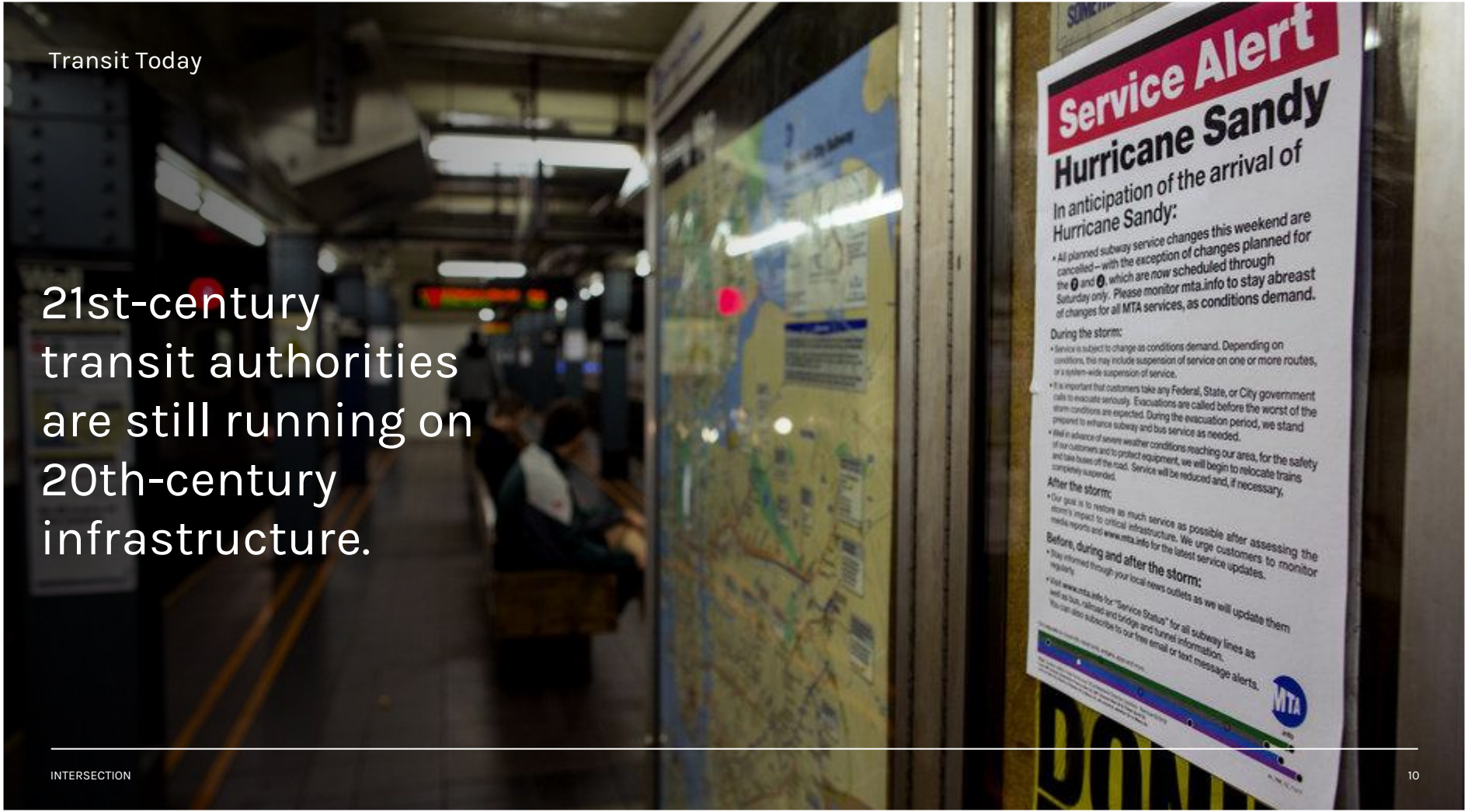
Connectivity can be a challenge and mobile maps don't work underground, leaving riders feeling cut off

Difficult

Mass transit can be intimidating and challenging, the domain of experts

Undervalued

Advertising generates significant revenue, but hasn't changed in a century



21st-century transit authorities are still running on 20th-century infrastructure.

Intersection's Transit Mission

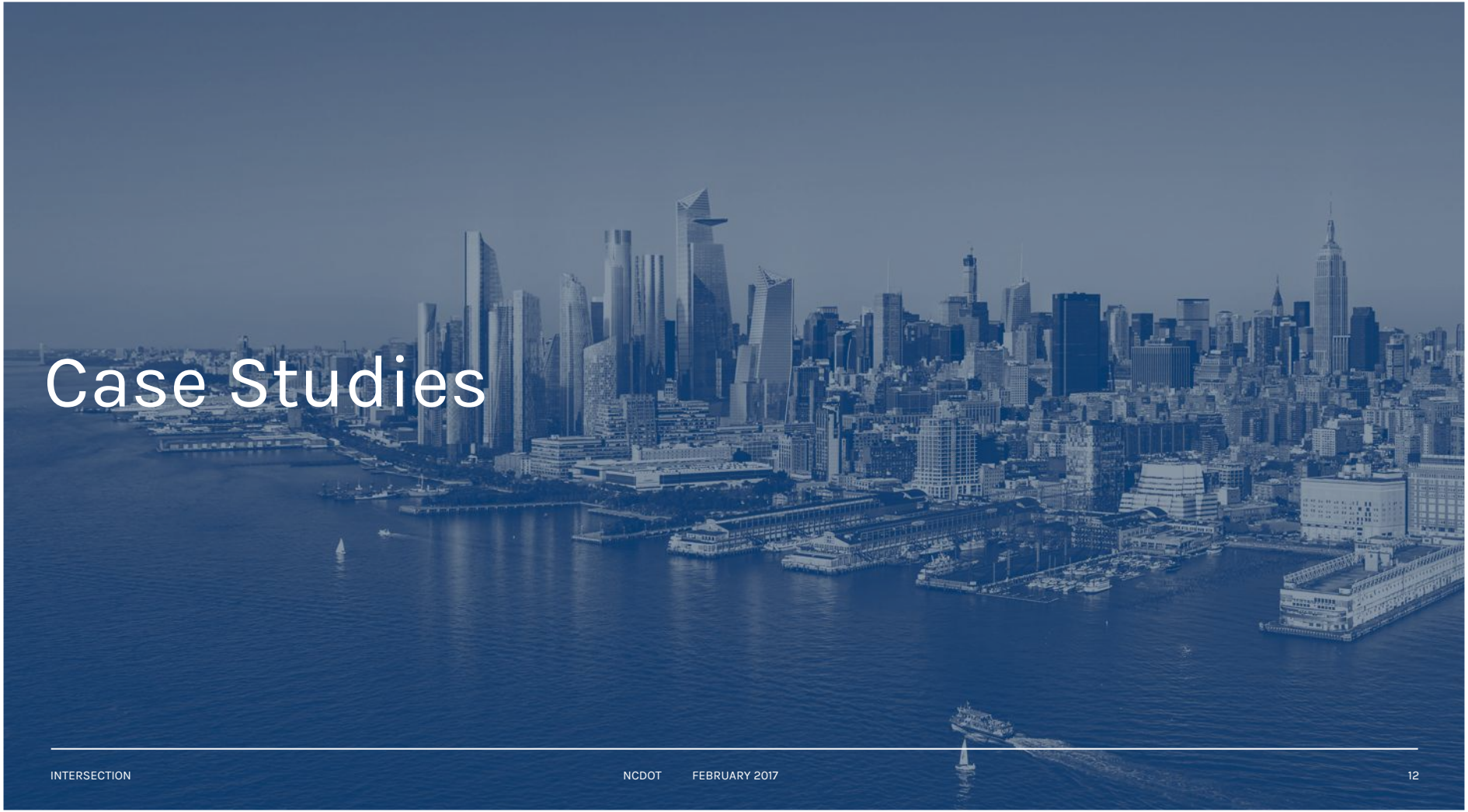
Improving the customer experience with better, more relevant information and new services.

Creating new capabilities and efficiencies for Transit Authorities.

Connecting brands to large captive audiences to fund a valuable public service.

Turning one of the most important parts of the city into a sandbox for new services and business opportunities.





Case Studies

Case Studies

LinkNYC

TRANSFORMING THE CITY EXPERIENCE

Replacing the aging public pay telephone infrastructure, LinkNYC is designed as a 21st century communication hub delivering free public access to content, data, and city services to fundamentally change the way that people connect to brands, each other and the city.

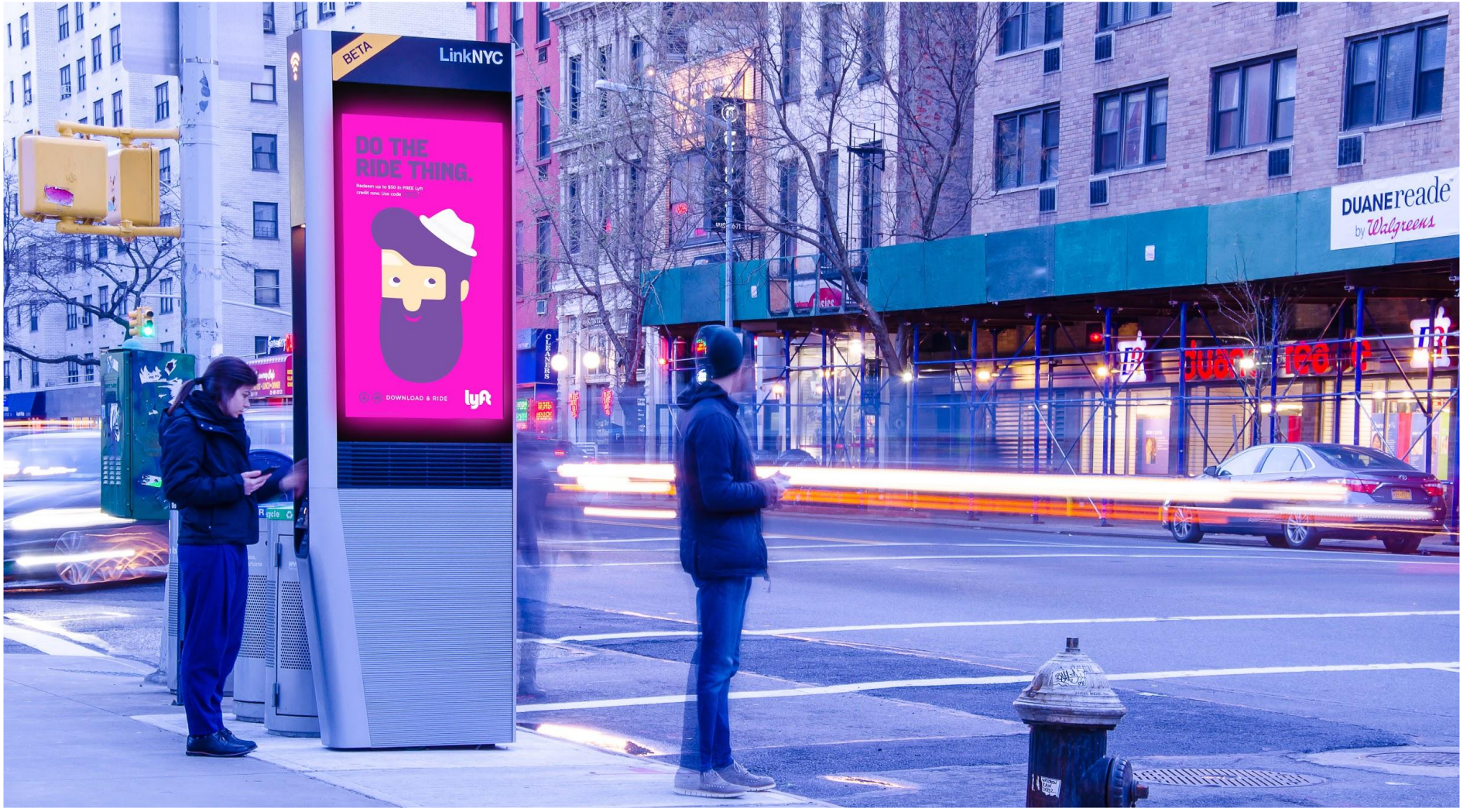


LARGEST & FASTEST PUBLIC WI-FI NETWORK IN THE WORLD
New Yorkers can now be more productive on-the-go than in their homes or offices

55” DYNAMIC AD DISPLAYS
Location-aware screens allow cities and brands to deliver contextual messages when and where it matters most

TOUCHSCREEN DISPLAY
On-demand access to free domestic phone calls, wayfinding, and city services

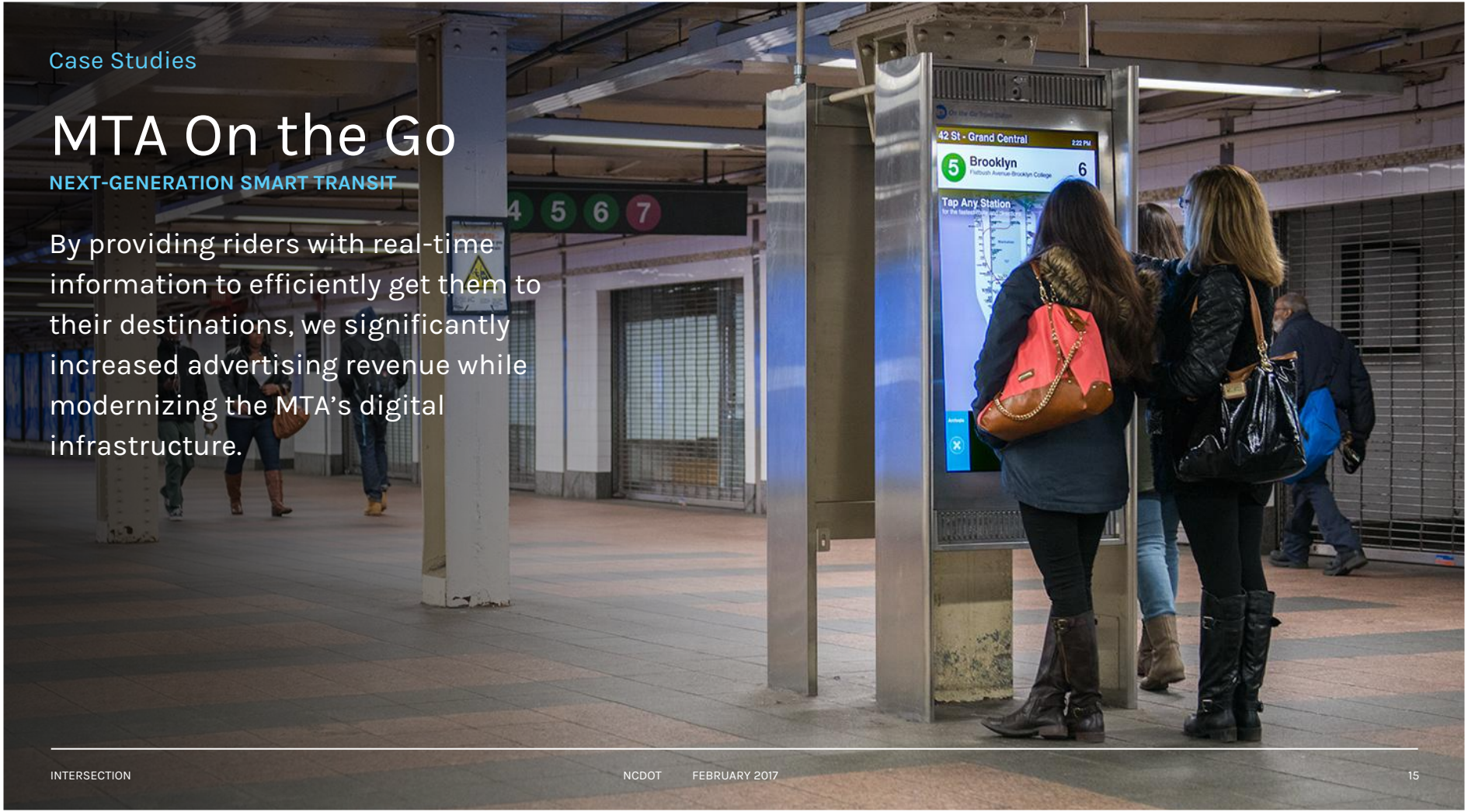
QUICK-CHARGE™ USB PORTS
For busy New Yorkers, charging a smartphone at lightning speed is now just a Link away


BETA
LinkNYC
DO THE
RIDE THING.
DOWNLOAD & RIDE
lyft
DUANE reade
by Walgreens

MTA On the Go

NEXT-GENERATION SMART TRANSIT

By providing riders with real-time information to efficiently get them to their destinations, we significantly increased advertising revenue while modernizing the MTA's digital infrastructure.

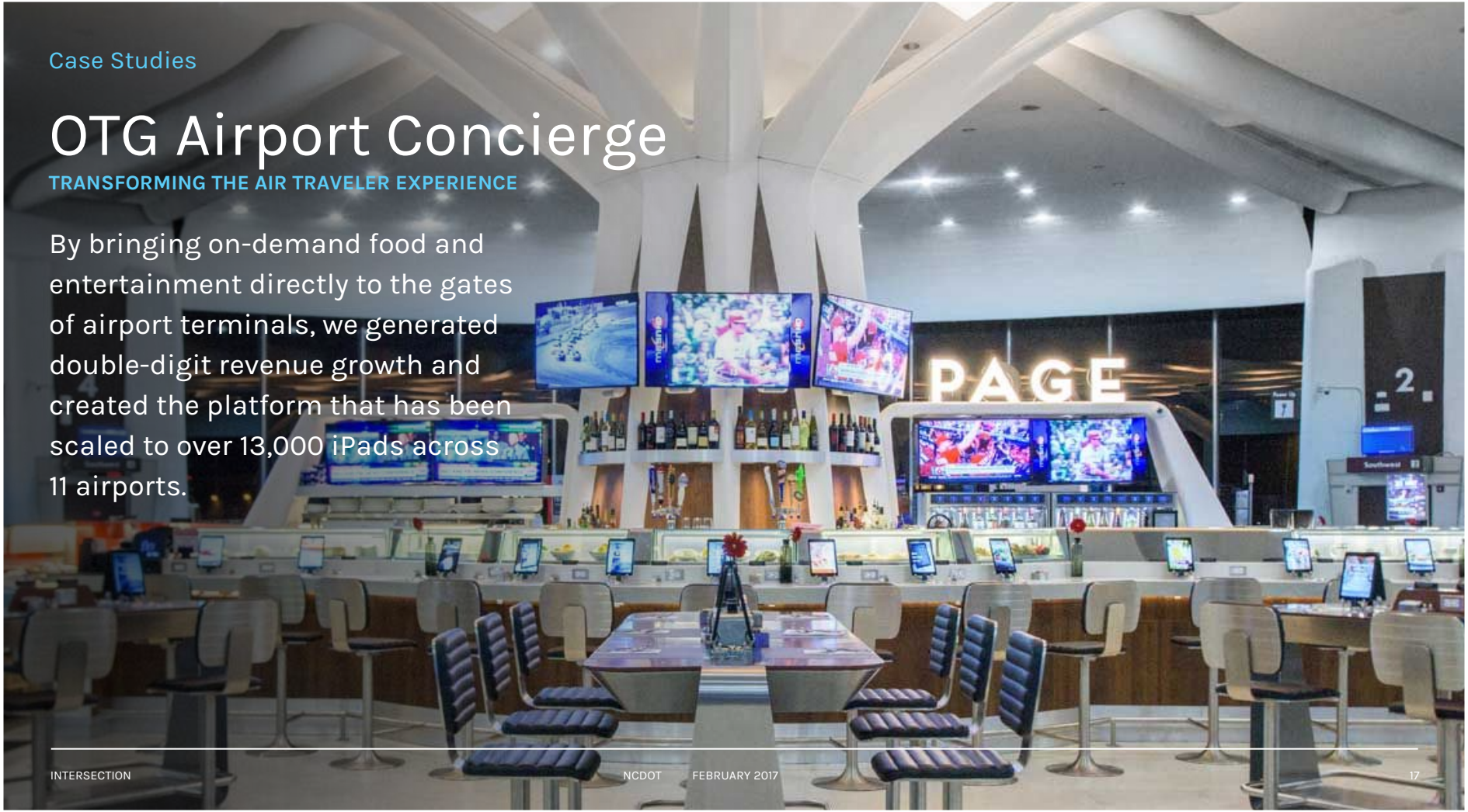



72 Street
Area of Rescue Assistance
On the Go Travel Station
72nd Street
Brooklyn
Stillwell Av-Coney Island
11:36 AM
2
Directions
Itinerary Info
Showing Route 2 / 3
Points of Interest

OTG Airport Concierge

TRANSFORMING THE AIR TRAVELER EXPERIENCE

By bringing on-demand food and entertainment directly to the gates of airport terminals, we generated double-digit revenue growth and created the platform that has been scaled to over 13,000 iPads across 11 airports.

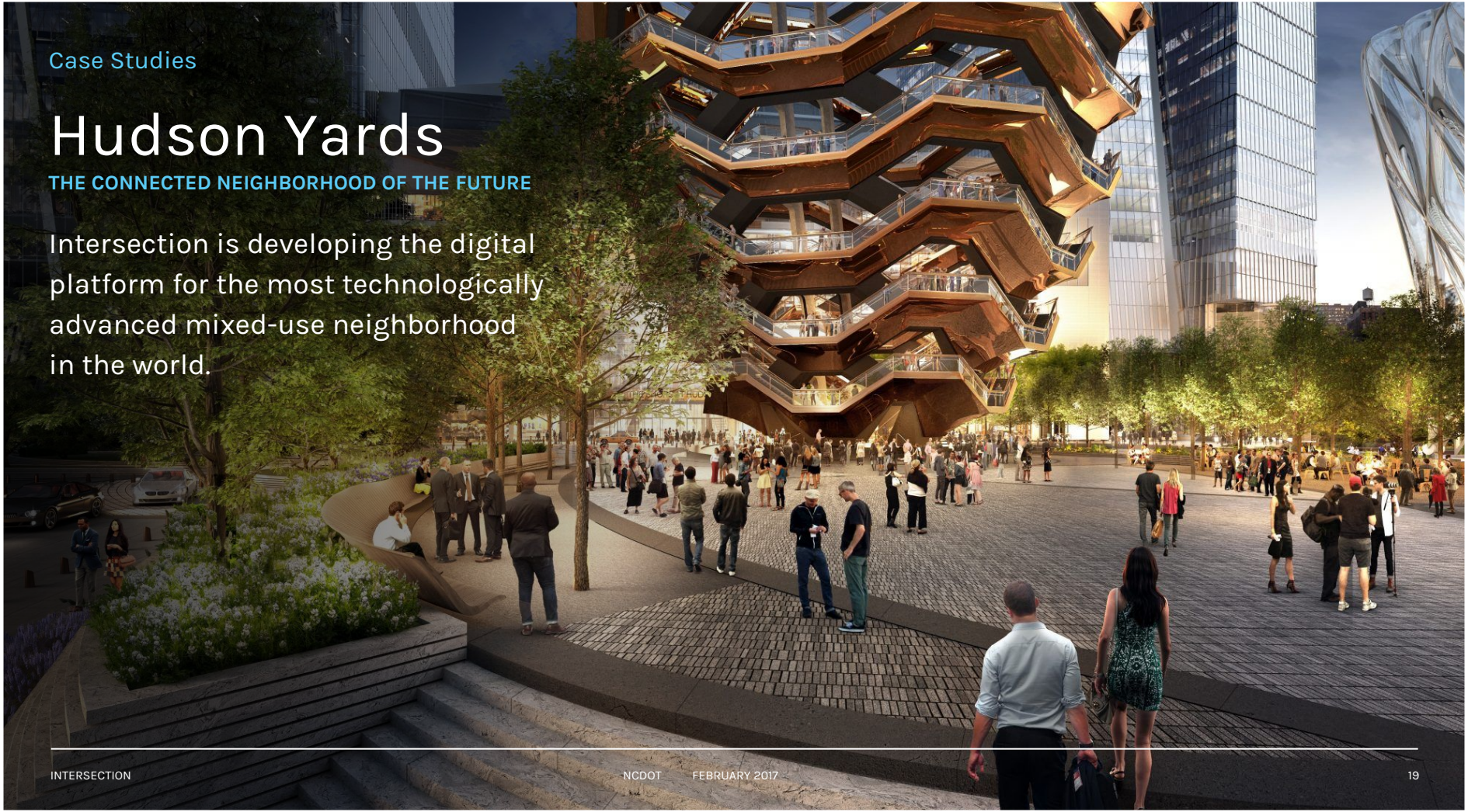



Gate
10
Gate
9
Gate
8
iPad
7:02 PM
Special Pasta
Fettuccine al fredo with chicken
and red chili flakes
6 of 6
Wines
Beer
Spirits
Specialty Cocktails
Salad
Bruschetta
LGA ATL
BOARDING 4:30 PM EDT
Destination
Internet
Order Food
Assistance

Hudson Yards

THE CONNECTED NEIGHBORHOOD OF THE FUTURE

Intersection is developing the digital platform for the most technologically advanced mixed-use neighborhood in the world.






7 34 Street Station Hudson yards
8:34:27
THU 21 APR
Subway 7



Lessons for TDM Planning?

Intersection's experience suggests that TDM planners should:

+ Focus on **customer experience first**, not technology

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+ Find opportunities for **cross-program coordination and simplification**, whether through policy or technology
+ **Enable others to build new features** on top of your infrastructure, from APIs to open data competitions
+ Plan for **iterative development** as technology platforms evolve

Intersection

Thank you.

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Sr. Director, Client Strategy
david.gilford@intersection.com

TRANSPORTATION DEMAND MANAGEMENT IN THE WASHINGTON DC REGION

North Carolina Statewide TDM Strategic Planning Session

Nicholas Ramfos
Director, Transportation Operations Programs

February 7, 2017



National Capital Region
Transportation Planning Board

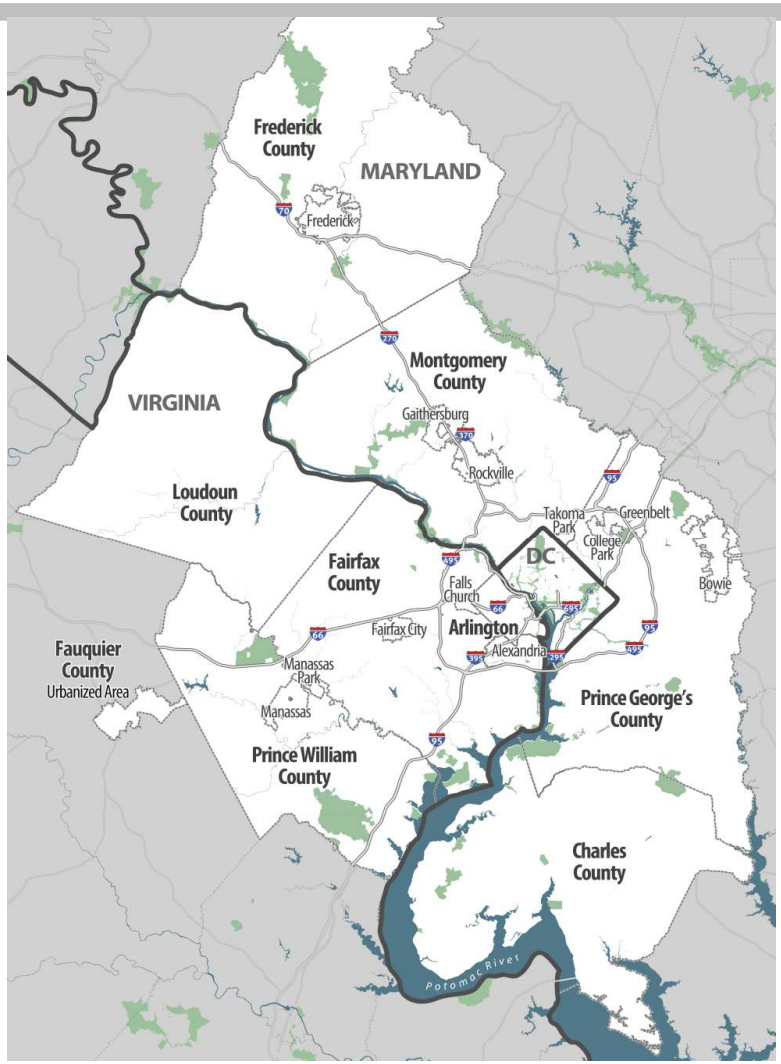
COMMUTER CONNECTIONS
A SMARTER WAY TO WORK

About the National Capital Region Transportation Planning Board (TPB) and the Washington DC Region

- National Capital Region Transportation Planning Board (TPB) is the federally designated Metropolitan Planning Organization (MPO) for the region
- Plays an important role as the regional forum for transportation planning
- Prepares plans and programs that the federal government must approve in order for federal-aid transportation funds to flow to metropolitan Washington

Today:
5.5 million residents
3.1 million workers

By 2040, There will be 23% more residents and 29% more jobs

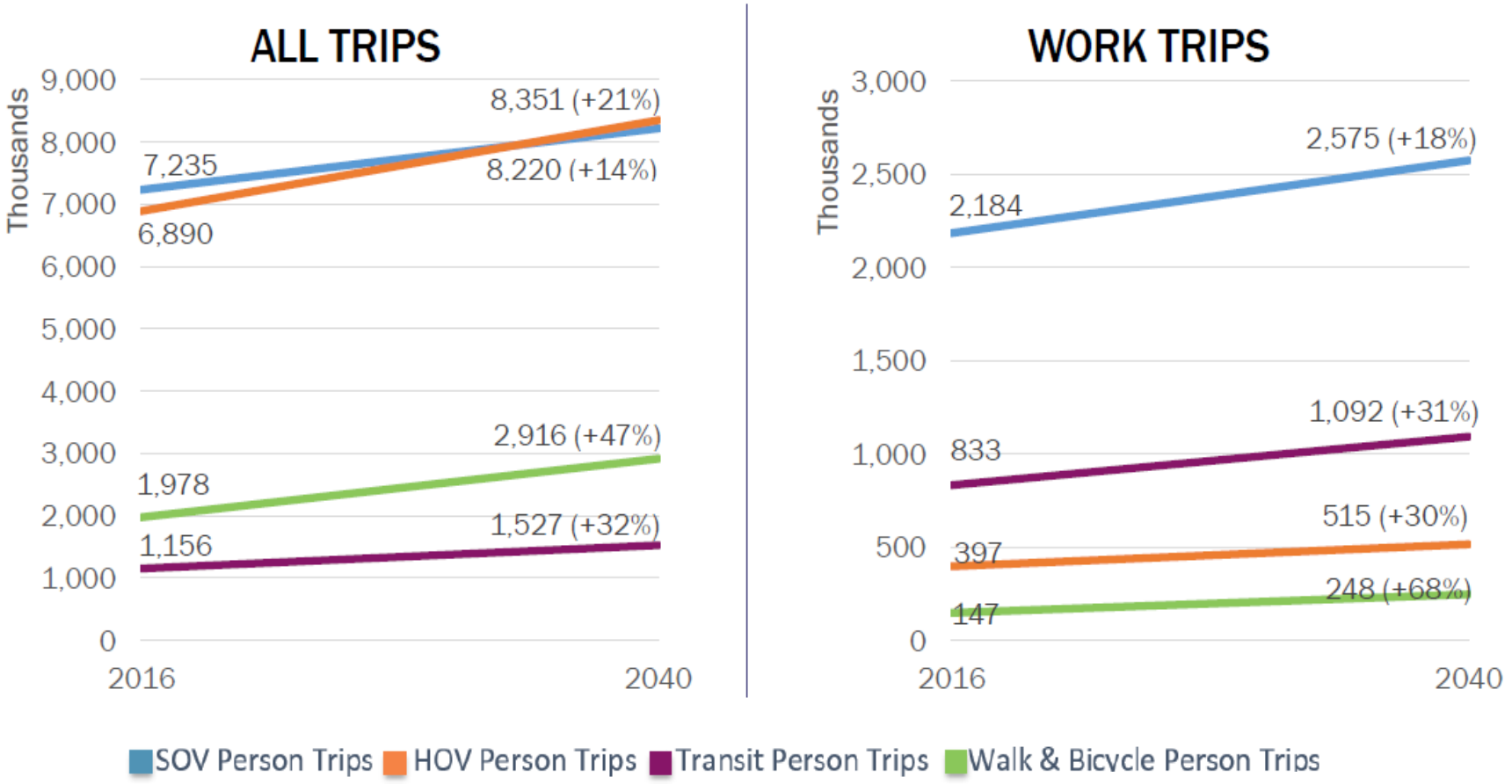


National Capital Region Transportation Planning Board

COMMUTER CONNECTIONS A SMARTER WAY TO WORK

Travel Choices

Growth in carpooling, transit, walking, and bicycling is expected to out pace growth in single occupancy driver trips, for all trips and work trips alike.



What is Commuter Connections?

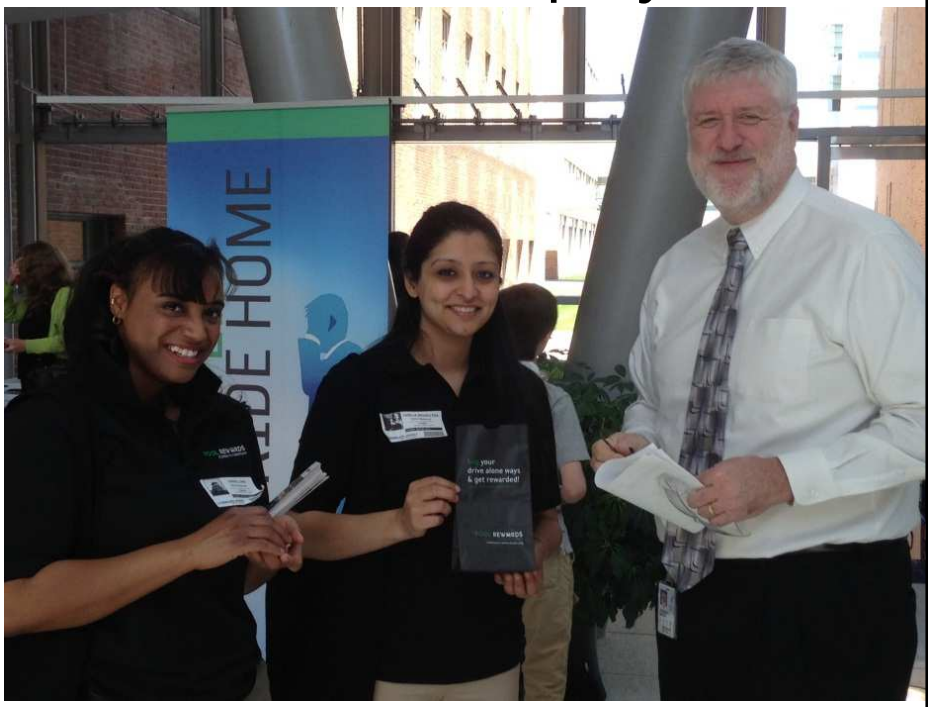
- Network of public and private transportation organizations, including COG, state funding agencies, and local organizations, that work together to assist and encourage people in the Washington region to use alternatives to the single-occupant automobile.

- Definition from Strategic Plan

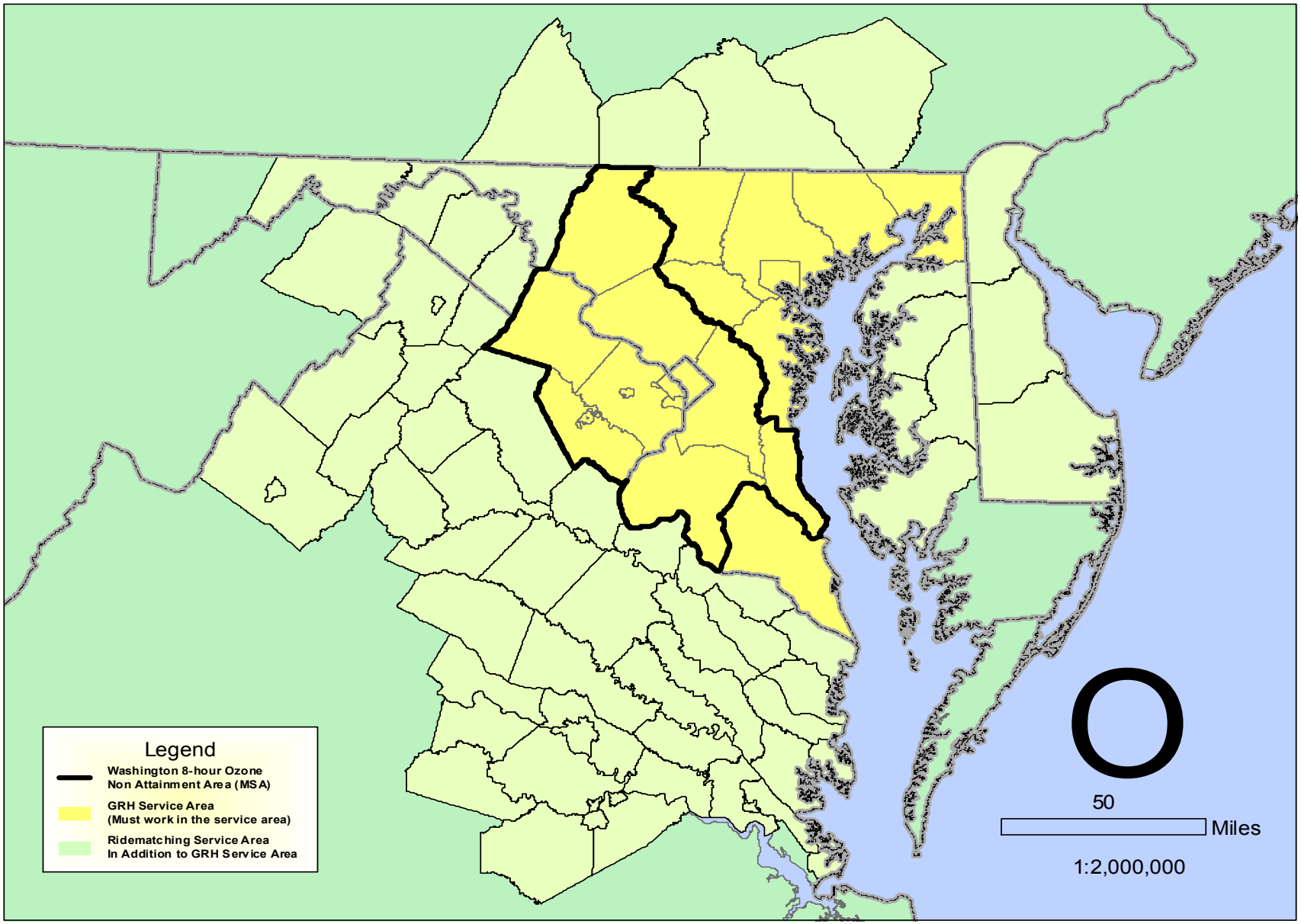


Commuter Connections Benefits

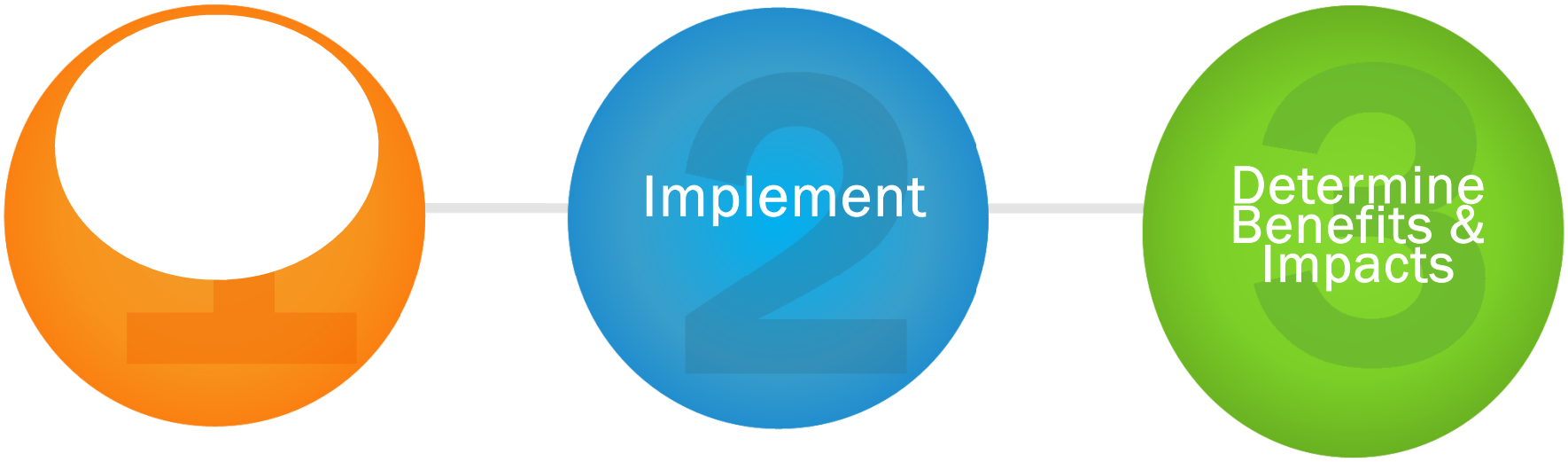
- Jurisdictions
  - Helps reduce and manage commuter congestion, goods movement, tourist travel
  - Helps reduce emissions
  - Supports local efforts to attract and retain employers
- Employers
  - Recruitment/Retention
- Workers
  - More commute options
  - Reduced stress/costs/time
  - Improved quality of life



Geographic Areas Serviced by Commuter Connections



Regional Transportation Demand Management (TDM) Programs



Engage decision-makers and stakeholders in the process

COMMUTER CONNECTIONS
A SMARTER WAY TO WORK

Design the Program

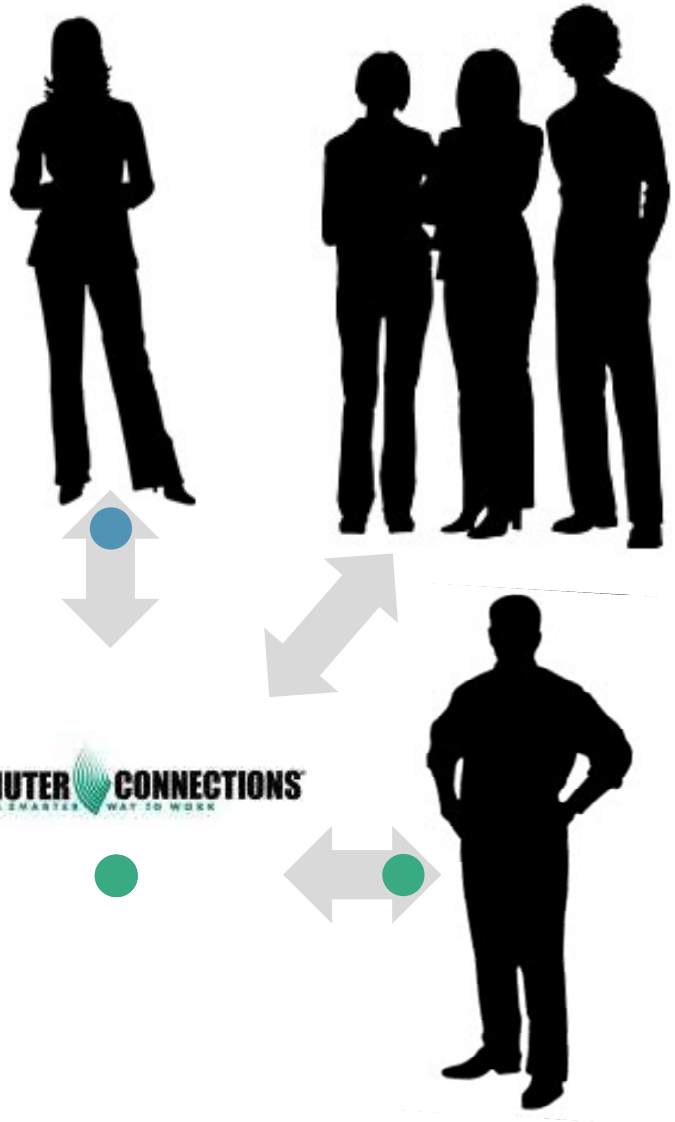
Develop measures that will contribute to regional goals and aspirations

- Address federal air quality and congestion management requirements.
  - Flagship program re-positioned as the **Commuter Operations Center**
  -
- New regional measures adopted included:
  - **Employer Outreach**
  - Regional **telework resource center**
  - Regional **Guaranteed Ride Home program,**
  - **Integrated Ridesharing**
  - **Mass marketing**
    - Bike to Work Day, Car Free Day and carpool/vanpool incentive program

Regional Collaboration

Agree to how TDM programs can assist the region to meet congestion reduction and air quality goals.

Team up with local governments, transportation management associations, transit operators, vanpool providers, Carshare, Bikeshare and dynamic rideshare services to develop program services that will contribute to regional transportation and emission impacts.





Commuter Connections' Role in the Regional Planning Process

- The TPB is required by Federal regulations to approve a congestion management process which includes TDM as part of the metropolitan transportation plan.
  - Commuter Connections constitutes the major demand management component of the region's congestion management process.

Commuter Connections' Role in the Regional Planning Process

- Commuter Connections also provides transportation emission reduction measure (TERM) benefits for inclusion in the air quality conformity determination approved by the TPB. This is part of the annual update of the region's Constrained Long Range Plan (CLRP) and Transportation Improvement Program (TIP).
- Commuter Connections also documents Green House Gas emission impacts in the region.

Commuter Connections' Role in the Regional Planning Process

- Commuter Connections' results may also help contribute to new performance measures and goals that will be set by the region under FAST Act requirements.

Implement the Program

Identify and address administration and operation hurdles

- Revised program began in 1996
  - Telework Resource Center, Employer Outreach and GRH
  - Mass Marketing followed

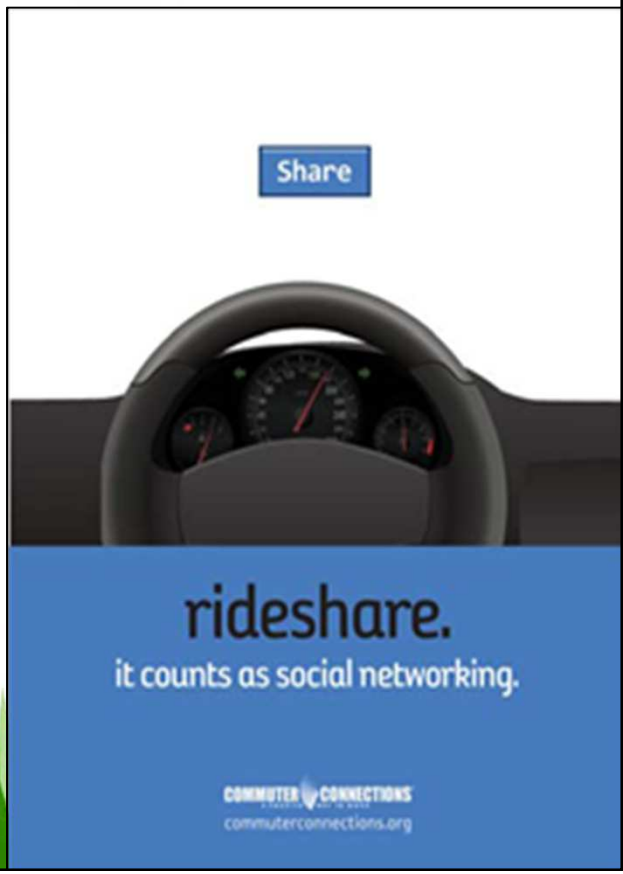
- Complexity of the region created several challenges
  - Needed to be overcome in order for the measures to launch and succeed
  - Great deal of interest from many to design the measures to meet their expectations rather than regional goals (30 local programs, 3 state funding agency, federal government)
  - Seed of thinking planted was to "think regionally and act locally"

- Program changes made based of feedback in order to strengthen each of the measures
  - That option continues to be on the table for all of the measures.

YOUR MESSAGE.

- Brand
  - Ridematching, Guaranteed Ride Home, Telecommuting, Employer Outreach, Marketing (Incentives, Special Events)
- Expected Goals and Outcomes
- Strategic Plan





PROGRAM OBJECTIVES

- Convert Single Occupant Vehicle (SOV) commuters to alternate modes of transportation
- Encourage continued use of alternate modes of transport
- Reduce vehicle trips and miles of travel
- Reduce vehicle emissions



OPERATIONAL OBJECTIVES



- Foster open and direct cooperation, communications, and coordination between Commuter Connections network members, including committee procedures that foster full participation
- Ensure responsiveness and accountability to funding agencies' direction and guidance for program focus and goals
- Ensure that all network members (e.g., funding agencies, local jurisdictions, MWCOG, local contractors, and others) hold each other accountable for fulfilling program objectives.
- Monitor cost effectiveness for Commuter Connections individual programs to help ensure optimal use of resources.
- Provide an open forum for sharing information and status on TDM projects in the region, whether implemented through or outside of Commuter Connections, with all network members.

Evaluate the Program

Develop and use data collection efforts to determine program impacts

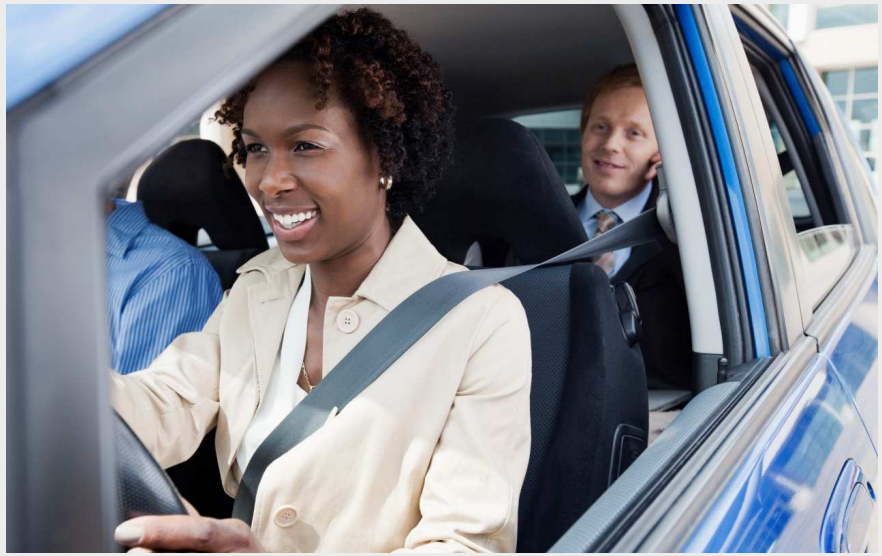
- Data collection and program analysis are key components in determining how effective each of the measures and the program as a whole is performing.
- Early on, it was decided that there would need to be a vigorous evaluation component of the program to measure both transportation and emission impacts.
- A detailed framework methodology is in place on how data is collected and analyzed and how it then fits back into the regional planning process for both air quality and congestion management. The evaluation cycle occurs over a three year period and there are several studies and reports that are produced during this time.

Evaluation Cycle



- Evaluation Methodology “Blueprint”
- Data Collection
- Reports
- Share Results
- Incorporate into Regional Planning Process





Data to Assess TDM Contributions to Regional Goals

Background: Transportation decisions are increasingly driven by sustainability, livability, health/safety, and system performance. TDM data could demonstrate TDM's wider range of societal benefits and contribution to regional transportation system performance

Framework Update: Expand efforts to collect data on societal benefits:

Collect data in SOC and user surveys to define CC users' travel route and time and role of TDM in QOL/livability and transportation satisfaction and for Performance Based Planning activities

Explore new measurement tools to estimate societal benefit (e.g., accident reduction) from reduced VMT

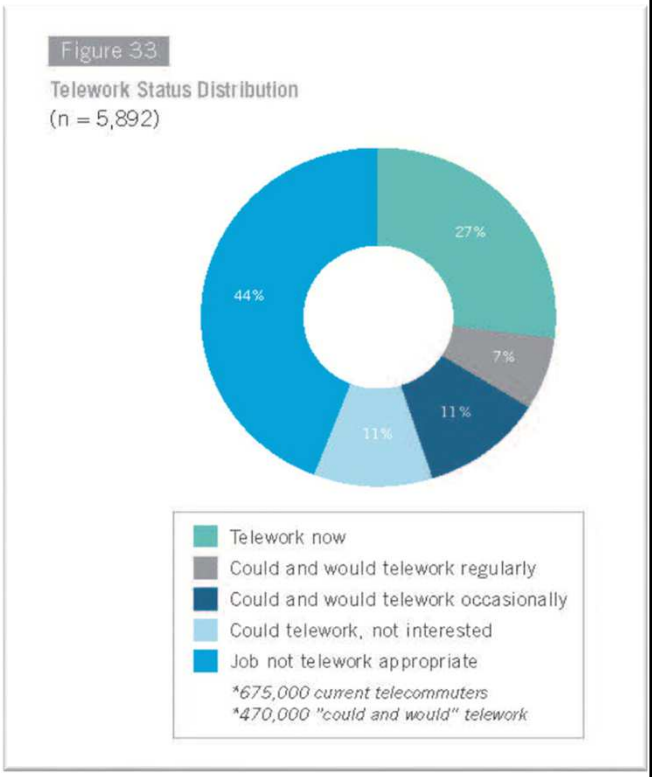
Explore how TERM data could be analyzed with travel movement data sources for location-specific analysis

Data to Communicate Results/Benefits

Background: TERM evaluation produces technical data for conformity tracking. Surveys collect data that could be valuable to CC partners, funders, and other audiences.

Framework Update: Format and organize data to facilitate communication of TERM results and CC value to stakeholders:

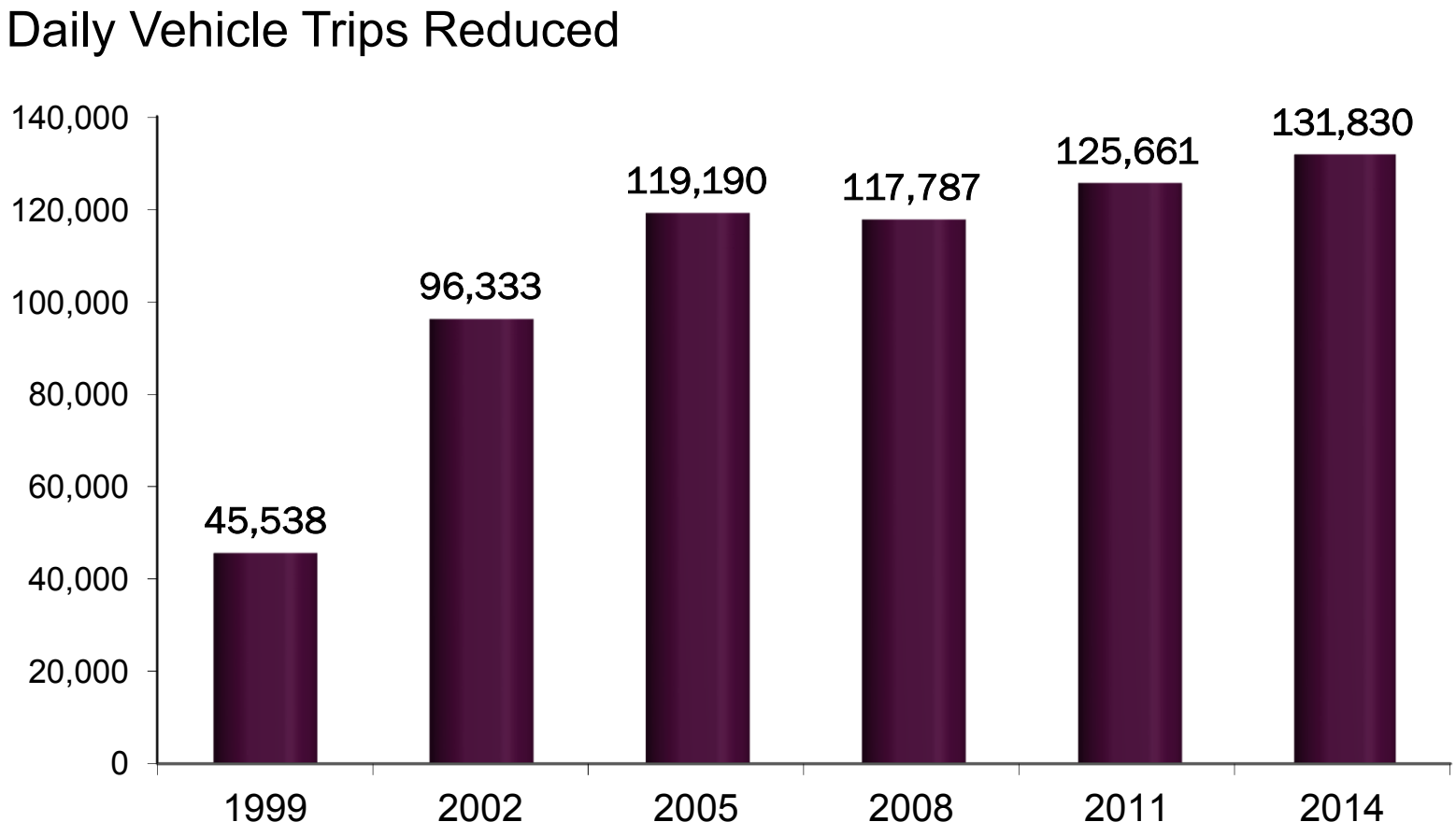
- For SOC, GRH, Placement surveys, prepare 1-3 page "Top Findings" summary
- Format other survey/evaluation data for COG to package/disseminate through other means:
  - Social media, blogs
  - Targeted emails
  - Research briefs



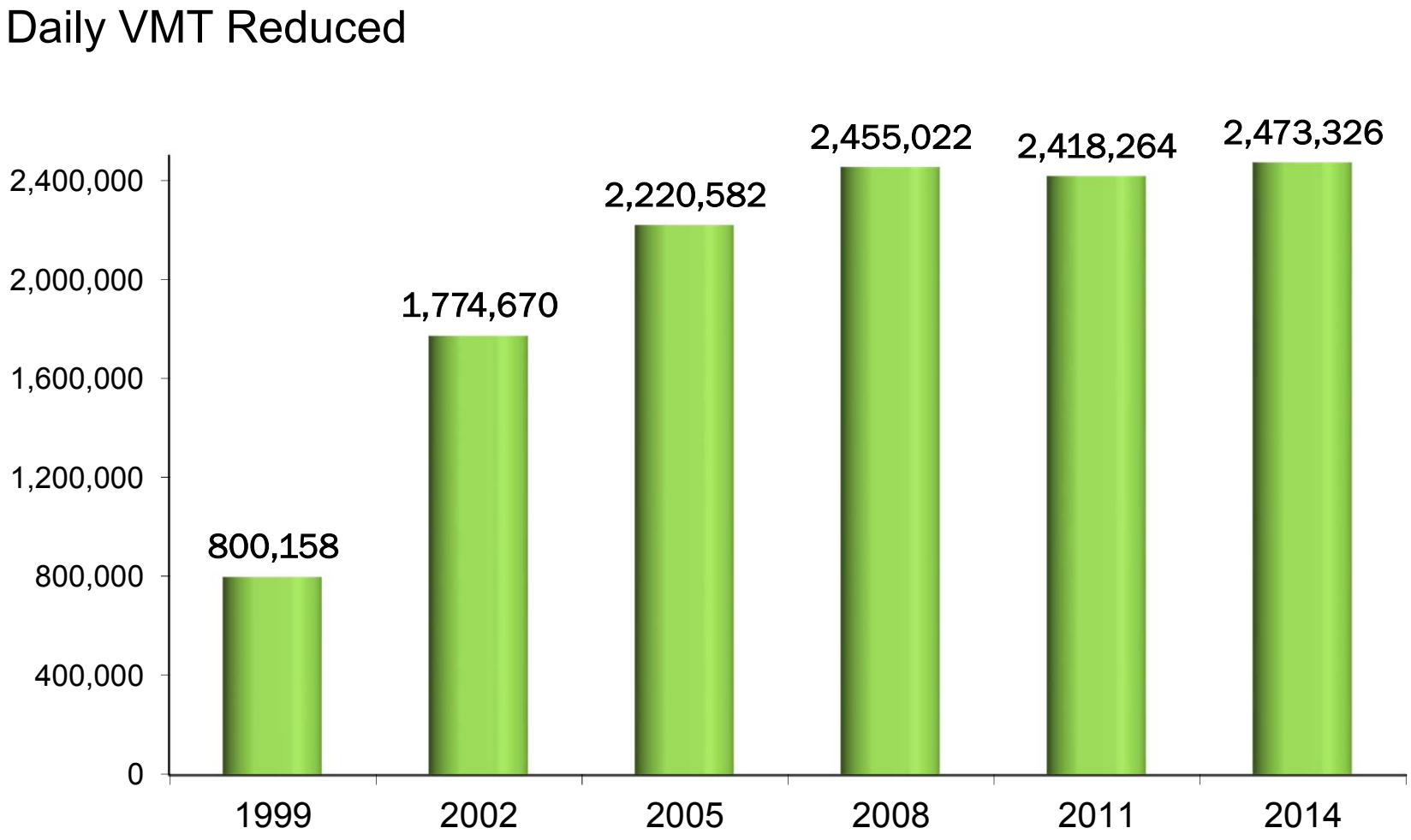
MSA Rankings for Carpooling and Transit Use

Metropolitan Statistical Area	Total Workers	% Carpool	% Transit
NYC/Long Island/N NJ/PA	8,719,316	7.4%	30.3%
LA/Long Bch/Santa Ana	5,816,255	11.4%	6.1%
Chicago/Naperville/Joliet	4,422,844	9.1%	11.5%
Dallas/Ft. Worth/Arlington	2,945,976	11.4%	1.6%
Washington DC Metro	**2,795,375**	**11.1%**	**13.9%**
Philadelphia Metro Area	2,751,491	8.9%	9.2%
Houston Metro Area	2,581,559	12.6%	2.7%
Atlanta Metro Area	2,494,475	10.9%	3.6%
Miami Metro Area	2,479,021	10.1%	3.8%
Boston Metro Area	2,277,958	8.1%	11.9%
San Francisco-Oakland	2,056,454	10.4%	14.5%

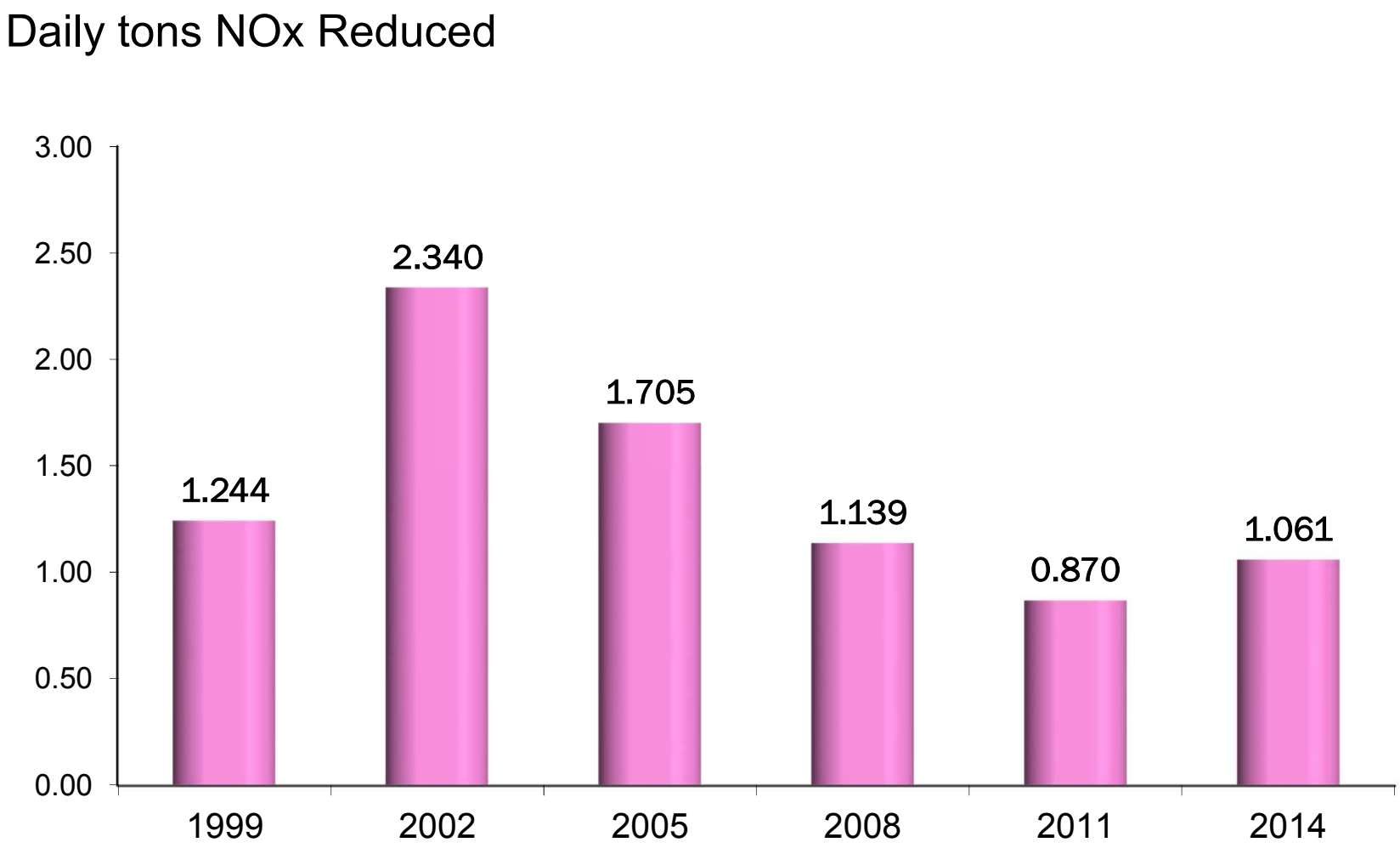
Commuter Connections
Vehicle Trip Reduction – 1999 to 2014



Commuter Connections
VMT Reduction – 1999 to 2014

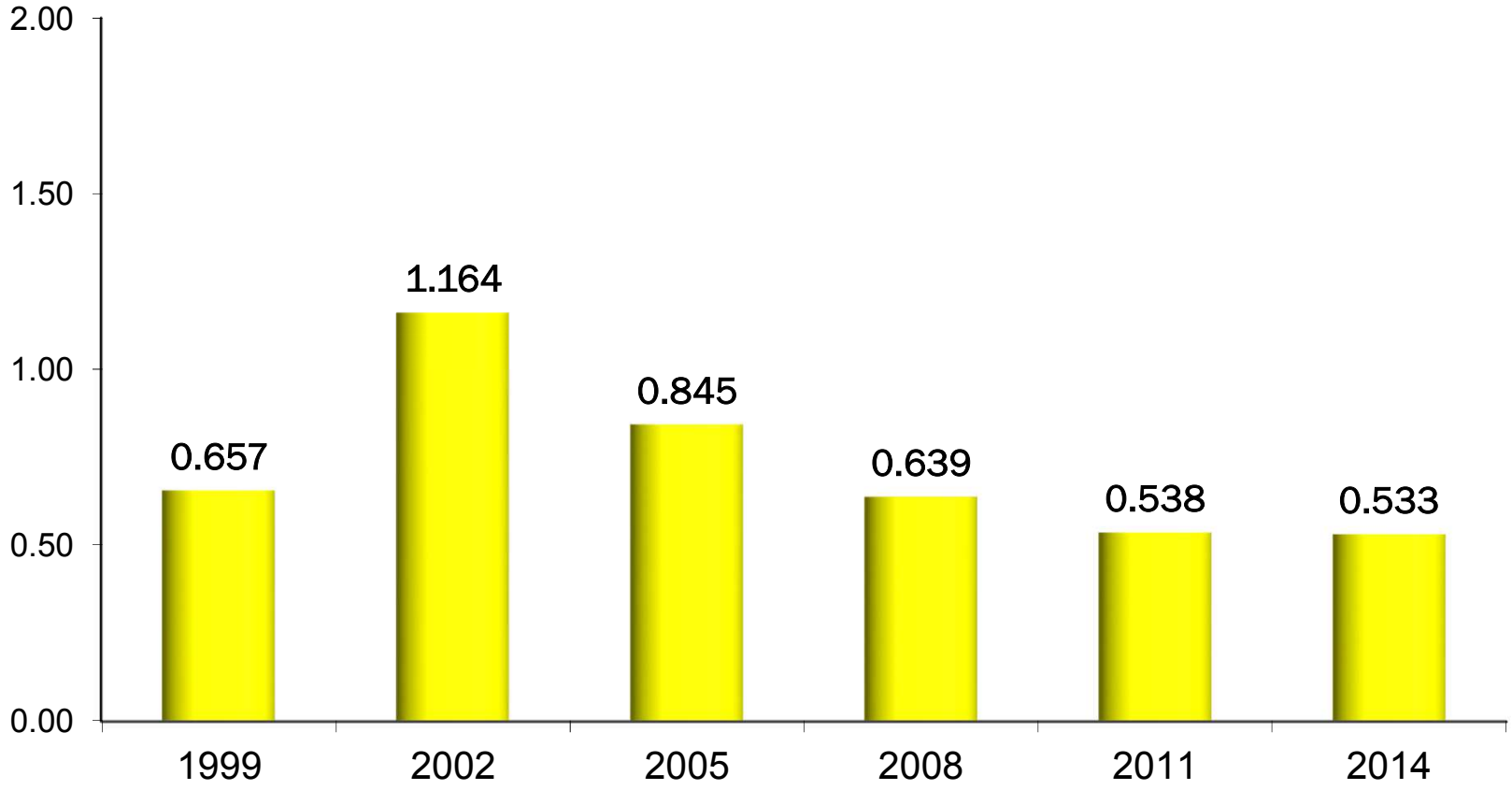


Commuter Connections
NOx Reduced (daily tons) – 1999 to 2014

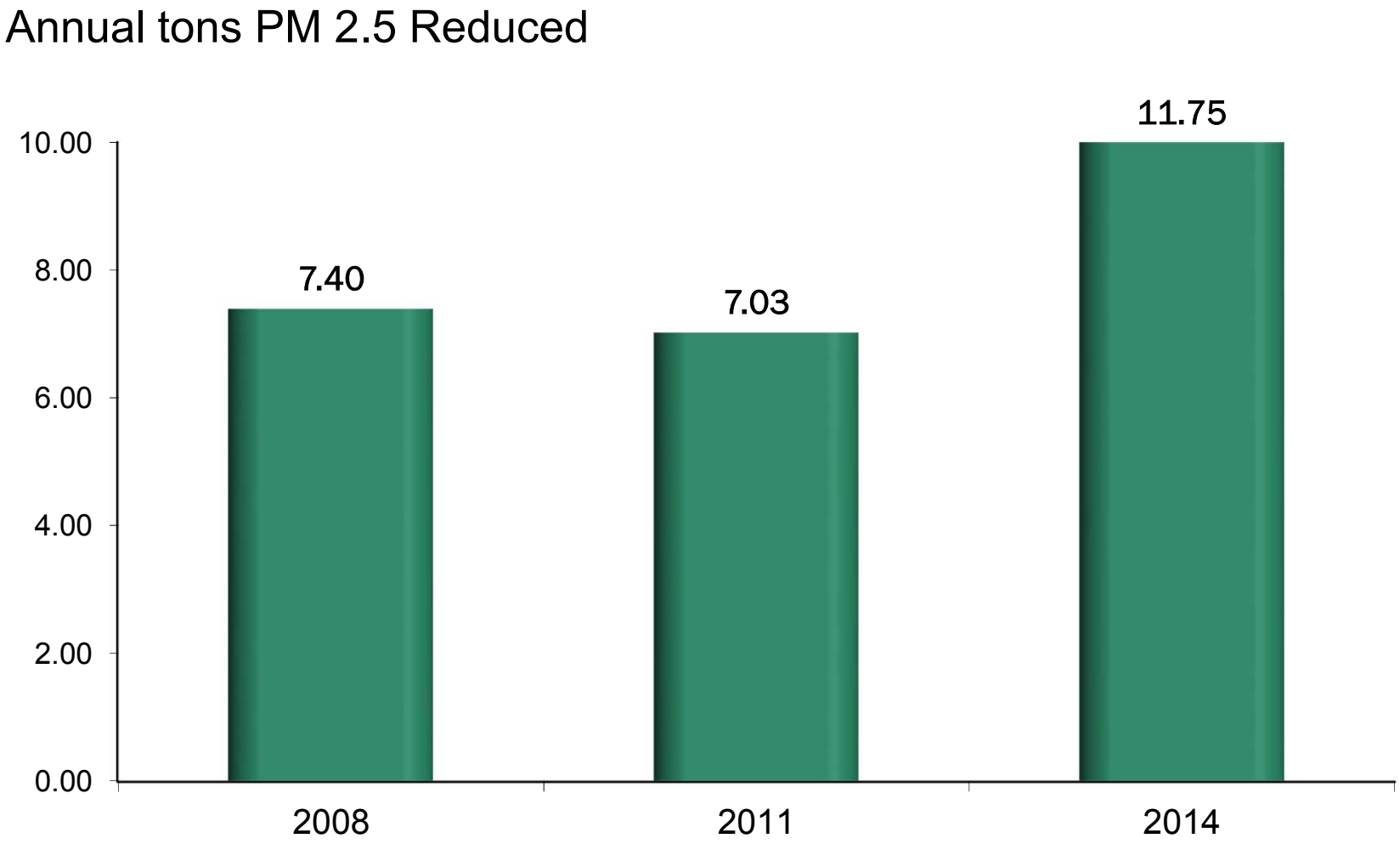


Commuter Connections VOC Reduced (daily tons) – 1999 through 2014

Daily tons VOC Reduced

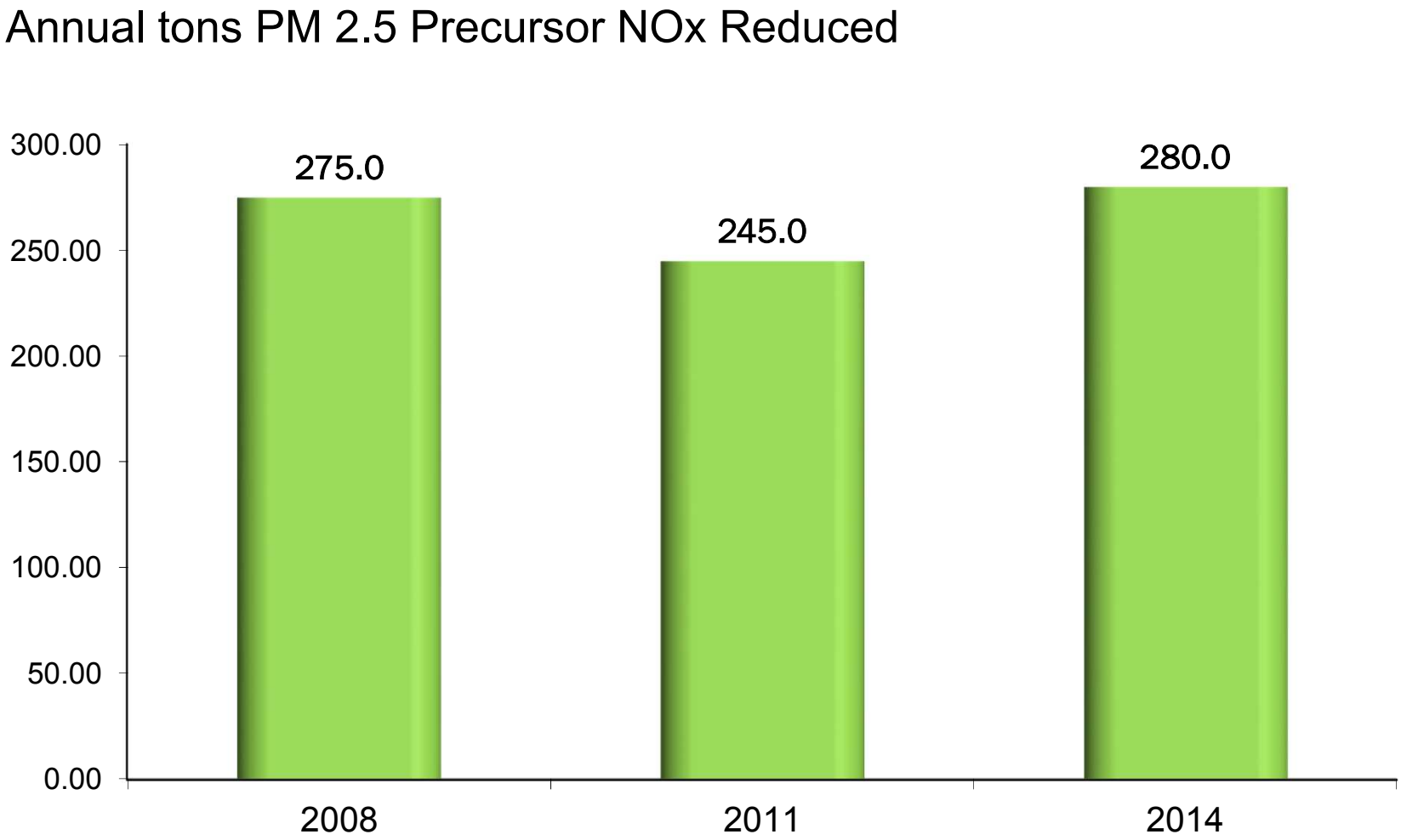


PM 2.5 Reduced (annual tons) – 2008 to 2014
Commuter Connections TERMs + Commuter Operations Center



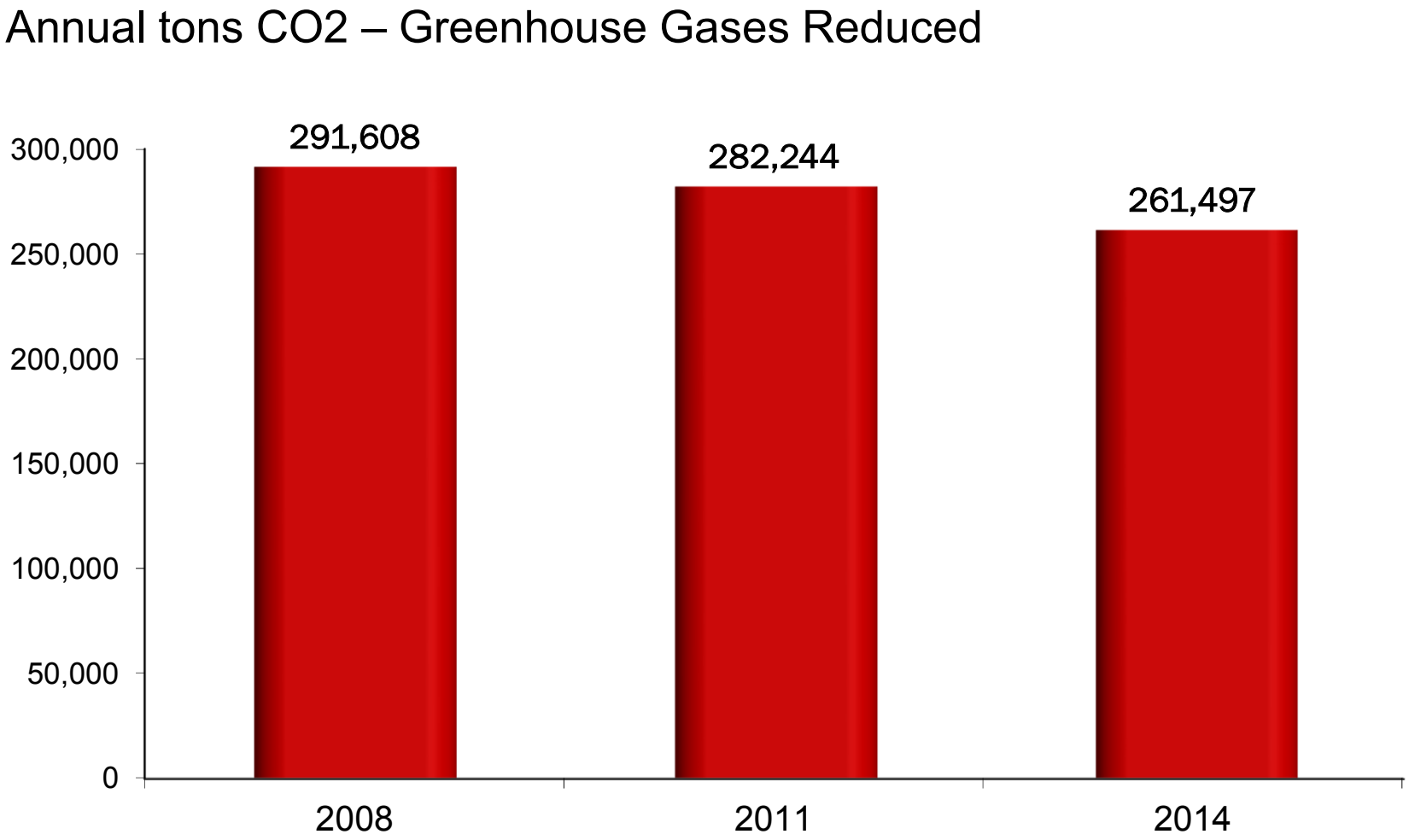
COMMUTER CONNECTIONS
A SMARTER WAY TO WORK

Precursor NOx Reduced (annual tons) – 2008 to 2014
Commuter Connections TERMs + Commuter Operations Center



COMMUTER CONNECTIONS
A SMARTER WAY TO WORK

CO2 Reduced (annual tons) – 2008 to 2014
Commuter Connections TERMs + Commuter Operations Center



COMMUTER CONNECTIONS
A SMARTER WAY TO WORK

Commuter Connections Daily Program Impacts

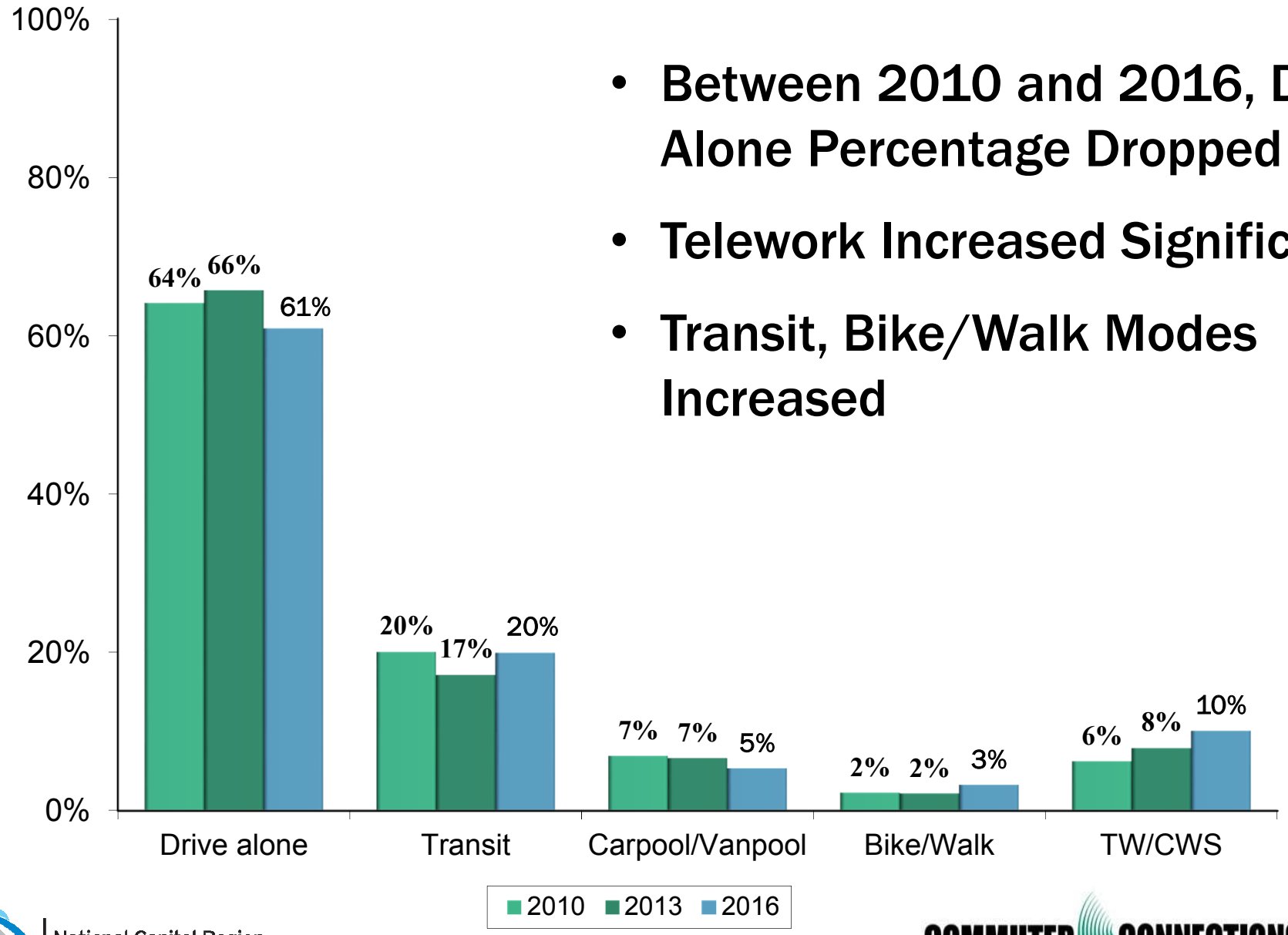
Measure	Reductions
Vehicle Trips	132,000
Vehicle Miles of Travel	2,500,000
Nitrogen Oxides (NOx)	1.0 Tons
Volatile Organic Compounds (VOC)	0.5 Tons

Cost Effectiveness of Commuter Connections

- Cost per Vehicle Trip Reduced $0.16
- Cost per Vehicle Mile of Travel Reduced $0.01
- Cost per ton of NOx Reduced $20,000
- Cost per ton of VOC Reduced $41,000

Commute Travel Mode Changes

Commute Trips Telework Rideshare Satisfaction Benefits

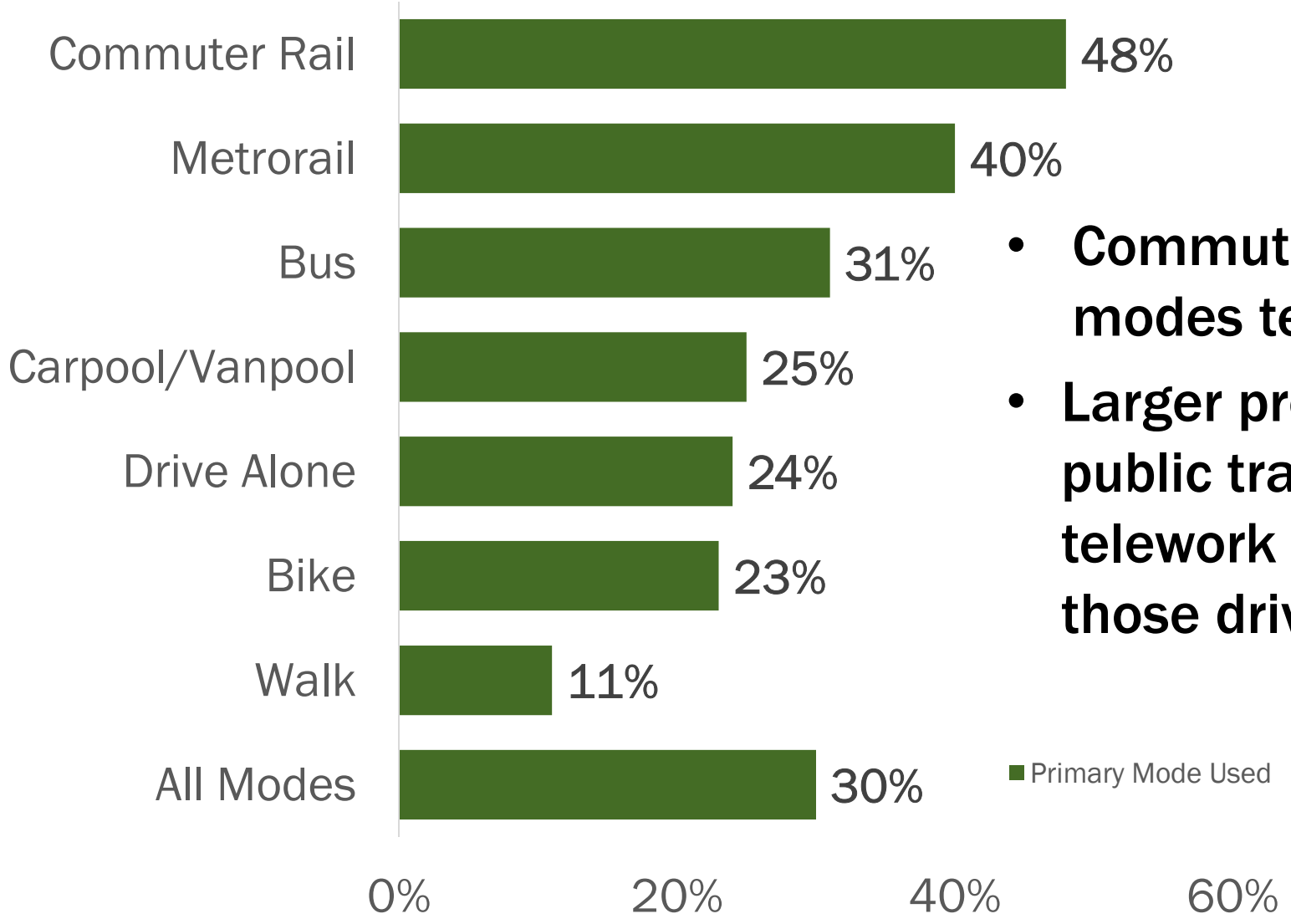


- Between 2010 and 2016, Drive Alone Percentage Dropped
- Telework Increased Significantly
- Transit, Bike/Walk Modes Increased

National Capital Region
Transportation Planning Board

COMMUTER CONNECTIONS
A SMARTER WAY TO WORK

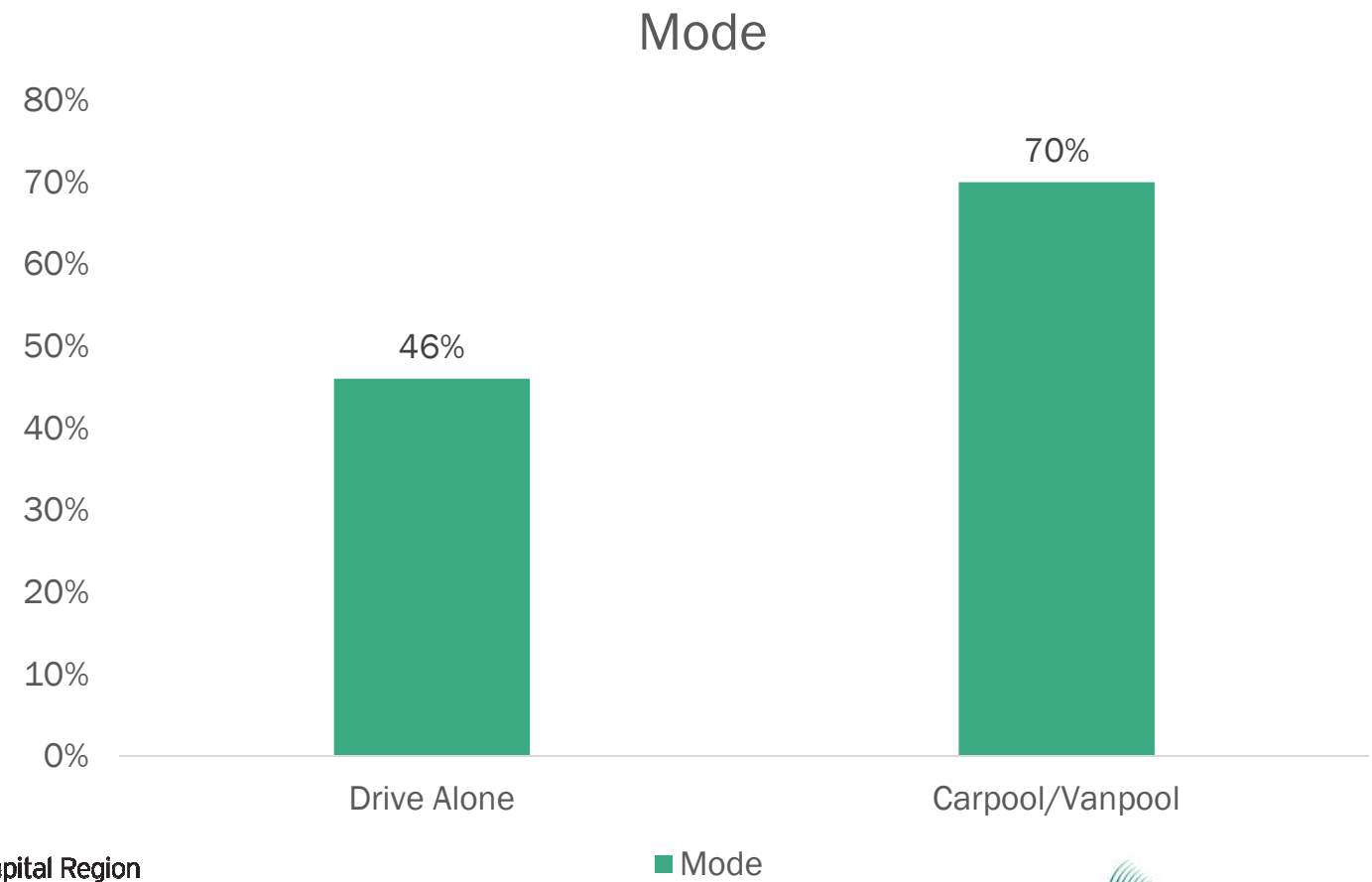
Percent Teleworking by Primary Commute Mode (2016 SOC)



- **Commuters of all modes telework**
- **Larger proportion of public transit users telework relative to those driving alone**

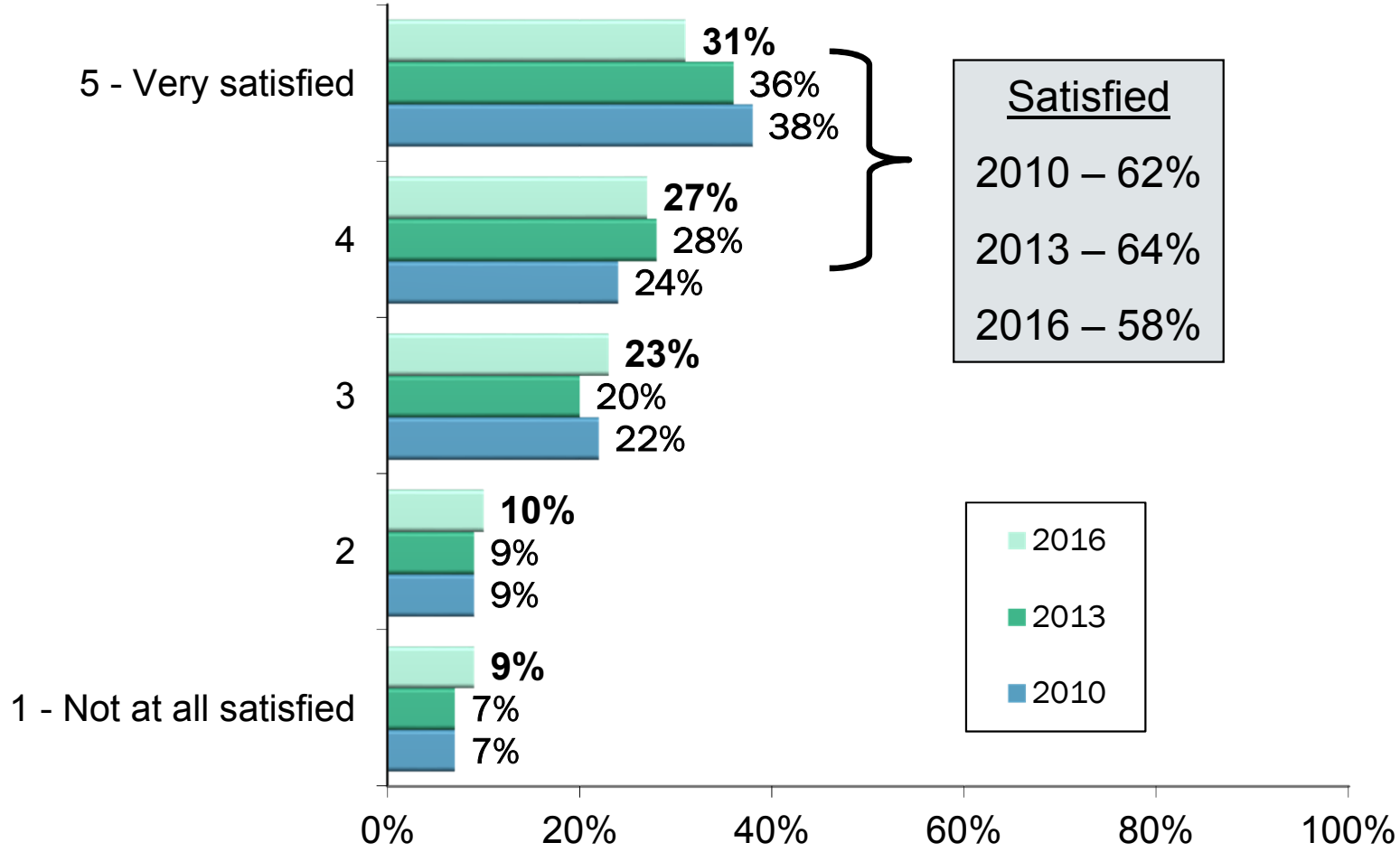
Use of Express Lanes (2016 SOC)

- Commuters with Access Use the Lanes at Least 3 or more Days A Week
- Much Higher Share of Carpool and Vanpool vs. Drive Alone Commuters



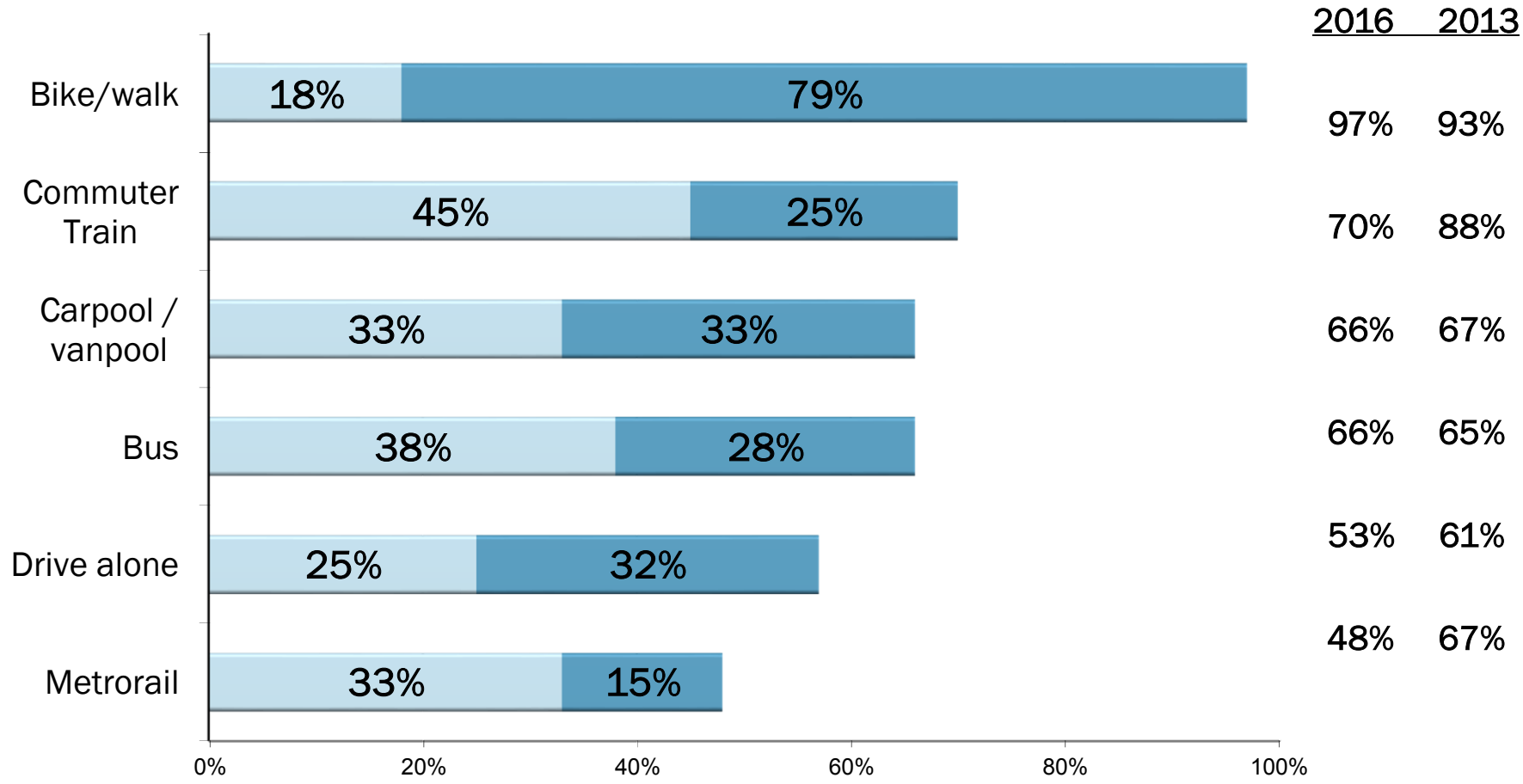
Overall Satisfaction With Commuting (2016 SOC)

- On average 58% Were Satisfied (less than in previous years)
- Commute Has Gotten Worse in Past Year – 31% satisfied
- Commute Has Gotten Easier in Past Year - 73% satisfied



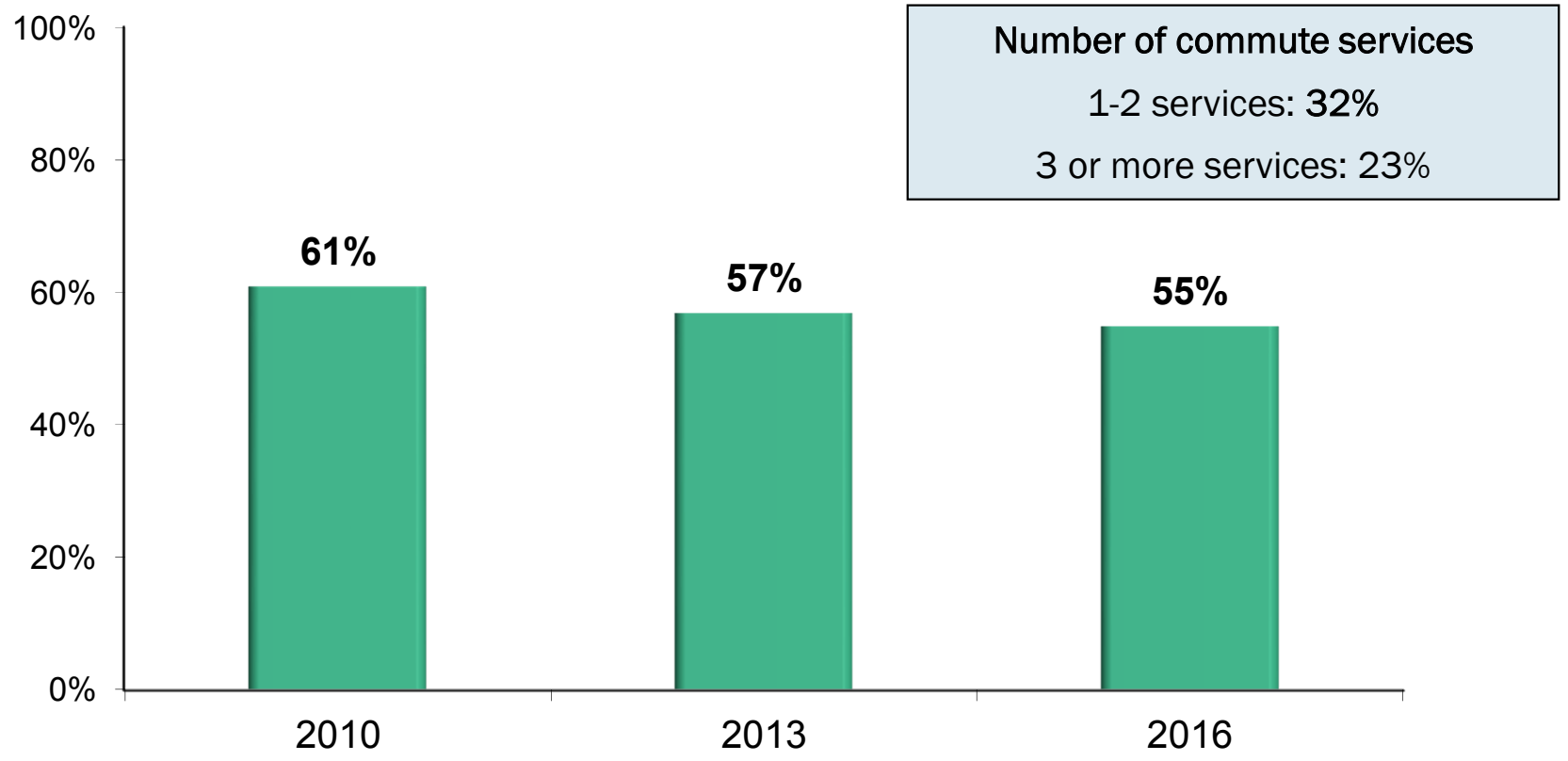
Commute Satisfaction by Mode (2016 SOC)

- Walk/Bike commuters most satisfied
- Metrorail and Commuter train riders least satisfied
- Fewer drive alone commuters satisfied compared to 2013



Alternative Mode Benefits (2016 SOC)

- More than half of commuters have access to employer commute services
- Commute service availability is less today than in 2010





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Director, Transportation Operations Programs

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[redacted]

mwcog.org/TPB

Metropolitan Washington Council of Governments

777 North Capitol Street NE, Suite 300

Washington, DC 20002

National Capital Region
Transportation Planning Board

COMMUTER CONNECTIONS
A SMARTER WAY TO WORK

The Story of TDM in Boulder

Will Toor

Southwest Energy Efficiency Project





Boulder and Boulder County





City of Boulder's approach to transportation

- **Traditional road-building focus until 1990**
- **Fiscal, political, and physical reality intervened!**
- **1996 Transportation Master Plan**
- **Goal: Hold traffic to 1994 levels; reduce SOV mode share to 25%**

Convergence of interests with university

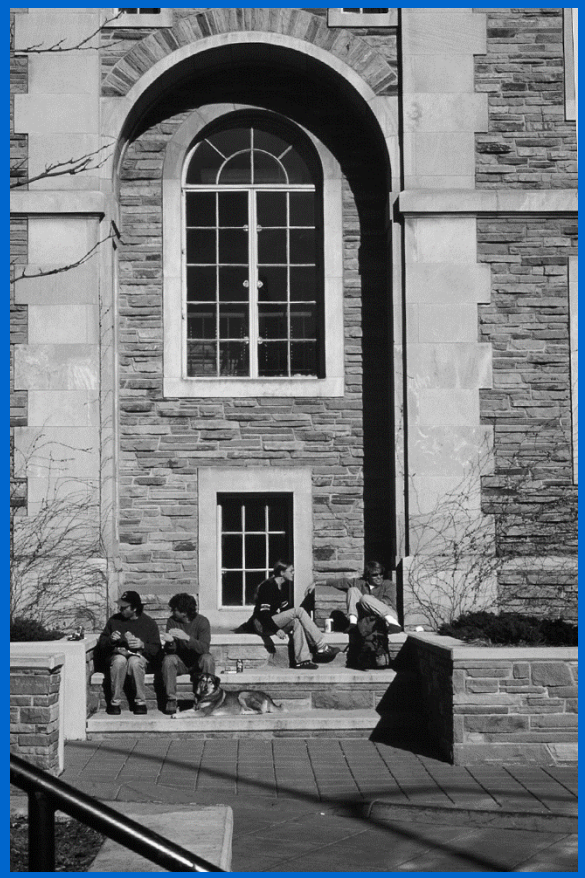
University administration

Students

Neighbors

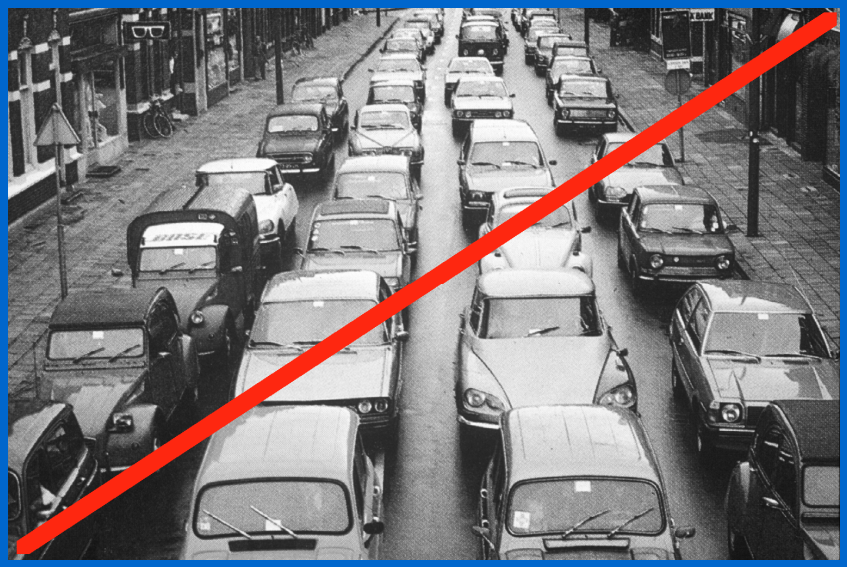
Local government

What are universities looking for?



- Mobility and Access
- Quality campus experience
- Convenience
- Best use of limited dollars / debt capacity
- Good community relations
- Campus sustainability goals

What are communities looking for?



- Managing congestion on city streets
- Reducing student and faculty parking demand in neighborhoods
- Maintaining good relations with universities

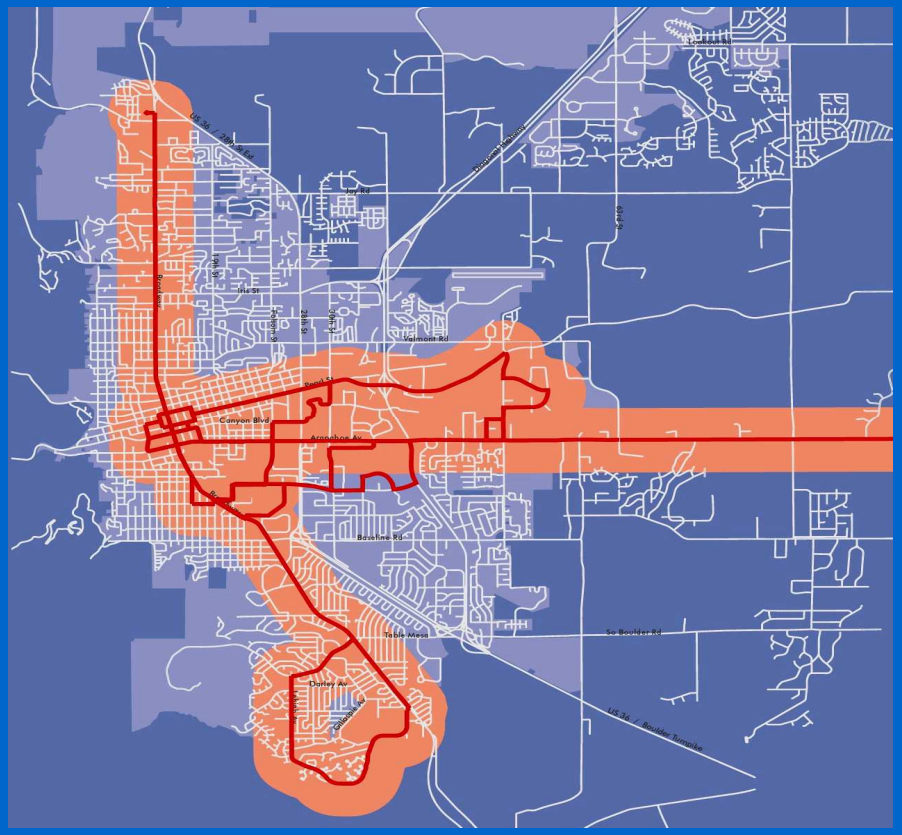
Focus on travel choices

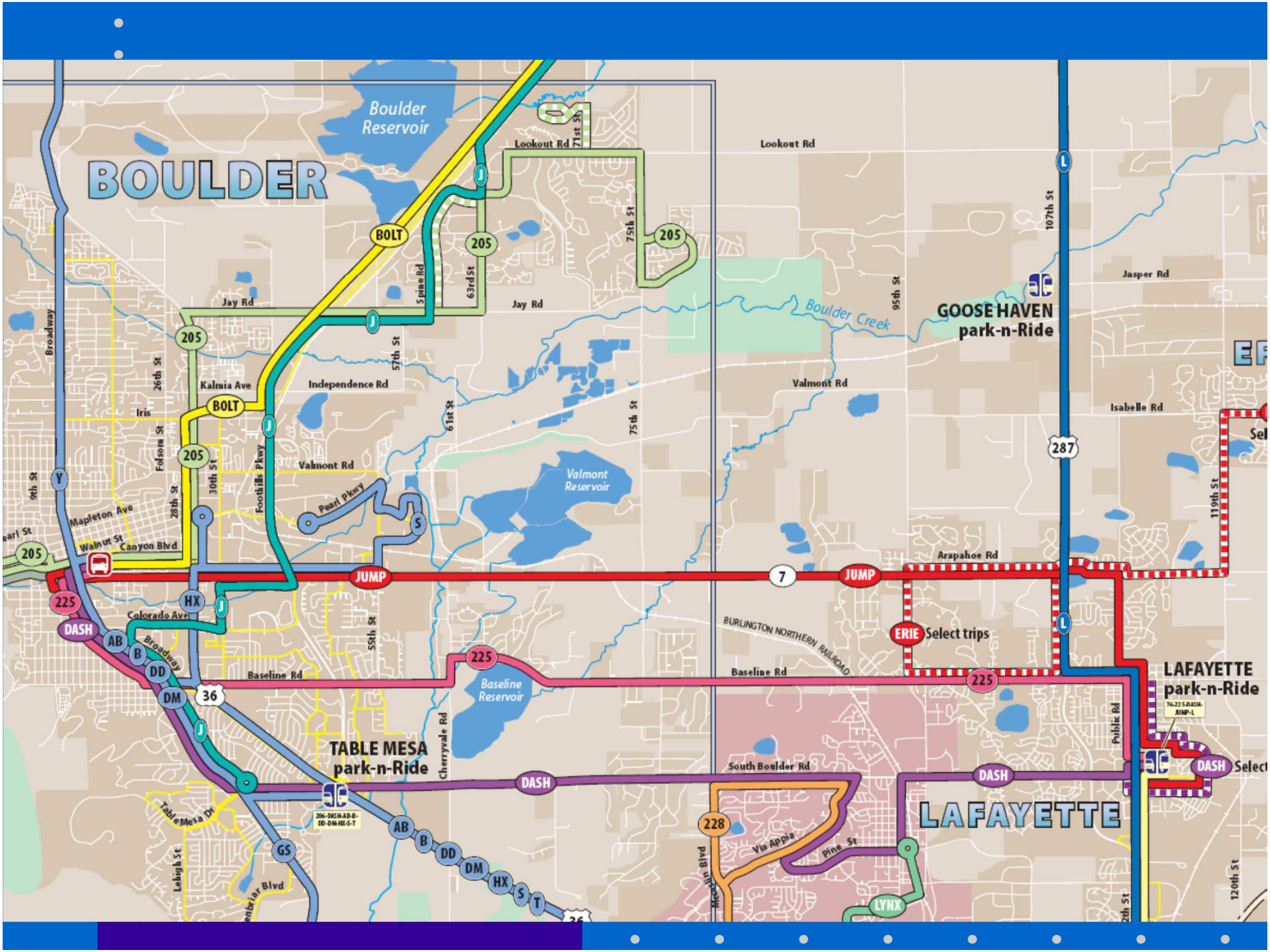
- **Transit service – high frequency buses, queue jumps, signal priority, BRT**
- **Create demand for transit – pass programs**
- **Bike system**
- **Pedestrian system**
- **Parking pricing**
- **Complete Streets**
- **Align investments with policy – most $ into maintenance, most new investment into travel options**

High frequency transit routes

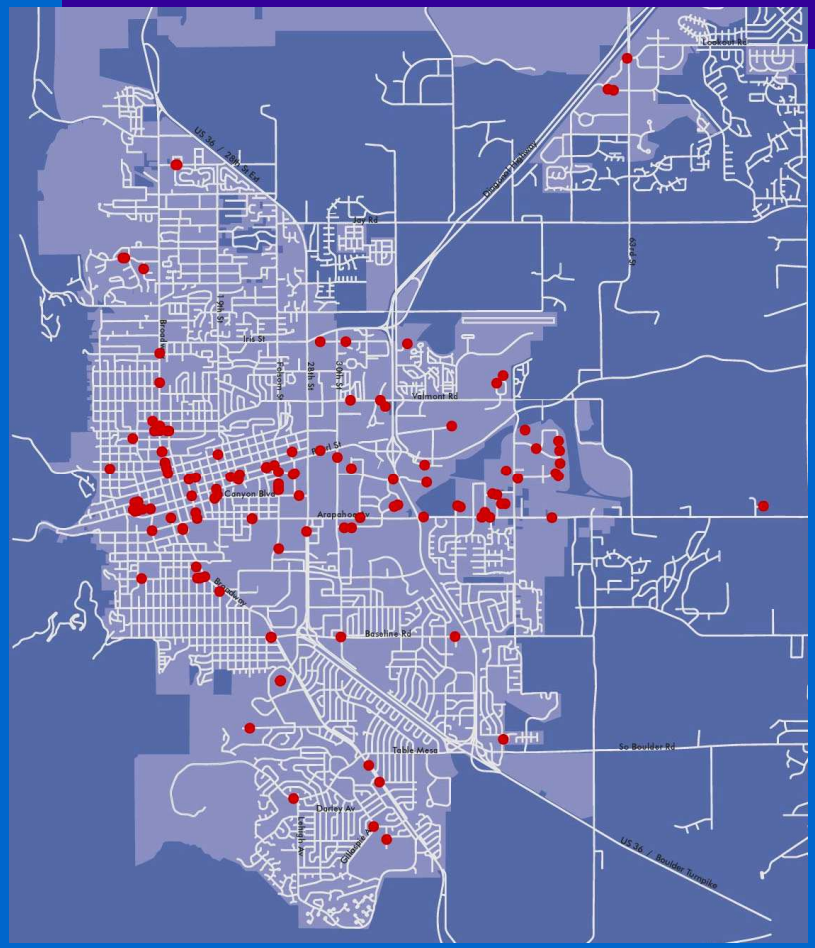


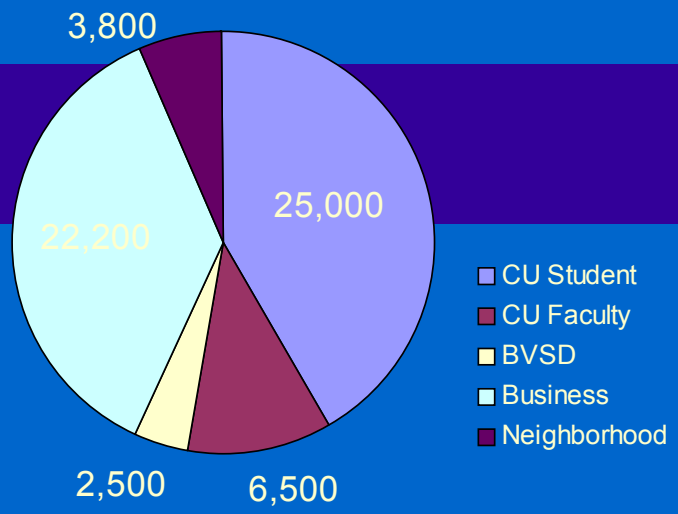




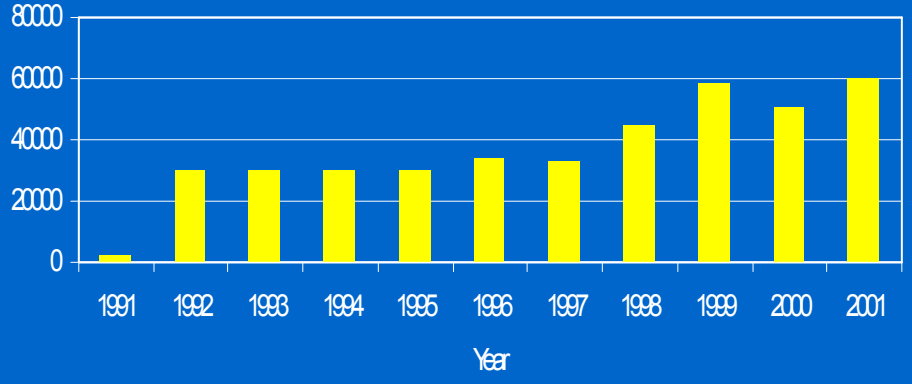

BOULDER
Boulder Reservoir
Lookout Rd
71st St
Jay Rd
Spine Rd
63rd St
75th St
205
BOLT
Broadway
26th St
Kalmia Ave
Iris
Folsom St
Independence Rd
57th St
61st St
Foothills Pkwy
30th St
Valmont Rd
Pearl Pkwy
Valmont Reservoir
9th St
28th St
Mapleton Ave
Walnut St
Canyon Blvd
Y
S
JUMP
7
225
DASH
HX
Colorado Ave
AB
B
DD
DM
36
Broadway
Baseline Rd
55th St
Baseline Reservoir
Cherryvale Rd
TABLE MESA
park-n-Ride
206-DASH-AB-B-DD-DM-HX-S-T
Table Mesa Dr
Lehigh St
GS
Greenbriar Blvd
AB
B
DD
DM
HX
S
T
DASH
South Boulder Rd
228
Via Appia
Pine St
LYNX
Public Rd
LAFAYETTE
LAFAYETTE
park-n-Ride
76-225-DASH-JUMP-L
DASH
Select
120th St
Lookout Rd
107th St
95th St
Boulder Creek
GOOSE HAVEN
park-n-Ride
Jasper Rd
Isabelle Rd
287
119th St
Arapahoe Rd
JUMP
ERIE
Select trips
BURLINGTON NORTHERN RAILROAD
Baseline Rd
225
L

Eco pass in Boulder





RTD Eco Passes and Discount Passes Issued as of Fall 2001



Business Eco Pass Programs

Lyons Communitywide Transit Pass

Everyone in town is eligible

900 housing units

2000 eligible residents





Pedestrian infrastructure





Bikes in Boulder





Converting space from cars to bikes



Converting auto streets to complete streets



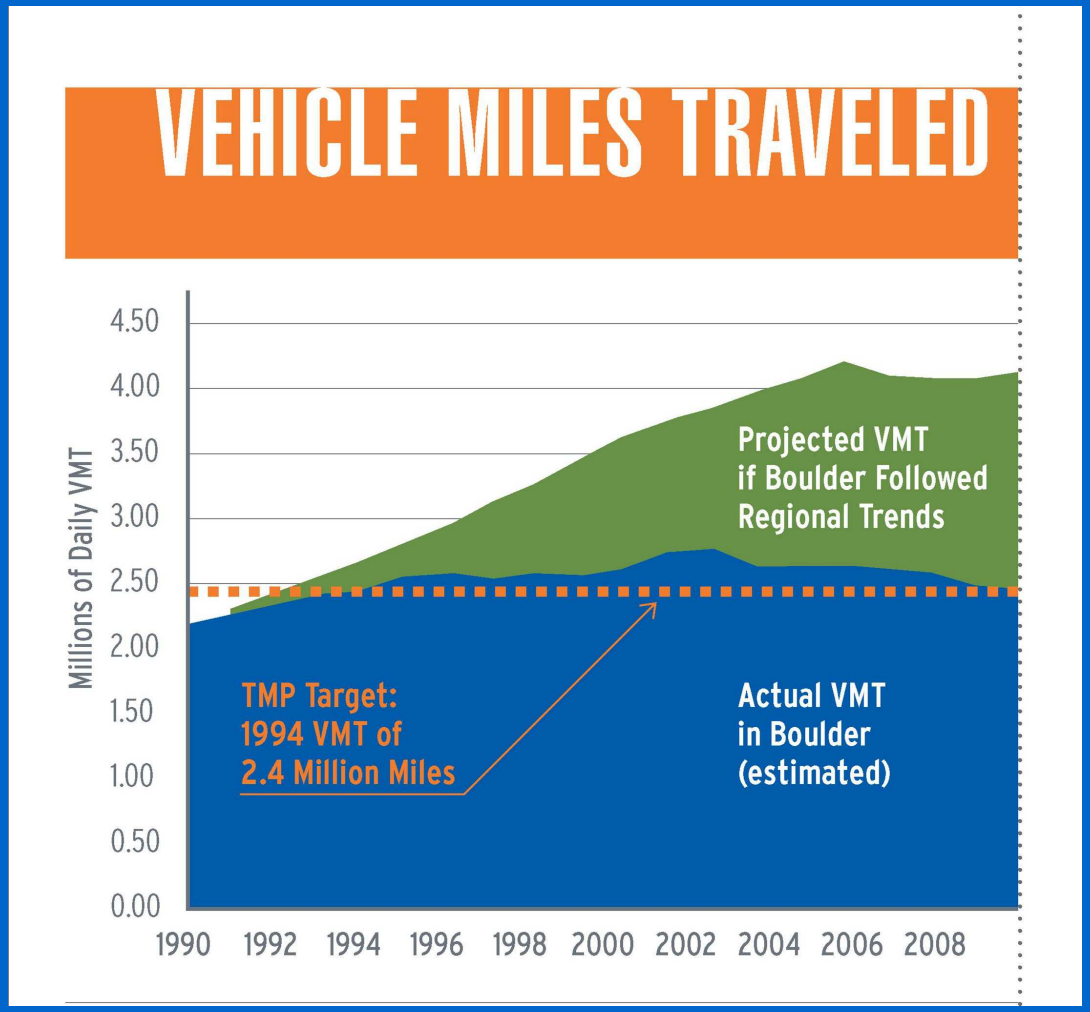




Performance measures: Boulder County

	Adams	Arapahoe	Boulder	Denver	Douglas	Jefferson	Weld
% SOV	76.8	78.8	64.9	69.4	78.5	77.1	81.7
Mean Travel Time	28.2	26.9	22.3	25.6	27.3	25.6	25.7
Work @ home	3.3	5.6	12.1	5.9	10.4	6.8	5.5
%Transit	4.5	4.3	5.3	7.8	1.9	3.5	0.9
%walk/other	3	3.2	10.7	6.6	2.3	4.1	2.8
% Residents Who Work outside County	61.9	51.1	19.3	38.3	59.9	48.7	39.6
emp/pop ratio	71.5	71.9	70.6	72.2	74.5	73.3	69

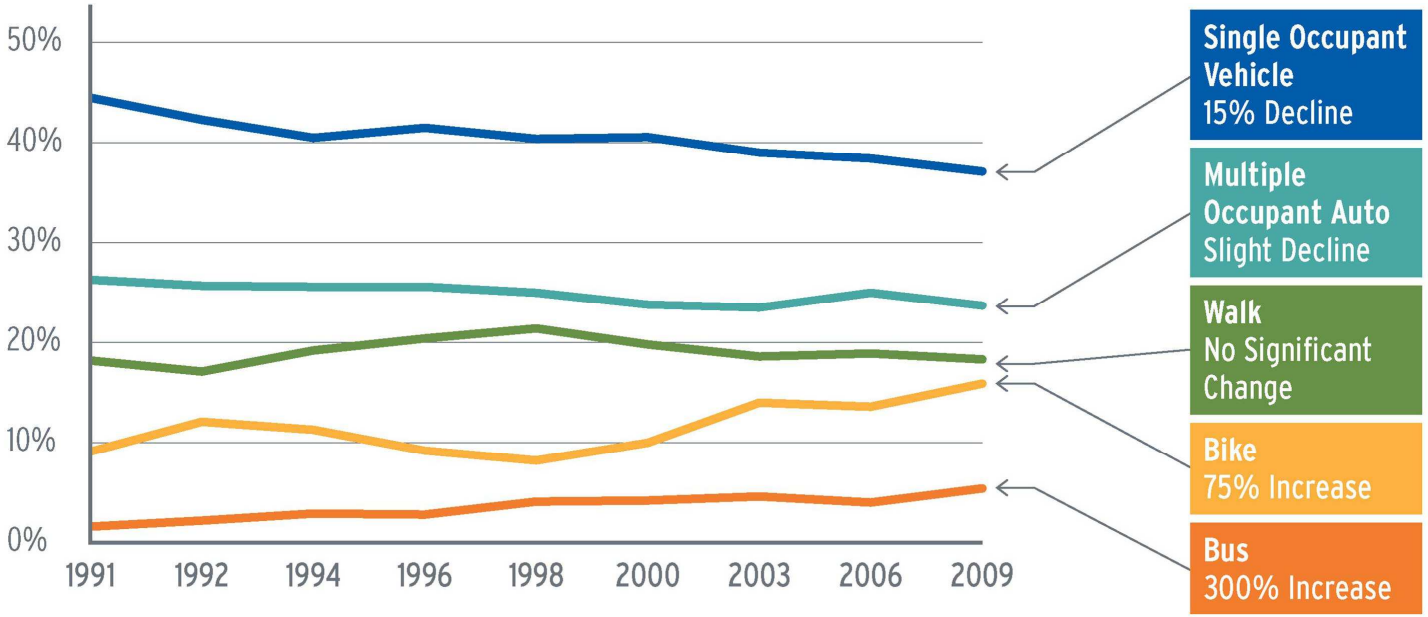
Performance Measures



Performance Measures

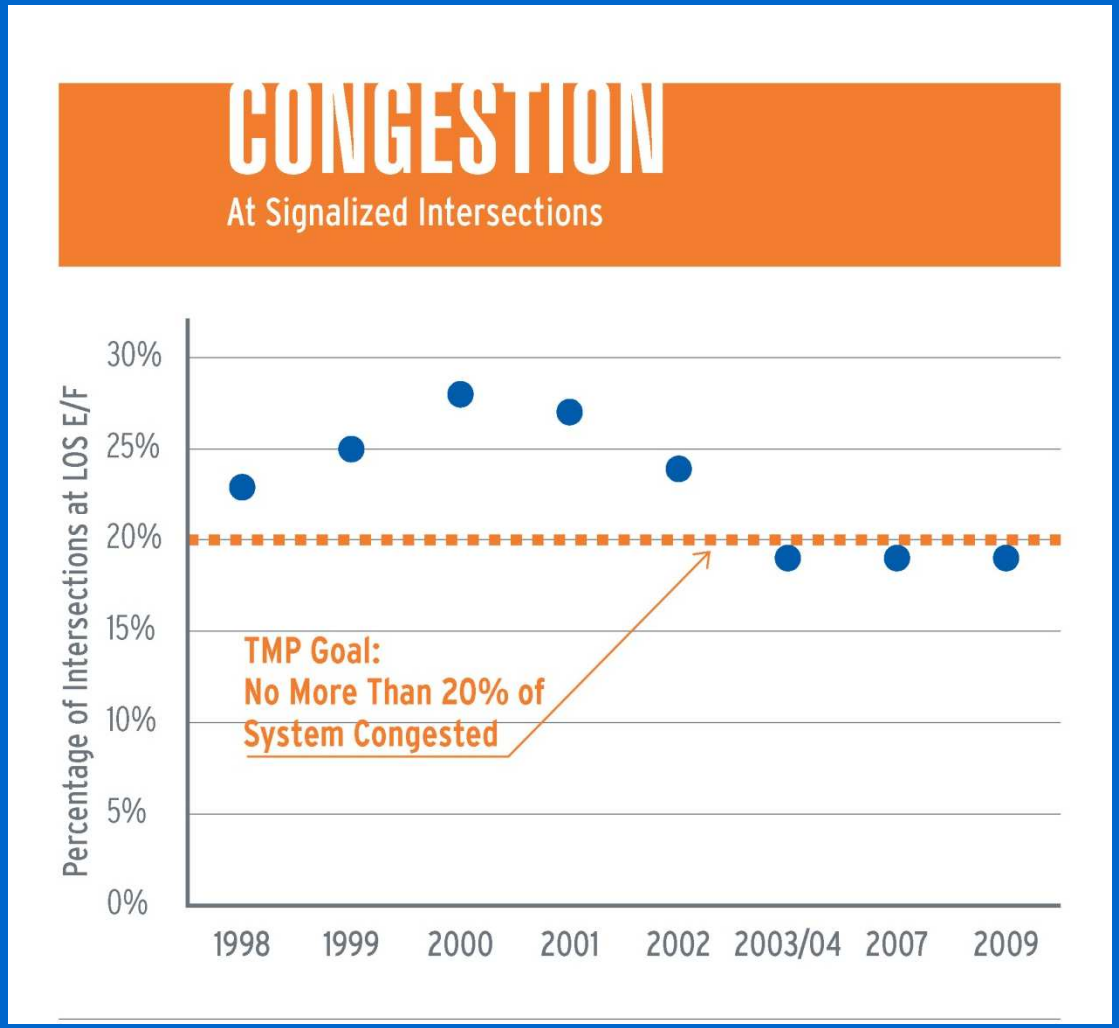
CHANGE IN MODE SHARE

All Trips by Boulder Residents

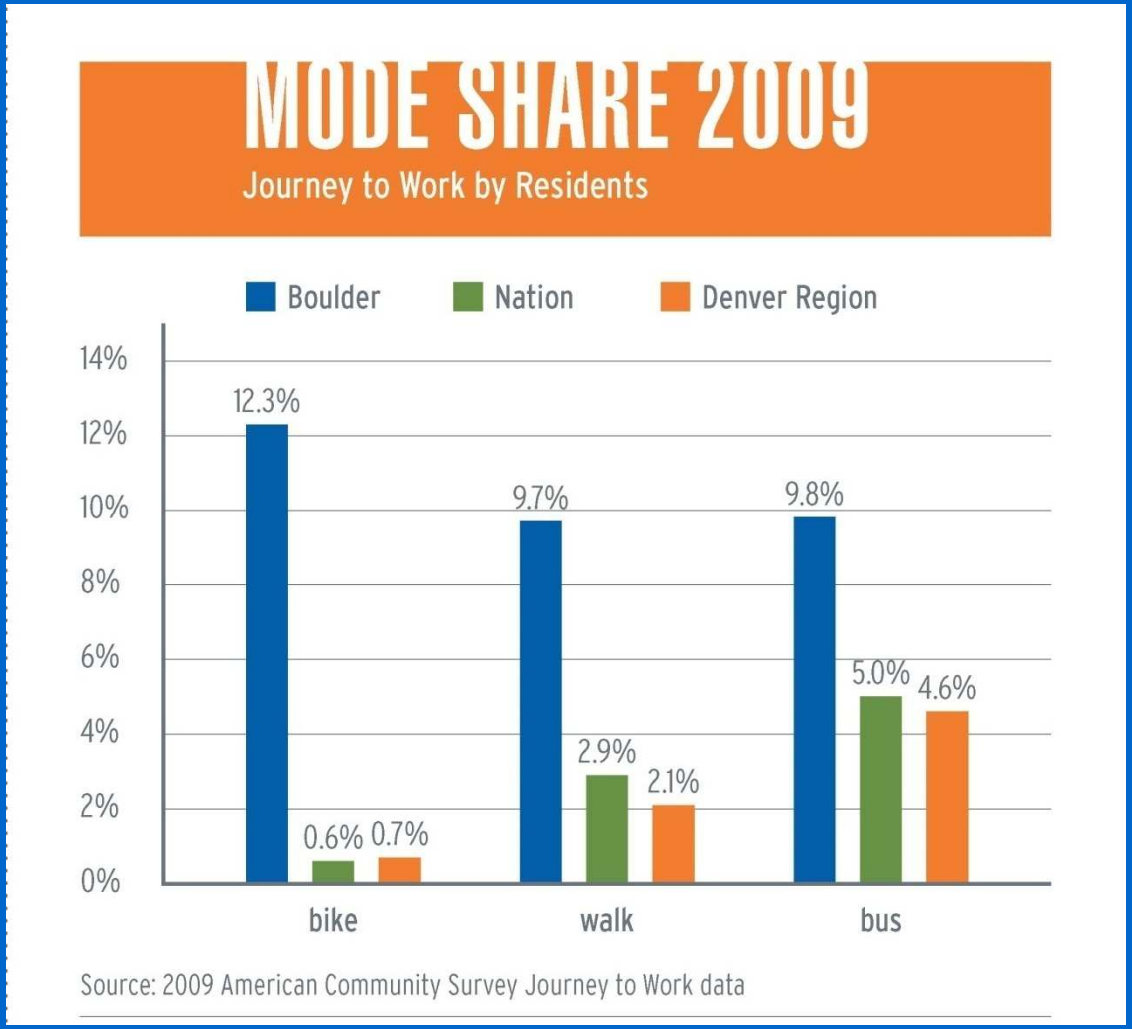


Source: City of Boulder Modal Shift Reports (Travel Diary of Boulder Residents)

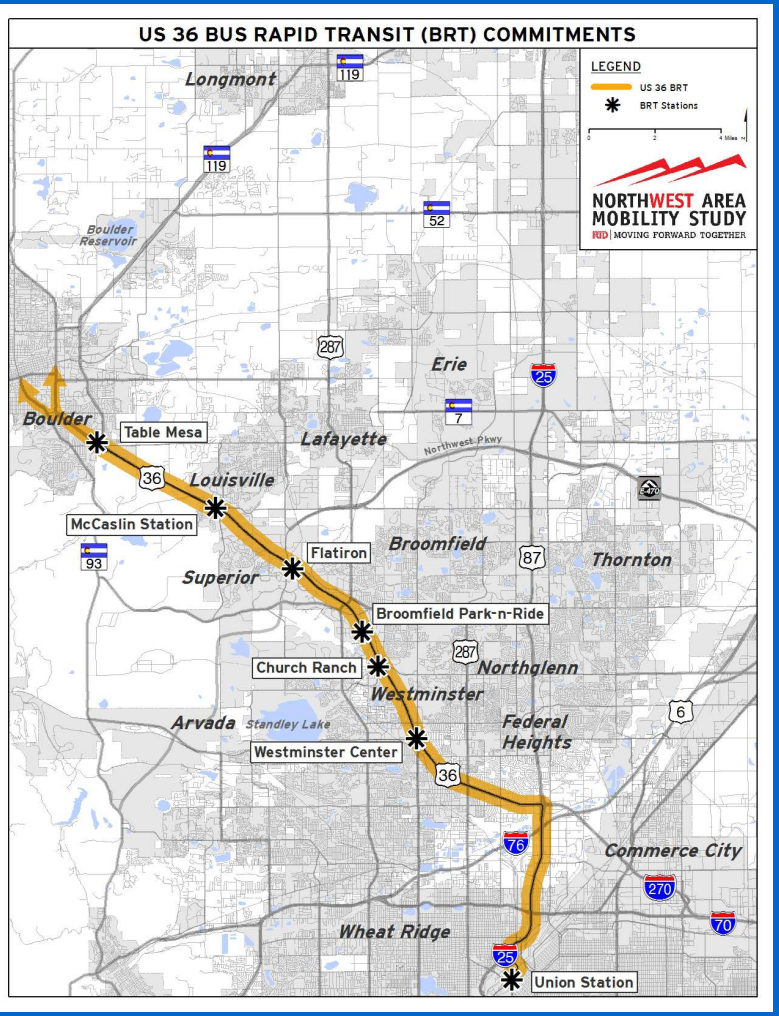
Performance Measures



Performance Measures



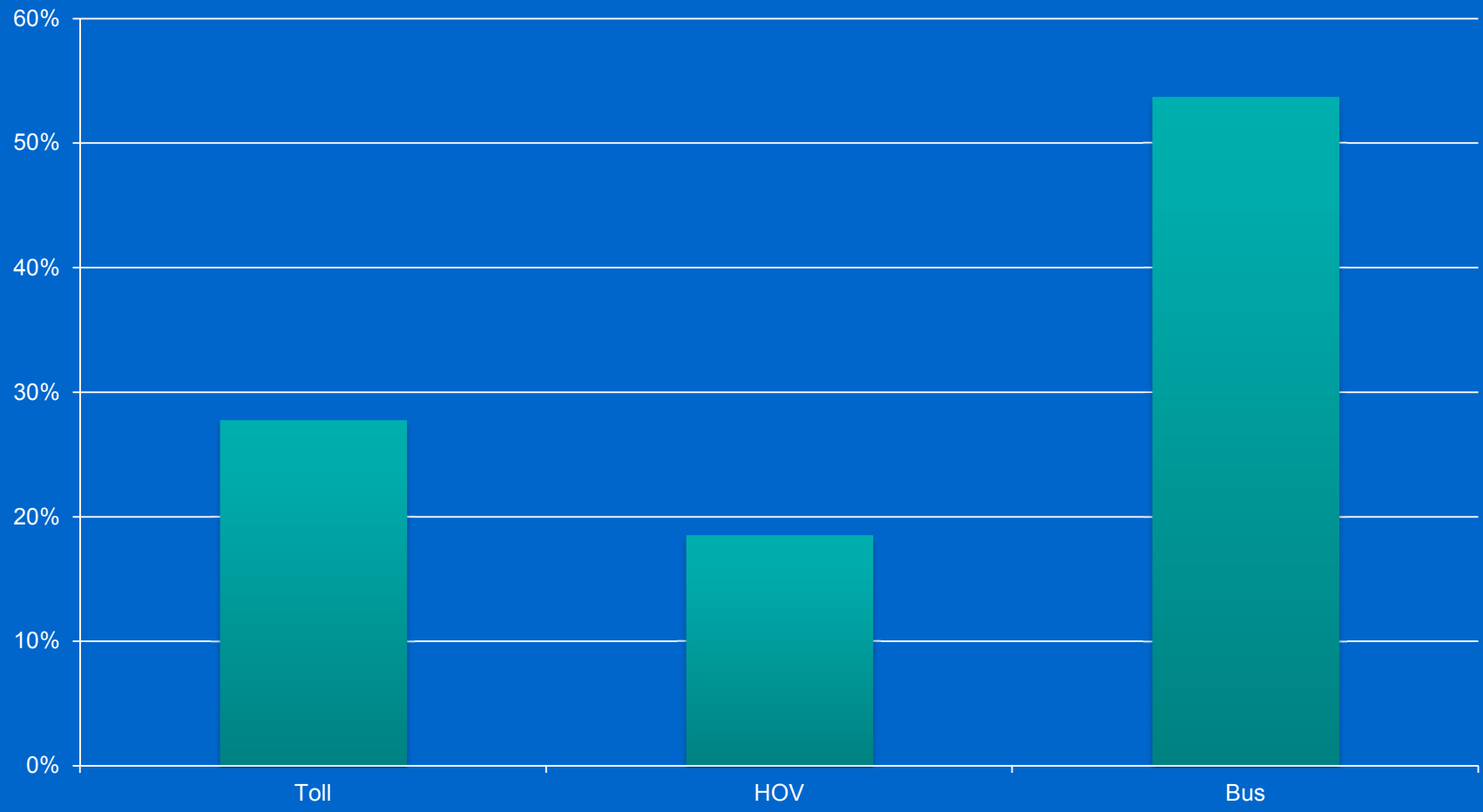
US 36 HOT Lanes/BRT project



- **Direct connection to Union Station**
- **Buses have 15 minute travel time advantage**
- **Buses every 6 minutes;**



Daily trips



Based on first quarter 2016 data from Colorado High Performance Transportation Enterprise and the Regional Transportation District

MOU on use of toll revenues

- **2009 legislation authorized toll revenues for transit, TDM, first/final mile**
- **Local government MOU with CDOT allocates "surplus revenue" to transit, TDM with local approval**
- **Current estimates – excess revenue starts 2020**

Pilot program: TNC access to downtown

Door to Downtown - Your Ride Downtown
November 25, 2016 - February 14, 2017
Get a $25 credit on Uber, Lyft or zTrip for rides downtown with d2d!

Uses parking district revenues – designed to avoid spending on new parking supply

TDM Lessons from Boulder

Be willing to experiment

Work with universities, major employers, parking districts

TDM needs supportive investments in infrastructure and service – not just outreach

Pricing is key – transit passes, parking pricing, congestion tolling

Contact Info

Will Toor

Transportation Program Director,

Southwest Energy Efficiency Project

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303-447-0078 x6

SWEEP

NCDOT Statewide TDM Strategic Plan Development

Strategic Plan Workshop

07 February 2017

GS&P

GRESHAM SMITH AND PARTNERS

WSP

PARSONS BRINCKERHOFF

Goals and Objectives Exercise

Goals Development & Prioritization

- **ACTIVITY 1:**

- **List statewide TDM goals / objectives on sticky notes**
  - **3 – 5 per person**
- **What does the state want to see TDM accomplish within each of its regions?**

Goals Development & Prioritization

- **ACTIVITY 2:**
- **Within groups, organize TDM goals / objectives into categories**

Goals Development & Prioritization

- **ACTIVITY 3:**

- **Prioritize TDM goals / objectives.**
- **Rotate groups, so that each group is NOT reviewing its own work.**
- **What are the most important goals / objectives to pursue? What are the most immediately implementable to pursue?**

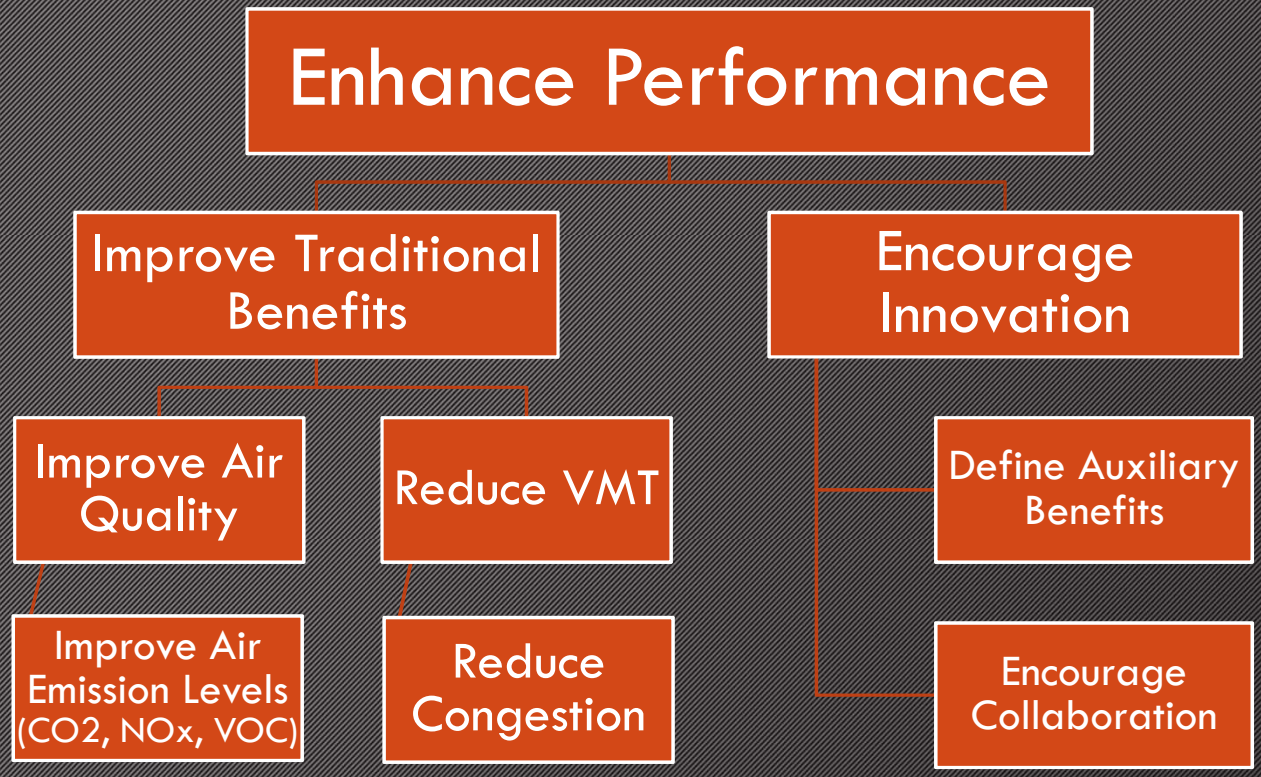
Goals Development & Prioritization

- **ACTIVITY 4:**

- **Summarize TDM goals / objectives.**
- **Summarize findings for discussion, distribution, and review within groups.**

Next Steps

Objectives


Enhance Performance
Improve Traditional Benefits
Encourage Innovation
Improve Air Quality
Reduce VMT
Define Auxiliary Benefits
Improve Air Emission Levels (CO2, NOx, VOC)
Reduce Congestion
Encourage Collaboration

Traditional & Enhanced Benefits

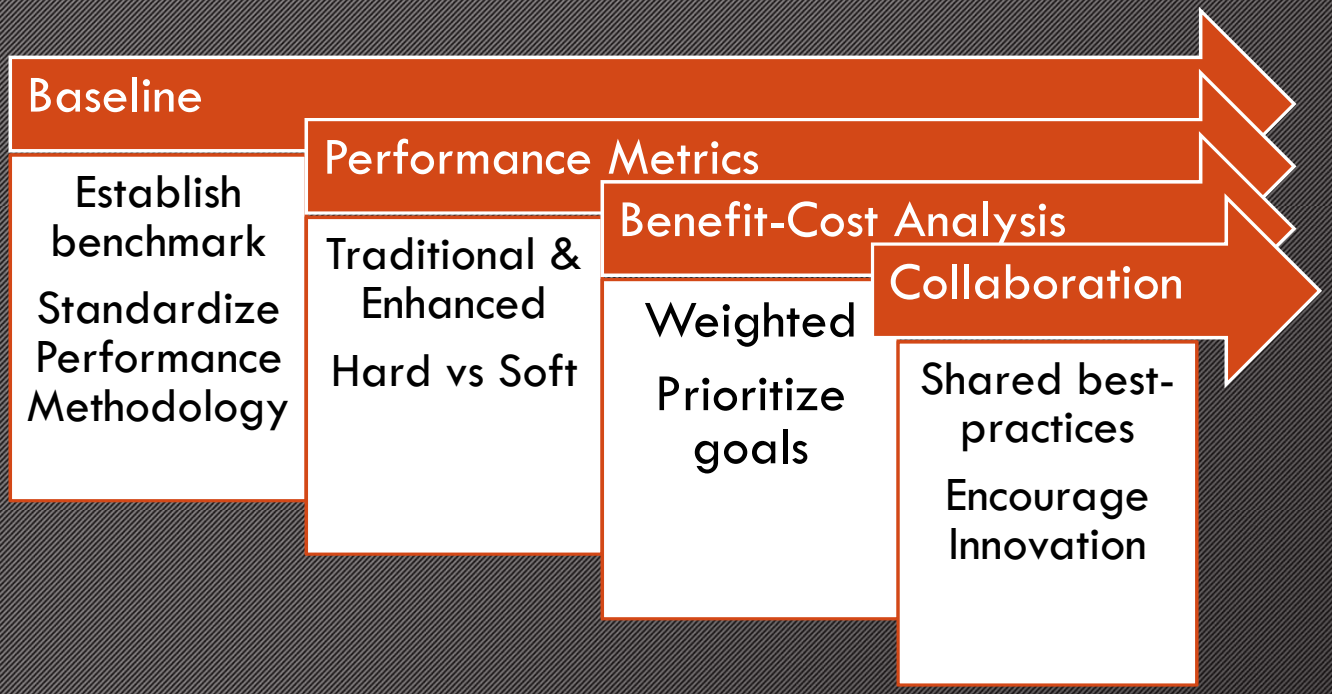
Traditional (NCDOT Motivated)	Enhanced Value
VMT	Economic*
Air Quality	Resiliency**
Congestion and Delays	Healthy Communities
	Accessibility***

**Economic Benefits (Local Economy and Individual Transportation Cost)*

***Resiliency (Emergency Preparedness, Reduced Strain on Existing Infrastructure)*

****Accessibility (Work, Education, Training, Medical, Shopping and/or Tourism)*

Proposed Process



Thank You



GRESHAM SMITH AND PARTNERS



PARSONS BRINCKERHOFF

Mary Clayton (mary_clayton@gspnet.com)
Sean Flaherty (sean_flaherty@gspnet.com)
David Ungemah (ungemah@pbworld.com)

NCDOT Statewide TDM Strategic Plan Workshop

Kick-Off Meeting Summary – February 7, 2017

I. Secretary Trogdon Remarks

- We need to provide for a better balance between areas of demand and attraction within our land use and transportation system
- Transportation provides the opportunity to bridge communities, enable growth, and respond to the pressures and stresses upon our infrastructure
- NC DOT will work to provide for integrated door to door services to enable mobility across the state
- The system will be driven by real-time data for real-time analysis to make real-time choices (this was the good line that Debbie and I liked)
- Desire a consolidated payment system for parking, transit, tolls, managed lanes, etc. The key question will be how to pull it all together?
- Challenge to the assembled group: how do we leverage the Internet of transportation to bridge all of our mobility needs

II. Synthesis Compilation from Breakout Group Exercise

Provide for a Well-Funded, Collaborative TDM Program Throughout North Carolina

a) Collaborate on TDM Services Throughout the State and Regions
b) Develop and Fund Regionally-Coordinated TDM Programs
c) Engage Partnerships throughout Public and Private Sectors
d) Adequately Staff TDM Coordination
e) Integrate TDM Strategies into MPO and DOT Transportation Plans

Develop Services That Reduce the Use of Single Occupancy Vehicles as the Primary Means of Commuting in North Carolina

a) Develop a Statewide Incentive Program for Multimodal Use
b) Identify, Fund, Implement, Operate, and Evaluate Cost-Effective TDM Services
c) Enhance Parking, Land Use, Transit, Bicycle, and Pedestrian Infrastructure to Improve Mobility

Leverage Technology to Enable 21st Century Transportation Services

a) Consolidate Multimodal Fare and Toll Payment and Incentive Systems
b) Explore, Plan, and Implement Interagency Farebox Operations
c) Provide for a Statewide Clearinghouse for Information and TDM Service
d) Coordinate Services with Technology Providers

Develop Clear and Measurable TDM Performance Metrics

a) Develop Specific Performance Targets Per Strategy and Per Region
b) Develop and Implement Performance Measurement Plans

NCDOT Statewide TDM Strategic Plan Workshop

Kick-Off Meeting Summary – February 7, 2017

III. Breakout Group TDM Objectives Exercise – Raw Results

A. Blue group

1. Metrics

- track parking area as a success metric
- track increases in transit ridership as a success metric
- standardized VMT reduction calculation methodology (5)
- identify uniform measurements and tools availability for statewide TDM providers
- measurable results tied to specific activities (1)

2. Miscellaneous

- statewide highway signage for TDM (1)
- programs that support pilots or demonstrate innovative activities and measure results
- connecting STRNC with social media
- regional promotional campaign
- utilize SRTS during peak hours (1)
- integrate TDM programming with building codes (1)
- cost-effective, comprehensive, collaborative regional TDM programs (2)
- increase funding to MPO's to coordinate TDM programs (5)
- remove legislation that hinders HOV/HOT lanes, transit funding matches, and environmental ordinances
- full-time statewide TDM coordinator (4)

3. Statewide Incentives

- set example as state: implement commuter tax benefit, market pricing for employee parking, and free transit if available (1)
- collaborate on statewide efforts (1)
- statewide incentive program (2)

4. Technology Tracking

- use affordable technology to track park-and-ride lot utilization (1)
- utilize data from alternative commute data sources (Uber, Strata, Walking apps, etc.) (1)
- one source pay system (3)

5. Emergency Preparedness

- statewide emergency communication plan (2)
- regional emergency preparedness program

NCDOT Statewide TDM Strategic Plan Workshop

Kick-Off Meeting Summary – February 7, 2017

B. Yellow Group

1. Funding and Policy

- increase alternative mode use
- reach many to educate about system and alternative modes
- state funding for bicycle and pedestrian projects
- more greenways and bike lanes (2)
- bike sharing system
- stronger ties to complete streets and demand management (1)
- more authority for local government to create special tax authority for transit
- incentives for more compact mixed use development
- find more stable funding (4)
- better connections between town cities and regions
- provide rural and exurban TDM, park and rides, and other strategies
- more park and rides (4)

2. VMT

- freight TDM
- de-romanticize driving alone
- optimizing use of STRNC
- off-peak mobility
- reduce VMT (7)

3. Vanpool

- clear, pro-urban support for transit options, like better headways
- increase carpool use by 3%
- offer carpool incentives
- provide lunch and learn opportunities
- work with employers to educate employees
- measure impacts of vanpooling

4. Business Community

- freight TDM
- focus on comprehensive mobility
- broaden audience
- involved downtown economic development districts
- attract employer interest and participation
- make the business case for new services such as looking at audience when selling ideas (2)

NCDOT Statewide TDM Strategic Plan Workshop

Kick-Off Meeting Summary – February 7, 2017

C. Pink Group

1. TDM infrastructure strategies

- develop HOV lanes on interstates
- integrate TDM strategies into MPO and DOT corridor and network planning (4)
- measure and improve placement rates (1)
- invest in sustainable travel service options and provide additional capacity
- greater adoption of go pass

2. Technology

- consolidate technology and software systems to work with multimodal processes for one system for the end-user (6)
- better website with information for commuters statewide (1)
- improve interagency farebox operations (2)

3. Carpool / Vanpool Improvements

- increase vanpool participation rates
- more incentives for adoption of transportation alternatives to single occupant vehicles (1)
- provide a statewide incentive and subsidy for carpools (6)

4. Measurement Objectives

- increase percentage of residents and visitors using sustainable travel services
- increase participant knowledge of transit and TDM options
- increase carpool participation rates by 10%
- set an increase percentage goals for each non-single occupant vehicle mode
- increase transit and mode share use by 5%
- reduce VMT growth by 3%
- funding increase funds going to innovative approaches in nontraditional organizations (1)
- continue to diversify the number of recipients of TDM funds in Charlotte region or choose new regional administrator
- increase use of transportation alternatives to driving alone

5. Intergovernmental

- expand metropolitan bus routes to suburban areas
- improve multimodal relationships between cities (1)

Characteristics of TDM Strategies

			Enabling Authority				Implementing Authority					
Strategy	Application Market Area	Time Frame To Implement	State	Regional	City/County	Transit Agency	State	Regional	City/County	Transit Agency	Private Sector	Non Profit
Alternative Mode Support Strategies												
Public Education and Promotion	All	Short-long	X	X	X	X	X	X	X	X	X	X
Ridematching Services	Urban & suburban commute trips not well served by transit	Short-medium		X	X	X		X	X	X	X	
Transit Services	Urban & suburban	Short-long		X	X	X		X	X	X	X	
Vanpool Services	Longer urban & suburban commute trips	Short-medium	X	X	X	X	X	X	X	X	X	
Custom Transit Services	Suburban	Medium		X	X	X		X	X	X	X	
Non-Motorized Mode Support	Short commuting & non-commute	Short-long	X	X	X		X	X	X		X	X
HOV Facilities	Congested corridors	Medium-long	X		X		X		X	X		
Park & Ride Lots	Congested corridors	Short-medium	X		X	X	X		X	X	X	
Carsharing	Urban & some suburban areas	Medium								X	X	X
Worksite-Based Strategies												
Monetary Incentives	Commuters	Short								X	X	
Alternative Work Schedules	Commuters	Short									X	
Guaranteed Ride Home	Commuters	Short								X	X	
Parking Management	Commuters	Short-medium			X						X	
Facility Amenities	Large employers and sites in areas with little mixed-use development	Short-medium			X						X	
Transportation Management Associations	Multi-employer sites and areas	Short-medium							X		X	

Characteristics of TDM Strategies

			Enabling Authority				Implementing Authority					
Strategy	Application Market Area	Time Frame To Implement	State	Regional	City/County	Transit Agency	State	Regional	City/County	Transit Agency	Private Sector	Non Profit
Land Use Strategies												
Compact Residential Development	Urban & suburban	Short-long			X				X		X	X
Compact Employment and Activity Centers	Urban & suburban	Short-long			X				X		X	X
Mixed Land Uses	Urban & suburban	Medium-long			X				X		X	X
Connectivity	Existing or developing suburban areas	Medium	X		X		X		X		X	X
Transit/Pedestrian Friendly Urban Design	Urban & suburban	Short-long	X		X				X	X	X	X
Parking Management	Urban & suburban	Short-long			X				X		X	X
Jobs/Housing Balance	Regional, urban & suburban	Short-long		X	X			X	X		X	
Providing Affordable Housing	All areas	Short-long	X	X	X			X	X		X	X
Development Impact Mitigation	Developing areas	Medium	X		X				X		X	
Public Policy & Regulatory Strategies												
Trip Reduction Ordnances	Congested or rapidly growing areas	Medium	X		X				X	X	X	
Access Priority/Restriction	Highly congested facilities or centers	Long	X		X				X			
Support of New Institutional Relationships	All areas	Short-medium	X		X			X	X	X	X	X

Characteristics of TDM Strategies

			Enabling Authority				Implementing Authority					
Strategy	Application Market Area	Time Frame To Implement	State	Regional	City/County	Transit Agency	State	Regional	City/County	Transit Agency	Private Sector	Non Profit
Telecommunications Strategies												
Information Services	Any geographic location	Short-medium					X	X	X	X	X	X
Internet-Based Strategies (teleshopping)	Any location or market	Short-medium					X	X	X	X	X	X
Telecommuting (telework)	Any location or market	Short-medium					X	X	X	X	X	X
Pricing Strategies												
Parking Pricing	Dense urban areas; jurisdictional or areawide application	Medium-long	X		X		X	X	X		X	
Gas Tax Increase	Statewide or local: all vehicle trips	Short-long	X	X	X		X	X	X			
Road/Congestion Pricing	Congested routes, road segments or regions	Long	X		X		X		X			
VMT Tax	Statewide or local/regional; all vehicle trips	Medium-long	X		X		X	X	X			
Transit and Vanpool Fare Subsidies	Within operations area; low income, elderly, students	Short-medium				X	X		X	X	X	

APPENDIX B. REGIONAL SUCCESS PLANS

NORTH CAROLINA
Department of Transportation



Statewide Transportation Demand Management (TDM) Strategic Planning

Asheville Regional Success Plan

FINAL DRAFT

October 2017

GS&P GRESHAM SMITH AND PARTNERS

wsp

Partnerships between the N.C. Department of Transportation and local governments, regional authorities and other state agencies have been the source of North Carolina's transit success. Currently under development, the Public Transportation Statewide Strategic Plan will build upon that success by creating the foundation for reinvigorated state and local transit partnerships.

As part of the statewide strategic planning and development process, including integration of best practices for various agencies across the state, NCDOT is supporting the state's TDM programs by bringing them into concurrence with the overall strategic focus of the Public Transportation Division (PTD). This work builds off the 2003 Statewide TDM Plan, including alignment of mission, vision and goals.

Mission Statement

To provide citizens of North Carolina opportunities and strategies for improving sustainable economic growth and quality of life through reduced transportation congestion, expanded mobility options, improved air quality and more efficient use of resources.

Vision

Effectively measure and communicate the benefits of alternatives to driving-alone in communities across North Carolina.

Goals

Achieve improved accessibility, connectivity, economic growth, public health and safety through enhanced performance of transportation demand management service provisions.

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Overview 1
Greater Asheville TDM Program 1
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Budget / Funding 1
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SWOT Analysis 5
Strengths 5
Weaknesses 5
Opportunities 6
Threats / Challenges 7
Technical Memorandum on Performance Measurements 8
Recommendations 9
Appendix 11

Overview

The Asheville regional area covers Buncombe, Henderson, Madison, Haywood and Transylvania Counties with a 2010 population of almost 465,000. That number is expected to grow to over 634,000 by 2040. The region has a significant percentage of residents aged 65 years and older (21 percent of the population in 2010) due to the area's attractiveness as a second-home and retirement destination. This has led to a stronger focus on planning and strategic investments to address the mobility needs of older populations.

Downtown Asheville contains several large employers that draw commuters from surrounding counties with the largest influx coming from Buncombe County. The Asheville urban core also features a higher level of public transportation services relative to other areas of the city, other cities and other towns in the region.

Workers tend to not reside in the immediate vicinity of their place of employment, leading to relatively long distance commutes. However, the area does not feature significant congestion. Asheville was not included in the INRIX 2016 Traffic Scorecard report, nor does it appear in the Texas A&M Transportation Institute's 2015 Urban Mobility Scorecard.

Greater Asheville TDM Program

The economic downturn of the late 2000's resulted in the suspension of a pre-existing regional TDM program. That previous program, which was led by the City of Ashville, has been inactive since around 2010. Some TDM-related services have remained in operation for many years, but reestablishment of coordinated TDM services has only just begun. A 2013 study by the French River Metropolitan Planning Organization (MPO) resulted in a TDM plan for the region. The plan recommended that, in the short term, a regional TDM program be housed within the Land of Sky Regional Council (Land of Sky) as it possesses the ability to "respond to different geographic markets."

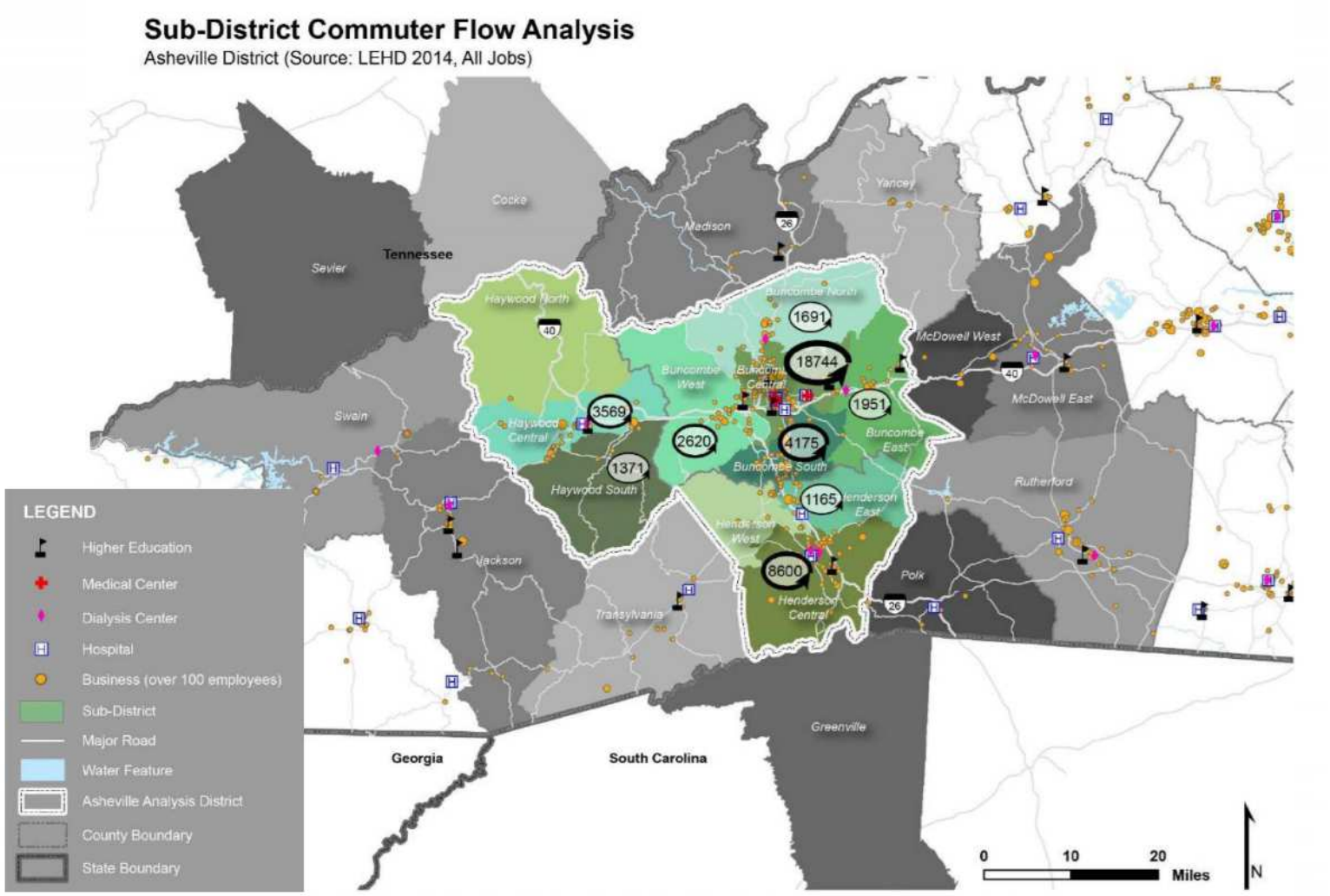
Leadership

TDM leadership in the region is provided by the TDM Coordinator through the regional MPO, Land of Sky. Regional TDM initiatives are starting to coalesce around this position. The TDM coordinator has addressed private employers, community groups such as rotary clubs, agency level transportation committees, and similar groups over the past year and has made several connections with employers and other potential regional partners. Furthermore, the TDM coordinator has offered advising services to several area companies regarding TDM supportive site development but those services have yet to be utilized. Due to the housing of the position within the regional MPO, the TDM coordinator has been increasingly involved with regional planning activities and provided input in support of longer term TDM program deployment. The coordinator spends time each day on messaging and outreach for TDM related events, such as the Strive Not to Drive Program, and programs such as Go Mountain.

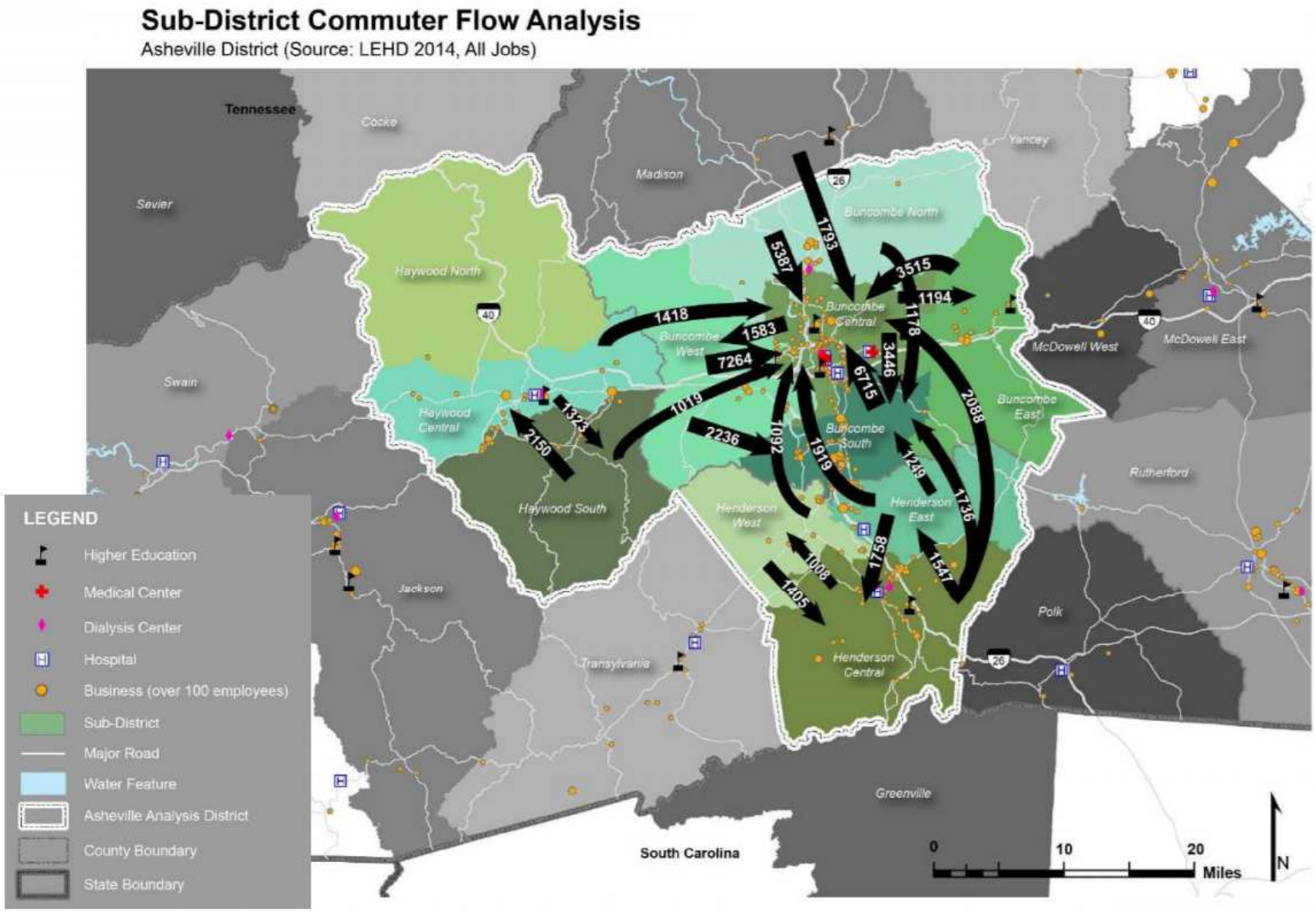
Budget / Funding

Land of Sky supports the TDM Coordinator full time through a grant provided by NCDOT-PTD. A small portion of the coordinators' time is also covered with funding from the regions local CMAQ program. In their initial year of work the TDM coordinator has gained additional familiarity with funding cycles and when opportunities like Job Access Reverse Commute (JARC) Grant funding become available in the future, staff will be ready to respond.

The following sub-district commuter flow analysis maps have been generated for the NCDOT Public Transportation Division (PTD) Statewide Strategic 2035 Plan. The maps identify activity centers relevant to TDM service areas and through coordination of planning efforts, can support short-term and long-range recommendations to improve North Carolinians' access to opportunities.



NCDOT Public Transportation Statewide Strategic Plan: Greater Asheville Region Intra-Area Commuter Flows



NCDOT Public Transportation Statewide Strategic Plan: Greater Asheville Region Significant Flows Between Sub-Districts

Agencies

Agencies in the Asheville region with either an active or potential role in TDM initiatives include the following:

- **City of Asheville:** The City of Asheville has, in the past, administered transportation demand management services. These included the Passport Program, the Way to Go! Commuter Club, and an emergency ride home program.
- **French Broad River MPO** - The French Broad River MPO (FBRMPO) represents a partnership between local and state governments to facilitate transportation planning in urbanized areas and meet planning federal planning requirements for transportation funding. Local governments belonging to the MPO are Buncombe, Haywood and Henderson and Madison Counties, and Asheville, Biltmore Forest, Black Mountain, Canton, Clyde, Flat Rock, Fletcher, Hendersonville, Laurel Park, Maggie Valley, Mars Hill, Mills River, Montreat, Waynesville, Weaverville, and Woodfin. A study by the French Broad River MPO resulted in recommendations for the placement of a regional TDM program within the Land of Sky Regional Council. FBRMPO is responsible for the region's Congestion Management Process (CMP).
- **Land of Sky Regional Council** – The Land of Sky Regional Council (Land of Sky) is a multi-county, local government planning and development organization. It includes 19 local governments in Madison, Buncombe, Henderson and Transylvania Counties with a total population of almost 320,000. Land of Sky's Transportation Resource Center administers the Mountain Mobility and Non-Emergency Medicaid Transportation (NEMT) services for Buncombe County. Land of Sky also provides transportation planning for 5 local governments in Haywood County. Land of Sky is the lead planning agency for the Land of Sky Rural Planning Organization (RPO) and the French Broad River Metropolitan Planning Organization (MPO). It therefore has primary responsibility for preparing the Rural Planning Work Program (PWP), Urban Area Planning Work Program (PWP), and the development of the Metropolitan Transportation Improvement Program (MTIP). Land of Sky is the primary local recipient of state and federal transportation planning funds. The 2013 Long Range Transportation Demand Management Plan identified Land of Sky as the optimal agency for managing a regional TDM and the agency currently houses the regional TDM program coordinator.
- **Transit Providers** – There are numerous transit providers in the region, but it does not appear that any offer TDM related services such as vanpooling. However, transit providers would likely be an integral component of future regional TDM initiatives. Asheville Redefines Transit (ART) and Apple Country Transit both provide regional service, but there are still underserved regions. Smaller, and in some cases on-demand-based systems include Madison County Transportation Authority, Transylvania County Transportation System, and Haywood Public Transit. Mountain Mobility is the public transportation system for Buncombe County and provides services to the clients of human services agencies, departments of local governments, and the general public. Services are managed by the Land of Sky Regional Council through a service contract with Buncombe County.

SWOT Analysis

Individual in-person interviews were conducted with TDM Service Providers across the state between April 24 – May 9, 2017. Additional interviews were held with associated stakeholders not currently receiving TDM funds from NCDOT PTD. The Asheville TDM Coordinator was interviewed on April 27, 2017.

During the interviews, participants were asked to summarize their program activities by identifying currently implemented TDM Strategies within a standard matrix. This process serves as the baseline for consistently measuring program work and has informed the analysis of strengths, weaknesses, opportunities and threats / challenges cited below.

In addition to the TDM Strategies Matrix exercise, service providers were asked to provide potential Enhanced Performance Metrics beyond VMT reduced and associated air quality improvements to provide a more open-ended opportunity to inform the process. A summary of proposed Enhanced Performance Metrics is attached (Appendix A).

Strengths

- **Public Education and Promotion:** The Asheville TDM Coordinator utilizes funds from NCDOT PTD to support alternative modes through public education and promotion. This is in addition to non-funded entities such as UNC-Asheville providing additional marketing support. The GO Mountain Commuting campaign assists companies and individuals plan commutes that get people to work in ways beyond one person in one car. This effort leverages experience from similar campaigns across the state including GoTriangle, GoDurham and GoRaleigh, further enhancing the strength of this TDM strategy.
- **Transit / Vanpool Services:** The GO Mountain program supports Transit / Vanpool Services, some of which are customized. The Asheville TDM program identified services as key elements for TDM service provisions in the region as travel patterns are characterized by relatively long intercounty commutes from outlying suburban and rural areas into more urbanized areas. Topographical features tend to limit the ability to quickly and easily reach destinations, meaning that there are a limited number of facilities that can provide true regional interconnectivity, further supporting the efficiency of customized Transit / Vanpool Services.
- **Ability to Communicate with Multiple Stakeholders:** The Asheville TDM Coordinator is housed at the Land of Sky Regional Council / French Broad River Metropolitan Planning Organization (MPO). This offers the ability to consistently coordinate and integrate TDM strategies across a variety of transportation planning efforts and associated stakeholders.

Weaknesses

- **Expanded Program Locations / Partnerships:** The statewide program supports TDM service provisions across academic, government and non-profit sectors, offering a variety of tailored strategies and lessons-learned for several audiences. However, complete TDM program coordination has not been attained in the Asheville region. For example, the University of North Carolina Asheville often deploys similar programs on their own without the involvement of or coordination with the TDM coordinator. The university does have transportation staff and better coordination with those staff would likely be beneficial, particularly since the university has parking issue of its own and may be able to better address them by working with the MPO. Furthermore, the university has initiated car sharing initiatives but currently lacks a shuttle service.

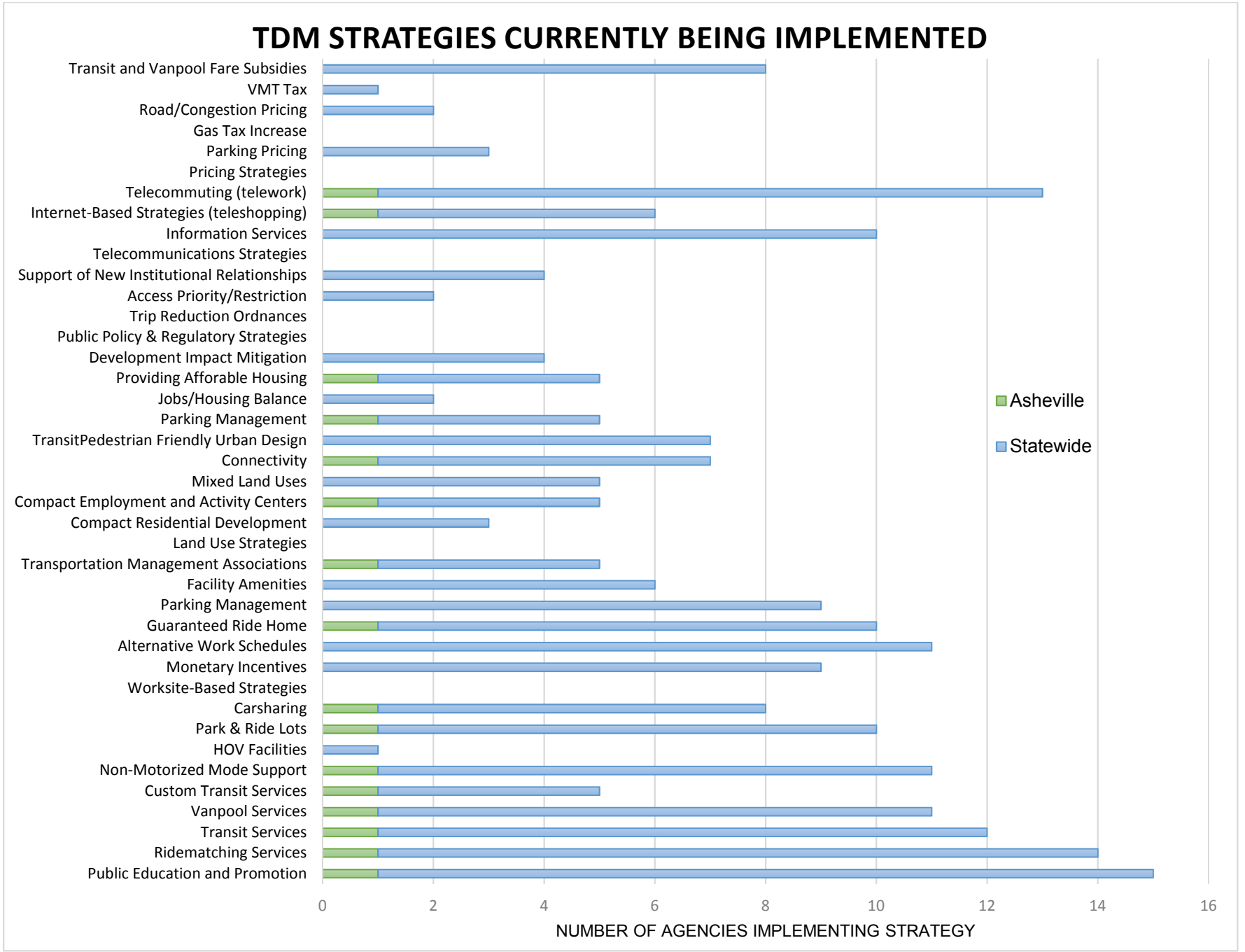
- **Inconsistent VMT Calculation:** Vehicles Miles Traveled (VMT) has historically been the primary performance metric for the statewide program, yet regional programs have reported annual reductions through individual calculations. These inconsistencies make it difficult to determine what strategies are successful, hence weakening the statewide program's ability to share best-practices.
- **Inconsistent Funding:** Regional programs do not share a consistent funding structure making it difficult to relate to peers across the state. Some regions leverage local funds to enhance NCDOT PTD investment where others do not. In other cases, the availability of local matching funds is limited despite a desire to collaborate.
- **Lack of Performance Incentives:** The Asheville TDM program lacks incentives for improving performance. If a greater reduction in VMT is reported from one fiscal year to the next, the program might be studied for justifiable reasons to increase financial support. A coordinated plan for moving from baseline to achievement would support additional funding opportunities such as the Job Access Reverse Commute (JARC) Grant along with justification for increased local cost-share investments into the regional program.

Opportunities

- **Statewide Collaboration:** TDM Service Providers across the state consistently noted the desire to share best-practices and lessons learned. In some instances, newer TDM staff were unaware that programs existed in other locations. In addition to opportunities for shared improvements, programs might share resources including commonly branded materials to increase efficient use of funds. Newly appointment staff including the Asheville TDM Coordinator could quickly assimilate into the statewide TDM effort if a better system were created for connecting service providers.
- **Support New Institutional Relationships:** Only four TDM Service Providers across the state identified this strategy as being implemented by their program. The Asheville region did not identify the strategy. The development of new relationships offer numerous opportunities ranging from additional funding for program activities to shared communication and marketing efforts. Creating a performance measurement for the creation of new partnership would enhance the achievement of TDM efforts in the Asheville region.
- **Technology-Based Solutions:** Advanced technologies including communication modes offer ever-improving opportunities for public education and promotion of alternative modes. Shared pilots and statewide deployment of appropriate technologies might provide chances to leverage exiting openings for enhanced programs.
- **Shared Resources / Branding:** Several TDM Service Providers cited the ability to leverage shared resources such as the "Go" Brand which has been successfully replicated by communities such as "GoMountain", "GoTriangle", "GoRaleigh", "GoCary" and others. The Asheville TDM program might coordinate with these similar efforts more closely to explore opportunities for efficient use of resources along with more consistent messaging across the state in disseminating information.
- **Trip Reduction Ordinances:** This strategy has proven successful in the past but is no longer being implemented by any program in the state.

Threats / Challenges

- **Funding:** Identifying and capturing additional funding requires time and presents several challenges. Pursuing external investments for programs that are rooted in government funding is difficult and often limited due to regulatory constraints. The Asheville TDM program has seen gaps in funding in the past that have halted momentum for several strategies.
- **Stagnation:** Many local TDM programs have been in existence for nearly a decade. This can cause stagnate program branding, messaging, and general impact in local communities. Maintaining a fresh program image is both critical and challenging for any marketing-based effort. While the Asheville TDM program has recently created relatively new efforts, maintaining relevance will be a constant challenge.
- **Limitations of Policy Development:** It is challenging for TDM Service Providers to develop and promote policies within their communities. Increased communication and support from community leaders and decision-makers is difficult for programs to prioritize while implementing services.
- **Coordination with Land Use Strategies**: Roughly half of TDM Service Providers across the state are implementing strategies related to land use and development. The Asheville TDM coordinator indicated current coordination of TDM service provisions within the areas of compact employment and activity centers, connectivity, parking management and affordable housing land use strategies but the true extent of implementation and performance measurement is not currently communicated as part of the TDM program.


TDM STRATEGIES CURRENTLY BEING IMPLEMENTED
Transit and Vanpool Fare Subsidies
VMT Tax
Road/Congestion Pricing
Gas Tax Increase
Parking Pricing
Pricing Strategies
Telecommuting (telework)
Internet-Based Strategies (teleshopping)
Information Services
Telecommunications Strategies
Support of New Institutional Relationships
Access Priority/Restriction
Trip Reduction Ordnances
Public Policy & Regulatory Strategies
Development Impact Mitigation
Providing Afforable Housing
Jobs/Housing Balance
Parking Management
TransitPedestrian Friendly Urban Design
Connectivity
Mixed Land Uses
Compact Employment and Activity Centers
Compact Residential Development
Land Use Strategies
Transportation Management Associations
Facility Amenities
Parking Management
Guaranteed Ride Home
Alternative Work Schedules
Monetary Incentives
Worksite-Based Strategies
Carsharing
Park & Ride Lots
HOV Facilities
Non-Motorized Mode Support
Custom Transit Services
Vanpool Services
Transit Services
Ridematching Services
Public Education and Promotion
Asheville
Statewide
0
2
4
6
8
10
12
14
16
NUMBER OF AGENCIES IMPLEMENTING STRATEGY

Technical Memorandum on Performance Measurements

The 2013 French Broad River MPO—Long-Range Transportation Demand Management Plan identified and recommended the performance measures shown in the table below for the future evaluation of TDM program effectiveness. The plan recommended that these measures be reported no less than every two years.

Performance Measure	Source
Reduction in Single-Occupant Vehicle Miles of Travel (VMT)	Surveys, TRIMMS model
Reduction in Fuel Consumed	Surveys, TRIMMS model
Program Participants (by program element and total)	Surveys
Number of New Registrants (by year)	Internal Records
Meetings / Events Attended	Internal Records
Facebook "Likes" or TDM Website "Hits"	Internet Records
Cost Benefit Analysis	Surveys, TRIMMS Model

Enhanced Value Performance Measures

New standardized enhanced value performance measures are identified in the Task 4.1 report, and should be incorporated throughout the regional TDM programs in the state. However, additional performance measures identified by local practitioners in Asheville have been categorized according to the Task 4.1 objectives. These are identified below.

Person Throughput

Concurrent with Asheville area practitioners' interest in workforce accessibility, a key metric for the future might be "additive trips" as opposed to simply aggregated trips. This would refer to the number of trips provided by the program and might be evaluated in conjunction with the per-capita number of transportation options available. Collecting data on the availability of mobility options can also help to identify "transportation deserts," similar to what might be seen on a cell phone coverage map.

Transit Mode Split

Supporting the traditional metrics identified above, measuring the use of park-and-ride lot utilization is desired locally. The use of photograph-based readers or similar technology would allow for lot counts to be generated on an automatic basis, while providing the option of expanding the use of this information for potential customers.

Recommendations

The Asheville Regional TDM Program has multiple strengths and opportunities to move from baseline to achievement. Reviewing current baseline levels of reporting and developing enhanced performance metrics can demonstrate added value, improving communication of program mission, vision and goals. Improved communication of program impacts will reinforce support from local leadership while offering a mutual understanding of TDM service provisions.

A process for the development of a 3-Year Regional TDM Plan will be informed by the Statewide TDM Plan Update and support the ability to improve current performance while creating a phased approach to Plan Review, Project Entitlement and TDM Plan Monitoring and

Reporting. This will also enhance efficiencies, reducing administrative burdens while offering opportunities to align with additional funding cycles.

Additionally, the Statewide TDM Plan Update will support opportunities for NCDOT to provide various forms of technical assistance. Coordinated aid at the statewide level will allow for the sharing of best-practices and lessons-learned across regional programs. Approaching a 3-Year Regional TDM Planning Process while integrating Enhanced Performance Metrics will support the development of localized specialties with consistent metrics for documenting results.

Given the relative lack of congestion in the area, Ashville's nascent regional TDM program is oriented around enhancing mobility options. Aligning the creation of Enhanced Performance Metrics for additive non-SOV trips (additional transit, carpool, active transportation trips), carpool lot usage and social awareness activities over 3-year horizon goals can offer a comprehensive approach to developing strategies most important to the region.

Reviewing current and needed strategies with the development of performance measurements should be coordinated with the Statewide TDM Plan Update to align local, regional and state funding priorities for the Asheville Regional TDM Program. These opportunities will provide a structure for defining current and newly defined baselines to demonstrate growth towards achievement, establishing an enhanced program model that can build on comprehensive improvements to better encourage innovation.

Appendix A
Task 4.1 – Enhanced Performance Metrics

MEMO

TO: NCDOT Public Transportation Division

FROM: Gresham, Smith & Partners; WSP USA

SUBJECT: Task 4.1: Enhanced Performance Measures Technical Memorandum

DATE: August 17, 2017

Performance Measurement of TDM Strategies

The development of TDM strategies emerged out of a recognized need for better surface transportation system performance while reducing the negative externalities associated with unimpeded travel growth. Presently, most metropolitan areas in the United States implement TDM as a mobility service, with limited expectations regarding the performance of the strategies deployed. The usefulness of static marketing and modal promotion over time as conditions change is rarely called into question, let alone respond to variations in demand or economic changes influencing travel demand. Typically, years go by before plans and strategies are changed to suit the current market. Even as more and more jurisdictions embrace TDM strategies as a complement to infrastructure oriented projects, metrics for evaluating the performance of TDM has lagged.

One study of performance measures for TDM identified current and best practices.[1] There are dozens of TDM performance measures in use by various agencies. Some of these measures are standard ones developed by TDM practitioners or researchers and promoted over time. Other measures are local in nature, responding to specific goals and objectives embedded within transportation plans, or are custom-tailored by agencies for specific purposes. This section will discuss some of the key measures in detail, along with relevant illustrations.

The review of TDM performance measures by Thompson and Suter indicate a four stage approach to evaluating performance:

1. **Inputs** involve quantifiable activities often conducted by TDM practitioners.
2. **Outputs** measure the direct results of activities that serve as inputs.
3. **Outcomes** involve a calculation of benefits as yielded from inputs and outputs.
4. **Effectiveness** measures take outcomes, and normalize them by cost, yielding a benefit cost relationship.

Altogether, this four stage approach involves escalating levels of difficulty in calculating the performance of TDM measures over time. These are summarized in turn.

[1] Thompson, R. and Suter, S. *Development of Standard Performance Measures for Transportation Demand Management Programs*, Transportation Research Record 2319, Transportation Research Board, Washington, DC. 2012.

Input Measures

input measures are primarily confined to the actual activities that are often conducted by TDM practitioners. In the context of outreach and marketing, which is the primary level of activity currently applied in the Asheville area, measures may involve the recording of the absolute number of meetings with employers, events attended, new employers organizations engaged in the program, literature distributed, advertisements and/or radio marketing placed, or Internet-based ad placement.

In terms of best and/or innovative TDM practices as it pertains to input measures, agencies around the United States may identify the same metrics, but the reporting of the absolute number is irrelevant. Instead, outreach and marketing input measures become normalization factors for outputs. As such, the input number becomes the denominator and calculation functions. For example, the number of carpools that are formed at any one ***particular*** event is irrelevant. However, the same number of carpools for formed ***per event*** attended is very much relevant towards effective calculations. Ultimately, these performance measures are described and summarized as placement rates, conversion rates, and cost-effectiveness of marketing and outreach activities.

Output Measures

The common use of output measures in TDM performance assessment involves the measurement of modal use as well as client satisfaction. Common measures of effectiveness currently in use include the number of participants by mode (for example, transit riders, car pullers, vamp rulers, teleworkers, etc.), the number of emergency ride home participants, the utilization of park-and-ride locations, and the conversion rate of new participants in TDM activities. For client satisfaction, these measures may include the number of commuters who recall marketing efforts, satisfaction with the services received, or the number of surveys distributed and/or returned to the TDM agency.

Best practices for TDM measurement, including those endorsed by the referenced article, emphasize the level of participation, and not the absolute number. These measures would include the percentage of employees using alternatives to work separated by mode, the frequency and duration of alternative mobile use, and the percent of the population that oscillate between modes. Furthermore, client satisfaction measures may be linked with marketing and outreach measures to determine an overall effectiveness of TDM program activities. These measures may include placement rates for campaigns and customer interaction, or, the cost per recipient of TDM services.

Outcome Measures

Whereas inputs and outputs pertain to the overall TDM program activities and utilization of alternatives, outcome measures evaluate the benefit upon the overall transportation system. In North Carolina, a common measurement has been the calculation of vehicle miles traveled (VMT) reduction that is a direct outcome from TDM services. This VMT reduction calculation may either be as an absolute number, or as a percentage of overall VMT. Additional outcome related measures utilized by other practitioners around the United States may include: single occupant vehicle trips reduced, percentage of trips taken by mode, absolute number of greenhouse gas emissions or ozone emissions reduced, overall costs to commuters, or improved travel time reliability.

Best practices for TDM activities involve the correlation of TDM investments to overall transportation system metrics. These innovative practices involve the separation of TDM effectiveness by outputs. For example, the TDM agency would establish outcome goals prior to the activity engagement, and then evaluate the effectiveness of meeting those outcome goals from the activity itself. Examples of these types of measures may include: VMT reduction comparisons by geography, sub area, or corridor, VMT reduced by mode, and the reduction in travel time delay for participants by mode.

Effectiveness

Overall, effectiveness measures involve the calculation of cost per input, output, and per outcome for every other performance metric. As such, this category measures efficiency of all efforts and demonstrates the value of TDM services over time. Examples of effectiveness measures include: cost per trip provided, cost per ton of emissions reduced, cost per advertisement viewed, cost per placement, and cost per day of service. Cost-effectiveness measures are essential for identifying the relative value of TDM as compared to other transportation related improvements. From a true calculation of benefits to cost, the appropriate role of TDM services can be aligned with the overall infrastructure investment plans. However, given the difficulty of making these types of calculations, most TDM practitioners do not yield cost-effectiveness performance measurement.

Reframing Metrics for Performance Enhancement

Leveraging the best practices identified above, the TDM Strategic Plan provides a cost-benefit analysis (effectiveness) driven approach for measuring traditional and enhanced indicators of success in order to more accurately assess the distribution of funds to improve efficiencies and enhance existing efforts. Measures of effectiveness are oriented towards providing clarity and uniformity across the statewide plan. To accomplish this, each measure requires sufficient definition so as to provide a high degree of certainty that the measure is accurate as calculated.

The TDM Strategic Plan has outlined the Enhanced Performance Metrics through a comparison between “Traditional” and “Enhanced” measures.

Traditional TDM Measures emphasize objectives that have been core to the North Carolina TDM Program for the past two decades - primarily, improving air quality and reducing congestion. Key measures of effectiveness for air quality included air emission levels from carbon dioxide (CO2), nitrogen oxides (NOx), and volatile organic compounds (VOC). Congestion reduction, however, was more limited in assessment to reducing the growth in vehicle miles traveled (VMT).

By comparison, **Enhanced TDM Measures** encourage innovation in not only the assessment and measurement of effectiveness, but also the very definition of societal benefits from TDM endeavors. These benefits extend to improving the larger economy, providing resiliency to disruptions in mobility, enabling access to employment and other components of life, and improving the overall quality of life itself. Inherently, these measures require succinct definition and collaboration across sectors for delivery and evaluation.

Initial Performance Measures

Initial performance measures were derived from the evaluation of best practices for TDM strategies. In turn, these performance measures can be detailed into measures of effectiveness. The selection of performance measures acted to:

- Guide overall mobility decisions by giving direction to fully utilize all highway and modal investments towards traditional and enhanced performance.
- Define the most cost-effective techniques and strategies to optimize system performance through demand management.
- Develop a future TDM investment strategy that optimizes the investments already made in the region using multimodal system and demand management strategies.
- Identify TDM strategies to improve system performance and preserve mobility.
- Utilize the most cost effective techniques to optimize system performance.

Inputs

For input measures, the reviewed research guidance indicated that the absolute numbers collected for various outreach and marketing activities should be utilized as normalization factors. Consequently, it will be important for TDM practitioners throughout the state to collect the necessary levels of data inputs in order to create those factors. The data points that will be collected will be dependent upon each of the contributing TDM strategic plans for service providers. Examples of data points include:

- number of active participating employers and commuters
- events conducted
- employers and commuters engaged for the first time
- years of engagement
- extent of marketing distribution
- market penetration with new marketing activities
- number of new incentives provided
- value of incentives and transit passes
- utilization rates

Outputs

Output measures conducted will include similar measures of effectiveness as currently collected. These may include a variety of factors that pertain directly to the utilization of different alternative modes as well as the utilization of TDM services. Inevitably, data collected will be done at either the employment worksite or through regional survey data collection. As such, it is important that surveys and other materials collect sufficient levels of data points in order to reflect utilization and satisfaction factors. The number of participants by mode, participation in other TDM activities (emergency ride home, incentive program, flexible working arrangement

assistance, etc.), utilization, and other components will be normalized by the input factors collected above. This will allow for the calculation of placement rates, utilization rates, cost per marketing distribution, and percentage of employee population utilizing TDM services.

Outcomes

Outcome factors reflect the newest and most important component of TDM performance metrics, and cross into both traditional and enhanced TDM performance measures. The following measures include a rating of "high, medium, or low" connection between the following performance values:

- Congestion Reduction
- Air Quality Management
- Economic Vitality
- Personal Income
- Resiliency
- Quality of Life

Current factors used by North Carolina TDM partners will continue to be important considerations for evaluating TDM performance, and are incorporated below. Furthermore, local communities may have measures which are important for the local context, and those should continue, too. However, additional factors are suggested for which demand management services can also interrelate with infrastructure and technology services include:

Person Throughput

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
High	High	High	Medium	Medium	Low

Person throughput is an important measure of mobility and congestion reduction, but it also cascades into other performance values. Put simply, the more people the transportation can carry, the more effective the system towards improving personal and societal economy. Person throughput refers to the number of persons utilizing transit and within private vehicles. Although metrics for improving personal health and quality of life are more positively associated with non-vehicular strategies, and hence the lone "low" measure, person throughput may have some residual benefit through accessibility and mobility that still make it a value measure of effectiveness for quality of life. Increases in the number of persons using a corridor's or area's infrastructure would imply that the operations and management strategies evaluated were effective in serving more persons who are not previously serviced as a result of the TDM strategy. The identified measures of effectiveness for person throughput are:

- Person Miles Traveled (PMT) by mode
- Vehicle Miles Traveled (VMT) by mode

The identified mechanism for assessing person throughput performance will be the calculated outcomes from spot measurement, origin/destination studies, and the respective regional travel demand model for PMT and VMT within each region. Whereas collection of new data is not anticipated, opportunities to categorize and archive applicable data from corridor, subarea, or municipal studies should be explored and conducted by each regional partner.

Transit Mode Split

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
Medium	High	High	High	High	Medium

A desired outcome of statewide TDM strategies is to increase the use of transit relative to the private auto, leading to a mode shift to transit. Mode shift may result from potential users being attracted to transit, or from increased transit use among occasional users. Thus, the central transit evaluation issue is the identification and measurement of mode shift. A mode shift to transit should then facilitate higher transit ridership, reduced levels of traffic congestion, more efficient use of existing road capacity, net reduction in greenhouse gas emissions and fuel consumption. and potentially higher levels of person throughput. The identified measures of effectiveness for transit mode shift are:

- Change in key corridor mode share
- Change in regional mode share

Peak Period Vehicle Traffic Volumes

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
High	Medium	Medium	Low	Low	Low

As it pertains to facility performance measure, total vehicular demand for regional highway capacity can be an effective measure for TDM services. Recognizing the state's highway system provides abundant capacity and only suffers a shortage in the peak periods, this measure identifies the success of alternatives in shifting demand from the peak period and/or shifting to alternative modes of travel. The identified measures of effectiveness for peak period vehicle traffic volumes are:

- Change from baseline in peak hour volumes
- Vehicle trips reduced
- Change in peak period VMT

Travel Time Reliability

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
Medium	High	High	High	High	Medium

Travel time reliability is a key metric for operational and demand management strategies, yet it remains an elusive metric for estimation and quantification. In order to represent travel time reliability, regional TDM partners will work in partnership with regional traffic management centers to determine the travel time index as a means of assessing the collective effectiveness of the strategies at reducing congestion between corridors and/or subareas. The travel time index is the ratio of the average peak period travel time as compared to a free-flow travel time. The free-flow travel time for each road section is the 15th percentile travel time during traditional off-peak times (i.e., weekdays between 9 am and 4 pm, between 7 pm and 10 pm; and weekends between 6 am and 10 pm). For example, a value of 1.20 means that average peak period travel times are 20% longer than free flow travel times. Coupled with a calculation of variability, this provides an approximation of reliability. The identified measures of effectiveness for travel time reliability are:

- Variability of trip travel time by mode
- Change in travel time index (total travel time compared to a free-flow travel time) of travelers by mode

Cost of Transportation

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
Low	High	High	High	Low	Low

The use of transportation systems inherently involves costs, borne by individual travelers, consumers of goods that are transported to market, and the society at large. Individual costs are reflected in multiple forms, including the price and acquisition of fuel, vehicles, maintenance, and value of time lost to congestion. Consumer costs reflect the passed along value of individual costs in the final cost of goods and services. Consumer costs are identified here, but are technically an externality, and as such are not reported as a discrete TDM metric. Societal costs largely reflect the additive cost of crashes, vehicular enforcement, emissions, and land development patterns. Altogether, these metrics are summarized by overall reduction in economic productivity as a result of transportation leakage.

- Individual aggregate costs per capita
- Change in travel time index (total travel time compared to a free-flow travel time) of travelers by mode

Calculation of Benefits

The performance measures above can be calculated in a consistent manner. The Metropolitan Washington Council of Governments has developed a similar process, and one which can be replicated as a part of the state of North Carolina utilizing the performance measures identified above. Their process is summarized here, and adapted to fit the North Carolina context:

1. *Estimate commuter population for study (e.g., all commuters, guaranteed ride home applicants, rideshare matching applicants, employer-TDM program employees, etc.)*
2. *Calculate placement rate – Percentage of commuters in the population base who made a travel change as a result of the TDM program*

3. *Estimate the number of new alternative mode placements – Multiply placement rate by the population base for the evaluation period*
4. *Calculate the vehicle trip reduction (VTR) factor for new placements – Average daily vehicle trips reduced per placement*
5. *Estimate vehicle trips reduced – Multiply number of placements by the VTR factor*
6. *Estimate vehicle miles traveled (VMT) reduced – Multiply number of vehicle trips reduced by average commute distance*
7. *Adjust vehicle trips and VMT for access mode – Discount vehicle trips reduced and VMT reduced to ac-count for commuters who drive alone to meet rideshare modes and transit*
8. *Estimate NOx, VOC, PM2.5, and CO2 emissions reduced – Multiply adjusted vehicle trips and VMT reduced by emissions factors consistent with the regional planning process*
9. *Estimate the energy and commuter and societal cost savings – Multiply VMT reduced by fuel efficiency and vehicle operating cost factors and by societal benefit cost factors*

This process reflects a relatively simplistic approach to performance calculation; however, it is a process that lends itself to guidance and replicability. Following NCDOT concurrence on the measures of effectiveness, a similar spreadsheet process will be developed to reflect a standardized method of calculating the performance measures from each region.

NORTH CAROLINA
Department of Transportation



Statewide Transportation Demand Management (TDM) Strategic Planning

Charlotte Regional Success Plan

FINAL DRAFT

October 2017

GS&P GRESHAM SMITH AND PARTNERS

wsp

Partnerships between the N.C. Department of Transportation and local governments, regional authorities and other state agencies have been the source of North Carolina's transit success. Currently under development, the Public Transportation Statewide Strategic Plan will build upon that success by creating the foundation for reinvigorated state and local transit partnerships.

As part of the statewide strategic planning and development process, including integration of best practices for various agencies across the state, NCDOT is supporting the state's TDM programs by bringing them into concurrence with the overall strategic focus of the Public Transportation Division (PTD). This work builds off the 2003 Statewide TDM Plan, including alignment of mission, vision and goals.

Mission Statement

To provide citizens of North Carolina opportunities and strategies for improving sustainable economic growth and quality of life through reduced transportation congestion, expanded mobility options, improved air quality and more efficient use of resources.

Vision

Effectively measure and communicate the benefits of alternatives to driving-alone in communities across North Carolina.

Goals

Achieve improved accessibility, connectivity, economic growth, public health and safety through enhanced performance of transportation demand management service provisions.

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Overview

The Charlotte Urbanized Area had a 2010 US Census Population of almost 1.25 million, representing about 13 percent of the population of North Carolina. The area has grown by about 65 percent since 2000 and is expected to grow by another 62 percent between 2010 and the 2040 census. The urbanized area that is currently under the jurisdiction of the regional metropolitan planning organization (MPO) is 930 square miles and includes all of Mecklenburg County and portions of adjacent Union and Iredell Counties with a total of 27 member jurisdictions including cities and towns. In 2013 there were 6,874 total roadway miles in the planning area and, in 2010, daily vehicle miles travelled was 38,566,000.

In 2010, the MPO's planning area held about 830,000 jobs with Mecklenburg County, where the principal city of Charlotte is located, having about 690,000 jobs. The Charlotte central business district had a 2010 employment density of about 5,000 employees per acre. The next highest density in employment was found in Mallard Creek with 1,516 employees per acre. Employment within the regional planning area is expected to increase by 57 percent between 2010 and 2040. Most trips taken by residents in the region are to access their place of employment, with primary employment centers being within the City of Charlotte. In 2000, the US Census Bureau's American Community Survey reported that commute times in the region were just under 23 minutes with 80 percent of workers driving alone, 11 percent carpooling, 3 percent taking transit, 3 percent working at home, and 1.4 percent walking to work.

The INRIX 2016 Traffic Scorecard ranked Charlotte 42nd out of 240 cities in terms of congestion the US. Per the report, Charlotte residents spent about 7 percent of their drive time in congestion with 23.4 hours spent in congestion during peak periods. The Texas A&M Transportation Institute's 2015 Annual Urban Mobility Scorecard noted that Charlotte's travel time index remained constant between 2010 and 2014 at 1.23, meaning that trips during peak periods of the day took 23 percent longer in 2010 as well as in 2014. Charlotte's travel time index placed it 25th in terms of rankings among US cities in 2010, and that ranking fell to 29th by 2016. Furthermore, over that time the city retained its 46th place ranking in terms of annual delay with total delay in 2014 being approximately 34 million person hours; up from 30 million in 2010. These statistics indicate that congestion is indeed an issue in the Charlotte area, but it has not worsened at the same pace as other US cities.

Greater Charlotte TDM Program

With the largest population in the North Carolina and the most significant congestion issues, the Charlotte metropolitan region could benefit the most from TDM strategies that manage congestion without the need for additional infrastructure investment. Certain strategies are already being utilized, but they are not managed as part of regionally coordinated and focused initiative. Agencies responsible for regional planning are cognizant of the need to implement TDM as part of a comprehensive and collective vision for regional mobility and have taken steps to integrate TDM in future regional plans. However, these efforts have only recently been initiated, and regional planning appears to focus heavily on infrastructure development and land use. North Carolina DOT might assist the region by providing funding and technical support for the establishment of dedicated staff at relevant regional agencies that can focus on actively pursuing TDM development and implementation in concert with regional planning and infrastructure development initiatives.

There is no comprehensive, regional TDM program for the region. Various TDM strategies are currently managed by various agencies in the region, most notably the metropolitan transit agency. However, The CONNECT Our Future Consortium, composed of 83 jurisdictions and organizations in North Carolina and 10 in South Carolina, was recently formed to "create a framework for guiding and investing" in the Charlotte region's growth, an overall objective being to coordinate long range planning and development in the region through a unified vision for future growth. In early 2014, several "Alternative Growth Scenarios" were developed based on the results of community workshops and submitted to the public for feedback. A preferred scenario was selected and recommendations and strategies were developed to help the region achieve its goals. One of the tools that is recommended for achieving the region's preferred development vision is TDM. Therefore, it is likely that TDM services and programs will, in the long run, be implemented through a yet to be identified regional coordinating agency.

Leadership

In the Charlotte region, public sector TDM services are offered through CATS. Charlotte Center City Partners and Sustain Charlotte received pilot-project TDM funding from NCDOT for service provisions during the 2016-2017 fiscal year. These agencies, and others, have formed effective partnerships in the past although a structure for regional coordination of funds or workplans has not yet been established.

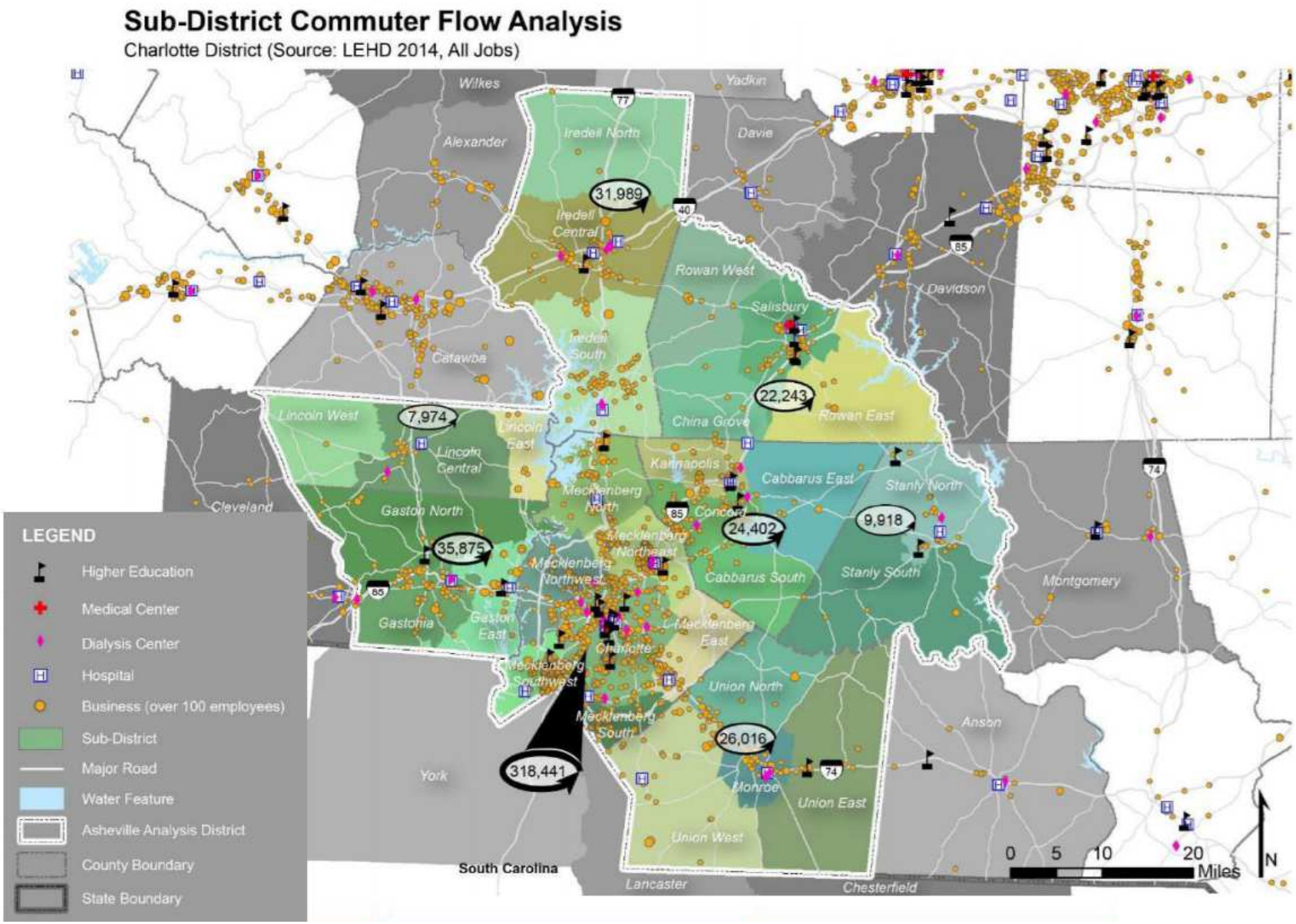
Throughout NCDOT's funding of TDM service provisions in the Charlotte area, there has been difficulty in effectively expanding the coordination of partnerships for efficiencies in the use of funds and service delivery. This is due, in part, to the number of transit agencies in the 12-county area and level of services appropriate to address a variety of need. In 2017, CRTPO funded the study of best-practices as it relates to the coordination of TDM services although no formal steps in leadership alignment have been made.

Budget / Funding

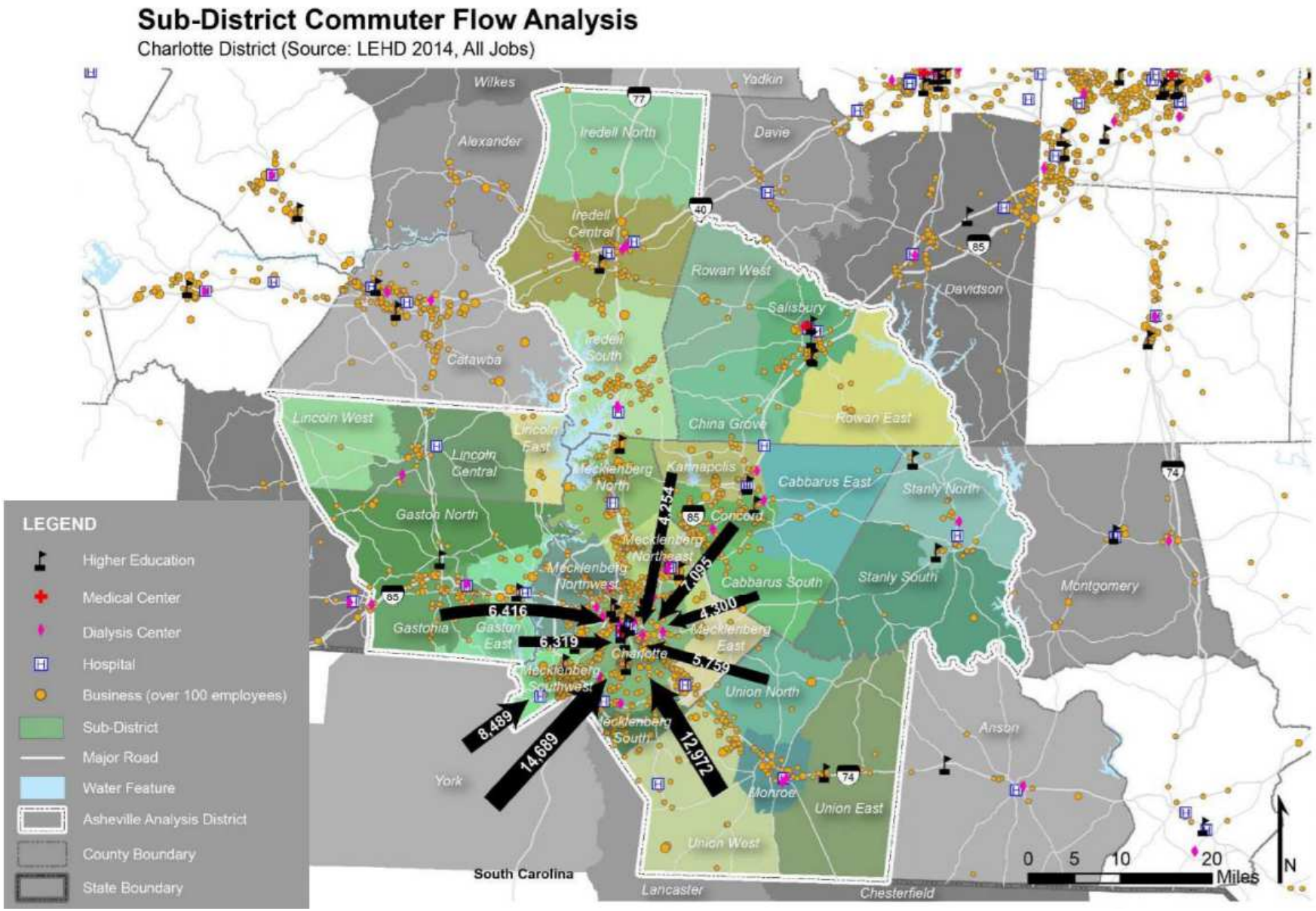
There have been no dedicated funding sources yet identified for TDM programs in the Charlotte region. Specific TDM related activities appear to be funded through individual agency budgets.

Plan Alignment

The following sub-district commuter flow analysis maps have been generated for the NCDOT Public Transportation Division (PTD) Statewide Strategic 2035 Plan. The maps identify activity centers relevant to TDM service areas and through coordination of planning efforts, can support short-term and long-range recommendations to improve North Carolinians' access to opportunities.



NCDOT Public Transportation Statewide Strategic Plan: Greater Charlotte Region Intra-Area Commuter Flows



NCDOT Public Transportation Statewide Strategic Plan: Greater Charlotte Region Significant Flows Between Sub-Districts

Agencies

Agencies in the Charlotte region with either an active or potential role in TDM initiatives include the following:

- **Charlotte Area Transit System (CATS)** – CATS is the primary transit provider in the Charlotte region, offering fixed route bus and rail service. CATS is also responsible for managing/administering regional TDM services.
- **Charlotte Center City Partners (CCCP)** – CCCP is a nonprofit organization with a vision for Charlotte's Center City to be viable, livable, memorable and sustainable. This vision includes the continuation of the growth of the city as pedestrian-friendly and walkable. In recent years, CCCP has been specifically focused on making sure that cycling becomes a more viable mode of transportation for residents.
- **Charlotte Regional Transportation Planning Organization (CRTPO)** – CRTPO is the federally designated Metropolitan Planning Organization (MPO) for the Charlotte Urbanized Area and consists of 27 jurisdictions within Iredell, Mecklenburg and Union counties. As the federally designated MPO for the region, CRTPO is responsible for the development of the region's transportation plans and administration of the congestion management plan. CRTPO has included TDM approaches as a strategy for addressing the region's transportation needs in these planning documents and recently conducted a study of TDM best-practices for future planning considerations.
- **Centralina Council of Governments (CCOG)** – CCOG is a voluntary organization of municipal and county governments serving the Greater Charlotte region including Anson, Cabarrus, Gaston, Lincoln, Iredell, Mecklenburg, Rowan, Stanly, and Union Counties. CCOG serves as a coordinating entity for local governments and provides technical assistance services to governmental members in the areas of regional planning, transportation, energy and environment, local government assistance, and business resources. The Centralina Mobility Management program helps coordinate transit vehicles across county lines to transport older adults and adults with disabilities.
- **Sustain Charlotte** – Sustain Charlotte is a community-based nonprofit organization dedicated to educating, engaging and uniting citizens to solve Charlotte's sustainability challenges. The organization has launched Way2Go CLT, a region-wide transportation initiative with the goal of reducing one million single-occupancy vehicle commutes between March – October 2017. The regional tracking and incentive program offer individual or teams the ability to log alternative commutes for the opportunity to win monthly prizes and recognition.
- **Transit Providers** – There are numerous transit providers in the region, but it does not appear that any offer TDM related services other than CATS. However, these additional transit providers would likely be an integral component of future regional TDM initiatives. Transit agencies operating in the greater Charlotte region in addition to CATS include Anson County Transportation System (ACTS), Cabarrus County Transportation Services (CCTS) & CK Rider, Gaston & Gastonia ACCESS, Iredell – ICATS, Transportation Lincoln County (TLC), Rowan Transit System (RTS), Salisbury Transit, Stanly SCUSA and Union County Transportation. There are also several volunteer mobility programs including Volunteer Transportation Services (VTS) working to fill the transportation gap for older adults, veterans and adults with permanent or temporary disabilities.

SWOT Analysis

Individual in-person interviews were conducted with TDM Service Providers across the state between April 24 – May 9, 2017. Additional interviews were held with associated stakeholders not currently receiving TDM funds from NCDOT PTD. Charlotte area TDM service providers and stakeholders were interviewed as part of the process including CCOG, CCCP, CRTPO and Sustain Charlotte staff on May 3, 2017 and CATS staff on May 8, 2017. A summary of these interviews is attached.

During the interviews, participants were asked to summarize their program activities by identifying currently implemented TDM Strategies within a standard matrix. This process serves as the baseline for consistently measuring program work and has informed the analysis of strengths, weaknesses, opportunities and threats / challenges cited below.

In addition to the TDM Strategies Matrix exercise, service providers were asked to provide potential Enhanced Performance Metrics beyond VMT reduced and associated air quality improvements to provide a more open-ended opportunity to inform the process. A summary of proposed Enhanced Performance Metrics is attached (Appendix A).

Strengths

- **Ability to Communicate with Multiple Stakeholders:** Historically serving as the primary TDM service provider in the region, CATS has been able to support numerous TDM initiatives and stakeholders for over a decade. This ability is supported by the City of Charlotte serving as the dominate employment center for the region along with the agency's ridership rates consistently being the highest in the state. CATS frequently coordinates with numerous transportation planning efforts offering the ability to integrate TDM strategies across multiple initiatives.
- **Public Education and Promotion:** TDM service providers in the Charlotte region are currently utilizing funds from NCDOT PTD to support alternative modes through public education and promotion. This is in addition to non-funded entities such as Clean Air Carolina, Mecklenburg County Air Quality and UNC-Charlotte providing partnerships and marketing support. The Clear the Air Campaign, Race to the Beach and newly created Way2Go CLT are examples of programs that have successfully coordinated multiple stakeholders in promoting alternative modes through public education efforts.
- **Transit / Vanpool Services:** Transit agencies in the Charlotte region support numerous options for Transit / Vanpool Services, some of which are customized. There are 12 transit agencies and 6 volunteer mobility programs serving the area offering the highest number of options than any other region in the state. CATS LYNX light rail service continues to expand across the region's major corridors offering increased accessibility and connectivity, including enhanced opportunities for TDM service provisions.

Weaknesses

- **Lack of Regional Coordination:** Some programs are not coordinating with regional stakeholders to the degree that would offer increased efficiencies in TDM service provisions. Missed opportunities include leveraging funds from organizations with shared interests and the ability to coordinate similar efforts. While TDM service providers and associated stakeholders have organically coordinated on numerous initiatives in the past, there is no formal structure to strategically align efforts to leverage existing momentum to scale and replicate success.

- **Inconsistent VMT Calculation:** Vehicles Miles Traveled (VMT) has historically been the primary performance metric for the statewide program, yet regional programs have reported annual reductions through individual calculations. These inconsistencies make it difficult to determine what strategies are successful, hence weakening the statewide program's ability to share best-practices. In the Charlotte region, CATS, CCCP and Sustain Charlotte are calculating VMT with differing methodologies which likely double-count successful mode shifts when reporting progress to NCDOT.
- **Inconsistent Funding:** Programs in the Charlotte region do not share a consistent funding structure making it difficult to relate to peers across the state. Some programs leverage local funds to enhance NCDOT PTD investment where others do not. In other cases, the availability of local matching funds is limited despite a desire to collaborate. As behavioral change efforts typically do not realize instant results, inconsistent messaging and program support due to gaps in the availability of funds can quickly stall or even erase momentum found in the implementation of new, innovative TDM strategies.
- **Lack of Performance Incentives:** Charlotte TDM programs lack incentives for improving performance. If a greater reduction in VMT is reported from one fiscal year to the next, a program might be studied for justifiable reasons to increase financial support. A coordinated plan for moving from baseline to achievement would support additional funding opportunities such as foundation and grant support, along with sponsorship and/or cost-match from businesses and local governments.

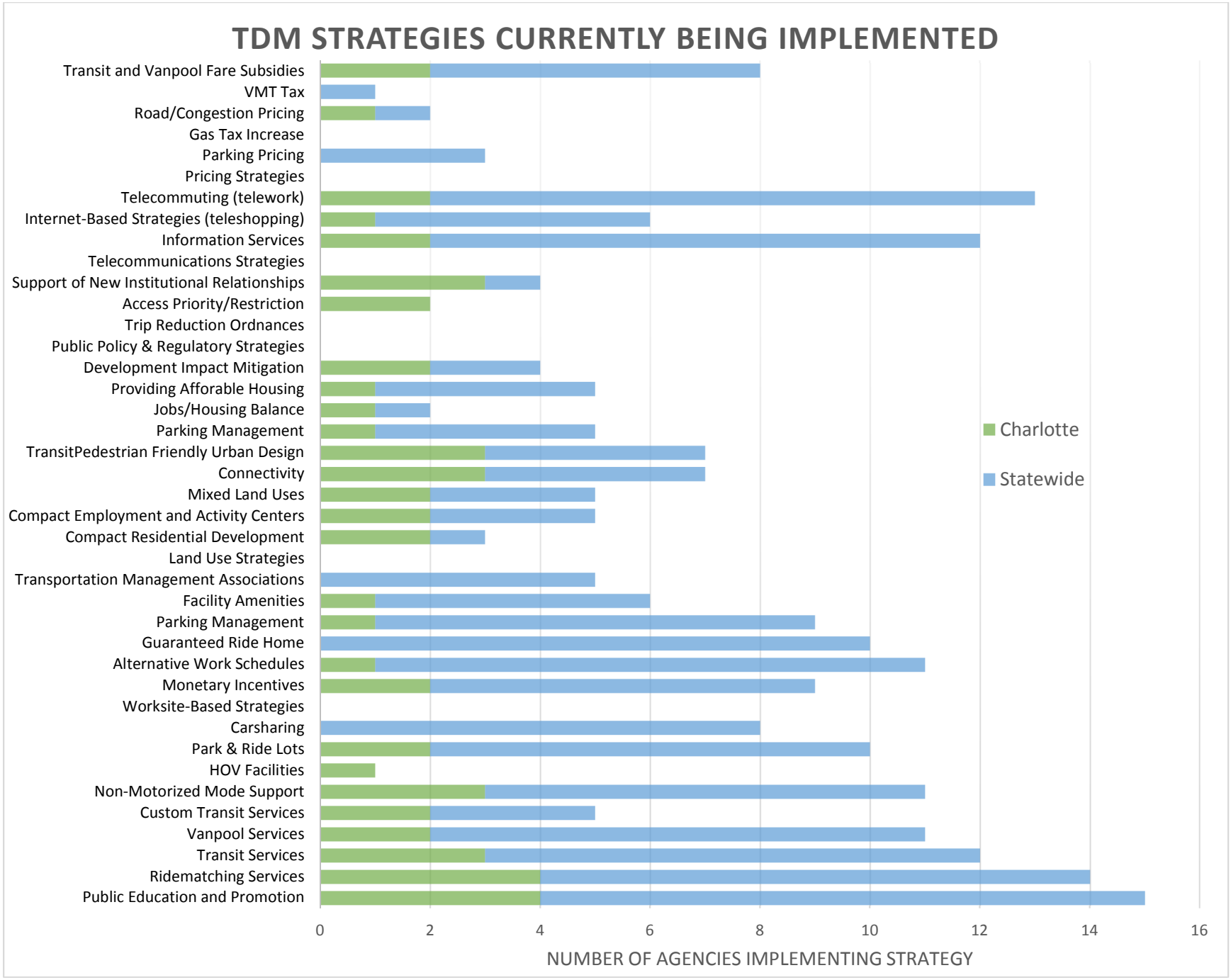
Opportunities

- **Expanded Program Locations / Partnerships:** The statewide program supports TDM service provisions across academic, government and non-profit sectors, offering a variety of tailored strategies and lessons-learned for several audiences. However, complete TDM program coordination has not been attained in the Charlotte region. While CATS has historically served as the only entity in the region receiving TDM grant funds from NCDOT-PTD, CCCP and Sustain Charlotte have recently received funding as well and are just starting to coordinate those resources for efficiencies.
- **Statewide Collaboration:** TDM Service Providers across the state consistently noted the desire to share best-practices and lessons learned. In some instances, newer TDM staff were unaware that programs existed in other locations. In addition to opportunities for shared improvements, programs might share resources including commonly branded materials to increase efficient use of funds. Newly appointment staff including the CATS TDM Coordinator could quickly assimilate into the statewide TDM effort if a better system were created for connecting service providers.
- **Support New Institutional Relationships:** Three of the four TDM Service Providers across the state that identified this strategy as being implemented by their program are located in the Charlotte region. This underlines the consistent willingness for existing TDM service providers and stakeholders in the area to coordinate efforts. The development of new relationships, however, offers numerous opportunities ranging from additional funding for program activities to shared communication and marketing efforts. Creating a performance measurement for generating new partnerships would enhance the achievement of TDM efforts in the Charlotte region and if existing TDM service providers and stakeholders developed a coordinated approach to move from a shared baseline, opportunities for accelerated achievements could be reported.

- **Technology-Based Solutions:** Advanced technologies including communication modes offer ever-improving opportunities for public education and promotion of alternative modes. Shared pilots and statewide deployment of appropriate technologies might provide chances to leverage exiting openings for enhanced programs.
- **Shared Resources / Branding:** Several TDM Service Providers cited the ability to leverage shared resources such as the "Go" Brand which has been successfully replicated by communities such as "GoMountain", "GoTriangle", "GoRaleigh", "GoCary" and others. TDM programs in the Charlotte region might coordinate with these efforts to explore opportunities for efficient use of resources along with more consistent messaging across the state in disseminating information.
- **Trip Reduction Ordinances:** This strategy has proven successful in the past but is no longer being implemented by any program in the state.

Threats / Challenges

- **Funding:** Identifying and capturing additional funding requires time and presents several challenges. Pursuing external investments for programs that are rooted in government funding is difficult and often limited due to regulatory constraints.
- **Stagnation:** Many local TDM programs have been in existence for nearly a decade. This can cause stagnate program branding, messaging, and general impact in local communities. Maintaining a fresh program image is both critical and challenging for any marketing-based effort. While the Charlotte TDM program has recently created relatively new efforts, maintaining relevance will be a constant challenge.
- **Limitations of Policy Development:** It is challenging for TDM Service Providers to develop and promote policies within their communities. Increased communication and support from community leaders and decision-makers is difficult for programs to prioritize while implementing services.
- **Coordination with Land Use Strategies**: Roughly half of TDM Service Providers across the state are implementing strategies related to land use and development. Four entities in Charlotte responded to including land use strategies as part of their TDM efforts in some form. Examples include CATS community transit centers supporting connectivity along with CATS development and planning staff working with developers and employers. Also, CRTPO's Congestion Mitigation Plan (CMP) toolbox and Sustain Charlotte actively advocating for consideration of alternative modes.


TDM STRATEGIES CURRENTLY BEING IMPLEMENTED
Transit and Vanpool Fare Subsidies
VMT Tax
Road/Congestion Pricing
Gas Tax Increase
Parking Pricing
Pricing Strategies
Telecommuting (telework)
Internet-Based Strategies (teleshopping)
Information Services
Telecommunications Strategies
Support of New Institutional Relationships
Access Priority/Restriction
Trip Reduction Ordnances
Public Policy & Regulatory Strategies
Development Impact Mitigation
Providing Afforable Housing
Jobs/Housing Balance
Parking Management
TransitPedestrian Friendly Urban Design
Connectivity
Mixed Land Uses
Compact Employment and Activity Centers
Compact Residential Development
Land Use Strategies
Transportation Management Associations
Facility Amenities
Parking Management
Guaranteed Ride Home
Alternative Work Schedules
Monetary Incentives
Worksite-Based Strategies
Carsharing
Park & Ride Lots
HOV Facilities
Non-Motorized Mode Support
Custom Transit Services
Vanpool Services
Transit Services
Ridematching Services
Public Education and Promotion
Charlotte
Statewide
0
2
4
6
8
10
12
14
16
NUMBER OF AGENCIES IMPLEMENTING STRATEGY

Technical Memorandum on Performance Measurements

CRTPO, the federally designated MPO for the Charlotte Urbanized Area, is responsible for the regional Congestion Management Process (CMP), which has the following regional objectives:

- Develop congestion management measures;
- Reduce non-recurring congestion duration;
- Consider the full range of congestion management strategies; and
- Improve the resiliency, redundancy, and reliability of the transportation network

These objectives align with the goals of TDM programs. In support of these objectives, CRTPO utilizes the performance measures shown in the table below, and for which somewhat reflect the intent of performance measures in Task 4.1 Report:

Performance Measure	Definition	Data Source	CMP Objective
% of Roadway Miles at a Travel Time Index (TTI)	A measure of congestion intensity that is calculated as the ratio of travel time during the peak period to the time it takes to make the same trip at free flow speeds	INRIX – GPS based travel time information	Develop congestion management measures
% of Roadway Miles at a Level of Service (LOS)	A qualitative measure that characterizes operational conditions within a traffic stream, and the perception by motorists and passengers.	Travel Demand Model	
Crash Rates	The No. of crashes per 100 million vehicle miles of travel (MVMT) related to the statewide average.	NCDOT	Reduce nonrecurring congestion duration
Were all reasonable techniques and strategies considered?	Determines whether or not capacity-adding SOV projects can be included in the CRTPO MTP, and ultimately in the CRTPO Transportation Improvement Program (TIP).	CMP Strategies for freeways and non-freeways	Consider full range of Congestion management strategies
Extract data from INRIX and use Buffer, or other indices such as % of Roadway Miles at a Planning Time Index (PTI)	PTI represents the total time that should be planned for trips with near-worst case travel. It is a measure of travel reliability, addressing both intensity and variability of congestion. It is calculated as the ratio of the 95th percentile TTI, or specifically, the ratio of the travel time for the worst weekday of the month to free flow travel time.	INRIX – GPS based travel time information	Improve the resiliency, redundancy, and reliability of the transportation network

Enhanced Value Performance Measures

New standardized enhanced value performance measures are identified in the Task 4.1 report, and should be incorporated throughout the regional TDM programs in the state.

Transportation Action Plan Performance Measures

The region's Transportation Action Plan (TAP) includes several goals that could be met with TDM approaches. These goals and potential performance metrics are shown in the table below:

Regional TDM-related Goals	Potential TDM Performance Measures
Increase the percent of residents living in Activity Centers and Growth Corridors who walk, bicycle, or take transit to work to 20 percent by 2040, and to 10 percent citywide.	Alternative mode share, change in alternative mode share, transit ridership, change in transit ridership
Continue to coordinate with regional partners to develop and implement strategies to reduce per capita VMT.	Meetings with regional TDM partners, number of programs implemented by regional TDM partners and employers, performance metrics associated with regional partner/employer TDM programs (Aggregate regional VMT, change in aggregate regional VMT, household VMT, change in household VMT)
Develop plans that include transportation, VMT, economic and air quality impacts, and consider VMT and vehicle trip reduction targets.	Number of TDM initiatives incorporated into regional plans, number of employer based TDM programs
Assist in the implementation of regional planning initiatives like the Centralina Council of Governments' Connect Our Future, Regional Growth Framework and Mecklenburg County's Livable Communities Plan that support the TAP.	Number of meetings with employer and other regional stakeholder groups, TDM-related social media interactions, number of employer-based TDM program sign-ups
Work with transportation partners to implement the recommendations of the regional Managed Lanes Study and create a regional network of high-occupancy toll (HOT) lanes and/or high-occupancy vehicle (HOV) lanes.	Implemented managed lanes projects (and metrics associated with the performance of those facilities)

Recommendations

The Charlotte Regional TDM Program has multiple strengths and opportunities to move from baseline to achievement. Reviewing current baseline levels of reporting and developing enhanced performance metrics can demonstrate added value, improving communication of program mission, vision and goals. Improved communication of program impacts will reinforce support from local leadership while offering a mutual understanding of TDM service provisions.

A process for the development of a 3-Year Regional TDM Plan will be informed by the Statewide TDM Plan Update and support the ability to improve current performance while

creating a phased approach to Plan Review, Project Entitlement and TDM Plan Monitoring and Reporting. This will also enhance efficiencies, reducing administrative burdens while offering opportunities to align with additional funding cycles.

Additionally, the Statewide TDM Plan Update will support opportunities for NCDOT to provide various forms of technical assistance. Coordinated aid at the statewide level will allow for the sharing of best-practices and lessons-learned across regional programs. Approaching a 3-Year Regional TDM Planning Process while integrating Enhanced Performance Metrics will support the development of localized specialties with consistent metrics for documenting results.

Given the growing congestion in the area, Charlotte's TDM program is experiencing growth in the number of formally funded and non-funded TDM service providers. The number of transit options in the region continues to present a challenge for communicating alternative modes. TDM service providers might consider working with local MPOs and the Centralina Council of Governments to expand shared program branding across additional platforms.

Aligning the creation of Enhanced Performance Metrics for targeted outreach activities that capture the successes seen in this larger geographic footprint over a 3-year horizon goal can offer a comprehensive approach to developing strategies most important to the region. These might include the formalization of focus areas such as Air Quality coordination with Mecklenburg County Air Quality and partnerships with Charlotte Center City Partners, Sustain Charlotte, University of North Carolina Charlotte.

As CATS is historically oriented around enhancing mobility options, aligning the creation of Enhanced Performance Metrics for targeted partnership activities over 3-year horizon goals can offer a comprehensive approach to developing strategies most important to the region.

Reviewing current and needed strategies with the development of performance measurements should be coordinated with the Statewide TDM Plan Update to align local, regional and state funding priorities for the Charlotte Regional TDM Program. These opportunities will provide a structure for defining current and newly defined baselines to demonstrate growth towards achievement, establishing an enhanced program model that can build on comprehensive improvements to better encourage innovation.

Appendix A
Task 4.1 – Enhanced Performance Metrics

MEMO

TO: NCDOT Public Transportation Division

FROM: Gresham, Smith & Partners; WSP USA

SUBJECT: Task 4.1: Enhanced Performance Measures Technical Memorandum

DATE: August 17, 2017

Performance Measurement of TDM Strategies

The development of TDM strategies emerged out of a recognized need for better surface transportation system performance while reducing the negative externalities associated with unimpeded travel growth. Presently, most metropolitan areas in the United States implement TDM as a mobility service, with limited expectations regarding the performance of the strategies deployed. The usefulness of static marketing and modal promotion over time as conditions change is rarely called into question, let alone respond to variations in demand or economic changes influencing travel demand. Typically, years go by before plans and strategies are changed to suit the current market. Even as more and more jurisdictions embrace TDM strategies as a complement to infrastructure oriented projects, metrics for evaluating the performance of TDM has lagged.

One study of performance measures for TDM identified current and best practices.[1] There are dozens of TDM performance measures in use by various agencies. Some of these measures are standard ones developed by TDM practitioners or researchers and promoted over time. Other measures are local in nature, responding to specific goals and objectives embedded within transportation plans, or are custom-tailored by agencies for specific purposes. This section will discuss some of the key measures in detail, along with relevant illustrations.

The review of TDM performance measures by Thompson and Suter indicate a four stage approach to evaluating performance:

1. **Inputs** involve quantifiable activities often conducted by TDM practitioners.
2. **Outputs** measure the direct results of activities that serve as inputs.
3. **Outcomes** involve a calculation of benefits as yielded from inputs and outputs.
4. **Effectiveness** measures take outcomes, and normalize them by cost, yielding a benefit cost relationship.

Altogether, this four stage approach involves escalating levels of difficulty in calculating the performance of TDM measures over time. These are summarized in turn.

[1] Thompson, R. and Suter, S. *Development of Standard Performance Measures for Transportation Demand Management Programs*, Transportation Research Record 2319, Transportation Research Board, Washington, DC. 2012.

Input Measures

input measures are primarily confined to the actual activities that are often conducted by TDM practitioners. In the context of outreach and marketing, which is the primary level of activity currently applied in the Charlotte area, measures may involve the recording of the absolute number of meetings with employers, events attended, new employers organizations engaged in the program, literature distributed, advertisements and/or radio marketing placed, or Internet-based ad placement.

In terms of best and/or innovative TDM practices as it pertains to input measures, agencies around the United States may identify the same metrics, but the reporting of the absolute number is irrelevant. Instead, outreach and marketing input measures become normalization factors for outputs. As such, the input number becomes the denominator and calculation functions. For example, the number of carpools that are formed at any one ***particular*** event is irrelevant. However, the same number of carpools for formed ***per event*** attended is very much relevant towards effective calculations. Ultimately, these performance measures are described and summarized as placement rates, conversion rates, and cost-effectiveness of marketing and outreach activities.

Output Measures

The common use of output measures in TDM performance assessment involves the measurement of modal use as well as client satisfaction. Common measures of effectiveness currently in use include the number of participants by mode (for example, transit riders, car pullers, vamp rulers, teleworkers, etc.), the number of emergency ride home participants, the utilization of park-and-ride locations, and the conversion rate of new participants in TDM activities. For client satisfaction, these measures may include the number of commuters who recall marketing efforts, satisfaction with the services received, or the number of surveys distributed and/or returned to the TDM agency.

Best practices for TDM measurement, including those endorsed by the referenced article, emphasize the level of participation, and not the absolute number. These measures would include the percentage of employees using alternatives to work separated by mode, the frequency and duration of alternative mobile use, and the percent of the population that oscillate between modes. Furthermore, client satisfaction measures may be linked with marketing and outreach measures to determine an overall effectiveness of TDM program activities. These measures may include placement rates for campaigns and customer interaction, or, the cost per recipient of TDM services.

Outcome Measures

Whereas inputs and outputs pertain to the overall TDM program activities and utilization of alternatives, outcome measures evaluate the benefit upon the overall transportation system. In North Carolina, a common measurement has been the calculation of vehicle miles traveled (VMT) reduction that is a direct outcome from TDM services. This VMT reduction calculation may either be as an absolute number, or as a percentage of overall VMT. Additional outcome related measures utilized by other practitioners around the United States may include: single occupant vehicle trips reduced, percentage of trips taken by mode, absolute number of greenhouse gas emissions or ozone emissions reduced, overall costs to commuters, or improved travel time reliability.

Best practices for TDM activities involve the correlation of TDM investments to overall transportation system metrics. These innovative practices involve the separation of TDM effectiveness by outputs. For example, the TDM agency would establish outcome goals prior to the activity engagement, and then evaluate the effectiveness of meeting those outcome goals from the activity itself. Examples of these types of measures may include: VMT reduction comparisons by geography, sub area, or corridor, VMT reduced by mode, and the reduction in travel time delay for participants by mode.

Effectiveness

Overall, effectiveness measures involve the calculation of cost per input, output, and per outcome for every other performance metric. As such, this category measures efficiency of all efforts and demonstrates the value of TDM services over time. Examples of effectiveness measures include: cost per trip provided, cost per ton of emissions reduced, cost per advertisement viewed, cost per placement, and cost per day of service. Cost-effectiveness measures are essential for identifying the relative value of TDM as compared to other transportation related improvements. From a true calculation of benefits to cost, the appropriate role of TDM services can be aligned with the overall infrastructure investment plans. However, given the difficulty of making these types of calculations, most TDM practitioners do not yield cost-effectiveness performance measurement.

Reframing Metrics for Performance Enhancement

Leveraging the best practices identified above, the TDM Strategic Plan provides a cost-benefit analysis (effectiveness) driven approach for measuring traditional and enhanced indicators of success in order to more accurately assess the distribution of funds to improve efficiencies and enhance existing efforts. Measures of effectiveness are oriented towards providing clarity and uniformity across the statewide plan. To accomplish this, each measure requires sufficient definition so as to provide a high degree of certainty that the measure is accurate as calculated.

The TDM Strategic Plan has outlined the Enhanced Performance Metrics through a comparison between “Traditional” and “Enhanced” measures.

Traditional TDM Measures emphasize objectives that have been core to the North Carolina TDM Program for the past two decades - primarily, improving air quality and reducing congestion. Key measures of effectiveness for air quality included air emission levels from carbon dioxide (CO2), nitrogen oxides (NOx), and volatile organic compounds (VOC). Congestion reduction, however, was more limited in assessment to reducing the growth in vehicle miles traveled (VMT).

By comparison, **Enhanced TDM Measures** encourage innovation in not only the assessment and measurement of effectiveness, but also the very definition of societal benefits from TDM endeavors. These benefits extend to improving the larger economy, providing resiliency to disruptions in mobility, enabling access to employment and other components of life, and improving the overall quality of life itself. Inherently, these measures require succinct definition and collaboration across sectors for delivery and evaluation.

Initial Performance Measures

Initial performance measures were derived from the evaluation of best practices for TDM strategies. In turn, these performance measures can be detailed into measures of effectiveness. The selection of performance measures acted to:

- Guide overall mobility decisions by giving direction to fully utilize all highway and modal investments towards traditional and enhanced performance.
- Define the most cost-effective techniques and strategies to optimize system performance through demand management.
- Develop a future TDM investment strategy that optimizes the investments already made in the region using multimodal system and demand management strategies.
- Identify TDM strategies to improve system performance and preserve mobility.
- Utilize the most cost effective techniques to optimize system performance.

Inputs

For input measures, the reviewed research guidance indicated that the absolute numbers collected for various outreach and marketing activities should be utilized as normalization factors. Consequently, it will be important for TDM practitioners throughout the state to collect the necessary levels of data inputs in order to create those factors. The data points that will be collected will be dependent upon each of the contributing TDM strategic plans for service providers. Examples of data points include:

- number of active participating employers and commuters
- events conducted
- employers and commuters engaged for the first time
- years of engagement
- extent of marketing distribution
- market penetration with new marketing activities
- number of new incentives provided
- value of incentives and transit passes
- utilization rates

Outputs

Output measures conducted will include similar measures of effectiveness as currently collected. These may include a variety of factors that pertain directly to the utilization of different alternative modes as well as the utilization of TDM services. Inevitably, data collected will be done at either the employment worksite or through regional survey data collection. As such, it is important that surveys and other materials collect sufficient levels of data points in order to reflect utilization and satisfaction factors. The number of participants by mode, participation in other TDM activities (emergency ride home, incentive program, flexible working arrangement

assistance, etc.), utilization, and other components will be normalized by the input factors collected above. This will allow for the calculation of placement rates, utilization rates, cost per marketing distribution, and percentage of employee population utilizing TDM services.

Outcomes

Outcome factors reflect the newest and most important component of TDM performance metrics, and cross into both traditional and enhanced TDM performance measures. The following measures include a rating of "high, medium, or low" connection between the following performance values:

- Congestion Reduction
- Air Quality Management
- Economic Vitality
- Personal Income
- Resiliency
- Quality of Life

Current factors used by North Carolina TDM partners will continue to be important considerations for evaluating TDM performance, and are incorporated below. Furthermore, local communities may have measures which are important for the local context, and those should continue, too. However, additional factors are suggested for which demand management services can also interrelate with infrastructure and technology services include:

Person Throughput

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
High	High	High	Medium	Medium	Low

Person throughput is an important measure of mobility and congestion reduction, but it also cascades into other performance values. Put simply, the more people the transportation can carry, the more effective the system towards improving personal and societal economy. Person throughput refers to the number of persons utilizing transit and within private vehicles. Although metrics for improving personal health and quality of life are more positively associated with non-vehicular strategies, and hence the lone "low" measure, person throughput may have some residual benefit through accessibility and mobility that still make it a value measure of effectiveness for quality of life. Increases in the number of persons using a corridor's or area's infrastructure would imply that the operations and management strategies evaluated were effective in serving more persons who are not previously serviced as a result of the TDM strategy. The identified measures of effectiveness for person throughput are:

- Person Miles Traveled (PMT) by mode
- Vehicle Miles Traveled (VMT) by mode

The identified mechanism for assessing person throughput performance will be the calculated outcomes from spot measurement, origin/destination studies, and the respective regional travel demand model for PMT and VMT within each region. Whereas collection of new data is not anticipated, opportunities to categorize and archive applicable data from corridor, subarea, or municipal studies should be explored and conducted by each regional partner.

Transit Mode Split

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
Medium	High	High	High	High	Medium

A desired outcome of statewide TDM strategies is to increase the use of transit relative to the private auto, leading to a mode shift to transit. Mode shift may result from potential users being attracted to transit, or from increased transit use among occasional users. Thus, the central transit evaluation issue is the identification and measurement of mode shift. A mode shift to transit should then facilitate higher transit ridership, reduced levels of traffic congestion, more efficient use of existing road capacity, net reduction in greenhouse gas emissions and fuel consumption. and potentially higher levels of person throughput. The identified measures of effectiveness for transit mode shift are:

- Change in key corridor mode share
- Change in regional mode share

Peak Period Vehicle Traffic Volumes

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
High	Medium	Medium	Low	Low	Low

As it pertains to facility performance measure, total vehicular demand for regional highway capacity can be an effective measure for TDM services. Recognizing the state's highway system provides abundant capacity and only suffers a shortage in the peak periods, this measure identifies the success of alternatives in shifting demand from the peak period and/or shifting to alternative modes of travel. The identified measures of effectiveness for peak period vehicle traffic volumes are:

- Change from baseline in peak hour volumes
- Vehicle trips reduced
- Change in peak period VMT

Travel Time Reliability

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
Medium	High	High	High	High	Medium

Travel time reliability is a key metric for operational and demand management strategies, yet it remains an elusive metric for estimation and quantification. In order to represent travel time reliability, regional TDM partners will work in partnership with regional traffic management centers to determine the travel time index as a means of assessing the collective effectiveness of the strategies at reducing congestion between corridors and/or subareas. The travel time index is the ratio of the average peak period travel time as compared to a free-flow travel time. The free-flow travel time for each road section is the 15th percentile travel time during traditional off-peak times (i.e., weekdays between 9 am and 4 pm, between 7 pm and 10 pm; and weekends between 6 am and 10 pm). For example, a value of 1.20 means that average peak period travel times are 20% longer than free flow travel times. Coupled with a calculation of variability, this provides an approximation of reliability. The identified measures of effectiveness for travel time reliability are:

- Variability of trip travel time by mode
- Change in travel time index (total travel time compared to a free-flow travel time) of travelers by mode

Cost of Transportation

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
Low	High	High	High	Low	Low

The use of transportation systems inherently involves costs, borne by individual travelers, consumers of goods that are transported to market, and the society at large. Individual costs are reflected in multiple forms, including the price and acquisition of fuel, vehicles, maintenance, and value of time lost to congestion. Consumer costs reflect the passed along value of individual costs in the final cost of goods and services. Consumer costs are identified here, but are technically an externality, and as such are not reported as a discrete TDM metric. Societal costs largely reflect the additive cost of crashes, vehicular enforcement, emissions, and land development patterns. Altogether, these metrics are summarized by overall reduction in economic productivity as a result of transportation leakage.

- Individual aggregate costs per capita
- Change in travel time index (total travel time compared to a free-flow travel time) of travelers by mode

Calculation of Benefits

The performance measures above can be calculated in a consistent manner. The Metropolitan Washington Council of Governments has developed a similar process, and one which can be replicated as a part of the state of North Carolina utilizing the performance measures identified above. Their process is summarized here, and adapted to fit the North Carolina context:

1. *Estimate commuter population for study (e.g., all commuters, guaranteed ride home applicants, rideshare matching applicants, employer-TDM program employees, etc.)*
2. *Calculate placement rate – Percentage of commuters in the population base who made a travel change as a result of the TDM program*

3. *Estimate the number of new alternative mode placements – Multiply placement rate by the population base for the evaluation period*
4. *Calculate the vehicle trip reduction (VTR) factor for new placements – Average daily vehicle trips reduced per placement*
5. *Estimate vehicle trips reduced – Multiply number of placements by the VTR factor*
6. *Estimate vehicle miles traveled (VMT) reduced – Multiply number of vehicle trips reduced by average commute distance*
7. *Adjust vehicle trips and VMT for access mode – Discount vehicle trips reduced and VMT reduced to ac-count for commuters who drive alone to meet rideshare modes and transit*
8. *Estimate NOx, VOC, PM2.5, and CO2 emissions reduced – Multiply adjusted vehicle trips and VMT reduced by emissions factors consistent with the regional planning process*
9. *Estimate the energy and commuter and societal cost savings – Multiply VMT reduced by fuel efficiency and vehicle operating cost factors and by societal benefit cost factors*

This process reflects a relatively simplistic approach to performance calculation; however, it is a process that lends itself to guidance and replicability. Following NCDOT concurrence on the measures of effectiveness, a similar spreadsheet process will be developed to reflect a standardized method of calculating the performance measures from each region.

NORTH CAROLINA
Department of Transportation



Statewide Transportation Demand Management (TDM) Strategic Planning

Piedmont-Triad Regional Success Plan

FINAL DRAFT

October 2017

GS&P GRESHAM SMITH AND PARTNERS

WSP

Partnerships between the N.C. Department of Transportation and local governments, regional authorities and other state agencies have been the source of North Carolina's transit success. Currently under development, the Public Transportation Statewide Strategic Plan will build upon that success by creating the foundation for reinvigorated state and local transit partnerships.

As part of the statewide strategic planning and development process, including integration of best practices for various agencies across the state, NCDOT is supporting the state's TDM programs by bringing them into concurrence with the overall strategic focus of the Public Transportation Division (PTD). This work builds off the 2003 Statewide TDM Plan, including alignment of mission, vision and goals.

Mission Statement

To provide citizens of North Carolina opportunities and strategies for improving sustainable economic growth and quality of life through reduced transportation congestion, expanded mobility options, improved air quality and more efficient use of resources.

Vision

Effectively measure and communicate the benefits of alternatives to driving-alone in communities across North Carolina.

Goals

Achieve improved accessibility, connectivity, economic growth, public health and safety through enhanced performance of transportation demand management service provisions.

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Overview

The Piedmont Authority for Regional Transportation (PART) is a unit of local government created in 1997 to enhance all forms of transportation in the Piedmont Triad Region. Governed by representatives from 10 member counties, four Metropolitan Planning Organizations, the Triad's four largest cities (Burlington, High Point, Greensboro, and Winston-Salem), two regional airports, and the NCDOT Board of Transportation, the organization's work is part of a larger statewide effort to improve transportation systems in North Carolina. This coordination includes housing a regional TDM coordinator with funding support from NCDOT-PTD. The TDM coordinator supports PART's mission to enhance mobility, address congestion, and reduce transportation related impacts on local air quality.

2016 included a number of changes with PART's Transportation Demand Management program, including renaming the department to Commuter Resources (CR). This new name provides a more comprehensive title for the various programs and services administered by the CR team including the Piedmont Transit Resources Call Center, Triad Vanpool Program, and new PARTnership program. Even though the name has changed, the goal remains the same: Educate on, advocate for, and provide alternative transportation strategies to reduce single-occupancy vehicle use in the Triad. During FY 2016, TDM efforts reduced vehicles miles traveled (VMT) by 13,978,440 Miles. There are 49 Vanpools in Operation FY 2016 and 88,494 Calls were Answered by Piedmont Transit Resources Call Center in FY 2016.

PART has 10 member counties comprised of Alamance, Davidson, Davie, Forsyth, Guilford, Randolph, Rockingham, Stokes, Surry, and Yadkin. The 10-county area represents 4,984 square miles or 9.5% of the state's total area. PART provides connections between major cities and counties in the Piedmont Triad. PART works in cooperation with the city bus systems of Winston-Salem Transit Authority (WSTA), Greensboro Transit Authority (GTA) and High Point Transit (Hi tran) who provide transportation access within the city limits.

Piedmont-Triad TDM Program

In August 2015, PART launched the Piedmont Triad Resources Call Center as the newest division of the Commuter Resources team. The four-person staff is available to answer questions related to regional transit services, the PART vanpool program, as well as support the promotion of ShareTheRideNC. The call center team was able to answer over 88,000 calls in its first year of inception.

Seeing the success of the GoPass program offered by Go Triangle, PART worked in coordination with UNC-Chapel Hill to expand the concept to allow free rides on PART Express Route 4 from Alamance Burlington to the Chapel Hill campus and hospitals. The Commuter Resources staff was heavily involved in working with UNC-Chapel Hill to market and promote this new benefit to the university population.

Recognizing the important role that the business community plays in the promotion of alternatives, PART's Commuter Resources program implemented the PARTnership program. The PARTnership is a FREE full service resource for major employers in the Triad. The goal of the program is to improve mobility for employees by identifying alternatives to driving alone, marketing sustainable options, and reporting results. As a PARTnership member company,

employers have access to a number of programs and services that are used to develop and implement a customized transportation options program to address the commuting challenges facing their worksite.

PART's Piedmont Transit Resource Guide provides information on alternative commuting options including vanpooling, carpooling, transit bicycling & walking and alternative work schedules.

Component Strategies

Strategy 1 – Commuter Resources

The Commuter Resources (CR) program seeks to make commuting to and from work in the Triad easier than ever by helping users find the right alternative to driving alone. The program seeks to address rapid growth in the region's communities while addressing traffic congestion and impact on the environment and air quality.

Strategy 2 – PARTnership Program

The PARTnership is a free full service resource for major employers in the Triad. It provides a platform to allow businesses the opportunity to work together to improve mobility for employees by identifying alternatives to driving alone, marketing sustainable options, and reporting results. PARTnership member companies have access to a number of programs and services to develop and implement a customized transportation options program to address the commuting challenges facing worksites, including:

- Employee Transportation Surveying
- Customized Reporting
- ExpressPass Transit Discount
- 4-3-2 Vanpool Discount
- Customized Incentive Programs
- Emergency Ride Home
- Marketing and Communications Support
- Onsite Events and Webinars
- Bicycle Education & Training
- Preferential Parking Program
- Commuter Tax Benefit Guidance
- Best Workplaces for Commuters Support
- Corporate Recognition

Strategy 3 - Alternative Mode Promotion

PART provides information on a number of alternative modes and resources as organized by the following categories:

- Bus
- Vanpools
- Carpool
- ShareTheRide NC
- Bike/Walk
- Telework
- Park & Ride

Leadership

As a Regional Public Transportation Authority, PART consists of member municipalities joined through resolutions executed by their respective governing boards. These municipalities include Burlington, Greensboro, High Point and Winston-Salem. The PART Board of Trustees is a twenty-three-member body comprised of representatives of the four largest cities (Greensboro, Winston-Salem, High Point & Burlington), representatives of the four Metropolitan Planning Organizations of the four urbanized areas, a commissioner from each of the 10 member counties, representatives of the two regional airports, and three representatives of the NCDOT Board of Transportation. The region's TDM Commuter Resources Program is both administered and staffed as a program within PART.

Budget / Funding

Funding for existing TDM services in the area do not appear to come from dedicated sources. Congestion Mitigation Plans at the local MPOs do not indicate funding opportunities for future regional TDM services.

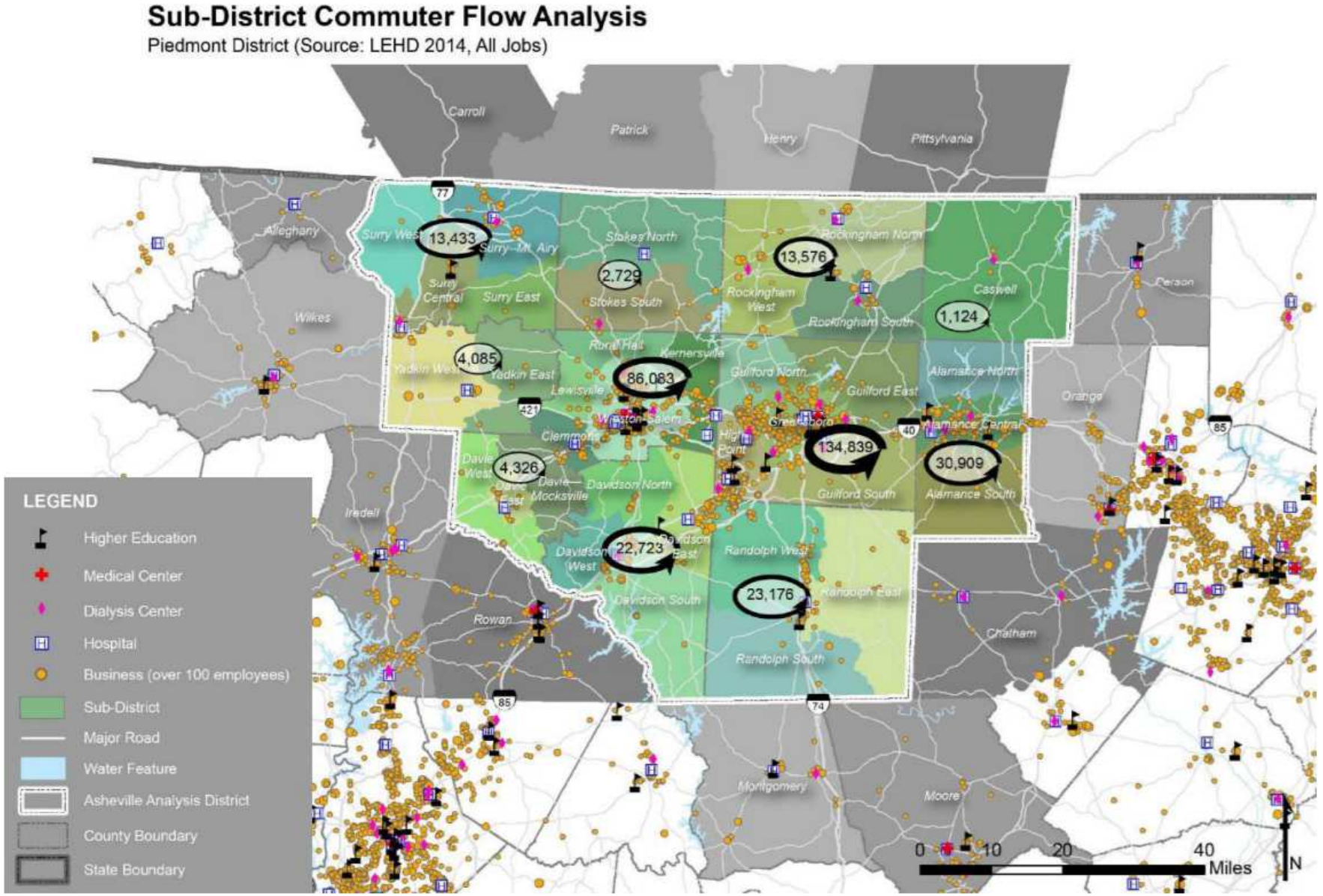
Agencies

Agencies in the Piedmont-Triad region with either an active or potential role in TDM initiatives include the following:

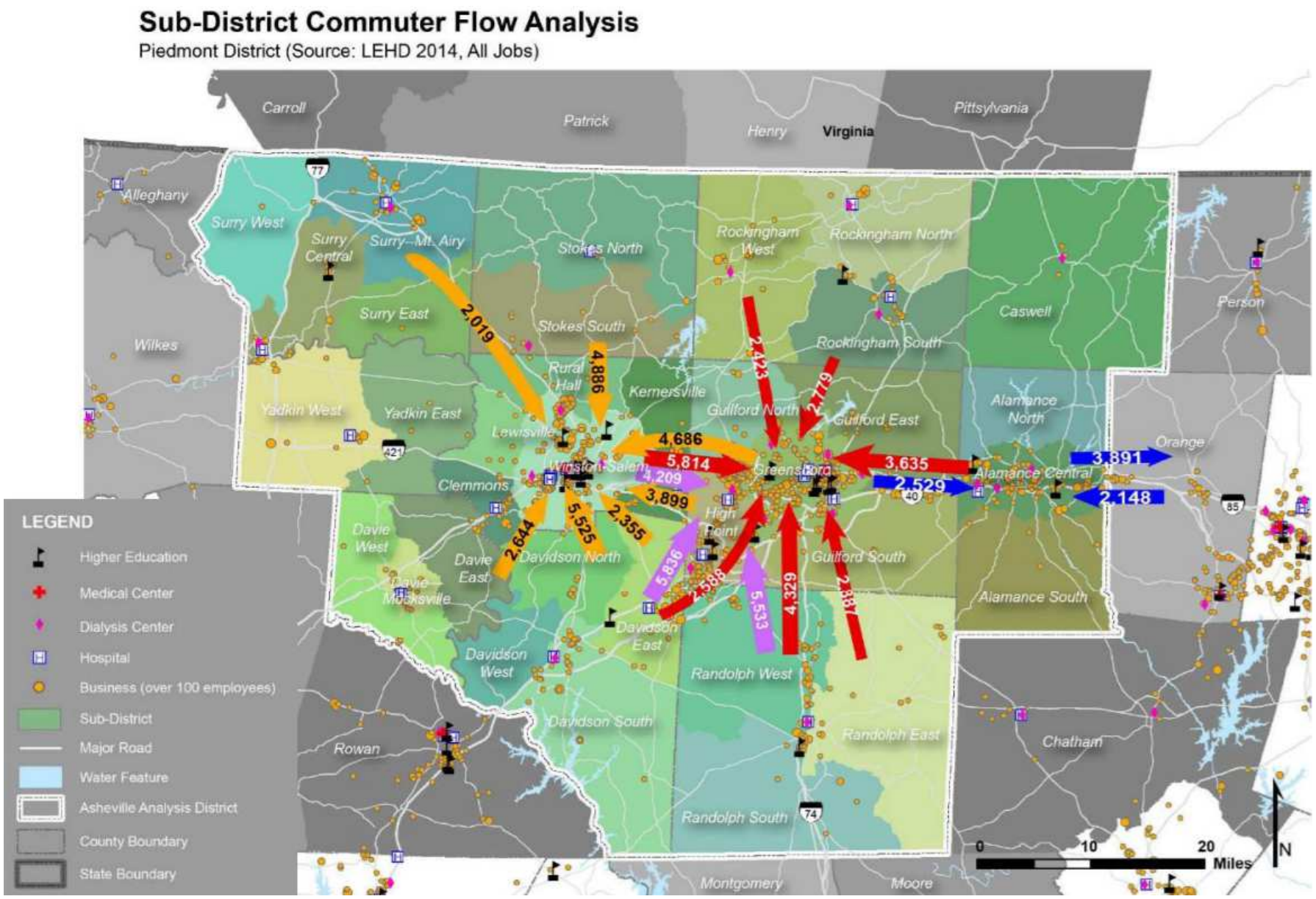
- **Piedmont Authority for Regional Transportation (PART):** The Piedmont Authority for Regional Transportation was created in 1997. The existence of PART is based on regional cooperation and the improvements to the transportation systems in the Piedmont Triad Region of North Carolina.
- **Transit Providers** – There are numerous transit providers in the region that coordinate through PART's Commuter Resources (CR) Program. These include:
    - Greensboro Transit Authority
    - High Point Transit System
    - Winston-Salem Transit Authority
    - Go Triangle
    - Link Transit – Burlington
    - Davidson County Transportation Services

Plan Alignment

The following sub-district commuter flow analysis maps have been generated for the NCDOT Public Transportation Division (PTD) Statewide Strategic 2035 Plan. The maps identify activity centers relevant to TDM service areas and through coordination of planning efforts, can support short-term and long-range recommendations to improve North Carolinians' access to opportunities.



NCDOT Public Transportation Statewide Strategic Plan: Piedmont-Triad Region Intra-County Commuter Flows



NCDOT Public Transportation Statewide Strategic Plan: Piedmont-Triad Region Significant Flows Between Sub-Districts

SWOT Analysis

Individual in-person interviews were conducted with TDM Service Providers across the state between April 24 – May 9, 2017. Additional interviews were held with associated stakeholders not currently receiving TDM funds from NCDOT PTD. The Piedmont-Triad TDM Coordinator at PART was interviewed on April 24, 2017.

During the interviews, participants were asked to summarize their program activities by identifying currently implemented TDM Strategies within a standard matrix. This process serves as the baseline for consistently measuring program work and has informed the analysis of strengths, weaknesses, opportunities and threats / challenges cited below.

In addition to the TDM Strategies Matrix exercise, service providers were asked to provide potential Enhanced Performance Metrics beyond VMT reduced and associated air quality improvements to provide a more open-ended opportunity to inform the process. A summary of proposed Enhanced Performance Metrics is attached (Appendix A).

Strengths

- **Public Education and Promotion:** The PART TDM Coordinator and Business Analyst utilize funds from NCDOT PTD to support alternative modes through public education and promotion. All three strategies of the PART TDM Program include educational components that offer information on alternative modes.
- **Transit / Vanpool Services:** The PART Vanpool program has been a focus of the organization since inception with High Point, Greensboro and Winston-Salem serving as the base before expanding services. There are currently 54 vans currently in operation making the program the most successful regional transportation collaboration in the area.
- **Ability to Communicate with Multiple Stakeholders:** The Piedmont-Triad TDM Coordinator is housed at the Piedmont Authority for Regional Transportation (PART), an organization whose mission is to enhance all forms of transportation in the Piedmont Triad Region. PART is governed by representatives from 10 member counties, four Metropolitan Planning Organizations, the Triad's four largest cities (Burlington, High Point, Greensboro, and Winston-Salem), two regional airports, and the NCDOT Board of Transportation. This offers the ability to consistently coordinate and integrate TDM strategies across a variety of transportation planning efforts and associated stakeholders.
- **Expanded Program Locations / Partnerships:** The PARTnership program has seen recent success in reaching out to local businesses in the region for a collaborative and efficient approach to promoting alternative modes. Supported by a Business Analyst, the campaign has great potential for continued growth, especially when PART's governing body and NCDOT leadership provide added support in the form of enhanced coordination and recognition.

Weaknesses

- **Inconsistent VMT Calculation:** Vehicles Miles Traveled (VMT) has historically been the primary performance metric for the statewide program, yet regional programs have reported annual reductions through individual calculations. These inconsistencies make it difficult to determine what strategies are successful, hence weakening the statewide program's ability to share best-practices.

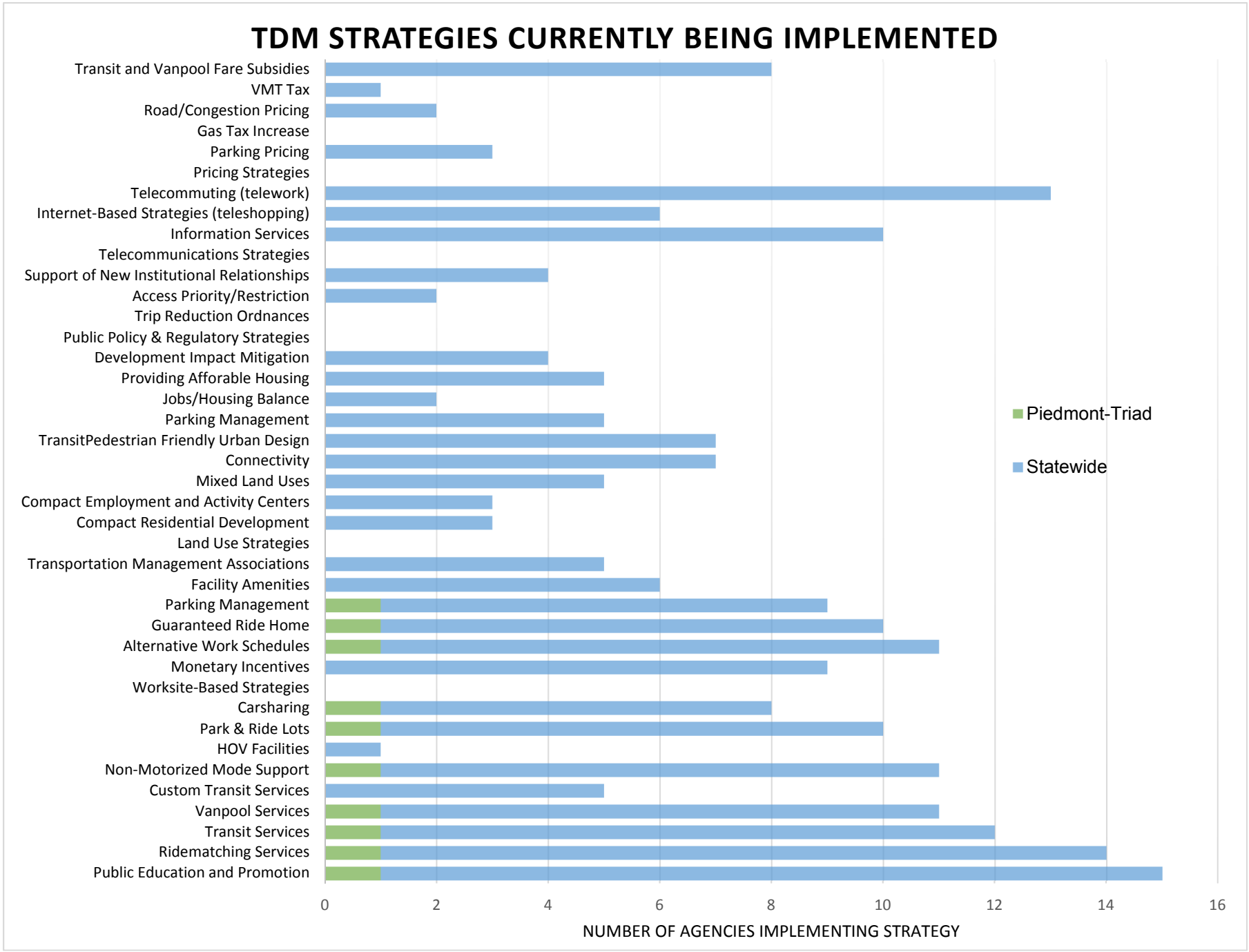
- **Inconsistent Funding:** Regional programs do not share a consistent funding structure making it difficult to relate to peers across the state. Some regions leverage local funds to enhance NCDOT PTD investment where others do not. In other cases, the availability of local matching funds is limited despite a desire to collaborate. PART receives investments from local governments at different levels, making it difficult to evenly disperse services.
- **Support New Institutional Relationships:** Only four TDM Service Providers across the state identified this strategy as being implemented by their program. The Piedmont-Triad region did not identify the strategy although as previous noted, the PARTnership program has experienced success in developing new relationships within the business community. The development of new relationships offer numerous opportunities ranging from additional funding for program activities to shared communication and marketing efforts. Creating a performance measurement for the creation of new partnerships and/or economic development gains would enhance the achievement of TDM efforts in the Piedmont-Triad region while offering an NCDOT endorsed methodology for communicating results to political leadership.

Opportunities

- **Statewide Collaboration:** TDM Service Providers across the state consistently noted the desire to share best-practices and lessons learned. In some instances, newer TDM staff were unaware that programs existed in other locations. In addition to opportunities for shared improvements, programs might share resources including commonly branded materials to increase efficient use of funds. Newly appointment staff including the Piedmont-Triad TDM Coordinator could quickly assimilate into the statewide TDM effort if a better system were created for connecting service providers.
- **Lack of Performance Incentives:** The Piedmont-Triad TDM program lacks incentives for improving performance. If a greater reduction in VMT is reported from one fiscal year to the next, the program might be studied for justifiable reasons to increase financial support. A coordinated plan for moving from baseline to achievement would support additional funding opportunities such as the Job Access Reverse Commute (JARC) Grant along with justification for increased local cost-share investments into the regional program. The success of PART's Vanpool program could calculate revenue per mile based on a statewide standard to better support application for federal and other funding sources.
- **Technology-Based Solutions:** Advanced technologies including communication modes offer ever-improving opportunities for public education and promotion of alternative modes. Shared pilots and statewide deployment of appropriate technologies might provide chances to leverage exiting openings for enhanced programs. Additional support from NCDOT could support PART's telematics efforts and position the initiative for funding. NCDOT may generate a study to report lessons-learned from PART's telematics efforts to serve as an innovative technology pilot that would benefit agencies across the state.
- **Shared Resources / Branding:** Several TDM Service Providers cited the ability to leverage shared resources such as the "Go" Brand which has been successfully replicated by communities such as "GoMountain", "GoTriangle", "GoRaleigh", "GoCary" and others. The Piedmont-Triad TDM program might coordinate with these similar efforts more closely to explore opportunities for efficient use of resources along with more consistent messaging across the state in disseminating information.
- **Trip Reduction Ordinances:** This strategy has proven successful in the past but is no longer being implemented by any program in the state.

Threats / Challenges

- **Funding:** Identifying and capturing additional funding requires time and presents several challenges. Pursuing external investments for programs that are rooted in government funding is difficult and often limited due to regulatory constraints. The Piedmont-Triad TDM program has seen gaps in funding in the past that have halted momentum for several strategies.
- **Stagnation:** Many local TDM programs have been in existence for nearly a decade. This can cause stagnate program branding, messaging, and general impact in local communities. Maintaining a fresh program image is both critical and challenging for any marketing-based effort. While the PART has recently created relatively new efforts such as the PARTnership, maintaining relevance will be a constant challenge.
- **Limitations of Policy Development:** It is challenging for TDM Service Providers to develop and promote policies within their communities. Increased communication and support from community leaders and decision-makers is difficult for programs to prioritize while implementing services. The lack of congestion in the Piedmon-Triad makes it difficult to communicate the importance of TDM services to decision-makers. Developing performance metrics that would better illustrate values important to local policymakers such as economic development opportunities would heighten program exposure.
- **Coordination with Land Use Strategies**: Roughly half of TDM Service Providers across the state are implementing strategies related to land use and development. The Piedmont-Triad TDM program is well positioned to integrate specific TDM policies into broader planning efforts due to its home agency of PART. However, developing these technical recommendations and finding the political support and opportunities to present them to decision-makers is challenging.


TDM STRATEGIES CURRENTLY BEING IMPLEMENTED
Transit and Vanpool Fare Subsidies
VMT Tax
Road/Congestion Pricing
Gas Tax Increase
Parking Pricing
Pricing Strategies
Telecommuting (telework)
Internet-Based Strategies (teleshopping)
Information Services
Telecommunications Strategies
Support of New Institutional Relationships
Access Priority/Restriction
Trip Reduction Ordnances
Public Policy & Regulatory Strategies
Development Impact Mitigation
Providing Afforable Housing
Jobs/Housing Balance
Parking Management
TransitPedestrian Friendly Urban Design
Connectivity
Mixed Land Uses
Compact Employment and Activity Centers
Compact Residential Development
Land Use Strategies
Transportation Management Associations
Facility Amenities
Parking Management
Guaranteed Ride Home
Alternative Work Schedules
Monetary Incentives
Worksite-Based Strategies
Carsharing
Park & Ride Lots
HOV Facilities
Non-Motorized Mode Support
Custom Transit Services
Vanpool Services
Transit Services
Ridematching Services
Public Education and Promotion
Piedmont-Triad
Statewide
0
2
4
6
8
10
12
14
16
NUMBER OF AGENCIES IMPLEMENTING STRATEGY

Technical Memorandum on Performance Measurements

PART has collected and analyzed the following performance metrics in relationship to its TDM program. These metrics continue to serve traditional factors for inputs and outputs measurements, consistent with the Task 4.1 performance measurement report (Appendix A).

Strategy	Measures
ShareetheRideNC promotion	• Number of registrations for events, campaigns, and other marketing • Return on Investment calculations • VMT reductions, emissions reductions, fuel savings, calories burned, and money saved exclusively for work trips based on commutes registered in ShareetheRideNC. • Number of potential and newly formed vanpools.
TDM Program Marketing	• VMT and NOx reduced • Number of new commuter registrations • Number of commuters participating in PART sponsored TDM programs. • Website and social media statistics. • Estimated number of participants at events / campaigns. • Estimate program penetration.
PART employer services	• Number of outreach activities, promotions, and marketing efforts to targeted businesses • Employer participation in Express Pass program • Number of employees using Express Pass program.

Enhanced Value Performance Measures

New standardized enhanced value performance measures are identified in the Task 4.1 report (Appendix A) and should be incorporated throughout the regional TDM programs in the state.

Recommendations

The Piedmont-Triad Regional TDM Program has multiple strengths and opportunities to move from baseline to achievement. Reviewing current baseline levels of reporting and developing enhanced performance metrics can demonstrate added value, improving communication of program mission, vision and goals. Improved communication of program impacts will reinforce support from local leadership while offering a mutual understanding of TDM service provisions.

A process for the development of a 3-Year Regional TDM Plan will be informed by the Statewide TDM Plan Update and support the ability to improve current performance while creating a phased approach to Plan Review, Project Entitlement and TDM Plan Monitoring and Reporting. This will also enhance efficiencies, reducing administrative burdens while offering opportunities to align with additional funding cycles.

Additionally, the Statewide TDM Plan Update will support opportunities for NCDOT to provide various forms of technical assistance. Coordinated aid at the statewide level will allow for the sharing of best-practices and lessons-learned across regional programs. Approaching a 3-Year Regional TDM Planning Process while integrating Enhanced Performance Metrics will support the development of localized specialties with consistent metrics for documenting results.

The Piedmont-Triad is an expansive region with limited congestion issues, making it difficult for a reduced number of TDM staff to provide services across 10-counties with diverse needs. The number of transit options in the region continues to present the largest challenge for communicating alternative modes. PART might consider working with local MPOs and the Piedmont-Triad Regional Council to expand the shared Commuter Resources (CR) brand across additional platforms. This might include replication of the Triangle TDM Model where a Regional Service Provider (PART) manages a consistent brand and clearinghouse for information, while Local Service Providers target specific hotspots and aid in disseminating resources. Aligning the creation of Enhanced Performance Metrics for targeted outreach activities that capture the successes seen in this larger geographic footprint over a 3-year horizon goal can offer a comprehensive approach to developing strategies most important to the region.

Reviewing current and needed strategies with the development of performance measurements should be coordinated with the Statewide TDM Plan Update to align local, regional and state funding priorities for the Piedmont-Triad Regional TDM Program. These opportunities will provide a structure for defining current and newly defined baselines to demonstrate growth towards achievement, establishing an enhanced program model that can build on comprehensive improvements to better encourage innovation.

Appendix A
Task 4.1 – Enhanced Performance Metrics

MEMO

TO: NCDOT Public Transportation Division

FROM: Gresham, Smith & Partners; WSP USA

SUBJECT: Task 4.1: Enhanced Performance Measures Technical Memorandum

DATE: August 17, 2017

Performance Measurement of TDM Strategies

The development of TDM strategies emerged out of a recognized need for better surface transportation system performance while reducing the negative externalities associated with unimpeded travel growth. Presently, most metropolitan areas in the United States implement TDM as a mobility service, with limited expectations regarding the performance of the strategies deployed. The usefulness of static marketing and modal promotion over time as conditions change is rarely called into question, let alone respond to variations in demand or economic changes influencing travel demand. Typically, years go by before plans and strategies are changed to suit the current market. Even as more and more jurisdictions embrace TDM strategies as a complement to infrastructure oriented projects, metrics for evaluating the performance of TDM has lagged.

One study of performance measures for TDM identified current and best practices.[1] There are dozens of TDM performance measures in use by various agencies. Some of these measures are standard ones developed by TDM practitioners or researchers and promoted over time. Other measures are local in nature, responding to specific goals and objectives embedded within transportation plans, or are custom-tailored by agencies for specific purposes. This section will discuss some of the key measures in detail, along with relevant illustrations.

The review of TDM performance measures by Thompson and Suter indicate a four stage approach to evaluating performance:

1. **Inputs** involve quantifiable activities often conducted by TDM practitioners.
2. **Outputs** measure the direct results of activities that serve as inputs.
3. **Outcomes** involve a calculation of benefits as yielded from inputs and outputs.
4. **Effectiveness** measures take outcomes, and normalize them by cost, yielding a benefit cost relationship.

Altogether, this four stage approach involves escalating levels of difficulty in calculating the performance of TDM measures over time. These are summarized in turn.

[1] Thompson, R. and Suter, S. *Development of Standard Performance Measures for Transportation Demand Management Programs*, Transportation Research Record 2319, Transportation Research Board, Washington, DC. 2012.

Input Measures

input measures are primarily confined to the actual activities that are often conducted by TDM practitioners. In the context of outreach and marketing, which is the primary level of activity currently applied in the Piedmont-Triad area, measures may involve the recording of the absolute number of meetings with employers, events attended, new employers organizations engaged in the program, literature distributed, advertisements and/or radio marketing placed, or Internet-based ad placement.

In terms of best and/or innovative TDM practices as it pertains to input measures, agencies around the United States may identify the same metrics, but the reporting of the absolute number is irrelevant. Instead, outreach and marketing input measures become normalization factors for outputs. As such, the input number becomes the denominator and calculation functions. For example, the number of carpools that are formed at any one ***particular*** event is irrelevant. However, the same number of carpools for formed ***per event*** attended is very much relevant towards effective calculations. Ultimately, these performance measures are described and summarized as placement rates, conversion rates, and cost-effectiveness of marketing and outreach activities.

Output Measures

The common use of output measures in TDM performance assessment involves the measurement of modal use as well as client satisfaction. Common measures of effectiveness currently in use include the number of participants by mode (for example, transit riders, car pullers, vamp rulers, teleworkers, etc.), the number of emergency ride home participants, the utilization of park-and-ride locations, and the conversion rate of new participants in TDM activities. For client satisfaction, these measures may include the number of commuters who recall marketing efforts, satisfaction with the services received, or the number of surveys distributed and/or returned to the TDM agency.

Best practices for TDM measurement, including those endorsed by the referenced article, emphasize the level of participation, and not the absolute number. These measures would include the percentage of employees using alternatives to work separated by mode, the frequency and duration of alternative mobile use, and the percent of the population that oscillate between modes. Furthermore, client satisfaction measures may be linked with marketing and outreach measures to determine an overall effectiveness of TDM program activities. These measures may include placement rates for campaigns and customer interaction, or, the cost per recipient of TDM services.

Outcome Measures

Whereas inputs and outputs pertain to the overall TDM program activities and utilization of alternatives, outcome measures evaluate the benefit upon the overall transportation system. In North Carolina, a common measurement has been the calculation of vehicle miles traveled (VMT) reduction that is a direct outcome from TDM services. This VMT reduction calculation may either be as an absolute number, or as a percentage of overall VMT. Additional outcome related measures utilized by other practitioners around the United States may include: single occupant vehicle trips reduced, percentage of trips taken by mode, absolute number of greenhouse gas emissions or ozone emissions reduced, overall costs to commuters, or improved travel time reliability.

Best practices for TDM activities involve the correlation of TDM investments to overall transportation system metrics. These innovative practices involve the separation of TDM effectiveness by outputs. For example, the TDM agency would establish outcome goals prior to the activity engagement, and then evaluate the effectiveness of meeting those outcome goals from the activity itself. Examples of these types of measures may include: VMT reduction comparisons by geography, sub area, or corridor, VMT reduced by mode, and the reduction in travel time delay for participants by mode.

Effectiveness

Overall, effectiveness measures involve the calculation of cost per input, output, and per outcome for every other performance metric. As such, this category measures efficiency of all efforts and demonstrates the value of TDM services over time. Examples of effectiveness measures include: cost per trip provided, cost per ton of emissions reduced, cost per advertisement viewed, cost per placement, and cost per day of service. Cost-effectiveness measures are essential for identifying the relative value of TDM as compared to other transportation related improvements. From a true calculation of benefits to cost, the appropriate role of TDM services can be aligned with the overall infrastructure investment plans. However, given the difficulty of making these types of calculations, most TDM practitioners do not yield cost-effectiveness performance measurement.

Reframing Metrics for Performance Enhancement

Leveraging the best practices identified above, the TDM Strategic Plan provides a cost-benefit analysis (effectiveness) driven approach for measuring traditional and enhanced indicators of success in order to more accurately assess the distribution of funds to improve efficiencies and enhance existing efforts. Measures of effectiveness are oriented towards providing clarity and uniformity across the statewide plan. To accomplish this, each measure requires sufficient definition so as to provide a high degree of certainty that the measure is accurate as calculated.

The TDM Strategic Plan has outlined the Enhanced Performance Metrics through a comparison between “Traditional” and “Enhanced” measures.

Traditional TDM Measures emphasize objectives that have been core to the North Carolina TDM Program for the past two decades - primarily, improving air quality and reducing congestion. Key measures of effectiveness for air quality included air emission levels from carbon dioxide (CO2), nitrogen oxides (NOx), and volatile organic compounds (VOC). Congestion reduction, however, was more limited in assessment to reducing the growth in vehicle miles traveled (VMT).

By comparison, **Enhanced TDM Measures** encourage innovation in not only the assessment and measurement of effectiveness, but also the very definition of societal benefits from TDM endeavors. These benefits extend to improving the larger economy, providing resiliency to disruptions in mobility, enabling access to employment and other components of life, and improving the overall quality of life itself. Inherently, these measures require succinct definition and collaboration across sectors for delivery and evaluation.

Initial Performance Measures

Initial performance measures were derived from the evaluation of best practices for TDM strategies. In turn, these performance measures can be detailed into measures of effectiveness. The selection of performance measures acted to:

- Guide overall mobility decisions by giving direction to fully utilize all highway and modal investments towards traditional and enhanced performance.
- Define the most cost-effective techniques and strategies to optimize system performance through demand management.
- Develop a future TDM investment strategy that optimizes the investments already made in the region using multimodal system and demand management strategies.
- Identify TDM strategies to improve system performance and preserve mobility.
- Utilize the most cost effective techniques to optimize system performance.

Inputs

For input measures, the reviewed research guidance indicated that the absolute numbers collected for various outreach and marketing activities should be utilized as normalization factors. Consequently, it will be important for TDM practitioners throughout the state to collect the necessary levels of data inputs in order to create those factors. The data points that will be collected will be dependent upon each of the contributing TDM strategic plans for service providers. Examples of data points include:

- number of active participating employers and commuters
- events conducted
- employers and commuters engaged for the first time
- years of engagement
- extent of marketing distribution
- market penetration with new marketing activities
- number of new incentives provided
- value of incentives and transit passes
- utilization rates

Outputs

Output measures conducted will include similar measures of effectiveness as currently collected. These may include a variety of factors that pertain directly to the utilization of different alternative modes as well as the utilization of TDM services. Inevitably, data collected will be done at either the employment worksite or through regional survey data collection. As such, it is important that surveys and other materials collect sufficient levels of data points in order to reflect utilization and satisfaction factors. The number of participants by mode, participation in other TDM activities (emergency ride home, incentive program, flexible working arrangement

assistance, etc.), utilization, and other components will be normalized by the input factors collected above. This will allow for the calculation of placement rates, utilization rates, cost per marketing distribution, and percentage of employee population utilizing TDM services.

Outcomes

Outcome factors reflect the newest and most important component of TDM performance metrics, and cross into both traditional and enhanced TDM performance measures. The following measures include a rating of "high, medium, or low" connection between the following performance values:

- Congestion Reduction
- Air Quality Management
- Economic Vitality
- Personal Income
- Resiliency
- Quality of Life

Current factors used by North Carolina TDM partners will continue to be important considerations for evaluating TDM performance, and are incorporated below. Furthermore, local communities may have measures which are important for the local context, and those should continue, too. However, additional factors are suggested for which demand management services can also interrelate with infrastructure and technology services include:

Person Throughput

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
High	High	High	Medium	Medium	Low

Person throughput is an important measure of mobility and congestion reduction, but it also cascades into other performance values. Put simply, the more people the transportation can carry, the more effective the system towards improving personal and societal economy. Person throughput refers to the number of persons utilizing transit and within private vehicles. Although metrics for improving personal health and quality of life are more positively associated with non-vehicular strategies, and hence the lone "low" measure, person throughput may have some residual benefit through accessibility and mobility that still make it a value measure of effectiveness for quality of life. Increases in the number of persons using a corridor's or area's infrastructure would imply that the operations and management strategies evaluated were effective in serving more persons who are not previously serviced as a result of the TDM strategy. The identified measures of effectiveness for person throughput are:

- Person Miles Traveled (PMT) by mode
- Vehicle Miles Traveled (VMT) by mode

The identified mechanism for assessing person throughput performance will be the calculated outcomes from spot measurement, origin/destination studies, and the respective regional travel demand model for PMT and VMT within each region. Whereas collection of new data is not anticipated, opportunities to categorize and archive applicable data from corridor, subarea, or municipal studies should be explored and conducted by each regional partner.

Transit Mode Split

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
Medium	High	High	High	High	Medium

A desired outcome of statewide TDM strategies is to increase the use of transit relative to the private auto, leading to a mode shift to transit. Mode shift may result from potential users being attracted to transit, or from increased transit use among occasional users. Thus, the central transit evaluation issue is the identification and measurement of mode shift. A mode shift to transit should then facilitate higher transit ridership, reduced levels of traffic congestion, more efficient use of existing road capacity, net reduction in greenhouse gas emissions and fuel consumption. and potentially higher levels of person throughput. The identified measures of effectiveness for transit mode shift are:

- Change in key corridor mode share
- Change in regional mode share

Peak Period Vehicle Traffic Volumes

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
High	Medium	Medium	Low	Low	Low

As it pertains to facility performance measure, total vehicular demand for regional highway capacity can be an effective measure for TDM services. Recognizing the state's highway system provides abundant capacity and only suffers a shortage in the peak periods, this measure identifies the success of alternatives in shifting demand from the peak period and/or shifting to alternative modes of travel. The identified measures of effectiveness for peak period vehicle traffic volumes are:

- Change from baseline in peak hour volumes
- Vehicle trips reduced
- Change in peak period VMT

Travel Time Reliability

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
Medium	High	High	High	High	Medium

Travel time reliability is a key metric for operational and demand management strategies, yet it remains an elusive metric for estimation and quantification. In order to represent travel time reliability, regional TDM partners will work in partnership with regional traffic management centers to determine the travel time index as a means of assessing the collective effectiveness of the strategies at reducing congestion between corridors and/or subareas. The travel time index is the ratio of the average peak period travel time as compared to a free-flow travel time. The free-flow travel time for each road section is the 15th percentile travel time during traditional off-peak times (i.e., weekdays between 9 am and 4 pm, between 7 pm and 10 pm; and weekends between 6 am and 10 pm). For example, a value of 1.20 means that average peak period travel times are 20% longer than free flow travel times. Coupled with a calculation of variability, this provides an approximation of reliability. The identified measures of effectiveness for travel time reliability are:

- Variability of trip travel time by mode
- Change in travel time index (total travel time compared to a free-flow travel time) of travelers by mode

Cost of Transportation

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
Low	High	High	High	Low	Low

The use of transportation systems inherently involves costs, borne by individual travelers, consumers of goods that are transported to market, and the society at large. Individual costs are reflected in multiple forms, including the price and acquisition of fuel, vehicles, maintenance, and value of time lost to congestion. Consumer costs reflect the passed along value of individual costs in the final cost of goods and services. Consumer costs are identified here, but are technically an externality, and as such are not reported as a discrete TDM metric. Societal costs largely reflect the additive cost of crashes, vehicular enforcement, emissions, and land development patterns. Altogether, these metrics are summarized by overall reduction in economic productivity as a result of transportation leakage.

- Individual aggregate costs per capita
- Change in travel time index (total travel time compared to a free-flow travel time) of travelers by mode

Calculation of Benefits

The performance measures above can be calculated in a consistent manner. The Metropolitan Washington Council of Governments has developed a similar process, and one which can be replicated as a part of the state of North Carolina utilizing the performance measures identified above. Their process is summarized here, and adapted to fit the North Carolina context:

1. *Estimate commuter population for study (e.g., all commuters, guaranteed ride home applicants, rideshare matching applicants, employer-TDM program employees, etc.)*
2. *Calculate placement rate – Percentage of commuters in the population base who made a travel change as a result of the TDM program*

3. *Estimate the number of new alternative mode placements – Multiply placement rate by the population base for the evaluation period*
4. *Calculate the vehicle trip reduction (VTR) factor for new placements – Average daily vehicle trips reduced per placement*
5. *Estimate vehicle trips reduced – Multiply number of placements by the VTR factor*
6. *Estimate vehicle miles traveled (VMT) reduced – Multiply number of vehicle trips reduced by average commute distance*
7. *Adjust vehicle trips and VMT for access mode – Discount vehicle trips reduced and VMT reduced to ac-count for commuters who drive alone to meet rideshare modes and transit*
8. *Estimate NOx, VOC, PM2.5, and CO2 emissions reduced – Multiply adjusted vehicle trips and VMT reduced by emissions factors consistent with the regional planning process*
9. *Estimate the energy and commuter and societal cost savings – Multiply VMT reduced by fuel efficiency and vehicle operating cost factors and by societal benefit cost factors*

This process reflects a relatively simplistic approach to performance calculation; however, it is a process that lends itself to guidance and replicability. Following NCDOT concurrence on the measures of effectiveness, a similar spreadsheet process will be developed to reflect a standardized method of calculating the performance measures from each region.

NORTH CAROLINA
Department of Transportation



Statewide Transportation Demand Management (TDM) Strategic Planning

Triangle Regional Success Plan

FINAL DRAFT

October 2017

GS&P GRESHAM SMITH AND PARTNERS

wsp

Partnerships between the N.C. Department of Transportation and local governments, regional authorities and other state agencies have been the source of North Carolina's transit success. Currently under development, the Public Transportation Statewide Strategic Plan will build upon that success by creating the foundation for reinvigorated state and local transit partnerships.

As part of the statewide strategic planning and development process, including integration of best practices for various agencies across the state, NCDOT is supporting the state's TDM programs by bringing them into concurrence with the overall strategic focus of the Public Transportation Division (PTD). This work builds off the 2003 Statewide TDM Plan, including alignment of mission, vision and goals.

Mission Statement

To provide citizens of North Carolina opportunities and strategies for improving sustainable economic growth and quality of life through reduced transportation congestion, expanded mobility options, improved air quality and more efficient use of resources.

Vision

Effectively measure and communicate the benefits of alternatives to driving-alone in communities across North Carolina.

Goals

Achieve improved accessibility, connectivity, economic growth, public health and safety through enhanced performance of transportation demand management service provisions.

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Overview

The Triangle J Council of Governments is responsible for administering TDM Programs in the Research Triangle Region of North Carolina. This area includes cities such as Raleigh, Durham and Chapel Hill. The regional program developed partnerships with local and regional TDM service providers starting in 2007 and boasts a litany of accomplishments since being launched. In fiscal year 2016 (July 2015 – June 2016) alone, accomplishments included a total VMT reduction of 4.6 million miles which equates to 2.6 million gallons of gas saved, 61 million commute miles reduced, 31,921 alternative transportation users supported and 28 million pounds of carbon dioxide release prevented. The Triangle TDM Program coordinates funding from multiple sources and provides annual reports detailing VMT reductions and air quality improvements.

Triangle TDM Program

In 2007, the Triangle TDM Program brought together the organizations that were currently working on and/or funding Transportation Demand Management (TDM) in the region to create a long-term plan for improving TDM efforts, including increased funding, evaluation and monitoring. The result was the Triangle Region 7-Year Long Range Travel Demand Management Plan. This plan called for, among other things, the two Metropolitan Planning Organizations and the NC Department of Transportation to pool their funds and have a competitive call for TDM projects.

The Triangle J Council of Governments (TJCOG) was charged with administering this effort on behalf of the funding organizations. In response, TJCOG developed an ongoing Transportation Demand Management Program to fund, coordinate, and evaluate regional TDM activities to reduce traffic and air pollution by promoting commute alternatives.

In addition to coordinating funding for marketing activities, TJCOG evaluates the TDM Program for effectiveness and efficiency through the Triangle TDM Oversight Committee. Representatives of the committee include representation from the region's two MPOs, NCDOT, FHWA and the NC Department of Environmental Quality. An annual call for projects targets designated service areas for TDM service provisions as defined by the Triangle Region 7-Year Long Range Travel Demand Management Plan. This prioritization of investments in TDM activities is based on 1) areas of high work-commute trip density and 2) areas with the best opportunities for TDM services.

Currently, a total of thirteen service areas have been designated in the region where a single service provider is responsible for responding to requests from employers for TDM services.

Leadership

The Triangle TDM program utilizes a Transportation Demand Oversight Committee, composed of representatives from the Capital Area MPO (CAMPO), Durham-Chapel Hill-Carrboro MPO (DCHC MPO), NC Department of Environmental Quality (NCDEQ), Federal Highway Administration (FHWA), NC Department of Transportation (NCDOT) and non-voting representation from Triangle J Council of Governments (TJCOG). The TDM Oversight Committee meets to provide guidance and recommendations on the development of the TDM program. This includes the annual call for projects and program impact evaluation studies. The Energy & Environment Planning Division at Triangle J COG is responsible for staffing the Triangle TDM Program.

Budget / Funding

Triangle J COG combined local CMAQ from participating MPOs (CAMPO and DCHC MPO) with NCDOT PTD TDM Funds, then requires local cost-match from service providers. Funds are allocated through an annual call for projects. The Triangle TDM grant program will fund a maximum of one "Core" program grant application per organization or local government. To be eligible for funds, entities must select an identified "hotspot" for service delivery.

Program Type	Reimbursement	Grant Applicant Match*
Regional Core	80%	20%
Local Core	50%**	50%**
Special Project	50%**	50%**

*Note: Local match must come from non-federal funds. In-kind match is **ineligible** as match Core and Special Projects.
**Example: $100 grant reimbursement, $100 local partner match

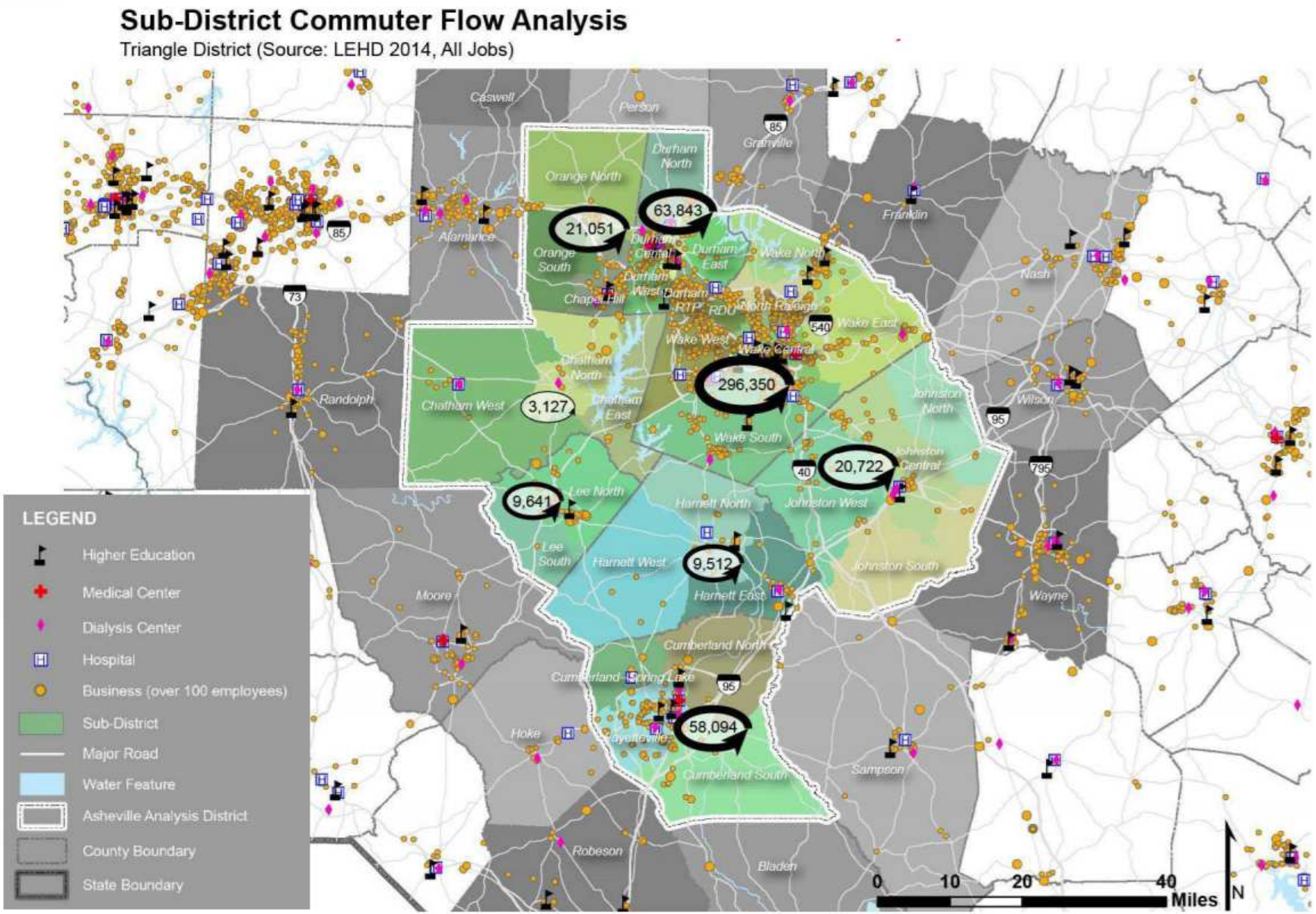
Agencies

Agencies in the Triangle region with either an active or potential role in TDM initiatives include the following:

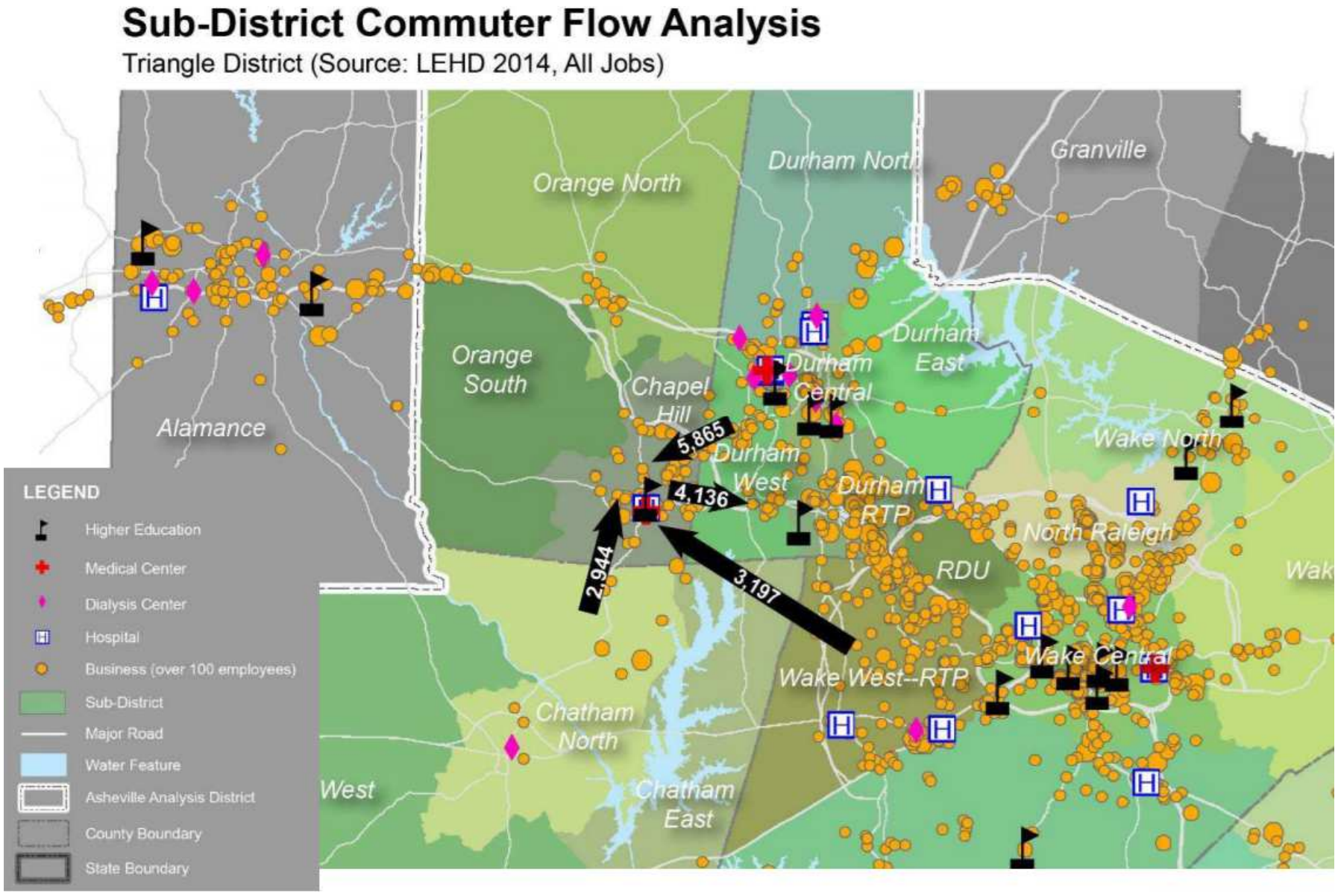
- **Triangle J Council of Governments (TJCOG)** – In addition to coordinating funding for the regional program, TJCOG has received funding for TDM service provisions focused on managing the Best Workplaces for Commuters (BWC) program and the creation of a Telecommuting Handbook.
- **Triangle Transit / GoSmart –** Triangle Transit serves as the Regional TDM Service Provider.
- **Local TDM Service Providers –** The following agencies receive funds to provide TDM services to targeted "hotspots" as identified in the Triangle Region 7-Year Long Range TDM Plan and Triangle TDM FY14 Plan Revision:
    - **Triangle Transit / GoTriangle –** North Raleigh and Central Durham
    - **City of Raleigh** – CommuteSmart Raleigh
    - **RTP Foundation** – **S**martCommute@RTP
    - **University of North Carolina at Chapel Hill (UNC)** – Commuter Alternative Program (CAP)
    - **North Carolina State University** – Wolftrails
    - **Duke University** – Unpark Yourself
    - **Town of Chapel Hill** – Go Chapel Hill
    - **Wake Technical Community College** – Zoom Water Tech

Commuter Flow

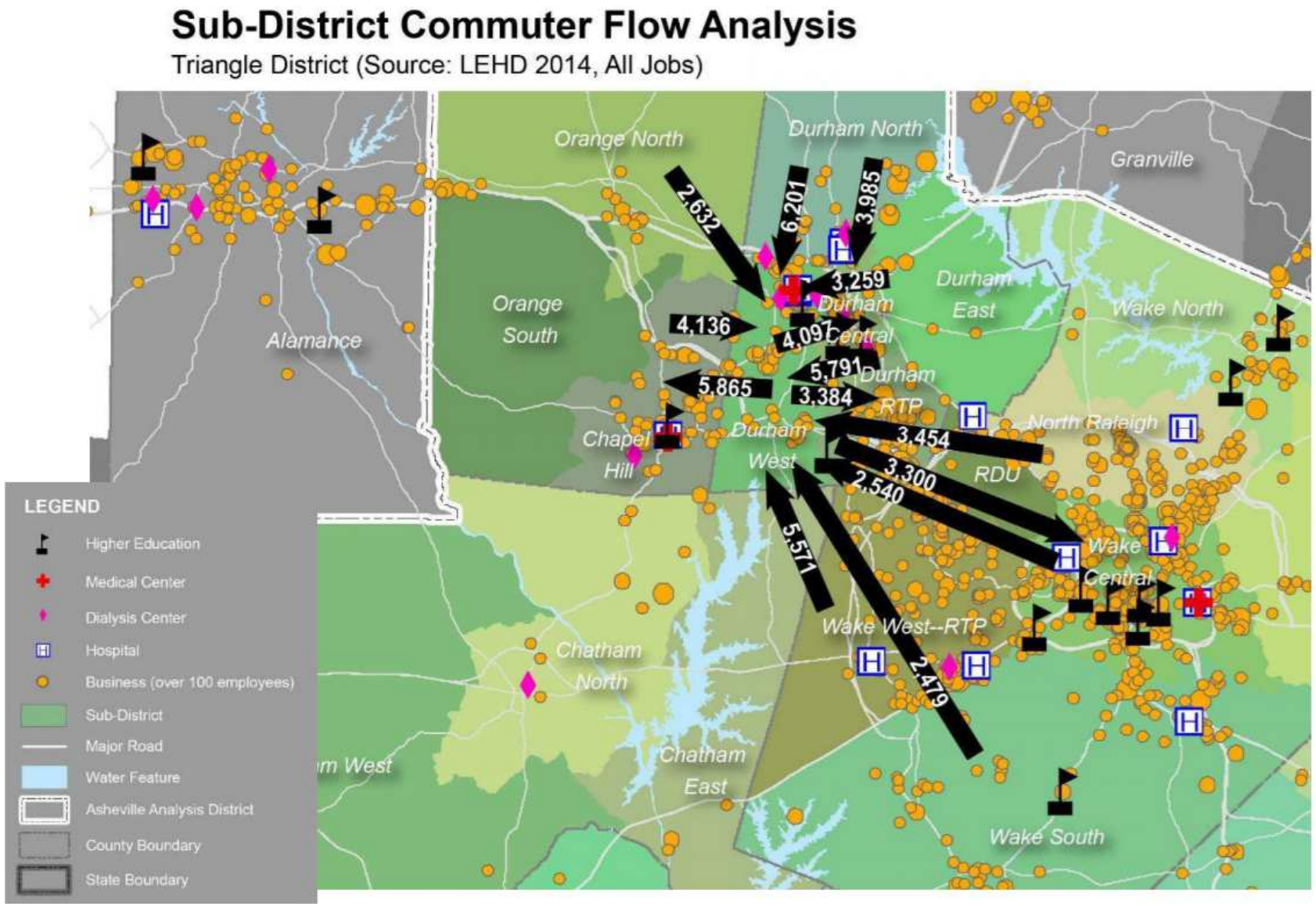
The following sub-district commuter flow analysis maps have been generated for the NCDOT Public Transportation Division (PTD) Statewide Strategic 2035 Plan. The maps identify activity centers relevant to TDM service areas and through coordination of planning efforts, can support short-term and long-range recommendations to improve North Carolinians' access to opportunities.



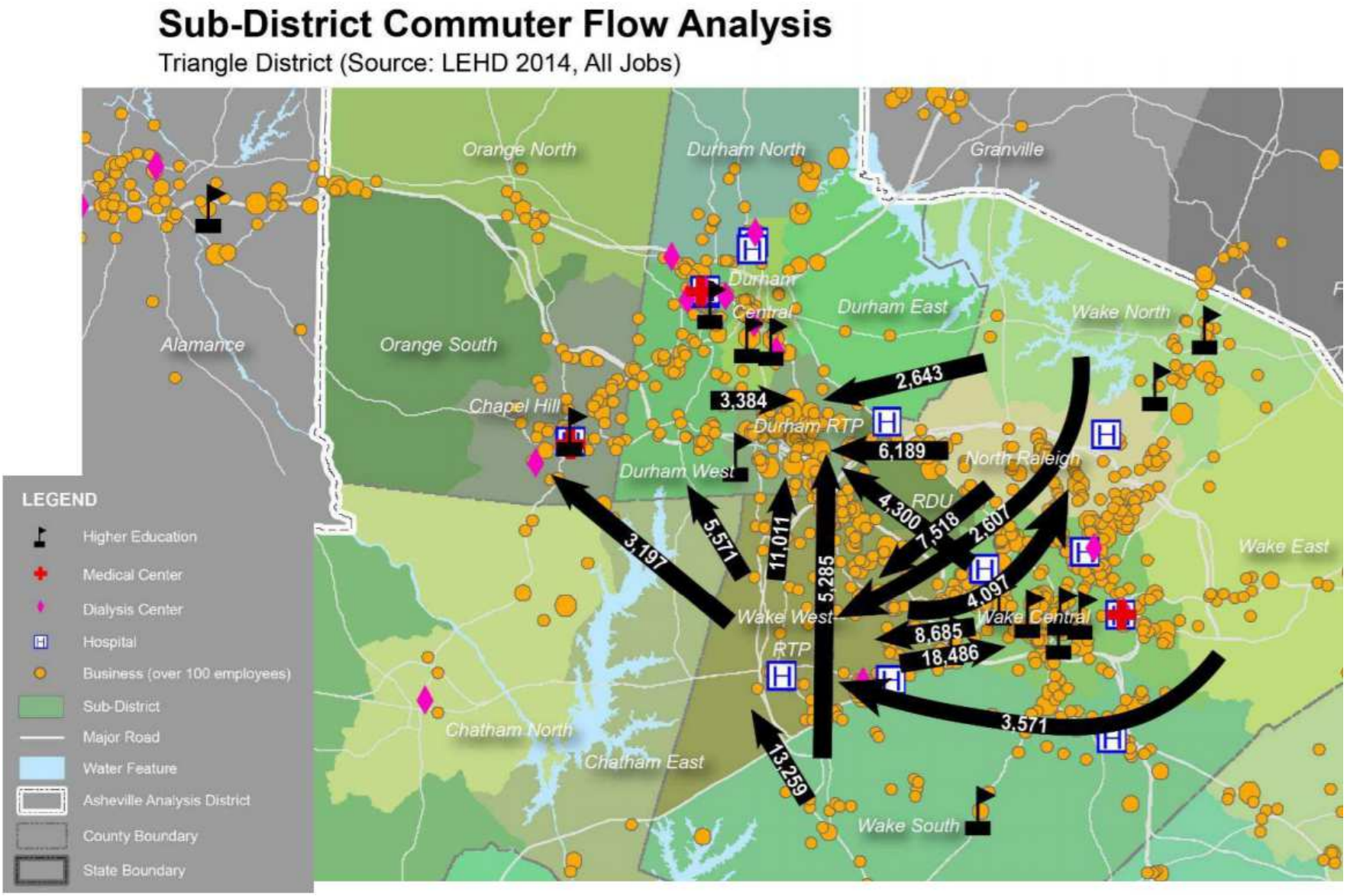
NCDOT Public Transportation Statewide Strategic Plan: Triangle Region Intra-County Commuter Flows



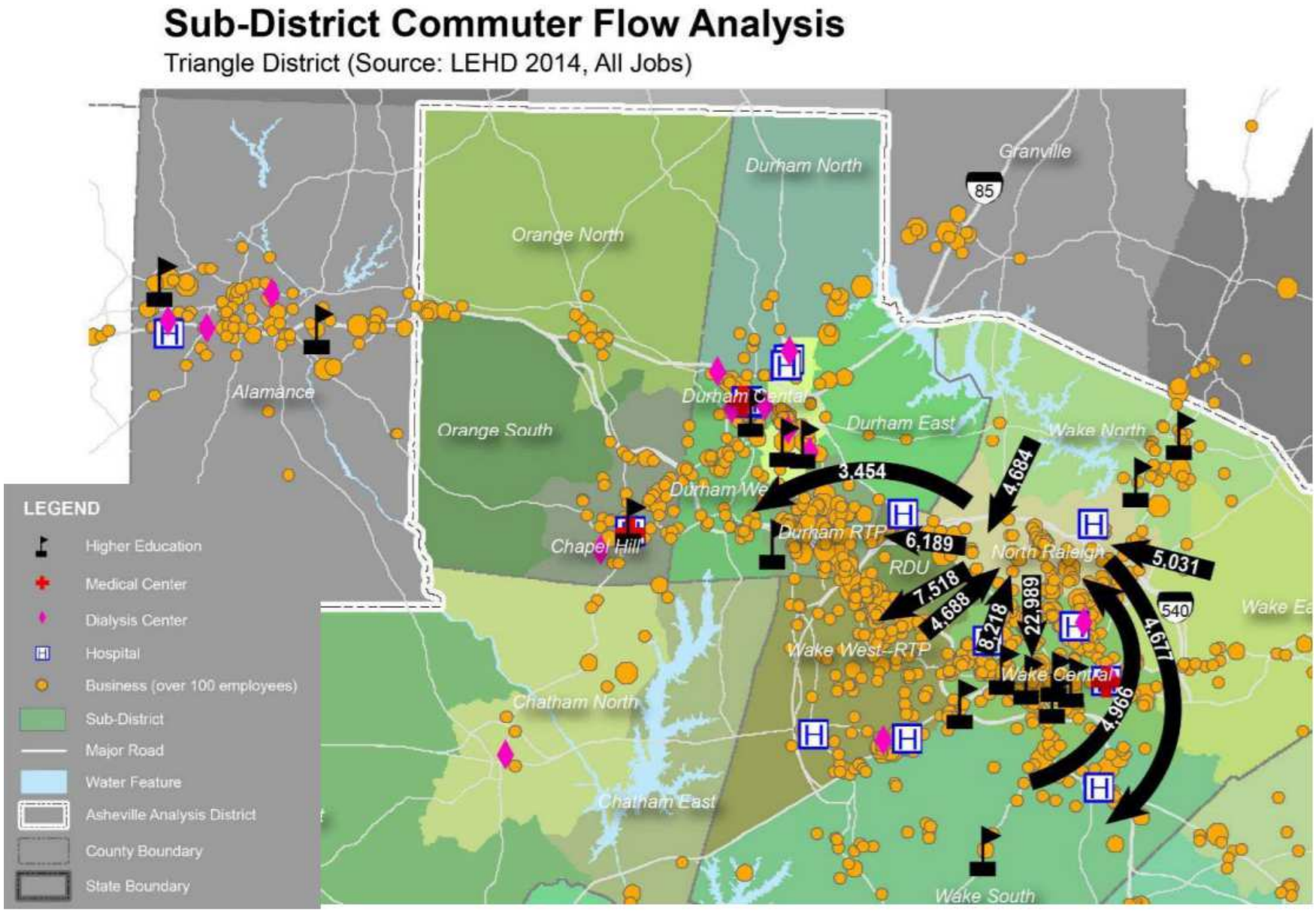
NCDOT Public Transportation Statewide Strategic Plan: Triangle Region Trips to/from Chapel Hill Sub-District



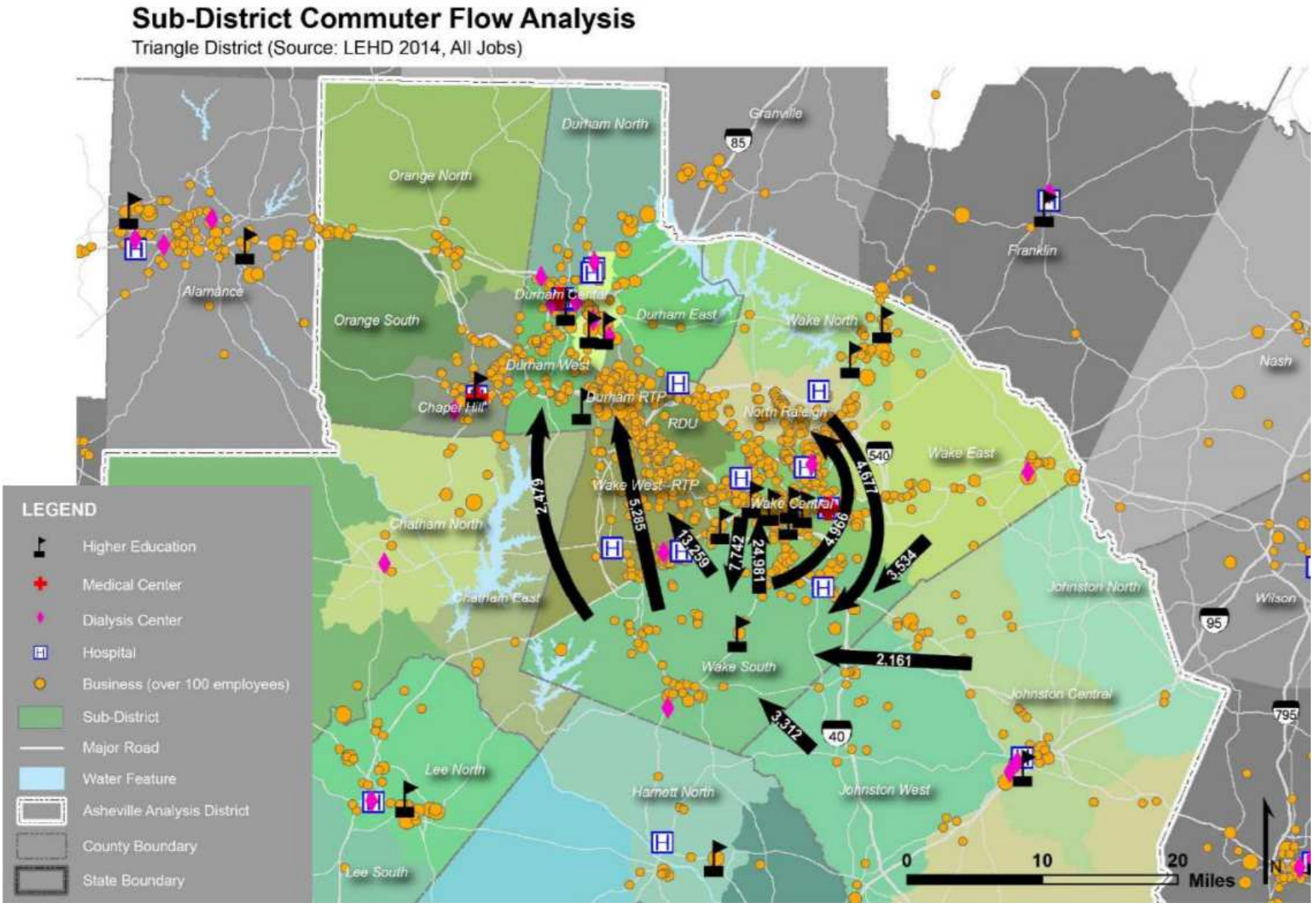
NCDOT Public Transportation Statewide Strategic Plan: Triangle Region Trips to/from Durham West & Durham Central Sub-Districts



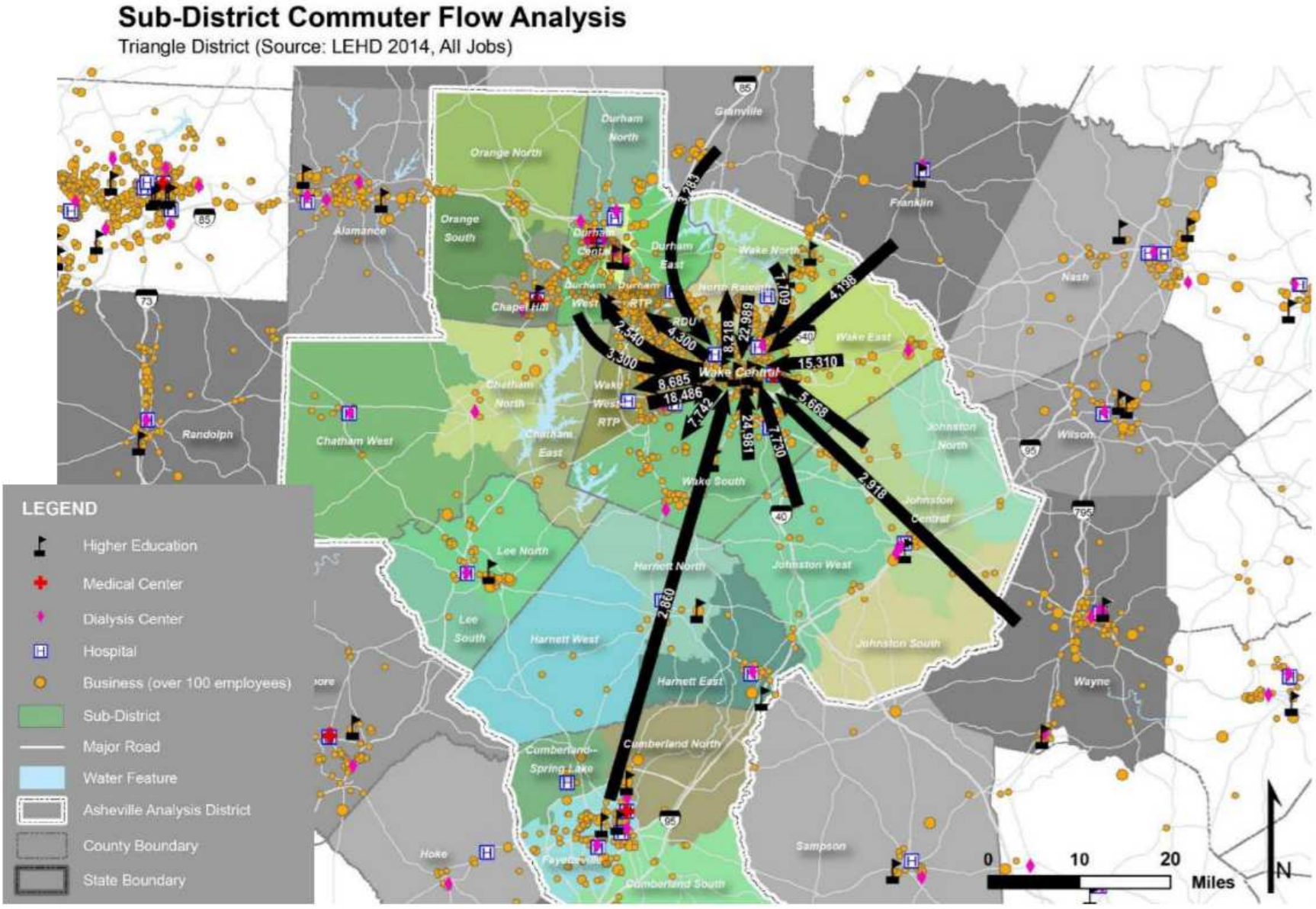
NCDOT Public Transportation Statewide Strategic Plan: Triangle Region Trips to/from Durham-RTP and Wake West RTP Sub-Districts



NCDOT Public Transportation Statewide Strategic Plan: Triangle Region Trips to/from North Raleigh Sub-District



NCDOT Public Transportation Statewide Strategic Plan: Triangle Region Trips to/from Wake South Sub-District



NCDOT Public Transportation Statewide Strategic Plan: Triangle Region Trips to/from Wake Central Sub-District

Summary of Service Providers

The following section providers a brief overview of Regional, Local and Special (Pilot Project) TDM Service Provisions in the Triangle area:

GoSmart (Regional and Local Services)

GoTriangle acts as both the regional Service Provider and a local Service Provider to two hotspots. GoTriangle's regional transportation services include buses, shuttles, and vanpools. GoTriangle also administers Share the Ride NC, the statewide rideshare matching software that includes tracking and incentive options in the Triangle. GoSmart also manages the regional call center for many of the area's transit providers. Regional programming promotes other alternative commute modes such as biking, walking, teleworking and carpooling. GoSmart is the regional TDM umbrella brand. Go Smart services include:

- Vanpool service, with fares that cover the cost of gas, insurance and vehicle maintenance
- GoPass, a regional discounted transit pass that allows employees or students to ride for free when employers, universities or property managers cover the cost of ridership. From 3,500 to over 5,000 trips are avoided each month due to the success of the GoPass Program.
- Regional marketing campaigns such as Think Transit Week, Telework Week, Bike Month, and more.
- Bicycle use and safety trainings for commuters, provided by Licensed Certified Instructors of the League of American Bicyclists.
- Share the Ride NC (STRNC), a rideshare database that matches commuters interested in carpooling or vanpooling together. Users can also request matches for single trips, track their commutes using the Commute Calendar (which also estimates savings in commuting costs and emissions), and access other resources. Cyclists can also search for other bike commuters with a similar skill level or for mentors.
- Emergency Ride Home (ERH), a service available to employee STRNC registrants who use alternative commute modes, provides a voucher for a taxi cab or rental car in the event of an emergency that prevents participants from utilizing their regular alternative commute mode for their trip home.
- GoLive Transit Real-Time Predictions System, which allows users to access real-time bus route information through the live.gotriangle.org mobile website, the GoLive TransLoc App, or the GoLive text messaging system.
- GoPerks incentive program that provides an incentive to start a smart commute or for loyal smart commuters to track trips for smart commuting with the opportunity to earn points. Points can be redeemed as entries in monthly prize drawings.

GoTriangle (Local Service)

GoTriangle conducts TDM outreach in Durham County and portions of Wake County; specifically, the North Raleigh/I-440 Corridor, areas impacted by the I-40/440 road reconstruction project (Fortify) and some major employment areas not covered by another local Service Provider. The two main programs that Go Triangle support are Wake County Hot Spot and Central Durham Hot Spot, which are described below.

- Wake County Hot Spot: With the population in Wake County topping a million in 2014 and continuing that growth throughout 2016, congestion and the demand on current

resources has been a big focus. Road construction on I-440, known as the Fortify Project, has compounded traffic congestion concerns. The Wake County TDM program services all municipalities within Wake County. The focus has been on reducing vehicle miles traveled (VMT) through employer commuter benefits programming and outreach due to the Fortify Construction project. Along with the efforts put forth to educate residents about the Fortify project, greater working relationships with the employers in North Hills and Perimeter Park, SAS, Rex Healthcare and other business centers have grown to work toward achievement of reduced SOV rates in Wake County.

- Central Durham Hot Spot: With employment growing rapidly in Durham County, attention is given to congestion levels and associated air quality. Durham employers contribute by committing to sustainable commuter benefits for employees and hosting multiple regional programs promoting sustainable mobility options that contribute to growing transit ridership and reducing parking demand. Durham's voluntary commute trip reduction program and dedicated outreach has made them champions of TDM.

Go Chapel Hill (Local Service)

The Town of Chapel Hill, in partnership with the Town of Carrboro, provides coordinated TDM services through the GO Chapel Hill program. Chapel Hill's Transportation Management Plan program is designed to assist building owners in incorporating TDM best practices at their building locations while contributing to reduction in the community's drive-alone rate. Go Chapel Hill offers free membership to its Commute Club, promoting the use of alternative transportation and encourages members to pledge to use alternative commutes.

Chapel Hill and Carrboro promote GoTriangle's vanpool program, Emergency Ride Home (ERH), ShareTheRideNC, Go Perks program and other regional services. Chapel Hill Transit provides fare free transit service to the University of North Carolina-Chapel Hill, Carrboro, and Chapel Hill.

Additionally, Chapel Hill and Carrboro are both Bicycle Friendly Communities. Bicycle commuting is increasing in popularity and cycling is encouraged through commuting events such as Annual Bike Night, Bicycle Breakfast, Open Streets Day, Bike on Bus, Lighten Up Cruiser Ride, safety workshops and more.

Unpark Yourself (Local Service)

Duke University's Unpark Yourself program offers TDM services to more than 35,000 employees and nearly 15,000 students on the main campus as well as worksite locations between Duke and downtown Durham. TDM services such as vanpool, carpool, Enterprise CarShare, Zagster bikeshare, and transit options are offered through the Parking & Transportation Services department. Two and three-person carpools are discounted, while four or more people receive free, convenient parking. All registered alternative commuters receive occasional parking as needed, and registered bicycle commuters are automatically enrolled in the national Bicycle Benefits program.

Duke offers the GoPass free-of-charge to students and at a low cost of $25 to employees for access to unlimited rides on regional and local transit systems. In addition, Duke Transit operates 10 fixed daytime transit routes as well as after-hours transport services within the Duke Vans coverage boundary when transit is not in service. The Bull City Connector is a fare-free bus available to students, staff and faculty living near Duke's campus.

The Unpark Yourself program promotes all of these campus benefits, ShareTheRideNC, and more through regular outreach at new employee orientations, partnerships with a variety of Duke departments, and participation in numerous campus events each year.

WolfTrails (Local Service)

The WolfTrails program assists students, faculty and staff in accessing transportation services such as carpooling, employee vanpooling, bicycling, walking and transit. Full-time students and employees participating in the carpool program receive access to premium decks and lots, a discounted parking permit, and free occasional parking passes. Students and employees enrolled in the transit/bike/walk commuter incentive program receive two free parking passes per month. Employees who reside more than 20 miles from campus are eligible to join the vanpool program. Vanpool participants receive a $20 monthly subsidy, free van parking and free occasional parking passes. Employees enrolled in WolfTrails receive access to emergency ride home (ERH) services.

NC State offers the GoPass program to all students, faculty, staff and Centennial Campus affiliates. GoPasses are free for students and $60 for employees and can be used on all GoRaleigh and GoTriangle buses. In addition, the WolfLine is the university's transit system that operates 10 daytime routes and 4 evening routes. Other services available include Share the Ride NC (the regional ridematching service), Zipcar (a carsharing service) and WolfWheels (a bike-rental program).

CommuteSmart Raleigh (Local Service)

The CommuteSmart Raleigh program aims to reduce the use of single occupancy vehicles (SOV) through strategies and policies that promote travel behavior change. Strategies can include, but are not limited to, biking, walking, car/vanpooling, transit, flexible hours and teleworking.

This program is housed in the City's Transportation Operations Division, which also includes GoRaleigh. The program also works closely with the Office of Transportation Planning, specifically the City's Bicycle and Pedestrian Coordinator.

The CommuteSmart Raleigh program enables two TDM Coordinators working as a team to oversee the project and serve as the points of contact for two City sectors: Downtown Raleigh and Inside the Beltline, and to regional partners. The CommuteSmart Raleigh program recently received national recognition at a TDM conference for the success of one of their innovative partnerships with Red Hat.

SmartCommute@RTP (Local Service)

Established in 1999, SmartCommute@rtp is the transportation management association (TMA) for the Research Triangle Park. There are currently 200 member companies in the SmartCommute@rtp program, 29 of which have to identified an internal Employee Transportation Coordinator (ETC) and promote TDM initiatives. Membership is automatic for companies within RTP's boundaries. There are more than 39,000 full-time and 9,000 contract workers in Research Triangle Park.

SmartCommute@rtp promotes are employee vanpools, telework, Emergency Ride Home (ERH), carpools, and bicycle facilities. New transit and vanpool commuters are eligible to apply for one free $25 stored-value bus pass and a 30-day vanpool subsidy. Many RTP companies also have strong telework and compressed workweek policies and internal benefits to

employees that choose alternative transportation for their commute. SmartCommute@rtp also provides member employers with air quality resources and materials to keep employees informed of local air quality updates.

CAP-UNC (Local Service)

UNC-Chapel Hill promotes the use of alternative transportation through the Commuter Alternative Program (CAP). The Program is free to employees of the University and UNC Health Care, and to commuter students living off campus. Alternative modes and services promoted through the University include free bus service through Chapel Hill Transit, numerous regional transit systems, ShareTheRideNC ridematching service, Zipcar carsharing program, carpooling, vanpooling, bicycling and walking.

Commuter subsidies include $20 per month off the fare for GoTriangle and PART vanpools, a free bus pass to ride Chatham Transit's Pittsboro Express (PX), and a free GoPass for CAP members living outside Chapel Hill Transit's service area. The GoPass can be used on GoTriangle and PART regional buses, as well as GoDurham, GoRaleigh, and C-Tran buses. Park & Ride lots are also available in the Chapel Hill/Carrboro area, which allow commuters to shorten their drive-alone distance for a nominal fee.

The services listed above are promoted at various events on campus, the CAP e-newsletter, advertisements, campaigns and welcome packets. CAP helps UNC keep the campus walk-able and bike-able by reducing traffic and the need for parking facilities. CAP also supports UNC's goal to be a sustainable campus and a Best Workplace for Commuters.

Zoom- Wake Tech CC (Local Service)

Wake Technical Community College's ZOOM program (Zeroing Ozone Output Measures) is designed to encourage the use of alternative commute modes such as transit, carpool, bicycling and walking. ZOOM supports Share the Ride NC and works closely with local and regional transit agencies to improve upon and develop alternative transportation initiatives. Employees and students at Wake Tech can ride the GoRaleigh 40X bus free with their Wake Tech ID card, and curriculum students can get a GoPass to ride any other GoRaleigh bus routes for free. Employees can also take advantage of Wake Tech's summer compressed work schedule, which allows them to work longer days but only four days a week.

Best Workplace for Commuters

Triangle J Council of Governments provides a coordinator for the Best Workplaces for Commuters program developed by the Center for Urban Transportation Research. Best Workplaces for Commuters is an innovative membership program which provides qualified employers with national recognition and an elite designation for offering outstanding commuter benefits, such as a free or low-cost bus pass, vanpool fares and strong telework programs. Best Workplaces for Commuters improves the way people get to and from work by recognizing forward thinking employers and celebrating their commitment to providing mobility options for their employees while improving our region and environment. The program provides public recognition and promotion of exemplary workplaces, as well as technical assistance, training, web-based tools, and forums for information exchange. Continuing its successes, the program now serves approximately 100,000 employees at designated BWC locations in the Triangle region.

North Carolina BWC Employers include the following:

American Tobacco Campus (Durham, NC)
BASF, Corp. (Raleigh, NC)
Capital Area Transit (Raleigh, NC)
City of Durham (Durham, NC)
City of Raleigh (Raleigh, NC)
Duke University (Durham, NC)
FHI360 (Durham, NC)
GoTriangle (Research Triangle Park, NC)
IBM (Research Triangle Park, NC)
Lenovo (Morrisville, NC)
North Carolina Department of Environmental Quality (Raleigh, NC)
North Carolina State University (Raleigh, NC)
Precor Strength (Whitsett, NC)
Public Broadcasting Service (Raleigh, NC)
Research Triangle Foundation of North Carolina (Research Triangle Park, NC)
RTI International (Research Triangle Park, NC)
Town of Chapel Hill (Chapel Hill, NC)
Triangle J Council of Governments (Research Triangle Park, NC)
Triangle Transit Authority (Research Triangle Park, NC)
University of North Carolina at Chapel Hill (Chapel Hill, NC)
UNC Healthcare (Chapel Hill, NC)
Veterans Affairs Medical Center (Durham, NC)
Wake Tech Community College (Raleigh, NC)

SWOT Analysis

Individual in-person interviews were conducted with TDM Service Providers across the state between April 24 – May 9, 2017. Additional interviews were held with associated stakeholders not currently receiving TDM funds from NCDOT PTD.

Triangle Regional TDM service providers and stakeholders were interviewed as part of the process including TJCOG, GoTriangle, Duke University, Research Triangle Park, NC State University, UNC Chapel Hill and Wake Tech on May 3, 2017 and Triangle TDM Oversight Committee members including CAMPO and DCHC MPO on May 5, 2017.

During the interviews, participants were asked to summarize their program activities by identifying currently implemented TDM Strategies within a standard matrix. This process serves as the baseline for consistently measuring program work and has informed the analysis of strengths, weaknesses, opportunities and threats / challenges cited below.

In addition to the TDM Strategies Matrix exercise, service providers were asked to provide potential Enhanced Performance Metrics beyond VMT reduced and associated air quality improvements to provide a more open-ended opportunity to inform the process. A summary of proposed Enhanced Performance Metrics is attached (Appendix A).

Strengths

- **Regional Coordination:** The Triangle TDM program has a well-established system that supports coordination of regional, local and special TDM service provisions across targeted “hotspots” in the region. This structure also coordinates with the regions two MPOs through a formalized committee that recommends program elements and aligns shared investment of funds for increased efficiencies. The required cost-share from funded TDM service providers ensures local investment from the communities receiving NCDOT and MPO grant funds.
- **Public Education and Promotion:** All TDM Service Providers receiving funds from NCDOT PTD support alternative modes through public education and promotion. This is

in addition to non-funded entities providing additional marketing support. Programs have strong local brands and in the Triangle region, coordinate efforts to leverage messaging.

- **Transit / Vanpool Services:** A majority of transit and vanpool services in the state are offered by organizations within the Triangle TDM Program. Transit agencies in the Triangle region support numerous options for Transit / Vanpool Services, some of which are customized.
- **Consistent VMT Calculation:** Vehicles Miles Traveled (VMT) has historically been the primary performance metric for the statewide program, yet regional programs have reported annual reductions through individual calculations. These inconsistencies make it difficult to determine what strategies are successful, hence weakening the statewide program's ability to share best-practices. The Triangle Region has developed a model that consistently measures VMT and associated air quality benefits across multiple service providers in the region. This consistency allows for fair and equal performance measurement.

Weaknesses

- **Inconsistent Funding:** Programs in the Triangle region enjoy a consistent funding structure through the pooling of funds from local MPOs and NCDOT. The availability of local matching funds, however, can be limited despite a desire to collaborate. As behavioral change efforts, typically do not realize instant results, inconsistent messaging and program support due to gaps in the availability of funds can quickly stall or even erase momentum found in the implementation of new, innovative TDM strategies.
- **Lack of Performance Incentives:** The Triangle TDM program lack incentives for improving performance. If a greater reduction in VMT is reported from one fiscal year to the next, a program might be studied for justifiable reasons to increase financial support. A coordinated plan for moving from baseline to achievement would support additional funding opportunities such as foundation and grant support, along with sponsorship and/or cost-match from businesses and local governments.
- **Stagnation:** Many local TDM programs have been in existence for nearly a decade. This can cause stagnate program branding, messaging, and general impact in local communities. Maintaining a fresh program image is both critical and challenging for any marketing-based effort. SmartCommute@rtp, ShareTheRideNC and Best Workplaces for Commuters are examples of well-established brands that require considerations of tradeoffs surrounding efficiencies in standardized/existing structures versus opportunities for improved impacts.

Opportunities

- **Expanded Program Locations / Partnerships:** The statewide program supports TDM service provisions across academic, government and non-profit sectors, offering a variety of tailored strategies and lessons-learned for several audiences. Growth in the Triangle Region is creating increased trips to/from sub-districts that have not seen high commute levels in the past. Utilizing trip data to forecast the need for targeted TDM services in these emerging communities can establish local brands to preempt SOV use. Similar opportunities are currently being explored by TDM service providers around infill development, where TDM strategies might offer resources in advance of congestion.
- **Statewide Collaboration:** TDM Service Providers across the state consistently noted the desire to share best-practices and lessons learned. In some instances, newer TDM staff were unaware that programs existed in other locations. In addition to opportunities for

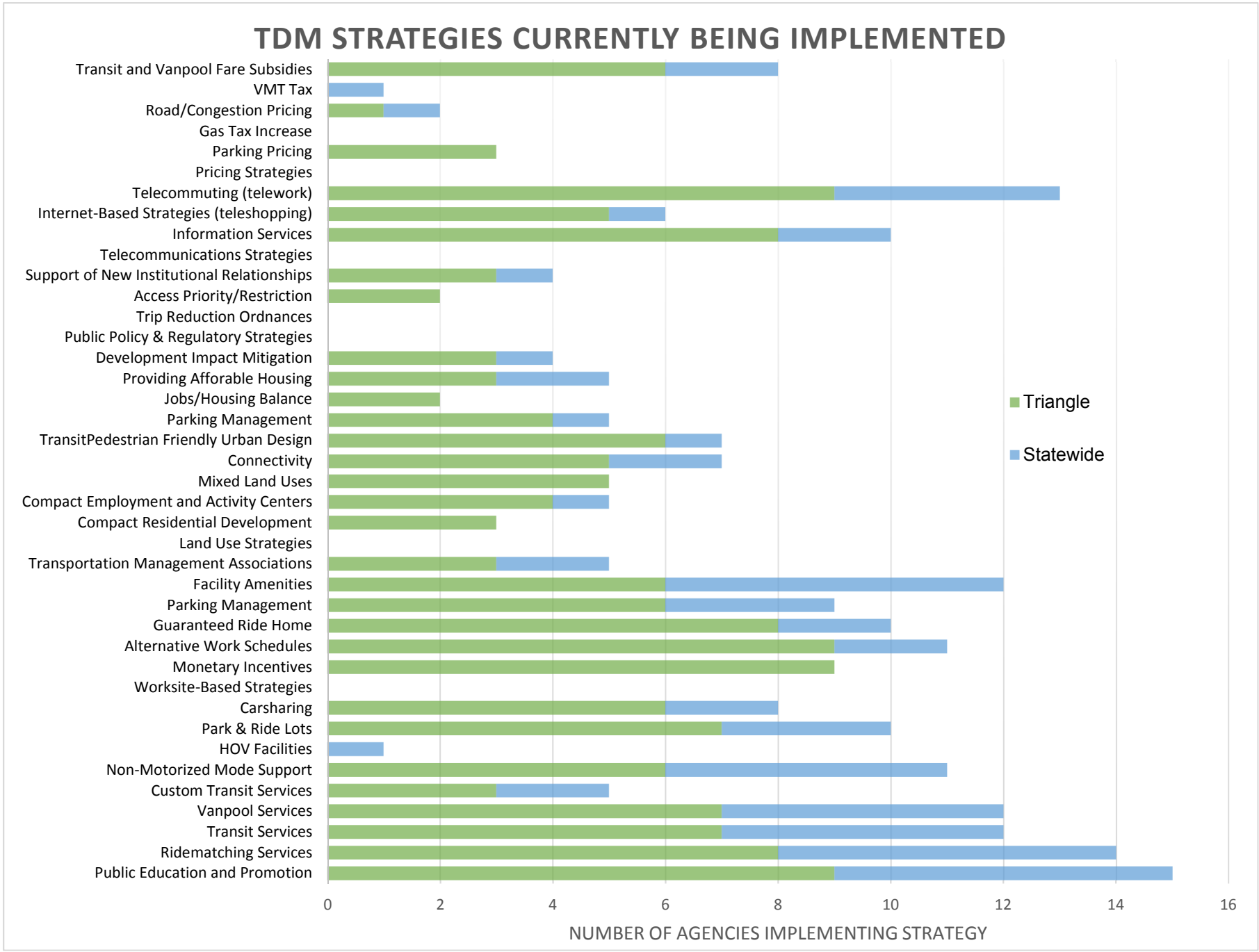
shared improvements, programs might share resources including commonly branded materials to increase efficient use of funds. Newly appointment staff could quickly assimilate into the statewide TDM effort if a better system were created for connecting service providers.

- **Support New Institutional Relationships:** Three of the four TDM Service Providers across the state that identified this strategy as being implemented by their program are in the Triangle region. This underlines the consistent willingness for existing TDM service providers and stakeholders in the area to coordinate efforts. The development of new relationships, however, offers numerous opportunities ranging from additional funding for program activities to shared communication and marketing efforts. Creating a performance measurement for generating new partnerships would enhance the achievement of TDM efforts in the Triangle region and if existing TDM service providers and stakeholders developed a coordinated approach to move from a shared baseline, opportunities for accelerated achievements could be reported.
- **Technology-Based Solutions:** Advanced technologies including communication modes offer ever-improving opportunities for public education and promotion of alternative modes. Shared pilots and statewide deployment of appropriate technologies might provide chances to leverage exiting openings for enhanced programs.
- **Shared Resources / Branding:** Several TDM Service Providers cited the ability to leverage shared resources such as the "Go" Brand which has been successfully replicated by communities such as "GoMountain", "GoTriangle", "GoRaleigh", "GoCary" and others. TDM programs in the Triangle region can enhance current coordination of these efforts to explore opportunities for efficient use of resources along with more consistent messaging across the state in disseminating information.
- **Trip Reduction Ordinances:** This strategy has proven successful in the past but is no longer being implemented by any program in the state.

Threats / Challenges

- **Funding:** Identifying and capturing additional funding requires time and presents several challenges. Pursuing external investments for programs that are rooted in government funding is difficult and often limited due to regulatory constraints.
- **Limitations of Policy Development:** It is challenging for TDM Service Providers to develop and promote policies within their communities. Increased communication and support from community leaders and decision-makers is difficult for programs to prioritize while implementing services.
- **Coordination with Land Use Strategies**: Roughly half of TDM Service Providers across the state are implementing strategies related to land use and development. Coordinating the integration of TDM strategies within land use policies is challenging due to the variety of processes and planning organizations within the region.
- **Ability to Communicate with Multiple Stakeholders:** The Triangle TDM program structure allows for communication across multiple stakeholders in the region. This includes reaching leadership at locations where local TDM services are administered. As the program administrator, TJCOG facilitates regular meetings for service providers to share lessons learned and best practices while coordinates efforts to best utilize resources. As the regional service provider, GoTriangle ensures local service providers have access to consistently branded resources and messaging, creating opportunities

for synergistic opportunities in service delivery. While the Triangle Region's TDM program structure offers ample opportunities for communication with currently service providers, funding agencies and existing stakeholders, expanding coordination to new stakeholders requires diverse tools and resources, creating a challenge in time management and allocation of program funds.


TDM STRATEGIES CURRENTLY BEING IMPLEMENTED
Transit and Vanpool Fare Subsidies
VMT Tax
Road/Congestion Pricing
Gas Tax Increase
Parking Pricing
Pricing Strategies
Telecommuting (telework)
Internet-Based Strategies (teleshopping)
Information Services
Telecommunications Strategies
Support of New Institutional Relationships
Access Priority/Restriction
Trip Reduction Ordnances
Public Policy & Regulatory Strategies
Development Impact Mitigation
Providing Afforable Housing
Jobs/Housing Balance
Parking Management
TransitPedestrian Friendly Urban Design
Connectivity
Mixed Land Uses
Compact Employment and Activity Centers
Compact Residential Development
Land Use Strategies
Transportation Management Associations
Facility Amenities
Parking Management
Guaranteed Ride Home
Alternative Work Schedules
Monetary Incentives
Worksite-Based Strategies
Carsharing
Park & Ride Lots
HOV Facilities
Non-Motorized Mode Support
Custom Transit Services
Vanpool Services
Transit Services
Ridematching Services
Public Education and Promotion
Triangle
Statewide
0
2
4
6
8
10
12
14
16
NUMBER OF AGENCIES IMPLEMENTING STRATEGY

Technical Memorandum on Performance Measurements

The TJCOG evaluates the TDM Program for effectiveness and efficiency through the Triangle TDM Oversight Committee. Representatives of the committee include representation from the region's two MPOs, NCDOT, FHWA and the NC Department of Environmental Quality. The regional TDM program currently collects the following performance metrics:

- Placements (new alternative mode users)
- Vehicle trips reduced
- VMT reduced
- Emissions (Nitrogen oxides, volatile organic compounds, carbon dioxide) reduced
- Energy Savings (gallons of gas saved)

Enhanced Value Performance Measures

New standardized enhanced value performance measures are identified in the Task 4.1 report (Appendix A), and should be incorporated throughout the regional TDM programs in the state.

Recommendations

The Triangle Regional TDM Program has multiple strengths and opportunities to move from baseline to achievement. Reviewing current baseline levels of reporting and developing enhanced performance metrics can demonstrate added value, improving communication of program mission, vision and goals. Improved communication of program impacts will reinforce support from local leadership while offering a mutual understanding of TDM service provisions.

A process for the development of a 3-Year Regional TDM Plan will be informed by the Statewide TDM Plan Update and support the ability to improve current performance while creating a phased approach to Plan Review, Project Entitlement and TDM Plan Monitoring and Reporting. This will also enhance efficiencies, reducing administrative burdens while offering opportunities to align with additional funding cycles.

Additionally, the Statewide TDM Plan Update will support opportunities for NCDOT to provide various forms of technical assistance. Coordinated aid at the statewide level will allow for the sharing of best-practices and lessons-learned across regional programs. Approaching a 3-Year Regional TDM Planning Process while integrating Enhanced Performance Metrics will support the development of localized specialties with consistent metrics for documenting results.

Given the number of TDM service providers currently active in the Triangle Region, the ability to better align performance metrics specific to areas of need would greatly benefit both regional and statewide efforts. In some instances, local TDM service providers are measuring and reporting program deliverables to their home institution but not to NCDOT or the Triangle TDM Oversight Committee in any formal way.

Reviewing current and needed strategies with the development of performance measurements should be coordinated with the Statewide TDM Plan Update to align local, regional and state funding priorities for the Triangle Regional TDM Program. These opportunities will provide a structure for defining current and newly defined baselines to demonstrate growth towards achievement, establishing an enhanced program model that can build on comprehensive improvements to better encourage innovation.

Appendix A
Task 4.1 – Enhanced Performance Metrics

MEMO

TO: NCDOT Public Transportation Division

FROM: Gresham, Smith & Partners; WSP USA

SUBJECT: Task 4.1: Enhanced Performance Measures Technical Memorandum

DATE: August 17, 2017

Performance Measurement of TDM Strategies

The development of TDM strategies emerged out of a recognized need for better surface transportation system performance while reducing the negative externalities associated with unimpeded travel growth. Presently, most metropolitan areas in the United States implement TDM as a mobility service, with limited expectations regarding the performance of the strategies deployed. The usefulness of static marketing and modal promotion over time as conditions change is rarely called into question, let alone respond to variations in demand or economic changes influencing travel demand. Typically, years go by before plans and strategies are changed to suit the current market. Even as more and more jurisdictions embrace TDM strategies as a complement to infrastructure oriented projects, metrics for evaluating the performance of TDM has lagged.

One study of performance measures for TDM identified current and best practices.[1] There are dozens of TDM performance measures in use by various agencies. Some of these measures are standard ones developed by TDM practitioners or researchers and promoted over time. Other measures are local in nature, responding to specific goals and objectives embedded within transportation plans, or are custom-tailored by agencies for specific purposes. This section will discuss some of the key measures in detail, along with relevant illustrations.

The review of TDM performance measures by Thompson and Suter indicate a four-stage approach to evaluating performance:

1. **Inputs** involve quantifiable activities often conducted by TDM practitioners.
2. **Outputs** measure the direct results of activities that serve as inputs.
3. **Outcomes** involve a calculation of benefits as yielded from inputs and outputs.
4. **Effectiveness** measures take outcomes, and normalize them by cost, yielding a benefit cost relationship.

Altogether, this four-stage approach involves escalating levels of difficulty in calculating the performance of TDM measures over time. These are summarized in turn.

[1] Thompson, R. and Suter, S. *Development of Standard Performance Measures for Transportation Demand Management Programs*, Transportation Research Record 2319, Transportation Research Board, Washington, DC. 2012.

Input Measures

input measures are primarily confined to the actual activities that are often conducted by TDM practitioners. In the context of outreach and marketing, which is the primary level of activity currently applied in the Triangle area, measures may involve the recording of the absolute number of meetings with employers, events attended, new employers organizations engaged in the program, literature distributed, advertisements and/or radio marketing placed, or Internet-based ad placement.

In terms of best and/or innovative TDM practices as it pertains to input measures, agencies around the United States may identify the same metrics, but the reporting of the absolute number is irrelevant. Instead, outreach and marketing input measures become normalization factors for outputs. As such, the input number becomes the denominator and calculation functions. For example, the number of carpools that are formed at any one ***event*** is irrelevant. However, the same number of carpools for formed ***per event*** attended is very much relevant towards effective calculations. Ultimately, these performance measures are described and summarized as placement rates, conversion rates, and cost-effectiveness of marketing and outreach activities.

Output Measures

The common use of output measures in TDM performance assessment involves the measurement of modal use as well as client satisfaction. Common measures of effectiveness currently in use include the number of participants by mode (for example, transit riders, car pullers, vamp rulers, teleworkers, etc.), the number of emergency ride home participants, the utilization of park-and-ride locations, and the conversion rate of new participants in TDM activities. For client satisfaction, these measures may include the number of commuters who recall marketing efforts, satisfaction with the services received, or the number of surveys distributed and/or returned to the TDM agency.

Best practices for TDM measurement, including those endorsed by the referenced article, emphasize the level of participation, and not the absolute number. These measures would include the percentage of employees using alternatives to work separated by mode, the frequency and duration of alternative mobile use, and the percent of the population that oscillate between modes. Furthermore, client satisfaction measures may be linked with marketing and outreach measures to determine an overall effectiveness of TDM program activities. These measures may include placement rates for campaigns and customer interaction, or, the cost per recipient of TDM services.

Outcome Measures

Whereas inputs and outputs pertain to the overall TDM program activities and utilization of alternatives, outcome measures evaluate the benefit upon the overall transportation system. In North Carolina, a common measurement has been the calculation of vehicle miles traveled (VMT) reduction that is a direct outcome from TDM services. This VMT reduction calculation may either be as an absolute number, or as a percentage of overall VMT. Additional outcome related measures utilized by other practitioners around the United States may include: single occupant vehicle trips reduced, percentage of trips taken by mode, absolute number of greenhouse gas emissions or ozone emissions reduced, overall costs to commuters, or improved travel time reliability.

Best practices for TDM activities involve the correlation of TDM investments to overall transportation system metrics. These innovative practices involve the separation of TDM effectiveness by outputs. For example, the TDM agency would establish outcome goals prior to the activity engagement, and then evaluate the effectiveness of meeting those outcome goals from the activity itself. Examples of these types of measures may include: VMT reduction comparisons by geography, sub area, or corridor, VMT reduced by mode, and the reduction in travel time delay for participants by mode.

Effectiveness

Overall, effectiveness measures involve the calculation of cost per input, output, and per outcome for every other performance metric. As such, this category measures efficiency of all efforts and demonstrates the value of TDM services over time. Examples of effectiveness measures include: cost per trip provided, cost per ton of emissions reduced, cost per advertisement viewed, cost per placement, and cost per day of service. Cost-effectiveness measures are essential for identifying the relative value of TDM as compared to other transportation related improvements. From a true calculation of benefits to cost, the appropriate role of TDM services can be aligned with the overall infrastructure investment plans. However, given the difficulty of making these types of calculations, most TDM practitioners do not yield cost-effectiveness performance measurement.

Reframing Metrics for Performance Enhancement

Leveraging the best practices identified above, the TDM Strategic Plan provides a cost-benefit analysis (effectiveness) driven approach for measuring traditional and enhanced indicators of success to more accurately assess the distribution of funds to improve efficiencies and enhance existing efforts. Measures of effectiveness are oriented towards providing clarity and uniformity across the statewide plan. To accomplish this, each measure requires sufficient definition to provide a high degree of certainty that the measure is accurate as calculated.

The TDM Strategic Plan has outlined the Enhanced Performance Metrics through a comparison between “Traditional” and “Enhanced” measures.

Traditional TDM Measures emphasize objectives that have been core to the North Carolina TDM Program for the past two decades - primarily, improving air quality and reducing congestion. Key measures of effectiveness for air quality included air emission levels from carbon dioxide (CO2), nitrogen oxides (NOx), and volatile organic compounds (VOC). Congestion reduction, however, was more limited in assessment to reducing the growth in vehicle miles traveled (VMT).

By comparison, **Enhanced TDM Measures** encourage innovation in not only the assessment and measurement of effectiveness, but also the very definition of societal benefits from TDM endeavors. These benefits extend to improving the larger economy, providing resiliency to disruptions in mobility, enabling access to employment and other components of life, and improving the overall quality of life itself. Inherently, these measures require succinct definition and collaboration across sectors for delivery and evaluation.

Initial Performance Measures

Initial performance measures were derived from the evaluation of best practices for TDM strategies. In turn, these performance measures can be detailed into measures of effectiveness. The selection of performance measures acted to:

- Guide overall mobility decisions by giving direction to fully utilize all highway and modal investments towards traditional and enhanced performance.
- Define the most cost-effective techniques and strategies to optimize system performance through demand management.
- Develop a future TDM investment strategy that optimizes the investments already made in the region using multimodal system and demand management strategies.
- Identify TDM strategies to improve system performance and preserve mobility.
- Utilize the most cost-effective techniques to optimize system performance.

Inputs

For input measures, the reviewed research guidance indicated that the absolute numbers collected for various outreach and marketing activities should be utilized as normalization factors. Consequently, it will be important for TDM practitioners throughout the state to collect the necessary levels of data inputs to create those factors. The data points that will be collected will be dependent upon each of the contributing TDM strategic plans for service providers. Examples of data points include:

- number of active participating employers and commuters
- events conducted
- employers and commuters engaged for the first time
- years of engagement
- extent of marketing distribution
- market penetration with new marketing activities
- number of new incentives provided
- value of incentives and transit passes
- utilization rates

Outputs

Output measures conducted will include similar measures of effectiveness as currently collected. These may include a variety of factors that pertain directly to the utilization of different alternative modes as well as the utilization of TDM services. Inevitably, data collected will be done at either the employment worksite or through regional survey data collection. As such, it is important that surveys and other materials collect sufficient levels of data points to reflect utilization and satisfaction factors. The number of participants by mode, participation in other TDM activities (emergency ride home, incentive program, flexible working arrangement

assistance, etc.), utilization, and other components will be normalized by the input factors collected above. This will allow for the calculation of placement rates, utilization rates, cost per marketing distribution, and percentage of employee population utilizing TDM services.

Outcomes

Outcome factors reflect the newest and most important component of TDM performance metrics, and cross into both traditional and enhanced TDM performance measures. The following measures include a rating of "high, medium, or low" connection between the following performance values:

- Congestion Reduction
- Air Quality Management
- Economic Vitality
- Personal Income
- Resiliency
- Quality of Life

Current factors used by North Carolina TDM partners will continue to be important considerations for evaluating TDM performance, and are incorporated below. Furthermore, local communities may have measures which are important for the local context, and those should continue, too. However, additional factors are suggested for which demand management services can also interrelate with infrastructure and technology services include:

Person Throughput

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
High	High	High	Medium	Medium	Low

Person throughput is an important measure of mobility and congestion reduction, but it also cascades into other performance values. Put simply, the more people the transportation can carry, the more effective the system towards improving personal and societal economy. Person throughput refers to the number of persons utilizing transit and within private vehicles. Although metrics for improving personal health and quality of life are more positively associated with non-vehicular strategies, and hence the lone "low" measure, person throughput may have some residual benefit through accessibility and mobility that still make it a value measure of effectiveness for quality of life. Increases in the number of persons using a corridor's or area's infrastructure would imply that the operations and management strategies evaluated were effective in serving more persons who are not previously serviced because of the TDM strategy. The identified measures of effectiveness for person throughput are:

- Person Miles Traveled (PMT) by mode
- Vehicle Miles Traveled (VMT) by mode

The identified mechanism for assessing person throughput performance will be the calculated outcomes from spot measurement, origin/destination studies, and the respective regional travel demand model for PMT and VMT within each region. Whereas collection of new data is not anticipated, opportunities to categorize and archive applicable data from corridor, subarea, or municipal studies should be explored and conducted by each regional partner.

Transit Mode Split

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
Medium	High	High	High	High	Medium

A desired outcome of statewide TDM strategies is to increase the use of transit relative to the private auto, leading to a mode shift to transit. Mode shift may result from potential users being attracted to transit, or from increased transit use among occasional users. Thus, the central transit evaluation issue is the identification and measurement of mode shift. A mode shift to transit should then facilitate higher transit ridership, reduced levels of traffic congestion, more efficient use of existing road capacity, net reduction in greenhouse gas emissions and fuel consumption. and potentially higher levels of person throughput. The identified measures of effectiveness for transit mode shift are:

- Change in key corridor mode share
- Change in regional mode share

Peak Period Vehicle Traffic Volumes

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
High	Medium	Medium	Low	Low	Low

As it pertains to facility performance measure, total vehicular demand for regional highway capacity can be an effective measure for TDM services. Recognizing the state's highway system provides abundant capacity and only suffers a shortage in the peak periods, this measure identifies the success of alternatives in shifting demand from the peak period and/or shifting to alternative modes of travel. The identified measures of effectiveness for peak period vehicle traffic volumes are:

- Change from baseline in peak hour volumes
- Vehicle trips reduced
- Change in peak period VMT

Travel Time Reliability

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
Medium	High	High	High	High	Medium

Travel time reliability is a key metric for operational and demand management strategies, yet it remains an elusive metric for estimation and quantification. In order to represent travel time reliability, regional TDM partners will work in partnership with regional traffic management centers to determine the travel time index as a means of assessing the collective effectiveness of the strategies at reducing congestion between corridors and/or subareas. The travel time index is the ratio of the average peak period travel time as compared to a free-flow travel time. The free-flow travel time for each road section is the 15th percentile travel time during traditional off-peak times (i.e., weekdays between 9 am and 4 pm, between 7 pm and 10 pm; and weekends between 6 am and 10 pm). For example, a value of 1.20 means that average peak period travel times are 20% longer than free flow travel times. Coupled with a calculation of variability, this provides an approximation of reliability. The identified measures of effectiveness for travel time reliability are:

- Variability of trip travel time by mode
- Change in travel time index (total travel time compared to a free-flow travel time) of travelers by mode

Cost of Transportation

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
Low	High	High	High	Low	Low

The use of transportation systems inherently involves costs, borne by individual travelers, consumers of goods that are transported to market, and the society at large. Individual costs are reflected in multiple forms, including the price and acquisition of fuel, vehicles, maintenance, and value of time lost to congestion. Consumer costs reflect the passed along value of individual costs in the final cost of goods and services. Consumer costs are identified here, but are technically an externality, and as such are not reported as a discrete TDM metric. Societal costs largely reflect the additive cost of crashes, vehicular enforcement, emissions, and land development patterns. Altogether, these metrics are summarized by overall reduction in economic productivity as a result of transportation leakage.

- Individual aggregate costs per capita
- Change in travel time index (total travel time compared to a free-flow travel time) of travelers by mode

Calculation of Benefits

The performance measures above can be calculated in a consistent manner. The Metropolitan Washington Council of Governments has developed a similar process, and one which can be replicated as a part of the state of North Carolina utilizing the performance measures identified above. Their process is summarized here, and adapted to fit the North Carolina context:

1. *Estimate commuter population for study (e.g., all commuters, guaranteed ride home applicants, rideshare matching applicants, employer-TDM program employees, etc.)*
2. *Calculate placement rate – Percentage of commuters in the population base who made a travel change as a result of the TDM program*

3. *Estimate the number of new alternative mode placements – Multiply placement rate by the population base for the evaluation period*
4. *Calculate the vehicle trip reduction (VTR) factor for new placements – Average daily vehicle trips reduced per placement*
5. *Estimate vehicle trips reduced – Multiply number of placements by the VTR factor*
6. *Estimate vehicle miles traveled (VMT) reduced – Multiply number of vehicle trips reduced by average commute distance*
7. *Adjust vehicle trips and VMT for access mode – Discount vehicle trips reduced and VMT reduced to ac-count for commuters who drive alone to meet rideshare modes and transit*
8. *Estimate NOx, VOC, PM2.5, and CO2 emissions reduced – Multiply adjusted vehicle trips and VMT reduced by emissions factors consistent with the regional planning process*
9. *Estimate the energy and commuter and societal cost savings – Multiply VMT reduced by fuel efficiency and vehicle operating cost factors and by societal benefit cost factors*

This process reflects a relatively simplistic approach to performance calculation; however, it is a process that lends itself to guidance and replicability. Following NCDOT concurrence on the measures of effectiveness, a similar spreadsheet process will be developed to reflect a standardized method of calculating the performance measures from each region.

NORTH CAROLINA
Department of Transportation



Statewide Transportation Demand Management (TDM) Strategic Planning

Wilmington Regional Success Plan

FINAL DRAFT

October 2017

GS&P GRESHAM SMITH AND PARTNERS

WSP

Partnerships between the N.C. Department of Transportation and local governments, regional authorities and other state agencies have been the source of North Carolina's transit success. Currently under development, the Public Transportation Statewide Strategic Plan will build upon that success by creating the foundation for reinvigorated state and local transit partnerships.

As part of the statewide strategic planning and development process, including integration of best practices for various agencies across the state, NCDOT is supporting the state's TDM programs by bringing them into concurrence with the overall strategic focus of the Public Transportation Division (PTD). This work builds off the 2003 Statewide TDM Plan, including alignment of mission, vision and goals.

Mission Statement

To provide citizens of North Carolina opportunities and strategies for improving sustainable economic growth and quality of life through reduced transportation congestion, expanded mobility options, improved air quality and more efficient use of resources.

Vision

Effectively measure and communicate the benefits of alternatives to driving-alone in communities across North Carolina.

Goals

Achieve improved accessibility, connectivity, economic growth, public health and safety through enhanced performance of transportation demand management service provisions.

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Appendix 11

Overview

The Wilmington metropolitan planning area covers 494 square miles and had a 2013 population of 253,738. That number is projected to grow to 365,927 by 2040 with an average annual growth rate of 1.47 percent; over 0.5 percent higher than the national average. The highest levels of population increase are anticipated to occur in the Brunswick County portion of the MPO, although Pender County will see high levels of growth and the City of Wilmington itself is anticipated to experience moderate growth. Of the three counties in the region, New Hanover is the most densely populated.

As of 2010 there were 109,323 jobs in the area and additional 40,000 are anticipated by 2040; an approximate 37% increase over 30 years with an annual average growth rate of 1.2% per year. The Brunswick County and northern Hanover County portions of the MPO are anticipated to see the largest employment increases in the region. The area is home to one of North Carolina's two major ports and the region's history and economy have been largely guided by maritime industries. Furthermore, the area is a major recreational destination, although the coastal communities are expected to see lower employment growth relative to the rest of the region.

The area's transportation network has been largely influenced by its coastal terrain, with the nearby Atlantic Ocean, bays, rivers, creeks and wetlands dictating how and where infrastructure can be deployed. Only a small portion of the road network follows a grid pattern, which means that the it increasingly relies on a limited number of primary routes for moving regional traffic. When congestion occurs, there is often a lack of viable alternative travel. NC132/US117/US421 (College Road) is currently the only major continuous north-south corridor in New Hanover County, and there are only two bridges connecting Brunswick County to New Hanover County. The two counties are closely related in terms of economic and community activities so a lack of connectivity in the long run could impact the regional economy.

A survey in support of the region's long-range transportation plan indicated that over 80 percent of respondents use a private vehicle for over half of their trips and do not carpool/vanpool, use public transit, bicycle or walk for any of these trips. That same survey showed that a majority of respondents (55 percent) would prefer to bicycle more often to their work or school, while 46 percent would like to take transit more often and 44 percent would like to walk more often. This is indicative of a desire among the travelling public for more modal options to complement traditional modes.

The INRIX 2016 Traffic Scorecard ranked Wilmington 63rd out of 240 cities in the US in terms of congestion. Per the report, Wilmington residents spent about 7 percent of their drive time in congestion with 19.2 hours spent in congestion during peak periods. Wilmington did not appear on the Texas A&M Transportation Institute's 2015 Urban Mobility Scorecard.

Greater Wilmington TDM Program

There has not been a TDM program in the region since the Cape Fear Breeze program in 2006, which had limited success due in part to a lack of branding and inadequate marketing. This has hindered employer response to TDM efforts. Much of that effort was conducted in-house at the

MPO due to a lack of resources for outsourcing activities such as outreach, communications and marketing. Furthermore, there was a lack of performance data that would allow for the assessment of program success and subsequent adjustments to program operations and administration. As such, future efforts are likely to need more funding allocated for external program support and marketing.

With the recent economic downturn, funding for the Cape Fear Breeze program was suspended until January of 2015 when the WMPO board adopted a regional TDM plan. Development of the plan began in 2013 and proceeded through 2014. TDM related grants were already being received in the region starting in around 2010, which had allowed for the concept to get more from attention and generate momentum for the development of a TDM plan and reactivation of a regional program. During 2013 a TDM committee was formed that included regional employers and regular meetings commenced in 2014. The committee began compiling ideas and developing a regional TDM plan that was eventually submitted to the WMPO board for approval. Once adopted, the plan was submitted to NCDOT for funding as part of the 2016 budget.

In January of 2016 a full time TDM coordinator position was activated with the goal if implementing the regional TDM plan. An RFP was recently issued by the TDM coordinator's office for marketing activities such as branding and logo development for the regional TDM program and associated services and proposals are expected soon. Furthermore, a consultant has been retained to provide various support services. Since the formation of the TDM committee in 2013, several initiatives have been launched including the development of park and ride lots to encourage transit use and contributions toward the state Share the Ride NC ride matching program to encourage carpooling.

The 2013 TDM plan adopted by the WMPO recognizes that TDM programs will be attractive to different employers for different reasons. As such, the WMPO identified four "employer functions" to guide TDM program marketing and deployment. These functions are as follows:

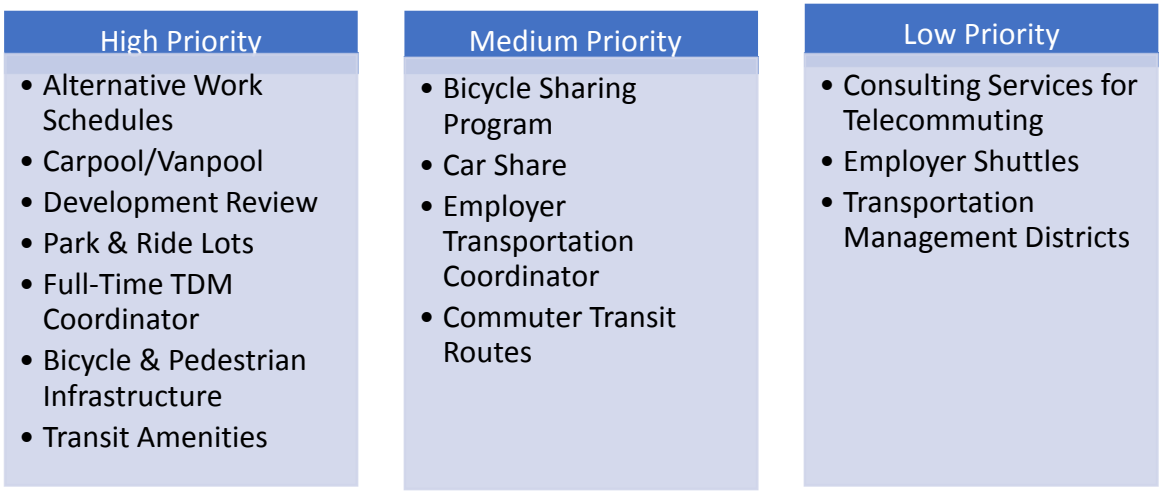
- Campus Style – These employment centers operate like a campus with large numbers of people arriving and departing and employees working variable schedules. These types of employment areas are likely to have a large number of visitors and may have visitors staying overnight. A large medical center is an example of a campus style employer function.
- Structured Schedule – These employers operates on a standard (or similar) 8:00 am – 5:00 pm schedule and can also include businesses with set, predictable shifts. A government office is an example of this type of employer function.
- Multi-Building/Campus – These employers have many locations as opposed to one central location. A school district or regional hospital system are two examples.
- Unique Schedule – These employers are those that have already implemented alternative work schedules, often in the form of telecommuting.

TDM strategies for the region are prioritized for implementation based on these employer functions and as well as four evaluation factors. For the development of TDM plan, strategies were graded on a scale of 1 to 3 for each of these four factors, which are as follows:

- Ease of implementation – to what extent does the strategy require coordination among other entities and to what extent does it require additional infrastructure;
- Cost/Benefit – how do the anticipated benefits compare to perceived costs;

- Initiative already in place – is the strategy already in place, are efforts already underway and/or has preliminary work already been completed;
- Demand/Impact – what is the anticipated demand/desire for the service among the travelling public and what is the anticipated impact

This scoring methodology resulted in the TDM strategy prioritization shown in the figure below:



Many of these strategies have yet to be deployed in the region, but their inclusion as part of an overall TDM plan and incorporation represents an initial step in wider deployment.

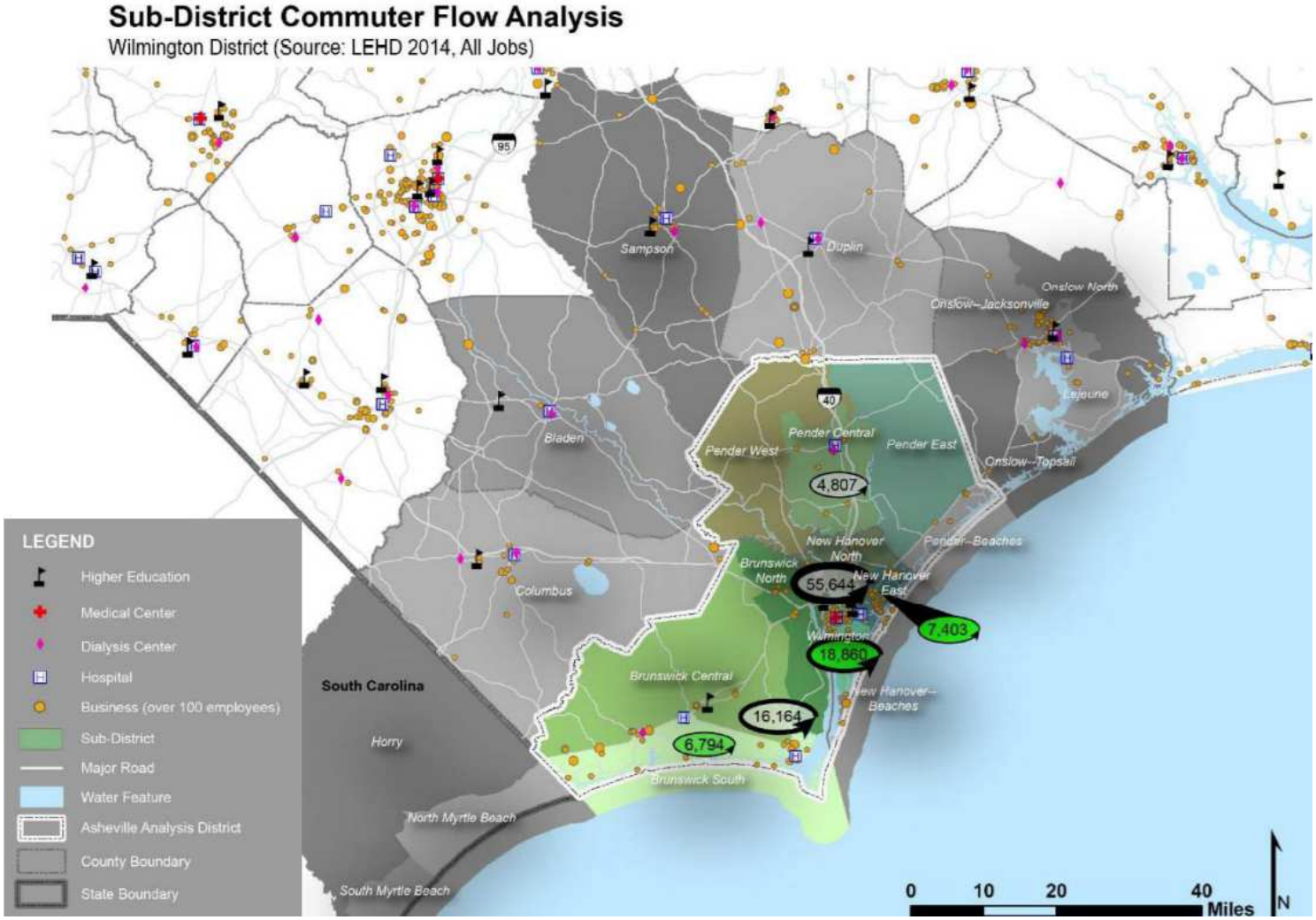
Leadership

The WMPO utilizes a Transportation Demand Management Committee, composed of representatives from major regional employers and staff from MPO member jurisdictions. The TDM Committee meets to provide guidance and recommendations on the development of the TDM program. Furthermore, beginning in 2015 the WMPO region has utilized a full time TDM Coordinator who is tasked with working with area employers to implement TDM strategies, develop marketing plans for TDM, and conducting public outreach to promote those strategies.

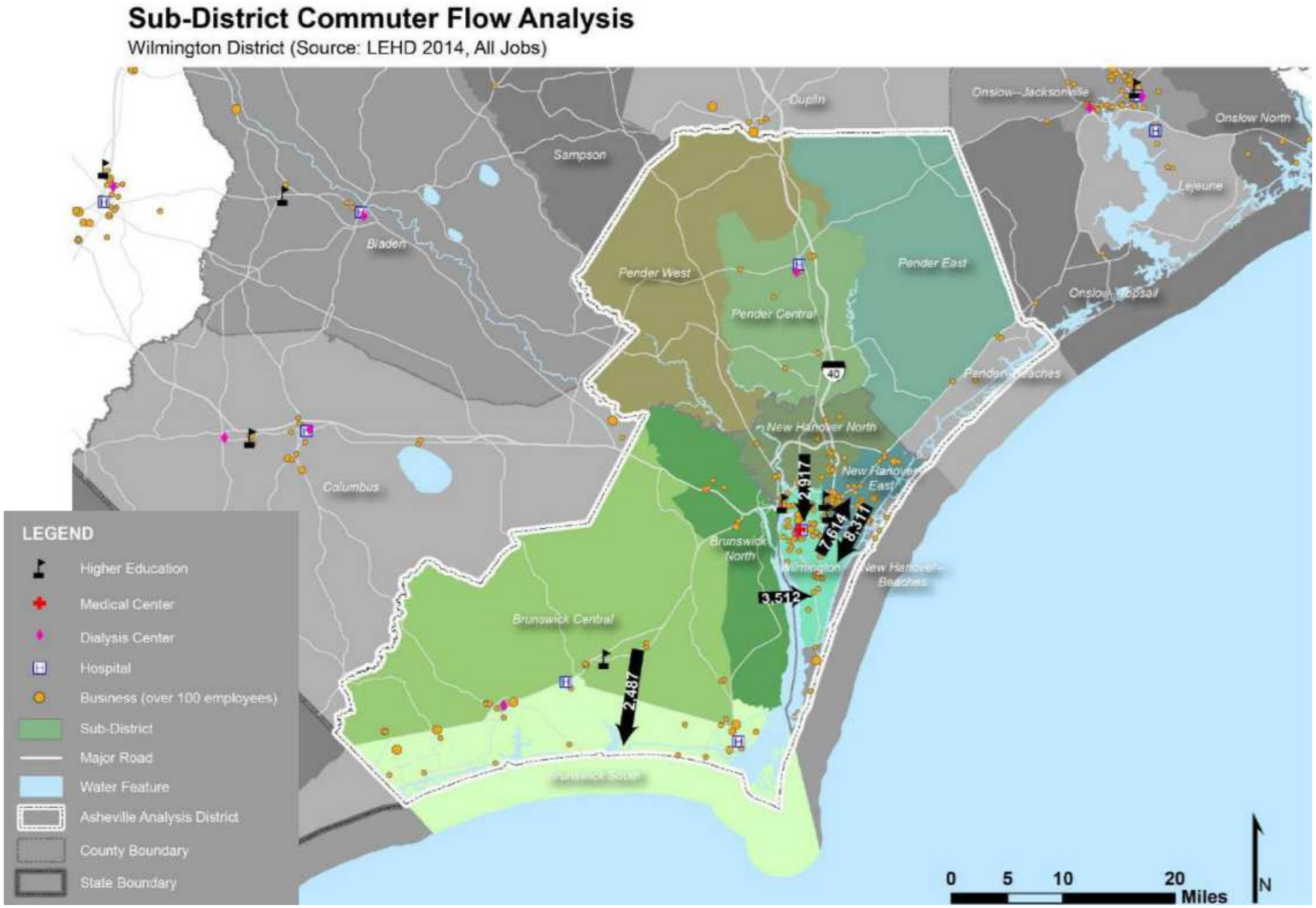
Budget / Funding

The budget for the first year of the TDM program was $100,000 which included salary, marketing materials, and funding for conferences and other peer exchange activities. The budget subsequent years is $120,000 and will likely remain at that amount for the foreseeable future. The TDM budget now includes funds for consulting and $33,000 has been reserved for marketing. This includes funds for materials for informational brochures and public service announcements. Funding for the current $120,000 budget is split between NCDOT grants and the WMPO. The WMPO portion is provided by the organization's various constituent agencies in proportion to their population. As such, the City of Wilmington contributes the largest share with additional WMPO cities and counties contributing smaller amounts. There is currently no private source of TDM funding, nor is funding provided by the University of North Carolina Wilmington (UNCW). However, the TDM coordinator is working with UNCW regarding the Share the Ride NC initiative. The WMPO currently provides funding for Share the Ride NC and the service is free for all the agencies to use. However, UNCW has expressed concerns about the privacy of students that might participate. Additional funds will therefore likely be provided by UNCW to implement the desired privacy safeguards.

The following sub-district commuter flow analysis maps have been generated for the NCDOT Public Transportation Division (PTD) Statewide Strategic 2035 Plan. The maps identify activity centers relevant to TDM service areas and through coordination of planning efforts, can support short-term and long-range recommendations to improve North Carolinians' access to opportunities.



NCDOT Public Transportation Statewide Strategic Plan: Greater Wilmington Region Significant Intra-District Flows



NCDOT Public Transportation Statewide Strategic Plan: Greater Wilmington Region Significant Flows Between Sub-Districts

Agencies

Agencies in the Wilmington region with either an active or potential role in TDM initiatives include the following:

- **Wilmington Metropolitan Planning Organization (WMPO)** - The WMPO is the federally designated MPO for the Greater Wilmington Area which includes all New Hanover County and portions of Brunswick and Pender Counties.
- **Cape Fear Public Transportation Authority (Wave Transit) –** Wave Transit is the primary public transportation service provide for the region and manages the regional vanpool system.

SWOT Analysis

Individual in-person interviews were conducted with TDM Service Providers across the state between April 24 – May 9, 2017. Additional interviews were held with associated stakeholders not currently receiving TDM funds from NCDOT PTD. The Wilmington TDM Coordinator was interviewed on April 28, 2017.

During the interviews, participants were asked to summarize their program activities by identifying currently implemented TDM Strategies within a standard matrix. This process serves as the baseline for consistently measuring program work and has informed the analysis of strengths, weaknesses, opportunities and threats / challenges cited below.

In addition to the TDM Strategies Matrix exercise, service providers were asked to provide potential Enhanced Performance Metrics beyond VMT reduced and associated air quality improvements to provide a more open-ended opportunity to inform the process. A summary of proposed Enhanced Performance Metrics is attached (Appendix A).

Strengths

- **Public Education and Promotion:** All TDM Service Providers receiving funds from NCDOT PTD support alternative modes through public education and promotion. This is in addition to non-funded entities providing additional marketing support. The Wilmington Regional program is developing a strong local brand in Wave Transit that coordinates efforts to leverage messaging.
- **Transit / Vanpool Services:** Nearly all TDM Service Providers and supporting stakeholders offer Transit / Vanpool Services, some of which are customized. The Wilmington area identified services as key elements for TDM service provisions.
- **Ability to Communicate with Multiple Stakeholders:** The Wilmington TDM Coordinator is housed at the Wilmington MPO. This offers the ability to consistently coordinate and integrate TDM strategies across a variety of transportation planning efforts and associated stakeholders.

Weaknesses

- **Expanded Program Locations / Partnerships:** The statewide program supports TDM service provisions across academic, government and non-profit sectors, offering a variety of tailored strategies and lessons-learned for several audiences. However, complete TDM program coordination has not been attained in the Wilmington region.

- **Inconsistent VMT Calculation:** Vehicles Miles Traveled (VMT) has historically been the primary performance metric for the statewide program, yet regional programs have reported annual reductions through individual calculations. These inconsistencies make it difficult to determine what strategies are successful, hence weakening the statewide program's ability to share best-practices.
- **Inconsistent Funding:** Regional programs do not share a consistent funding structure making it difficult to relate to peers across the state. Some regions leverage local funds to enhance NCDOT PTD investment where others do not. In other cases, the availability of local matching funds is limited despite a desire to collaborate.
- **Lack of Performance Incentives:** The Wilmington TDM program lacks incentives for improving performance. If a greater reduction in VMT is reported from one fiscal year to the next, the program might be studied for justifiable reasons to increase financial support. A coordinated plan for moving from baseline to achievement would support additional funding opportunities along with justification for increased local cost-share investments into the regional program.

Opportunities

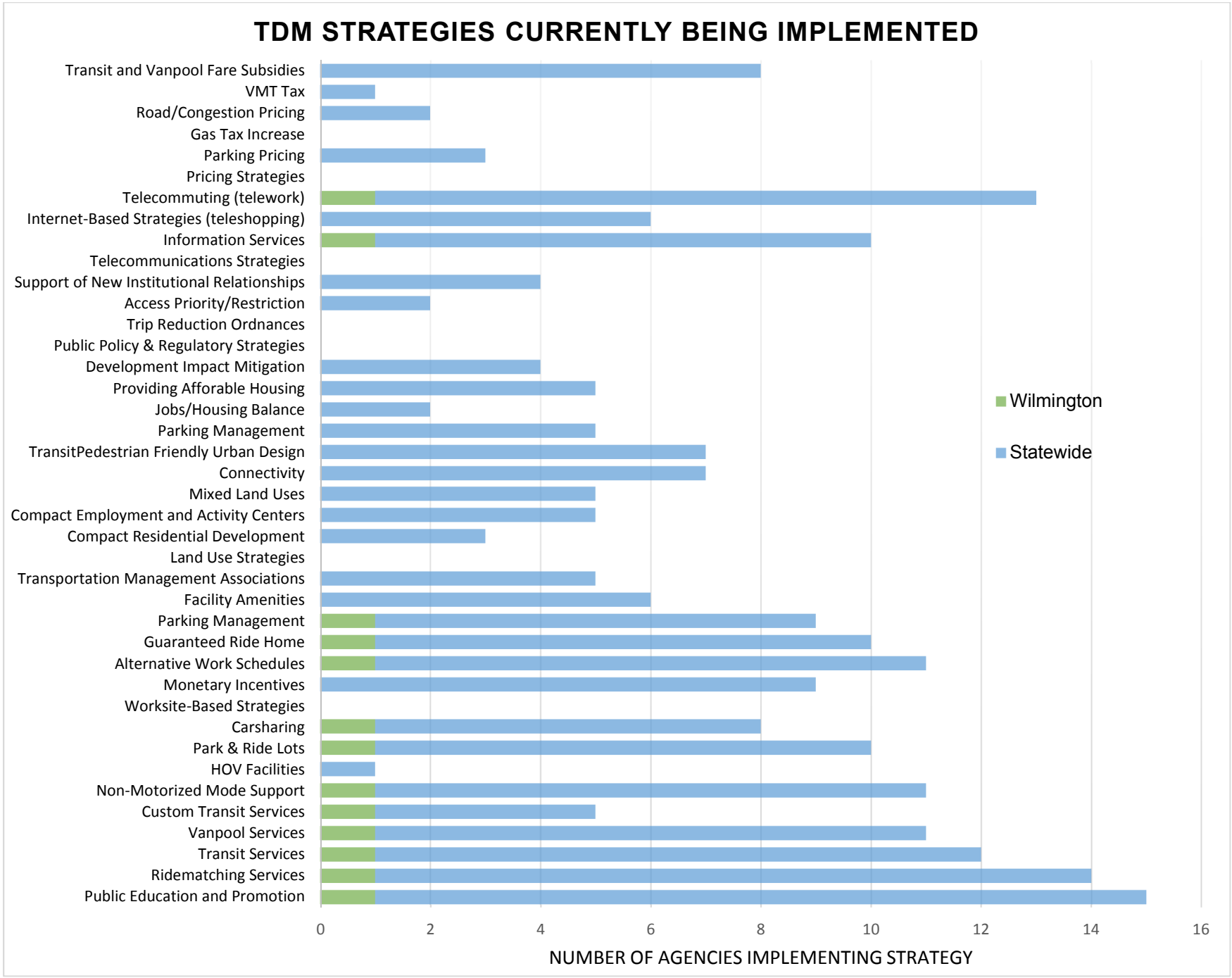
- **Statewide Collaboration:** TDM Service Providers across the state consistently noted the desire to share best-practices and lessons learned. In some instances, newer TDM staff were unaware that programs existed in other locations. In addition to opportunities for shared improvements, programs might share resources including commonly branded materials to increase efficient use of funds.
- **Support New Institutional Relationships:** Only four TDM Service Providers across the state identified this strategy as being implemented by their program. The Wilmington region did not identify the strategy. The development of new relationships offers numerous opportunities ranging from additional funding for program activities to shared communication and marketing efforts. Creating a performance measurement for the creation of new partnership would enhance the achievement of TDM efforts in the Wilmington region.
- **Technology-Based Solutions:** Advanced technologies including communication modes offer ever-improving opportunities for public education and promotion of alternative modes. Shared pilots and statewide deployment of appropriate technologies might provide chances to leverage exiting openings for enhanced programs.
- **Shared Resources / Branding:** Several TDM Service Providers cited the ability to leverage shared resources such as the "Go" Brand which has been successfully replicated by communities such as "GoMountain", "GoTriangle", "GoRaleigh", "GoCary" and others. The Wilmington TDM program might coordinate with these similar efforts more closely to explore opportunities for efficient use of resources along with more consistent messaging across the state in disseminating information.
- **Trip Reduction Ordinances:** This strategy has proven successful in the past but is no longer being implemented by any program in the state.

Threats / Challenges

- **Funding:** Identifying and capturing additional funding requires time and presents several challenges. Pursuing external investments for programs that are rooted in government

funding is difficult and often limited due to regulatory constraints. The Wilmington TDM program has seen gaps in funding in the past that have halted momentum for several strategies.

- **Stagnation:** Many local TDM programs have been in existence for nearly a decade. This can cause stagnate program branding, messaging, and general impact in local communities. Maintaining a fresh program image is both critical and challenging for any marketing-based effort. While the Wilmington TDM program has recently created relatively new efforts, maintaining relevance will be a constant challenge.
- **Limitations of Policy Development:** It is challenging for TDM Service Providers to develop and promote policies within their communities. Increased communication and support from community leaders and decision-makers is difficult for programs to prioritize while implementing services.
- **Coordination with Land Use Strategies**: Roughly half of TDM Service Providers across the state are implementing strategies related to land use and development. The Wilmington TDM coordinator did not indicate current coordination of TDM service provisions within the areas of compact employment and activity centers, connectivity, parking management and affordable housing land use strategies.


TDM STRATEGIES CURRENTLY BEING IMPLEMENTED
Transit and Vanpool Fare Subsidies
VMT Tax
Road/Congestion Pricing
Gas Tax Increase
Parking Pricing
Pricing Strategies
Telecommuting (telework)
Internet-Based Strategies (teleshopping)
Information Services
Telecommunications Strategies
Support of New Institutional Relationships
Access Priority/Restriction
Trip Reduction Ordnances
Public Policy & Regulatory Strategies
Development Impact Mitigation
Providing Afforable Housing
Jobs/Housing Balance
Parking Management
TransitPedestrian Friendly Urban Design
Connectivity
Mixed Land Uses
Compact Employment and Activity Centers
Compact Residential Development
Land Use Strategies
Transportation Management Associations
Facility Amenities
Parking Management
Guaranteed Ride Home
Alternative Work Schedules
Monetary Incentives
Worksite-Based Strategies
Carsharing
Park & Ride Lots
HOV Facilities
Non-Motorized Mode Support
Custom Transit Services
Vanpool Services
Transit Services
Ridematching Services
Public Education and Promotion
Wilmington
Statewide
0
2
4
6
8
10
12
14
16
NUMBER OF AGENCIES IMPLEMENTING STRATEGY

Technical Memorandum on Performance Measurements

Current TDM program reporting is fairly limited and done pursuant to grant requirements (not planning activities) and includes items like the number of press releases issued, number of meetings attended, event logs, and number of sign-ups for events. Opportunities to extend traditional measures as identified in the Task 4.1 report should be incorporated throughout the regional TDM program (Appendix A).

Enhanced Value Performance Measures

Whereas the collection and identification of traditional TDM performance measures are limited, the Wilmington region engages in extensive data collection for the purposes of evaluating system performance along specific corridors and roadway segments as part of its Congestion Management Process, which conforms with many of the Enhanced Value Performance Metrics from the Task 4.1 report. The agency's Biennial Data Report illustrates how the regional network is performing according to various performance measures established in the CMP. The effectiveness of TDM strategies are therefore evaluated based on these performance metrics and on a roadway specific basis. Measures used in the CMP evaluation are shown in the table below:

Criteria	Performance Measure	Source
Travel Time	Average Travel Time AM/PM	Collected by WMPO and City of Wilmington traffic engineering staff over the course of two years through a traffic monitoring method called floating car studies. This method uses GPS devices to collect data on speed and travel time.
	Average Delay AM/PM	
	Hotspot identification	
Safety	Rear End Collisions	Collected by the NCDOT Traffic Safety Unit through the TEAAS Program which aggregates and geo-locates traffic incidents from law enforcement officials throughout the state of North Carolina.
	Bicycle Crashes	
	Pedestrian Crashes	
Volume	Average Vehicle Count	Collected by the WMPO staff through pneumatic tube counters at various locations along CMP segments.
	Truck Percentage	Collected along CMP freight corridors by the WMPO staff with Hi-Star portable traffic analyzers by utilizing vehicle magnetic imaging technology.
	Bicycle Counts	Collected along CMP commercial and destination corridors by the WMPO through manual counts and review of VHS recordings of select intersections
	Pedestrian Counts	
Transit	Transit Boarding	Fixed route passenger totals per FY are provided by Cape Fear Public Transportation Authority

Recommendations

The Wilmington Regional TDM Program has multiple strengths and opportunities to move from baseline to achievement. Reviewing current baseline levels of reporting and developing enhanced performance metrics can demonstrate added value, improving communication of program mission, vision and goals. Improved communication of program impacts will reinforce support from local leadership while offering a mutual understanding of TDM service provisions.

A process for the development of a 3-Year Regional TDM Plan will be informed by the Statewide TDM Plan Update and support the ability to improve current performance while creating a phased approach to Plan Review, Project Entitlement and TDM Plan Monitoring and Reporting. This will also enhance efficiencies, reducing administrative burdens while offering opportunities to align with additional funding cycles.

Additionally, the Statewide TDM Plan Update will support opportunities for NCDOT to provide various forms of technical assistance. Coordinated aid at the statewide level will allow for the sharing of best-practices and lessons-learned across regional programs. Approaching a 3-Year Regional TDM Planning Process while integrating Enhanced Performance Metrics will support the development of localized specialties with consistent metrics for documenting results.

In Wilmington, where there is a particular need to link TDM strategies with afterschool activities. The TDM coordinator indicated that a “K to 12 Toolkit for TDM” might be a valuable resource that could be developed and provided by NCDOT. Aligning the creation of Enhanced Performance Metrics for afterschool activities over a 3-year horizon goal can offer a comprehensive approach to developing strategies most important to the region.

Reviewing current and needed strategies with the development of performance measurements should be coordinated with the Statewide TDM Plan Update to align local, regional and state funding priorities for the Wilmington Regional TDM Program. These opportunities will provide a structure for defining current and newly defined baselines to demonstrate growth towards achievement, establishing an enhanced program model that can build on comprehensive improvements to better encourage innovation.

Appendix A
Task 4.1 – Enhanced Performance Metrics

MEMO

TO: NCDOT Public Transportation Division

FROM: Gresham, Smith & Partners; WSP USA

SUBJECT: Task 4.1: Enhanced Performance Measures Technical Memorandum

DATE: August 17, 2017

Performance Measurement of TDM Strategies

The development of TDM strategies emerged out of a recognized need for better surface transportation system performance while reducing the negative externalities associated with unimpeded travel growth. Presently, most metropolitan areas in the United States implement TDM as a mobility service, with limited expectations regarding the performance of the strategies deployed. The usefulness of static marketing and modal promotion over time as conditions change is rarely called into question, let alone respond to variations in demand or economic changes influencing travel demand. Typically, years go by before plans and strategies are changed to suit the current market. Even as more and more jurisdictions embrace TDM strategies as a complement to infrastructure oriented projects, metrics for evaluating the performance of TDM has lagged.

One study of performance measures for TDM identified current and best practices.[1] There are dozens of TDM performance measures in use by various agencies. Some of these measures are standard ones developed by TDM practitioners or researchers and promoted over time. Other measures are local in nature, responding to specific goals and objectives embedded within transportation plans, or are custom-tailored by agencies for specific purposes. This section will discuss some of the key measures in detail, along with relevant illustrations.

The review of TDM performance measures by Thompson and Suter indicate a four-stage approach to evaluating performance:

1. **Inputs** involve quantifiable activities often conducted by TDM practitioners.
2. **Outputs** measure the direct results of activities that serve as inputs.
3. **Outcomes** involve a calculation of benefits as yielded from inputs and outputs.
4. **Effectiveness** measures take outcomes, and normalize them by cost, yielding a benefit cost relationship.

Altogether, this four-stage approach involves escalating levels of difficulty in calculating the performance of TDM measures over time. These are summarized in turn.

[1] Thompson, R. and Suter, S. *Development of Standard Performance Measures for Transportation Demand Management Programs*, Transportation Research Record 2319, Transportation Research Board, Washington, DC. 2012.

Input Measures

input measures are primarily confined to the actual activities that are often conducted by TDM practitioners. In the context of outreach and marketing, which is the primary level of activity currently applied in the Charlotte area, measures may involve the recording of the absolute number of meetings with employers, events attended, new employers organizations engaged in the program, literature distributed, advertisements and/or radio marketing placed, or Internet-based ad placement.

In terms of best and/or innovative TDM practices as it pertains to input measures, agencies around the United States may identify the same metrics, but the reporting of the absolute number is irrelevant. Instead, outreach and marketing input measures become normalization factors for outputs. As such, the input number becomes the denominator and calculation functions. For example, the number of carpools that are formed at any one ***particular*** event is irrelevant. However, the same number of carpools for formed ***per event*** attended is very much relevant towards effective calculations. Ultimately, these performance measures are described and summarized as placement rates, conversion rates, and cost-effectiveness of marketing and outreach activities.

Output Measures

The common use of output measures in TDM performance assessment involves the measurement of modal use as well as client satisfaction. Common measures of effectiveness currently in use include the number of participants by mode (for example, transit riders, car pullers, vamp rulers, teleworkers, etc.), the number of emergency ride home participants, the utilization of park-and-ride locations, and the conversion rate of new participants in TDM activities. For client satisfaction, these measures may include the number of commuters who recall marketing efforts, satisfaction with the services received, or the number of surveys distributed and/or returned to the TDM agency.

Best practices for TDM measurement, including those endorsed by the referenced article, emphasize the level of participation, and not the absolute number. These measures would include the percentage of employees using alternatives to work separated by mode, the frequency and duration of alternative mobile use, and the percent of the population that oscillate between modes. Furthermore, client satisfaction measures may be linked with marketing and outreach measures to determine an overall effectiveness of TDM program activities. These measures may include placement rates for campaigns and customer interaction, or, the cost per recipient of TDM services.

Outcome Measures

Whereas inputs and outputs pertain to the overall TDM program activities and utilization of alternatives, outcome measures evaluate the benefit upon the overall transportation system. In North Carolina, a common measurement has been the calculation of vehicle miles traveled (VMT) reduction that is a direct outcome from TDM services. This VMT reduction calculation may either be as an absolute number, or as a percentage of overall VMT. Additional outcome related measures utilized by other practitioners around the United States may include: single occupant vehicle trips reduced, percentage of trips taken by mode, absolute number of greenhouse gas emissions or ozone emissions reduced, overall costs to commuters, or improved travel time reliability.

Best practices for TDM activities involve the correlation of TDM investments to overall transportation system metrics. These innovative practices involve the separation of TDM effectiveness by outputs. For example, the TDM agency would establish outcome goals prior to the activity engagement, and then evaluate the effectiveness of meeting those outcome goals from the activity itself. Examples of these types of measures may include: VMT reduction comparisons by geography, sub area, or corridor, VMT reduced by mode, and the reduction in travel time delay for participants by mode.

Effectiveness

Overall, effectiveness measures involve the calculation of cost per input, output, and per outcome for every other performance metric. As such, this category measures efficiency of all efforts and demonstrates the value of TDM services over time. Examples of effectiveness measures include: cost per trip provided, cost per ton of emissions reduced, cost per advertisement viewed, cost per placement, and cost per day of service. Cost-effectiveness measures are essential for identifying the relative value of TDM as compared to other transportation related improvements. From a true calculation of benefits to cost, the appropriate role of TDM services can be aligned with the overall infrastructure investment plans. However, given the difficulty of making these types of calculations, most TDM practitioners do not yield cost-effectiveness performance measurement.

Reframing Metrics for Performance Enhancement

Leveraging the best practices identified above, the TDM Strategic Plan provides a cost-benefit analysis (effectiveness) driven approach for measuring traditional and enhanced indicators of success in order to more accurately assess the distribution of funds to improve efficiencies and enhance existing efforts. Measures of effectiveness are oriented towards providing clarity and uniformity across the statewide plan. To accomplish this, each measure requires sufficient definition so as to provide a high degree of certainty that the measure is accurate as calculated.

The TDM Strategic Plan has outlined the Enhanced Performance Metrics through a comparison between “Traditional” and “Enhanced” measures.

Traditional TDM Measures emphasize objectives that have been core to the North Carolina TDM Program for the past two decades - primarily, improving air quality and reducing congestion. Key measures of effectiveness for air quality included air emission levels from carbon dioxide (CO2), nitrogen oxides (NOx), and volatile organic compounds (VOC). Congestion reduction, however, was more limited in assessment to reducing the growth in vehicle miles traveled (VMT).

By comparison, **Enhanced TDM Measures** encourage innovation in not only the assessment and measurement of effectiveness, but also the very definition of societal benefits from TDM endeavors. These benefits extend to improving the larger economy, providing resiliency to disruptions in mobility, enabling access to employment and other components of life, and improving the overall quality of life itself. Inherently, these measures require succinct definition and collaboration across sectors for delivery and evaluation.

Initial Performance Measures

Initial performance measures were derived from the evaluation of best practices for TDM strategies. In turn, these performance measures can be detailed into measures of effectiveness. The selection of performance measures acted to:

- Guide overall mobility decisions by giving direction to fully utilize all highway and modal investments towards traditional and enhanced performance.
- Define the most cost-effective techniques and strategies to optimize system performance through demand management.
- Develop a future TDM investment strategy that optimizes the investments already made in the region using multimodal system and demand management strategies.
- Identify TDM strategies to improve system performance and preserve mobility.
- Utilize the most cost effective techniques to optimize system performance.

Inputs

For input measures, the reviewed research guidance indicated that the absolute numbers collected for various outreach and marketing activities should be utilized as normalization factors. Consequently, it will be important for TDM practitioners throughout the state to collect the necessary levels of data inputs in order to create those factors. The data points that will be collected will be dependent upon each of the contributing TDM strategic plans for service providers. Examples of data points include:

- number of active participating employers and commuters
- events conducted
- employers and commuters engaged for the first time
- years of engagement
- extent of marketing distribution
- market penetration with new marketing activities
- number of new incentives provided
- value of incentives and transit passes
- utilization rates

Outputs

Output measures conducted will include similar measures of effectiveness as currently collected. These may include a variety of factors that pertain directly to the utilization of different alternative modes as well as the utilization of TDM services. Inevitably, data collected will be done at either the employment worksite or through regional survey data collection. As such, it is important that surveys and other materials collect sufficient levels of data points in order to reflect utilization and satisfaction factors. The number of participants by mode, participation in other TDM activities (emergency ride home, incentive program, flexible working arrangement

assistance, etc.), utilization, and other components will be normalized by the input factors collected above. This will allow for the calculation of placement rates, utilization rates, cost per marketing distribution, and percentage of employee population utilizing TDM services.

Outcomes

Outcome factors reflect the newest and most important component of TDM performance metrics, and cross into both traditional and enhanced TDM performance measures. The following measures include a rating of "high, medium, or low" connection between the following performance values:

- Congestion Reduction
- Air Quality Management
- Economic Vitality
- Personal Income
- Resiliency
- Quality of Life

Current factors used by North Carolina TDM partners will continue to be important considerations for evaluating TDM performance, and are incorporated below. Furthermore, local communities may have measures which are important for the local context, and those should continue, too. However, additional factors are suggested for which demand management services can also interrelate with infrastructure and technology services include:

Person Throughput

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
High	High	High	Medium	Medium	Low

Person throughput is an important measure of mobility and congestion reduction, but it also cascades into other performance values. Put simply, the more people the transportation can carry, the more effective the system towards improving personal and societal economy. Person throughput refers to the number of persons utilizing transit and within private vehicles. Although metrics for improving personal health and quality of life are more positively associated with non-vehicular strategies, and hence the lone "low" measure, person throughput may have some residual benefit through accessibility and mobility that still make it a value measure of effectiveness for quality of life. Increases in the number of persons using a corridor's or area's infrastructure would imply that the operations and management strategies evaluated were effective in serving more persons who are not previously serviced as a result of the TDM strategy. The identified measures of effectiveness for person throughput are:

- Person Miles Traveled (PMT) by mode
- Vehicle Miles Traveled (VMT) by mode

The identified mechanism for assessing person throughput performance will be the calculated outcomes from spot measurement, origin/destination studies, and the respective regional travel demand model for PMT and VMT within each region. Whereas collection of new data is not anticipated, opportunities to categorize and archive applicable data from corridor, subarea, or municipal studies should be explored and conducted by each regional partner.

Transit Mode Split

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
Medium	High	High	High	High	Medium

A desired outcome of statewide TDM strategies is to increase the use of transit relative to the private auto, leading to a mode shift to transit. Mode shift may result from potential users being attracted to transit, or from increased transit use among occasional users. Thus, the central transit evaluation issue is the identification and measurement of mode shift. A mode shift to transit should then facilitate higher transit ridership, reduced levels of traffic congestion, more efficient use of existing road capacity, net reduction in greenhouse gas emissions and fuel consumption. and potentially higher levels of person throughput. The identified measures of effectiveness for transit mode shift are:

- Change in key corridor mode share
- Change in regional mode share

Peak Period Vehicle Traffic Volumes

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
High	Medium	Medium	Low	Low	Low

As it pertains to facility performance measure, total vehicular demand for regional highway capacity can be an effective measure for TDM services. Recognizing the state's highway system provides abundant capacity and only suffers a shortage in the peak periods, this measure identifies the success of alternatives in shifting demand from the peak period and/or shifting to alternative modes of travel. The identified measures of effectiveness for peak period vehicle traffic volumes are:

- Change from baseline in peak hour volumes
- Vehicle trips reduced
- Change in peak period VMT

Travel Time Reliability

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
Medium	High	High	High	High	Medium

Travel time reliability is a key metric for operational and demand management strategies, yet it remains an elusive metric for estimation and quantification. In order to represent travel time reliability, regional TDM partners will work in partnership with regional traffic management centers to determine the travel time index as a means of assessing the collective effectiveness of the strategies at reducing congestion between corridors and/or subareas. The travel time index is the ratio of the average peak period travel time as compared to a free-flow travel time. The free-flow travel time for each road section is the 15th percentile travel time during traditional off-peak times (i.e., weekdays between 9 am and 4 pm, between 7 pm and 10 pm; and weekends between 6 am and 10 pm). For example, a value of 1.20 means that average peak period travel times are 20% longer than free flow travel times. Coupled with a calculation of variability, this provides an approximation of reliability. The identified measures of effectiveness for travel time reliability are:

- Variability of trip travel time by mode
- Change in travel time index (total travel time compared to a free-flow travel time) of travelers by mode

Cost of Transportation

Congestion Reduction	Air Quality Management	Economic Vitality	Personal Income	Resiliency	Quality of Life
Low	High	High	High	Low	Low

The use of transportation systems inherently involves costs, borne by individual travelers, consumers of goods that are transported to market, and the society at large. Individual costs are reflected in multiple forms, including the price and acquisition of fuel, vehicles, maintenance, and value of time lost to congestion. Consumer costs reflect the passed along value of individual costs in the final cost of goods and services. Consumer costs are identified here, but are technically an externality, and as such are not reported as a discrete TDM metric. Societal costs largely reflect the additive cost of crashes, vehicular enforcement, emissions, and land development patterns. Altogether, these metrics are summarized by overall reduction in economic productivity as a result of transportation leakage.

- Individual aggregate costs per capita
- Change in travel time index (total travel time compared to a free-flow travel time) of travelers by mode

Calculation of Benefits

The performance measures above can be calculated in a consistent manner. The Metropolitan Washington Council of Governments has developed a similar process, and one which can be replicated as a part of the state of North Carolina utilizing the performance measures identified above. Their process is summarized here, and adapted to fit the North Carolina context:

1. *Estimate commuter population for study (e.g., all commuters, guaranteed ride home applicants, rideshare matching applicants, employer-TDM program employees, etc.)*
2. *Calculate placement rate – Percentage of commuters in the population base who made a travel change as a result of the TDM program*

3. *Estimate the number of new alternative mode placements – Multiply placement rate by the population base for the evaluation period*
4. *Calculate the vehicle trip reduction (VTR) factor for new placements – Average daily vehicle trips reduced per placement*
5. *Estimate vehicle trips reduced – Multiply number of placements by the VTR factor*
6. *Estimate vehicle miles traveled (VMT) reduced – Multiply number of vehicle trips reduced by average commute distance*
7. *Adjust vehicle trips and VMT for access mode – Discount vehicle trips reduced and VMT reduced to ac-count for commuters who drive alone to meet rideshare modes and transit*
8. *Estimate NOx, VOC, PM2.5, and CO2 emissions reduced – Multiply adjusted vehicle trips and VMT reduced by emissions factors consistent with the regional planning process*
9. *Estimate the energy and commuter and societal cost savings – Multiply VMT reduced by fuel efficiency and vehicle operating cost factors and by societal benefit cost factors*

This process reflects a relatively simplistic approach to performance calculation; however, it is a process that lends itself to guidance and replicability. Following NCDOT concurrence on the measures of effectiveness, a similar spreadsheet process will be developed to reflect a standardized method of calculating the performance measures from each region.

APPENDIX C. PEER PANEL REVIEW

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

AGENDA

STATEWIDE TRANSPORTATION DEMAND MANAGEMENT STRATEGIC PLAN

PEER REVIEW PANEL

Skype Meeting /
1 (704) 944-7990, access code: 558916

Wednesday, January 10, 2018
11:00 AM – 12:30 PM

1) **Welcome & Introductions** (5 minutes)

2) **History of TDM in North Carolina** (10 minutes)

3) **Review NCDOT Statewide TDM Plan Update** (45 minutes)
   - Context / Planning Process
   - Current State of Programs*
     - Asheville
     - Charlotte
     - Piedmont-Triad
     - Triangle
     - Wilmington
   - Statewide SWOT
   - Defining Success
   - Defining Innovation

4) **Performance Metrics** (20 minutes)

5) **Closing Remarks** (10 minutes)

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Location:
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*Please consider Objectives "Check-List" for consistently evaluating Current State

	Metric	Weight
1	**Provide for a Well-Funded, Collaborative TDM Program**	**20%**
	1.a Collaborate on Regional TDM Services	
	1.b Review and Refine TDM Services through Annual Strategic Plan	
	1.c Integrate TDM Strategies into Regional Transportation Plans	
2	**Develop Services that Reduce SOV Commuting in North Carolina**	**40%**
	2.a Deploy Desirable TDM Strategies for SOV reduction	
	2.b Identify, Fund, Implement, and Operate Cost-Effective TDM Services	
	2.c Develop a Database of Activities (inputs & outputs)	
3	**Leverage Technology to Enable 21st Century Transportation Services**	**15%**
	3.a Conduct Exploratory Use of Innovative TDM Strategies	
	3.b Explore Multimodal Operations Integration	
	3.c Coordinate Services with Technology Providers	
4	**Enhance Effectiveness of TDM Service Delivery**	**25%**
	4.a Develop and Implement Performance Monitoring Plan	
	4.b Implement Quarterly Reporting System	
	4.c Deploy Training for Performance Calculations	
	4.d Develop Enhanced Performance Program	

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

MEETING NOTES

STATEWIDE TRANSPORTATION DEMAND MANAGEMENT STRATEGIC PLAN

PEER REVIEW PANEL

Wednesday, January 10, 2018
11:00 AM – 12:30 PM

Attendees

Last Name	First Name	Organization
Clayton	Mary	Gresham, Smith & Partners
Collins	Debbie	NCDOT-PTD
Flaherty	Sean	Gresham, Smith & Partners
Gilford	David	Intersection
Ramfos	Nicholas	Metropolitan Washington Council of Governments
Toor	Will	Southwest Energy Efficiency Project
Wimmer	Jason	NCDOT-PTD

1) Welcome & Introductions

- Mary Clayton welcomed the team and thanked members of the Peer Panel for their attendance. Participants introduced themselves.

2) History and Context of TDM in North Carolina

- Mary provided a summary of the Statewide TDM Plan Update process and purpose, pointing back to kicking off the effort with members of the Peer Panel in February 2017.
- Debbie Collins thanked Mary and members of the panel. Noted that NCDOT is trying to move towards performance monitoring.
  - Expectations haven't been as high as they should.
  - Moving forward, Success Plans have been and are being created for all efforts that request programs articulate what they're going to do and how performance will be measured.
- Debbie noted congestion being a major issue facing North Carolina.
  - 3 million + population increase expected by 2035.
  - NC is currently the 9th most populous state in the county.
  - The value of TDM is heightened by this but a sense of urgency is not being felt by TDM programs in the state.

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- As an example, we are already seeing people change jobs in the Raleigh area due to commute congestion. This causes issues for accessibility to the workforce for employers.
- Funding in boundaries in NC is a problem. Example: Currently working with Enterprise to create vanpool services for rural areas.

- Mary noted that when we started this planning effort, a strong emphasis was made on the difference between the 2003 Statewide TDM Plan and what is needed now. We did not see much change occurring despite growth in the state, congestion, etc.

3) Review NCDOT Statewide TDM Plan Update

a) Planning Process
- Sean Flaherty thanked Debbie and Mary for providing context and members of the Peer Panel for their continued support of the planning effort.
- Sean summarized the planning process, starting with the Kick-Off Meeting in February 2017 where members of the Peer Panel were first introduced to NC's TDM Program and met with services providers from across the state to present their best practices/lessons learned.
  - A vision for enhancing performance and encouraging innovation was presented at the close of the kick-off meeting. This vision asked service providers to begin considering what additional benefits come from their programs beyond VMT reduction and how those benefits could be measured.
  - As a next step, the consultant team held in-person interviews with each individual TDM program across the state. Results were captured to inform a SWOT analysis for each program. TDM coordinators were asked to complete a TDM Strategies Scan (Survey) and provide feedback as to what Enhanced Performance Metrics and Strategies might be applied to their service areas.
  - Regional Success Plans were created and reviewed with each program and Jason Wimmer (NCDOT) via conference calls. The plans were refined based on feedback and served as guidance for the programs in seeking FY2019 funding to better align their workplans with the Statewide TDM Plan Update.
  - The Final Draft of the Statewide TDM Plan Update was authored utilizing information gathered from the planning process.

b) Current State of Programs
- Sean noted that gathering neutral third-party expert review from members of the Peer Panel was a primary focus of the call.
- Sean provided a summary of context and characteristics for each regional program and requested feedback for each:
  - <u>Asheville</u> –
    - Jason Wimmer stated that Asheville may have the greatest opportunities for moving towards a fully successful program.
    - Mary noted the regional aspect of service delivery and how rural the greater community becomes once outside the urban core. In this context, how can we develop multi-modal opportunities?

- Will Toor referenced mountain resort communities surrounding Denver, CO. There are active TDM programs driven by difficulties in their employees commuting to and from the resort towns where affordable housing is an issue.
    - Transit-based programs were created for this target audience through collaboration between cities and towns. This includes free bus services for employees of resorts.
- David Gilford noted the role of technology in serving similar audiences. Messaging and information helps people efficiently utilize alternative modes – it's not so much about the mode shift.
    - How we use data is important. The Asheville TDM program could work with the City to establish partnerships with technology companies and make connections for efficiencies. Examples seen elsewhere include partnerships with Uber/Lyft.
    - Technologies / data from partnership can help optimize routes and target areas most needing TDM services.
- Nicholas Ramfos said that the TDM coordinator being housed at the local MPO / Regional Council is a good sign.
    - The program should take a closer look at the communities around the MPO and discuss how to create a regionally coordinated program.
    - Getting the MPO / Regional Council Board(s) involved will enhance the program. Ask "How does TDM effect regional transportation planning?"

- <u>Charlotte</u> –
    - Nicholas stated that it seems there are "lots of cooks in the kitchen" and that someone needs to take the lead here, perhaps NCDOT?
    - Jason referenced work with the consultants outside of the TDM Plan Update effort that encouraged CATS to serve as the lead regional coordinating agency and include that task in their workplan with meaningful performance metrics.
    - Will asked where the City of Charlotte is in this effort.
    - Mary noted several conversations held with municipal leadership but that they do not understand what TDM is and what we're trying to do.
    - Sean added on saying that the City of Charlotte / CATS seems preoccupied with planning, designing and building infrastructure such as commuter rail. TDM continues to take a backseat and is not part of these discussions.
    - Will referenced similarities with the Denver area and called it a mistake to have focused solely on building infrastructure without considering demand. It should not be something that is just marketing on the side.
    - Nicholas said there are 30-35 organizations involved in the Metropolitan Washington Regional TDM Program.
        - If CATS is the lead then they must coordinate with all relevant organizations and create a plan.

        - David referenced the large millennial population in Charlotte and the challenges around the standardization and coordination of technologies.
            - Who will be positioned well to create standards on how technologies will "play well" with each other?
            - New York City provides guidance for how technologies will be coordinated most efficiently with existing services. The City of Charlotte could do the same.
            - Reaching millennials through technology is more challenging than one would think. You must "meet people where they are" and communicate through smartphone apps that are already being used.
    - Piedmont-Triad –
        - Sean noted the large and diverse geographic region currently served by one TDM program seen in PART, a regional entity. The rural-urban divide created challenges in how audiences are reached.
        - Jason agreed and noted that coordinating with local governments is a consistent theme. TDM programs need help from NCDOT in coordinating with local jurisdictions around this topic.
        - Will noted there are 4 MPOs in the region and agreed that a single TDM service provider would need help coordinating across so many jurisdictions.
        - Mary referenced the closing of Business I-40 and how PART is struggling to employ TDM strategies to mitigate.
    - Triangle –
        - Sean summarized the region citing it housing the highest number of TDM service providers out of any in the state, administered by the Triangle Council of Governments and coordinated by GoTriangle / Triangle Transit as the regional TDM service provider. He noted many local programs having been in existence for over a decade.
        - Mary referenced irony in that the Triangle region was a national and state model for innovative TDM programs in the past, generating first-of-their-kind successful programs such as SmartCommute@RTP / SmartCommute Challenge and the City of Durham TDM Ordinance.
        - Nicholas stated that programs should be constantly looking at effectiveness of messaging.
            - If we see something isn't working right we talk to people to see what needs to be changed, or even eliminated.
            - We administer annual communication audits. As an example, our program is currently going through our entire website to learn where people are visiting and how it resonates.
        - Will noted the importance of reevaluating the underlying program and services you are communicating about. Are they the appropriate services? These change over time.

- Wilmington –
  - Jason described how the program is devoting a majority of resources to branding and marketing.
  - Mary confirmed that this is a large part of the program budget.
  - Nicholas noted that in WMPO, the state has an organization that has "stepped up" and taken the lead for TDM service delivery to the region.
    - How are they going to do this from a performance standpoint?
    - There seem to be great opportunities with UNCW and Downtown Wilmington in addition to aspects of tourism.
  - Debbie said that the Port of Wilmington is growing drastically and that associated congestion needs to be addressed.

4) Performance Metrics

- Sean reiterated how the planning process began with a focus on enhancing performance and encouraging innovation through the program's defining the benefits of their activities and how they will be measured.
  - Referenced this in the draft plan sections "Defining Success" and "Defining Innovation".
  - Reviewed "Performance Standards" and how the TDM Scorecard is designed to provide the programs with guidance for change.
- Nicholas said it is great that the plan is incentivizing performance and asked if the state is prepared to not fund a program that doesn't perform. Perhaps there is a middle ground?
  - Scorecard has good metrics but some may be subjective. What might work in one region may not work elsewhere. For this reason, need to be careful how you look at numbers.
- Debbie noted how this work is more prescriptive than NCDOT-PTD's typical programs as a call for guidance was heard from the programs.
  - Moving forward, what is our next task? Start fresh? Continue to do what we've been doing; i.e., "coach" the programs?
- Nicholas recommended using the plan update to establish a common baseline and start at that base-level.
  - As a next step, communicate to the programs that the state is going to provide the necessary tools to move towards success based on the various networks. This will provide an incentive for programs to succeed.
- Will underscored the importance of being sure the state communicates with each program about what program elements they already have that are successful.
  - If you don't communicate what is currently successful those program elements may be thrown out.
- Will noted that recommended performance metrics seem to focus on number of program participants, not necessarily what impact participation has. It is important to focus on impact.
- Will said that the metric of integrating TDM in regional transportation plans is great.
  - Are transportation planners looking at TDM as something they can fund as part of typical projects; i.e., corridor projects?

5) Closing Remarks

- Sean thanked the Peer Panel for participating in the call and asked for any final comments.
- Nicholas said it is important to have buy-in from each regional program and stakeholders within.
    - Need to be clear about the state's goal, citing growth and the importance of TDM in addressing associated challenges such as congestion.
    - Important to allow programs to voice any concerns in agreeing with vision.
    - Need to be clear that the state wants to grow the statewide program and wants to fully integrate with planning.
    - Important to integrate program delivery with the business community, developers and as many stakeholder groups as possible for true success.

APPENDIX D. SCORECARD

North Carolina Statewide TDM - Scorecard Template

	Metric	Weight
1	**Provide for a Well-Funded, Collaborative TDM Program**	**20%**
	1.a Collaborate on Regional TDM Services	
	1.b Review and Refine TDM Services through Annual Strategic Plan	
	1.c Integrate TDM Strategies into Regional Transportation Plans	
2	**Develop Services that Reduce SOV Commuting in North Carolina**	**40%**
	2.a Deploy Desirable TDM Strategies for SOV reduction	
	2.b Identify, Fund, Implement, and Operate Cost-Effective TDM Services	
	2.c Develop a Database of Activities (inputs & outputs)	
3	**Leverage Technology to Enable 21st Century Transportation Services**	**15%**
	3.a Conduct Exploratory Use of Innovative TDM Strategies	
	3.b Explore Multimodal Operations Integration	
	3.c Coordinate Services with Technology Providers	
4	**Enhance Effectiveness of TDM Service Delivery**	**25%**
	4.a Develop and Implement Performance Monitoring Plan	
	4.b Implement Quarterly Reporting System	
	4.c Deploy Training for Performance Calculations	
	4.d Develop Enhanced Performance Program	

North Carolina Statewide TDM - Scorecard Template

Performance Scorecard

Goal	Objective	Performance Metric	Performance Assessment					Points Allocation				
			Goal	Q1	Q2	Q3	Q4	Weighted	Q1	Q2	Q3	Q4
1	**Provide for a Well-Funded, Collaborative TDM Program**											
1.a	Collaborate on Regional TDM Services	Annual percentage growth in employer and community partners engaged with TDM program. Measured as new partners added as compared to previous quarter.	10%					7				
1.b	Review and Refine TDM Services through Annual Strategic Plan	Documentation of achievement of identified actions in strategic plan. Measured as percentage of identified quarterly actions achieved.	85%					7				
1.c	Integrate TDM Strategies into Regional Transportation Plans	Quarterly certification. Measured by certification that TDM strategies are considered in transportation planning activities, including CMP, RTP, MTP, and strategic corridor / development plans.	Pass / Fail					7				
2	**Develop Services that Reduce SOV Commuting in North Carolina**											
2.a	Deploy Desirable TDM Strategies for SOV reduction	Annual percentage increase in commuter participation. Measured as new participating commuters added as compared to previous quarter	15%					13				
2.b	Identify, Fund, Implement, and Operate Cost-Effective TDM Services	Annual percentage reduction in cost per commuter participating in the program. Measured as the percentage change in total quarterly budget divided by the quarterly number of all participants.	5%					13				
2.c	Develop a Database of Activities (inputs & outputs)	Quarterly certification. Measured by certification that TDM strategies core data for all identified ***inputs*** and ***outputs*** within the Regional TDM strategic plan are collected and stored for analysis.	Pass / Fail					13				
3	**Leverage Technology to Enable 21st Century Transportation Services**											
3.a	Conduct Exploratory Use of Innovative TDM Strategies	Quarterly certification of one demonstration per year of TDM integration with innovative technologies or processes. Measured by certification that a new, innovative strategy has been identified, developed, programmed for demonstration, conducted, evaluated, and reported.	Pass / Fail					5				
3.b	Explore Multimodal Operations Integration	Annual percentage of total TDM incentives that are claimed by use of transit. Measured as percentage of total quarterly incentive budget that is usable by participating commuters on regional transit services	50%					5				
3.c	Coordinate Services with Technology Providers	Annual percentage of participants that participate via technology with the TDM program. Measured as percentage of TDM commuter participants that engage with the program via mobile, field-based, or web-based solutions.	50%					5				

Goal	Objective	Performance Metric	Performance Assessment Goal	Q1	Q2	Q3	Q4	Weighted	Points Allocation Q1	Q2	Q3	Q4
4	**Enhance Effectiveness of TDM Service Delivery**											
4.a	Develop and Implement Performance Monitoring Plan	Documentation of achievement of performance monitoring plan in strategic plan. Measured as quarterly certification that the TDM program is successfully conducting its performance monitoring plan.	Pass / Fail					6				
4.b	Implement Quarterly Reporting System	Annual percentage improvement in overall benefit to cost ratio for TDM program. Measured as percentage improvement in quarterly calculation of benefit to cost, as described by performance monitoring plan, as compared to previous quarter.	5%					6				
4.c	Deploy Training for Performance Calculations	Annual calculation of performance measures, coupled with a training program. Measured as certification of training and achievement of quarterly calculation of VMT reduction, as well as other regionally adopted measures.	Pass / Fail					6				
4.d	Develop Enhanced Performance Program	Documentation of achievement of enhanced performance measures developed. Measured as quarterly certification that the TDM program is successfully developing and implementing enhanced performance metrics.	Pass / Fail					6				
								100				

Acronym	**Definition**
CMP	Congestion Management Process
MTP	Metropolitan Transportation Plan
RTP	Regional Transportation Plan
SOV	Single-Occupancy Vehicle
TDM	Transportation Demand Management
VMT	Vehicle Miles Traveled