

Regional Active Transportation Research Scan



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ABSTRACT

The term ‘active transportation’ refers to all forms of human-powered transportation modes, including walking and bicycling. As part of the development of the HRTPO 2040 Long-Range Transportation Plan, and to enhance active transportation planning efforts in Hampton Roads, HRTPO staff performed a Regional Active Transportation Research Scan. The purpose of the scan was to identify best practices in active transportation planning within the United States and abroad. This report summarizes the findings of the research scan and provides suggestions on next steps for integrating active transportation modes into the regional transportation system. The eight elements of active transportation planning are explained along with highlights of best practices from select cities.

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INTRODUCTION

Whether we do it out of necessity or enjoyment, everyone is an active transportation user. Active transportation encompasses all forms of human-powered transportation.¹ These include but are not limited to:

- Walking/Jogging/Running
- Cycling
- In-line skating
- Skateboarding
- Snowshoeing/skiing

Active transportation is noted for its historical precedent as well as the economic, social, environmental, and health benefits that it provides to individuals and communities. The social experience as a result of active transportation is greatly enhanced. Active transportation allows users to interact with their peers, foster place-making, develop a sense of community, and enhance perceptions of safety and security.² From a health perspective, physical and mental well-being is enhanced through active transportation. From an active mode of travel, users experience improved mental health and self-esteem as well as decreased levels of obesity.³ Active transportation modes hence represent viable, beneficial, economical and environment-friendly modes of transportation.

In recent years, regions across the US have started focusing their attention to active transportation modes. Cities and communities are now trying to retrofit their transportation networks to accommodate active transportation users. The transportation

planning process now actively considers the need of active transportation users. This shift in planning can be attributed to the recognition of the above mentioned benefits of active transportation.⁴

Supplementing the planning process, researchers have also started focusing on ways active transportation modes can be integrated into the transportation system. For example, a recent issue of the Transportation Research Board, *TR News*, focused specifically on active transportation. The highlighted research addressed topics in the planning, design, operations and maintenance of active transportation (bicycle/pedestrian) facilities and the integration of these modes into the transportation system.⁵

In the Hampton Roads region, planning for active transportation is managed at the local level. However there has been growing regional coordination on non-motorized infrastructure development, specifically on national, state and regional bicycle and pedestrian trails. To enhance these efforts, the HRTPO staff performed a broad research scan of bike and pedestrian plans. The goal was to review plans from across the US and worldwide and to identify best practices in active transportation planning.

This report summarizes the finding of this research scan. This report is organized as follows: a detailed explanation of the eight elements or 'E's of active transportation planning is presented in the next section. This is followed by one-page summaries of best practices from select cities in the US. The report concludes with a discussion of the next steps as it applies to active transportation planning in Hampton Roads.

PLANNING AND POLICY TRENDS



There are eight elements or 'E's of active transportation planning. These are guiding principles that help planners and stakeholders approach active transportation planning from a holistic approach.⁶ The six traditional E's include:

- Education
- Encouragement
- Enforcement
- Equity
- Engineering & Maintenance
- Evaluation

The traditional E's in active transportation planning are supplemented with two additional E's to reflect current sustainability initiatives.⁷ The additional E's include:

- Environment
- Economic

Education

Communities use a variety of tools and programs to educate the public on multimodal transportation usage. These tools and programs are elaborated below.

Maps and Guides

Standard across any transportation planning process is the conveyance of information through maps and guides. Historically, biking and walking maps were static print maps, providing a snapshot of an area and its active transportation facilities. With interactive maps and GPS, biking and walking maps have evolved in tandem.



Though not the first developers of bicycling and walking directions, Google has mass marketed their Google Maps application to encompass these mapping abilities. In July 2008, Google introduced walking directions into the Google Maps application. In March 2010,

Google released the bicycle component in their Google Maps application. Partnering with the Rails to Trails Conservancy, bike infrastructure data was incorporated into the map to provide cycling directions.⁸

Agencies are stepping up their efforts in recent years to visualize their biking and walking maps. In addition, these same agencies are enhancing these maps to allow users to report infrastructure conditions and usage. Cyclopath, a geowiki out of the Twin Cities region of Minnesota, provides users the ability to take notes on the biking network and edit maps for the benefit of all users.⁹ Other examples include Washington, DC's Commuter Connections website and San Francisco's 511 website.^{10, 11}

Community Audits

Pioneered in the 1980s by Dan Burden, the walking audit encompasses a community charrette and walking tour of their community.¹² These audits now encompass cycling as well. The objective of these audits is to provide a diverse set of stakeholders the opportunity to view their community and analyze the health, quality of life, and operational impacts of their transportation system for cyclists and pedestrians.

Community Programs

In educating the public about bicycle and pedestrian safety, various community programs have been formulated. The Safety Town and Safe Routes to School programs are two national programs implemented locally, aimed at educating school children. Other programs around the country provide after school bicycle riding, and maintenance education for older youth.

Safety Town

Developed in 1937 and formalized in 1964, Safety Town is an international program promoting early childhood safety training. The basis of Safety Town is to provide an interactive experience to young school children on community dangers and safety behaviors.¹³ Specifically within the Safety Town curriculum, there is discussion on walking and biking safety. Educators, community advocates, and community safety professionals (police, fire, and emergency medical staff) collaborate to provide Safety Town in their communities.

Within Hampton Roads, the Cities of [Portsmouth](#) and [York County](#) have developed Safety Town programs for their respective communities, dating back nearly 40 years.¹⁴



Safe Routes to School

The Safe Routes to School (SRTS) concept was developed by the US Department of Transportation in 1975. This concept was developed pairing research on “School Trip Safety and Urban Play Areas” with the precedent setting school commute safety campaign in Denmark around the same time.¹⁵

The SRTS concept focuses on transportation network improvements aimed at reducing traffic and pollution, as well as educating and incentivizing walking and biking to school.¹⁶ The program aims to recapture school walking trips, which amounted

to 48% of all school children in the United States in 1969, but only 13% of all school children in 2009.¹⁷

Within Hampton Roads, the cities of Portsmouth, Virginia Beach, Chesapeake, and James City County have pursued the implementation of the SRTS program in select schools. In the past three years, the regional SRTS programs have emphasized improvements to sidewalks and paths, intersection crossings, curbs and signal timings, improved signage, and bicycle parking in the participant schools. Additionally, the various SRTS programs have included education and encouragement activities in their schools.¹⁸

After School Activities

Local advocates in communities have looked to engage youth in promoting bicycling in their communities. In pursuing this endeavor, advocates look to bridge the gap that bars youth from cycling. Key barriers to youth cycling, especially in disadvantaged communities, has been in owning a bike, maintaining a bike, and riding with someone.¹⁹ As a result, over 500 group sponsored bicycle education programs have been developed to meet this need.²⁰ Examples of such programs include the Bicycle Works program in Milwaukee, WI and the West Town Bike Shop's after school program in Chicago, IL.^{21,22}

Other Community Activities

Bicycling and walking education has typically emphasized incorporation into youth education. However, adults can benefit from additional community education opportunities.



Various communities in the United States have fostered bicycle mentoring and cooperative programs to educate novice cyclists on bicycle safety, maintenance, and commuting tips. Bicycle mentoring programs have been established in Charlotte, Washington, Spokane, Portland, and San Francisco to name a few. Cleveland and Atlanta are among four cities with bicycle cooperative programs.²³

Bicycle Ambassador Programs have been recently formed in major cities. The aim of these programs is to provide a visible cycling presence in the city or region. Cities such as Chicago, New York, Philadelphia, Washington, and Toronto have established programs that are being emulated across North America.²⁴

Encouragement

In encouraging walking and cycling in a community, there are three types of approaches that communities use. Communities use marketing campaigns, events, and work/neighborhood groups to encourage walking and cycling and create a 'strength in numbers' presence.²⁵

Marketing Campaigns

Marketing campaigns are commonly presented through various media outlets to reach the entire community. Examples include the use of Public Service Announcements (PSA) on TV, radio, print, and the internet.

In the Hampton Roads region, the City of Virginia Beach recently unveiled a PSA campaign, titled "Two-Way Street". The overall objective of this Bike Safety campaign is to educate both motorists and cyclists about ways they can safely share the road. Further the campaign tries to give equal considerations to the perspectives of people in cars and people on bikes.

The first 30 second campaign recently took to the airwaves on regional television and radio. The second and third PSAs are expected to air shortly. Additional details on the campaign can be found on the City of Virginia Beach [website](#).

Print versions (posters, rack cards, print ads etc.) of this PSA campaign were distributed as well. An important highlight of these efforts is that the artwork and design for the "Two Way Street" Bike Safety Campaign recently received the prestigious American Inhouse Design award for two categories.



While the campaign is more of educational effort, it points to the use of PSAs in enhancing active transportation in a region.

Community Events

Community events provide participants the opportunity to experience walking and cycling in the supportive company of their community. Nationally and locally, there are various high-profile cycling and walking focused events. Those events include but are not limited to:

Cycling Focused

- Tour de Cure

- Tour de Chesapeake
- BP MS 150
- Red Ribbon Ride
- Bike Month

Walking Focused

- March of Dimes
- Walk for Alzheimer's
- American Heart Walk
- Race for the Cure
- Avon Walk
- MS Walk
- Relay for Life
- Walk to School Day

Community Coalitions

Community coalitions refer to the various active transportation clubs and groups within communities. These coalitions provide a forum for people interested in cycling or walking. These groups organize group walks or bike rides in their communities for commuting or recreational purposes.

In Hampton Roads, there are various clubs that aim to promote cycling and walking, including:

Active Transportation Clubs²⁶

- Gator Volksmarsch Club – Southside Volkssport club
- Peninsula Pathfinders – Peninsula Volkssport club
- Virginia Vagabonds – Peninsula Volkssport club



Cycling Clubs²⁷

- Williamsburg Area Bicyclists – Historic Triangle cycling club
- Tidewater Bicycle Association – Southside cycling club
- Peninsula Bicycle Association – Peninsula cycling club
- Tripower Cycling Club – Virginia Beach cycling club
- James River Velo Sport – Hampton Roads cycling club
- Eastern Virginia Mountain Bike Association – Hampton Roads mountain biking club
- Law Enforcement United – Hampton Roads law enforcement cycling club

Advocacy Groups

- Bike Norfolk – Norfolk bike advocacy group
- Active Williamsburg Alliance – active transportation advocacy group

Various businesses have started to promote walking and cycling. In efforts to reduce congestion, environmental footprint, and health costs, businesses are providing incentives for employees to walk or bike more in their daily activities. In an example from Norfolk Southern, a locally headquartered corporation, the company has developed and promoted the Virgin Health Miles program.²⁸ The program aims to improve health and rewards participants with cash, shopping rebates, and other rewarding opportunities.

Enforcement

Enforcement is another element of active transportation planning needed to ensure the safety and security of the active transportation system users. Through laws and policies at the state and local level, pedestrians and cyclists can feel assured to walk and ride in their community.

Laws & Policies

Conflicts do occur between motorized and non-motorized transportation modes, leading to operational, safety, and security issues. In response to these conflicts, state and local governments have enacted laws to govern the behavior of motorized and non-motorized users.

Reviewing the state laws and local ordinances that impact cyclists and pedestrians in Hampton Roads, the laws focus on the safety of active transportation users. Most local laws in Hampton Roads emulate state law, occasionally adding additional regulations pertinent to their community. Table 1 provides an overview of local active transportation laws applicable to Hampton Roads, not specifically stipulated in state law.



The Northern Virginia Regional Commission (NVRC) recently released the 2nd edition of “Sharing the Road in Virginia” in July 2012. This pocket guide was funded by a Transportation Enhancement grant from the Virginia Department of Transportation. This guide provides safety procedures and traffic regulations to ensure the safety of all users. The guide also covers rules and best practices for all users sharing Virginia’s roads, trails

and paths. This pocket guide is expected to be available online by fall 2012. The first edition of this guide is available on the NVRC website.²⁹

Enforcement Efforts

The success of the above mentioned laws and policies depends on the enforcement efforts in place. These efforts to promote active transportation focus on the treatment of violators and the incorporation of active transportation in police and driver education training.

Some communities have embarked on programs that target youth active transportation violators. In cities such as Dallas, TX, Santa Barbara, CA, and Missoula, MT, law enforcement has partnered with the judiciary system to issue youth citations to be heard in established youth courts. Emphasis of these programs is to educate youngsters and publicize active transportation rules in their communities.³⁰

Integrated as both an education and enforcement tool, driver education raises awareness on bicycle and pedestrian laws. An increasing number of states are incorporating bicycle and pedestrian training into the driver education curriculum.

Table 1: Local Active Transportation Laws – Hampton Roads

Regulation	Commonwealth of Virginia	Gloucester County	Isle of Wight County	James City County	Southampton County	Surry County	York County	City of Chesapeake	City of Franklin
Cyclists can ride on sidewalks, yielding to pedestrians	★	★	★	★	★	★	★	★	Res.
Helmet use is required for users under 15 years of age				★			★		
Bicycle registration with local police / sheriff's department								Opt.	Req.
Bicycle must be equipped with a warning device				★				★	
Bicycle shall not be operated while under the influence of drugs and alcohol									
Cyclists can't ride in a parking garage or on the beach									

Regulation	City of Hampton	City of Newport News	City of Norfolk	City of Poquoson	City of Portsmouth	Town of Smithfield	City of Suffolk	City of Virginia Beach	City of Williamsburg
Cyclists can ride on sidewalks, yielding to pedestrians	Res.	Res.	Res.	★	Res.	Res.	Res.	Res.	★
Helmet use is required for users under 15 years of age	★	★	★					★	★
Bicycle registration with local police / sheriff's department			Req.		Req.		Req.	Opt.	
Bicycle must be equipped with a warning device	★	★	★		★				
Bicycle shall not be operated while under the influence of drugs and alcohol		★							
Cyclists can't ride in a parking garage or on the beach								★	

Res. – Restricted in certain areas (business districts) Req. – Required Opt. - Optional

Equity

Pertaining to active transportation, equity can be defined in two ways. In one definition, equity encompasses how active transportation modes are considered and incorporated in transportation projects. Another viewpoint on equity emphasizes social considerations in active transportation planning.

With the Complete Streets advocacy reaching a national audience since 2003, various states and localities across the country have started to design ordinances, resolutions, and policies that mandate the consideration and integration of cyclists and pedestrians into the transportation network. As of the beginning of 2012, approximately 340 policies across 321

jurisdictions in the United States have adopted a variation of complete streets policy.³¹

In 2004, the Commonwealth Transportation Board enacted a “Policy for Integrating Bicycle and Pedestrian Accommodations.” The policy calls for the Virginia Department of Transportation (VDOT) to take a leadership role in integrating bicycle and pedestrian accommodations on all highway construction projects. The policy outlines applications and exceptions to the policy, as well as the implementation steps to realize active transportation facilities.³²

Environment

Urban regions around the United States and the world are experiencing increasing populations. United Nations Statistics show that in 2008, for the first time in human history, the percentage of population living in urban areas exceeded the percentage living in rural areas.³³

With the community and transportation infrastructure in the United States predominately accommodating motorized traffic, increasing roadway congestion and associated pollution is anticipated to rise under a status quo approach to transportation planning and management.



Air and Water Quality




Active transportation provides mobility options for all residents with positive health and environmental benefits. Bicycling and walk are noted as clean transportation modes because of zero-emissions emitted.³⁴ Hence these modes are pollution neutral in comparison to motorized transportation. Figure 1, obtained from the City of Los Angeles' 2010 Bicycle Plan, highlights the relationship between walking, cycling, and driving from a health, economic, and environmental perspective.

It is difficult to quantify the reduction in fuel consumption and air pollution due to active transportation. However a 2008 Rails-to-Trails Conservancy study showed that a modest increase in bicycling and walking would result in a 3 billion gallons of gasoline saving and would keep 28 million tons of CO2 from the atmosphere.³⁵

Integration with Green Infrastructure

Metropolitan areas have networks of parks and green space that are vital to the environmental vitality of a region. This green infrastructure network can also be harnessed to provide valuable active transportation linkages. Such an approach would provide environmental benefits while allowing for the preservation of the natural landscape. Further such facilities provide a safe haven for the flora and fauna in the region.³⁶

Figure 1: Transportation Comparison

	Miles Per Hour	Calories burned per hour	National Average (\$)	Annual greenhouse gas emissions in 2008 (metric tons of CO ₂ Eq./mile)	Minimum road space dimensions (ft ²)
Walking	3	353	0	0	1 
Bicycling	10	484	308 \$	0	10 
Driving (Passenger Cars and Light-Duty Trucks)	30	170	11,263 \$	399.39 CO ₂ .50 CH ₄ 7.62 N ₂ O	96.4 

Source: [Los Angeles Bicycle Plan, 2011](#)

Data Sources:

Calories

Center for Disease Control & Prevention
Health Status
Sierra Club
Transportation Planning & Technology, Routledge
RideTHISbike.com
CaloriesPertour.com
Everyday Health

Cost

American Public Transportation Association
Newgeography
CommuteSolutions.org
Bikes Belong Coalition
US Bureau of Transportation Statistics

Greenhouse Gases

US Bureau of Transportation Statistics
US Environmental Protection Agency
SPACE
LA Department of Transportation
USA Today
Westchester County Municipalities

Economic

Investments in active transportation provides users with recreational and commuter transportation options. Communities are working diligently to retrofit their planning efforts and transportation networks to accommodate active transportation users. As communities plan, design, and build bicycle and pedestrian accommodations, the local and regional economy can be stimulated to support active transportation.

Active transportation investments have been shown to enhance the community's livability and provide significant economic development opportunities for communities. Communities investing in active transportation have shown documented increase in business activities. Tourism and knowledge-based industries are attracted to communities investing and prioritizing active transportation in their transportation network.³⁷

Nationally, active transportation policies and investments contributed to \$17.7 billion in federal, state, and local tax revenues.³⁸ Examples that stand out include the states of Colorado and Wisconsin where active transportation investments and policies have provided significant economic returns in terms of increased manufacturing activities, creation of full-time jobs with associated increase in personal incomes, and increased retail activities.^{39, 40}

Closer to Hampton Roads, in the Outer Banks of North Carolina, non-motorized transportation investments have yielded significant economic benefits. A conservative estimate shows

the annual economic impact of bicycle tourism in the Outer Banks to be nine times as much as the initial investment in active transportation.^{41, 42}



Another economic aspect of active transportation is from a health viewpoint. A study conducted in Portland, Oregon evaluated the past and future costs of active transportation investments with a focus on health benefits. The analyses showed that investments in active transportation (bicycling) will provide health care cost savings of \$388 to \$594 million for investments in the range of \$138 million to \$605 million by 2040.⁴³

Funding Active Transportation Investments

Promoting active transportation in a community costs money. Between paying for infrastructure and associated amenities, as well as the education, encouragement, and enforcement activities, the costs in implementing an active transportation program can add up.

Table 2 lists the programs included in the new federal surface transportation legislation that may be used to fund active transportation projects. The new legislation, 'Moving Ahead for Progress in the 21st Century Act' (MAP-21) was signed into law on July 6, 2012 and replaces the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A legacy for Users (SAFETEA-LU). MAP-21 authorizes \$105 billion through September 2014 in spending on highway, mass transit and other transportation programs. The funding is achieved mainly through extending the various fuel and highway taxes. The majority of funding in MAP-21 is dedicated to highway spending with a split of 80% funding for highways and 20% funding for transit.⁴⁴

Funding for active transportation projects (bicycle/pedestrian) projects is under a new program called Transportation Alternatives (TA). This program consolidates the former Transportation Enhancements program with the Recreational Trails programs and the now-eliminated Safe Routes to School program. The anticipated funding for TA programs is around 26% lower than the funding for similar programs under SAFETEA-LU. Fifty percent of the TA funding will be distributed by the state to Metropolitan Planning Organizations

(MPO) and communities for local program grants. States can use the remaining 50% of TA funds and have the flexibility to divert a portion of this funding to other transportation priorities such as air quality improvement projects.^{45, 46}

This reduction in funding for active transportation projects highlights the importance of pursuing innovative funding mechanisms. Bike advocates point to the importance of connecting active transportation projects with other programs such as transit and health initiatives to pursue other funding streams. Examples of such efforts include Nice Ride Minnesota and BikeDelaware.

Nice Ride Minnesota is an example of an innovative funding program in active transportation. Nice Ride Minnesota is a non-profit organization that provides bike sharing in the Twin Cities. The bike sharing system became operational in July 2010. Nice Ride Minnesota was formed through an extensive collaboration of private and public partners. The Blue Cross and Blue Shield of Minnesota Center for Prevention is a major sponsor of this program along with Bike/Walk Twin Cities. Other local private firms contributed staff resources to assist with the design, marketing, web development, public relations and legal aspects of the program.

BikeDelaware, a non-profit advocacy group, successfully teamed with health groups and bike-friendly General Assembly members and the Governor to pass and fund *Walkable Bikeable Delaware*, an initiative to dedicate state funding to expand the state trails. Further the leadership in Delaware has been

successful in using state funds to match federal funding. The Walkable Bikeable Delaware funds from the last year have been used to secure the Congestion Mitigation and Air Quality (CMAQ) funds for a bike project.

While the use of CMAQ funds for a bike project was a first in Delaware's history,⁴⁷ the Hampton Roads region has a long history of funding bike and pedestrian projects with CMAQ funds. A review of CMAQ allocations in Hampton Roads from 1993 to 2018 found that a total of 44 active transportation projects totaling \$27,557,499 have been funded. This represents 14% of the total number of CMAQ projects or 8% of the total dollar amount allocated to all CMAQ projects over the 26-year period.

Table 2: Possible Funding Streams for Active Transportation under MAP-21

Highway Programs	Description
National Highway Performance Program (NHPP)	Project must be on a National Highway System (NHS) facility and support progress toward achievement of national performance goals for improving infrastructure condition, safety, mobility, or freight movement on the NHS.
Surface Transportation Program (STP)	Program provides flexible funding that may be used by States and localities for projects to preserve and improve the conditions and performance on any Federal-aid highway, bridge and tunnel projects on any public road, pedestrian and bicycle infrastructure, and transit capital projects, including intercity bus terminals.
Highway Safety Improvement Program (HSIP)	The goal of the program is to achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-state-owned public roads. The HSIP requires a data-driven, strategic approach to improving safety. A highway safety improvement project is any strategy, activity, or project on a public road that is consistent with the state Strategic Highway Safety Plan (SHSP).
Congestion Mitigation and Air Quality (CMAQ)	Program funds are to be used for transportation projects likely to contribute to the attainment or maintenance of a national ambient air quality standard, with a high level of effectiveness in reducing air pollution.
Transportation Alternatives (TA)	This program is funded via set asides from the NHPP, STP, HSIP, CMAQ, and Metro Planning. The state receives a share of total TA funding equal to its share of total FY 2009 Transportation Enhancements funding. The set aside is taken proportionally from each of the five programs in relation to the relative sizes of the state's apportionments. Unless the state opts out, an amount of TA equal to the state's FY 2009 Recreational Trails Program (RTP) apportionment is set aside for the RTP.

Source: HRTPO



Engineering & Maintenance

Engineering is the designing and building of infrastructure, such as streets and public spaces, that support a safe and convenient environment for active transportation users.⁴⁸ Infrastructure is a visible element of government support and an important factor in encouraging active transportation. In addition to the design of non-motorized facilities, other engineering aspects include considerations for amenities (ex. rest stops, repair stations) as well as maintenance and operation needs.

Design

The design of non-motorized facilities includes decisions on the type of non-motorized transportation facility, the signage supporting the facility, and traffic operation integration. These design decisions are dependent on the facilities' anticipated purpose and usage, interconnectedness to the multimodal transportation network, and other local, regional, state, and federal design considerations.

The design standards and guidelines that typically serve as reference in designing non-motorized transportation facilities in Hampton Roads are presented in Tables 3 and 4.

In addition to the aforementioned standards and guidelines, VDOT has developed a Bicycle & Pedestrian Accommodation Decision Process.⁴⁹ This process, drafted in 2008, assists state and local planners and engineers in determining if a non-motorized facility is justified not being included in a roadway construction project. The process standardizes the exceptions to the 2004 [Policy for Integrating Bicycle and Pedestrian Accommodations](#), as adopted by the Virginia Commonwealth Transportation Board.

Table 3: Design Standards


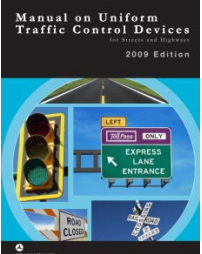

	Description
 <p>ROAD DESIGN MANUAL VIRGINIA DEPARTMENT OF TRANSPORTATION LOCATION AND DESIGN DIVISION</p>	<p>VIRGINIA DOT ROAD DESIGN MANUAL</p> <ul style="list-style-type: none"> • Manual providing standard design guidance in the Commonwealth of Virginia • Based on MUTCD and AASHTO Guidance • Appendix A notes design specifications
 <p>Manual on Uniform Traffic Control Devices for Streets and Highways 2009 Edition</p>	<p>MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD)</p> <ul style="list-style-type: none"> • Manual providing national (US) standards on traffic control devices • Encompasses signs, signals, markings, or any device used to regulate, warn, or guide traffic on any public access transportation facility (including non-motorized)
 <p>Americans with Disabilities Act and Architectural Barriers Act Accessibility Guidelines July 23, 2004 UNITED STATES ACCESS BOARD</p>	<p>AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES</p> <ul style="list-style-type: none"> • Accommodation standards for mobility challenges populations at public access facilities • Transportation standards have added focus on minimizing distances around obstacles and detectable warning on curb ramps

Table 4: Design Guidance

Design Guidance	Description
 <p>Guide for the Planning, Design, and Operation of Pedestrian Facilities</p>	<p>AASHTO GUIDE FOR THE PLANNING, DESIGN, & OPERATIONS OF PEDESTRIAN FACILITIES</p> <ul style="list-style-type: none"> • Guidance on the planning, design, and operation of pedestrian facilities along streets and highways • Notes facilities dependent on roadway types and land use
 <p>Guide for the Development of Bicycle Facilities 2002 - Fourth Edition</p>	<p>AASHTO GUIDE FOR THE DEVELOPMENT OF BICYCLE FACILITIES</p> <ul style="list-style-type: none"> • Guidance on the planning, design, and operation of bicycle facilities • Notes facilities dependent on roadway types, land use, and user
 <p>HCM2010 HIGHWAY CAPACITY MANUAL</p>	<p>2010 HIGHWAY CAPACITY MANUAL</p> <ul style="list-style-type: none"> • Guidance on multimodal analysis and evaluation of urban streets • Examines active traffic management strategies in relations to operations
<p>PUBLIC RIGHTS-OF-WAY ACCESSIBILITY CONSIDERATIONS</p> <ul style="list-style-type: none"> • Draft guidance on public right of way design considerations • Accounts for blind pedestrians, wheelchair access to on-street parking, as well as updated design constraints and practices to meet the needs of mobility challenged individuals 	

Parking

Bicycling is one of the active transportation modes that involve the use of a vehicle, albeit pedal powered. As such, bicycles need facilities in which to store the vehicle while not in use. It is the lack of parking that has potential cyclists deterred to ride, for fear of bicycle theft.⁵⁰ Hence the design of bicycle parking facilities is an important element in the design of a non-motorized transportation system.

Specific considerations in the planning, designing, and placement of bicycle parking facilities are listed in Table 5.⁵¹ The AASHTO Guide for the Development of Bicycle Facilities (listed in the table above) has additional details on the planning and design of bicycle parking facilities as well.⁵²

Maintenance

Communities are rapidly constructing and dedicating non-motorized transportation facilities. Over time and with increased usage, these facilities will face structural failure that can include potholes, pavement cracks, shifting blocks, surface disintegration and uneven surfaces.⁵³

It becomes critical for communities to factor in maintenance of these facilities, so as to ensure the safety and accessibility of users, maximize the investment, and minimize the liability on the community. The first consideration in a community maintenance program is for non-motorized maintenance and replacement to occur concurrently with roadway rehabilitation/replacement projects.⁵⁴ The Virginia Department of Transportation, per their Bicycle and Pedestrian

Accommodations policy, incorporates the addition and maintenance of non-motorized facilities in conjunction with roadway projects.

Table 5: Bicycle Parking Considerations

Bike Parking Consideration	Definition
Visibility	Parking should be easily identifiable
Access	Parking should be convenient from the street and into buildings; should avoid stair access
Security	Parking should be located near street activity or assigned a designated parking attendant
Lighting	Parking should be lit to deter theft, enhance personal security, and prevent accidents
Weather Protection	Parking is encouraged to be located near existing building overhang, covered walkway, or include a canopy or roof
Minimal Pedestrian Conflict	Parking should not block pedestrian paths or create a tripping hazard for all pedestrian users
Minimal Motorized Conflict	Parking should be buffered by space and physical barriers from motorized parking to deter theft and motorized vehicle intrusion
User Amenities⁵⁵	Parking is encouraged to be located near restrooms and changing facilities

Evaluation

At the heart of every active transportation program are mechanisms for stakeholders to look back and assess the effectiveness of their policies, efforts, and investments. Evaluation encompasses the metrics and methods to conduct such assessments of active transportation programs.

In assessing an active transportation program or plan, evaluation can focus on three key elements. Those elements include the actions, outcomes, and fiscal aspects of the program or plan. The actions focus on enabling policies and efforts to build a non-motorized transportation network and an active transportation culture in a community. The outcomes emphasize the tangible results stemming from the actions of the plan. The fiscal aspects of the plan focus on the funding and economic impacts of the plan.

In the subsequent tables, there are various benchmarks and metrics to measure the performance of a region or community's active transportation plan. These metrics were developed by the Alliance for Bicycling and Walking, as part of their 2012 Bicycling and Walking in the United States Benchmarking Report.⁵⁶ These metrics provide a basis for developing a plan's performance evaluation methodology.

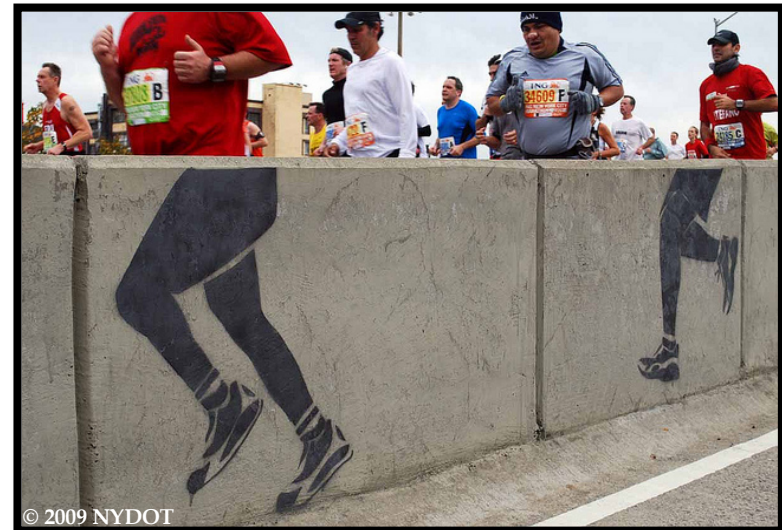


Table 6: Action Performance Metrics

Metric	Definition	Measurement
Policy		
Complete Street Policy Implementation	Implementation of policies aimed to create multimodal streets for all users	Tally/listing of implemented policies
Adopted Active Transportation Plan	A documented plan that uses an existing conditions snapshot to plan for future programs and investments	Tally/listing of adopted active transportation plans
Active Transportation Advisory Committees	An organized committee advising elected officials on active transportation issues	Tally/listing of organized active transportation advisory committees
Active Transportation Legislation	Legislation at various levels of government that aim to improve active transportation	Tally/listing of adopted legislation/laws
Programs		
Active Transportation Education Courses	Programs aimed at educating youth and adults on safe active transportation practices	Tally/listing of active transportation education courses for youth and/or adults
Active Transportation Community Events	Events aimed at encouraging community support and increased usage of active transportation	Tally/listing of Active Transportation Community Events
Advocacy		
Presence of Active Transportation Advocacy Groups	Organized community groups that provide citizen or specialty interest advocacy for active transportation	Tally/listing of active transportation advocacy groups
Membership of Advocacy Groups	The support behind organized active transportation advocacy groups	Total Membership Membership per capita
Public Involvement Efforts	Efforts organized by government entities to engage the public and obtain their input	Tally/listing of active transportation public involvement efforts Percentage of public involvement by sponsoring entity

Table 7: Outcome Performance Metrics

Metric	Definition	Measurement
Infrastructure Development		
Implemented Bicycle Facilities	The implementation and availability of bicycle facilities	Total Lane Miles (system wide; by facility type)
Implemented Pedestrian Facilities	The implementation and availability of pedestrian facilities	Total Lane Miles (system wide; by facility type)
Bicycle Parking	The availability of bicycle parking in an area	Total bicycle parking spots Bicycle Parking per capita
ADA Ramp Implementation	The availability of ramps installed to assist mobility challenged active transportation users	Total number of ADA Ramps ADA Ramp ratio to intersections/crosswalks
Signal/ Signage Installation	The availability of signage and signals facilitating active transportation traffic	Total number of bicycle/pedestrian signals Number of signs (total; by type)
Active Transportation integration with Transit	The integration of policies and facility improvements to accommodate active transportation users	Integration policy Number of vehicles with active transportation accommodations (total; by transit mode)
Safety		
Crashes	Number of crashes involving active transportation users	Total number of active transport crashes Percent active transport crashes to total crashes Demographics of crash victims
Injuries	Number of crashes involving injuries to active transportation users	Total number of active transport injuries Percent active transport injuries to total crash injuries Demographics of injured crash victims
Fatalities	Number of crashes involving fatalities of active transportation users	Total number of active transport fatalities Percent active transport fatalities to total fatalities Demographics of crash fatality victims
Helmet Usage	Number of active transportation users wearing helmets	Total number of helmet users Helmet usage ratio to total active transport users
Contraflow Usage	Number of active transportation users riding unsafely contrary to the flow of traffic	Total number of contraflow users Percent crashes involving contraflow users

Table 8: Outcome Performance Metrics (Continued)

Metric	Definition	Measurement
Usage		
Active Transportation Users	The number of users that are using active transportation travel options	Number of active transportation users (total; by active transportation mode; trip purpose)
Community Event Participation	Number of participants engaging in community events (ciclovias, Bike to Work Day, Race for the Cure)	Total number of participants
Mode Share	Percentage share of users using all available modes of transportation	Percentage of total users by mode Change in active transportation mode share Demographics of mode share users
Level of Service	The quantified active transportation user experience on a transportation facility.	Multimodal Level of Service (NCHRP 3-70) Bicycle Level of Service
Public Health		
Obesity Levels	The prevalence of obesity in the population	Obesity rates (total; users vs. non-users)
Hypertension Levels	The prevalence of hypertension in the population	Hypertension rates (total; users vs. non-users)
Diabetes Levels	The prevalence of diabetes in the population	Diabetes rates (total; users vs. non-users)
Asthma Levels	The prevalence of asthma in the population	Asthma rates (total; users vs. non-users)
Physical Activity Levels	The prevalence of physical activity by the population	Physical activity rates (total; users vs. non-users)

Table 9: Fiscal Performance Metrics

Metric	Definition	Measurement
Funding		
Cost/Benefit	Ratio of project costs to estimated quantified benefits of a project	Cost Benefit Ratio
Funding	The transportation funds dedicated to active transportation programs and investments	Total dollars Per capita dollars
Economic Impact		
Property Values	The economic value of properties adjacent to non-motorized facilities	Total dollars Per capita dollars Percent increase
Travel Savings	The economic savings of time with active transportation options in a community	Total dollars Per capita dollars Percent increase
Health Benefits	The economic savings of prevented health costs in a community due to active transportation availability	Total dollars Per capita dollars Percent increase
Environmental Benefits	The economic savings on the environment as a result of active transportation availability	Total dollars Percent increase
Retail Sales	The resulting sales at retail establishments adjacent to non-motorized facilities	Total dollars Percent increase
Job Creation	The jobs created due to constructing non-motorized facilities and/or indirect enterprises benefiting from non-motorized facilities	Total number of jobs created Percent increase in total community jobs Percent decline in unemployment rates
Indirect Economic Impact	The resulting economic value on indirect enterprises such as manufacturing as a result of active transportation in a community	Total dollars in indirect enterprises Percent increase
Induced Economic Impact	The resulting economic value on induced expenditures created in the local economy by those employed as a direct or indirect result of a non-motorized facility	Total dollars Per capita dollars Percent increase
Tax Revenues	The resulting taxes generated in sales, property, or other streams as a result of non-motorized facilities	Total dollars Percent increase

BEST PRACTICES



The previous section covered the eight elements of active transportation. In the next successive pages, there are one page summaries on a sample of cities and regions. Spanning from regions in Virginia and the rest of the United States, each region provides their unique insight in delivering an active transportation plan, program, culture, and associated non-motorized infrastructure. Each page summarizes the policy document governing active transportation planning in that community, as well as specific strategies each community is engaging upon as it relates to the eight 'E's of active transportation planning.

Communities and regions are exploring how to integrate active transportation in their communities. Predominately established to allow the unimpeded flow of automobiles, most communities find themselves trying to find the most fiscally prudent and innovative ways to retrofit active transportation into their transportation network.

Very few communities get to start with an open, clean slate to build their multimodal transportation infrastructure network. However, with the best practices and lessons learned from other regions, any community can customize their approach to successfully integrate active transportation in their community.

Table 10: Active Transportation Profile of Select US Metropolitan Regions

Region	State	Population (2010)	Regional Plans	City Plans	Bike Sharing
Charlottesville	VA	234,712	2004	2003	N/A
Fredericksburg	VA	327,773	2009	2006	N/A
Petersburg	VA	173,463	2004		N/A
Richmond	VA	1,002,696	2004		N/A
Roanoke	VA	274,759	2005		N/A
Birmingham	AL	1,105,132	2011		N/A
Los Angeles	CA	18,051,334	2012	2010	Anticipated 2013
Sacramento	CA	2,275,401	2011	1995/2006 ³	N/A
San Diego	CA	3,095,313	2010	2002	N/A
San Francisco	CA	7,150,739	2009	2009/2010 ⁴	Anticipated 2012
Miami	FL	2,496,435	2001	2010	Under Development
Tampa	FL	1,229,226	2004/2008 ¹		Under Development
Boston	MA	3,153,590	2007/2010 ²	2001	Hubway (2011)
Minneapolis	MN	2,849,567		2009/2011 ⁵	Nice Ride (2010)
Portland	OR	2,226,009		1998/2010 ⁶	Under Development
Memphis	TN	1,127,309	2011		N/A
Austin	TX	1,716,289		2009	Anticipated 2013
Salt Lake City	UT	1,433,509		2004	Anticipated 2012
Seattle	WA	3,616,747	2002	2007/2009 ⁷	Under Development
¹ Comprehensive Pedestrian Plan developed in 2004; Comprehensive Bike Plan developed in 2008 ² Regional Bicycle Plan adopted in 2007; Regional Pedestrian plan developed in 2010 ³ Updates to the 1995 Bicycle Master Plan adopted in 2001 and 2004. Pedestrian Master Plan adopted in 2006. ⁴ Bicycle Plan adopted in 2009. Pedestrian Plan adopted in 2010. ⁵ Pedestrian Plan adopted in 2009. Bicycle Plan adopted in 2011. ⁶ Pedestrian Master Plan adopted in June 1998. Bicycle Plan adopted in 2010. ⁷ Bicycle Master Plan adopted in 2007. Pedestrian Master Plan adopted in 2009.					



Charlottesville, Virginia

As of the 2010 Census, the Charlottesville regional area has a population of 234,712. This area, consisting of six localities, boasts topography, climate, destinations, and vistas conducive to active transportation. However, existing conditions curtail safety of active transportation users.

In 2004, the Thomas Jefferson Planning District Commission (TJPDC) adopted the Jefferson Area Bicycle, Pedestrian, and Greenways Plan.⁵⁷ Member localities use the plan to assist in the development of non-motorized facilities and accommodations. The City of Charlottesville adopted the Bicycle and Pedestrian Facilities Master Plan in 2003 to help in planning and implementation of bicycle and pedestrian facilities.⁵⁸

In 2012, the TJPDC launched the Cville Bike mApp.⁵⁹ The Smartphone application allows users to map their routes, which provides data to identify cycling corridors and barriers.

Strategies

Education

- Multimodal User Public Awareness campaigns
- Rules of the Road education programs
- Multimodal directions to major activity centers
- Safety Campaign

Encouragement

- Community Awareness events
- Bikeways map

Enforcement

- Share the Road sign installation
- Voluntary bicycle registration program
- Improve accident reporting
- Standardize law enforcement response to active transportation issues

Equity - N/A

Engineering & Maintenance

- Facility Design and Placement Selection Guidelines
- Existing Non-motorized Facility Inventory
- Proposed Non-motorized Network
- Increase non-motorized network visibility and safety

Evaluation - NA

Environment - NA

Economic Vitality

- Incentivize active transportation facilities development
- Sidewalk cleanliness program



Fredericksburg, Virginia

According to the 2010 Census, the Fredericksburg regional area has a population of 327,773. This area, consisting of five localities, is noted as the fastest growing region in Virginia. To accommodate the increasing population, the region is looking to enhance transportation options.

In 2009 as part of the region's Long Range Transportation Plan, the Fredericksburg Area Metropolitan Planning Organization (FAMPO) adopted the George Washington Regional Bicycle and Pedestrian Plan.⁶⁰ The plan represents a coordinated effort between FAMPO and the member localities to facilitate the development of an interconnected regional network of bicycle and pedestrian facilities. The City of Fredericksburg adopted the Bicycle and Pedestrian Master Plan in 2006.⁶¹ The plan titled, *Fredericksburg Pathways*, provides the policy framework for

accommodating bicyclists and pedestrians in the transportation system

Strategies

Education

- Youth/Adult education programs
- Safety Campaign
- Regional Active Transportation resource website

Encouragement

- Community Awareness events
- Bikeways map
- Develop bicycle tours

Enforcement

- Police bicycle patrols
- Strategic school crossing guard placement
- Regional helmet ordinance
- Standardize law enforcement response to active transportation issues
- Active Transportation protection laws
- Active Transportation crash reporting

Equity - N/A

Engineering & Maintenance

- Development of a BikeStation
- Increase bicycle parking
- Defined Maintenance Responsibilities
- Proposed Non-motorized Network

Evaluation

- Performance Metrics

Environment - NA

Economic Vitality - NA



Petersburg, Virginia

Based on the 2010 Census, the Petersburg regional area has a population of 173,463. The Petersburg area, consisting of eleven localities, is looking to foster active transportation to provide viable transportation options and to develop a comprehensive multimodal transportation system.

In 2004, the Tri-Cities Area Metropolitan Planning Organization adopted the Tri-Cities Area Bikeway Plan.⁶² The plan focuses on documenting existing conditions and possible enhancements to the non-motorized network as well as providing strategies to promote active transportation.

Strategies

Education

- Youth/Adult education programs
- Safety Campaign
- Regional Active Transportation resource website

Encouragement

- Community Awareness events
- Media Awareness Campaign

Enforcement

- Police bicycle patrols
- Regional helmet ordinance
- Standardize law enforcement response to active transportation issues
- Active Transportation crash reporting

Equity - N/A

Engineering & Maintenance

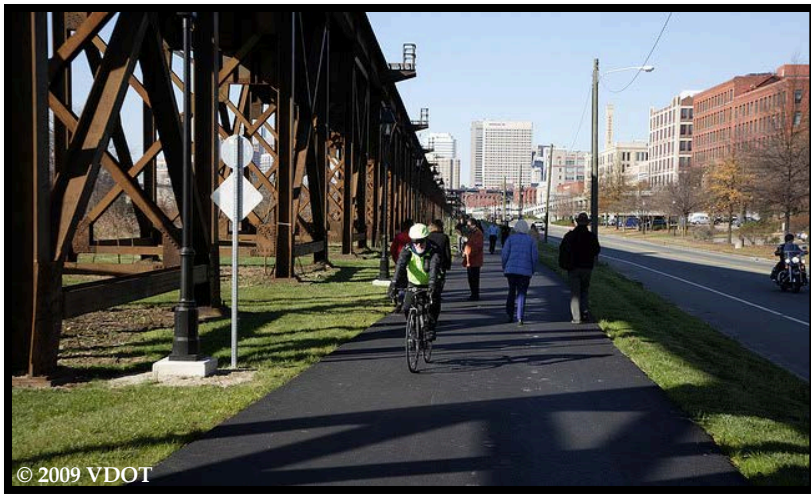
- Proposed Non-motorized Network

Evaluation - NA

Environment - NA

Economic Vitality

- Documentation of active transportation benefits



Richmond, Virginia

As of the 2010 census, the Richmond regional area has a population of 1,002,696. This area, consisting of nine localities, has been faced with increasing demand for alternative transportation options and improving air quality.

In 2004, the Richmond Area Metropolitan Planning Organization adopted the Richmond Regional Bicycle, and Pedestrian Plan.⁶³ This plan was developed by the Virginia Department of Transportation. The plan documents existing conditions and provides recommendations for developing non-motorized facilities and accommodations. Additionally, the plan features level of service mapping of the region, highlighting user perceptions and latent demand of the non-motorized transportation network.

Strategies

Education

- Multimodal User Public Awareness campaigns
- Rules of the Road education programs
- Youth/Adult education programs

Encouragement

- Community Awareness events
- Media awareness Campaign
- Bicycle Commuter Assistance Program
- Facility marketing and signage

Enforcement

- Bicycle Licensing Program
- Standardize law enforcement response to active transportation issues

Equity

- Encouragement strategies for diverse users

Engineering & Maintenance

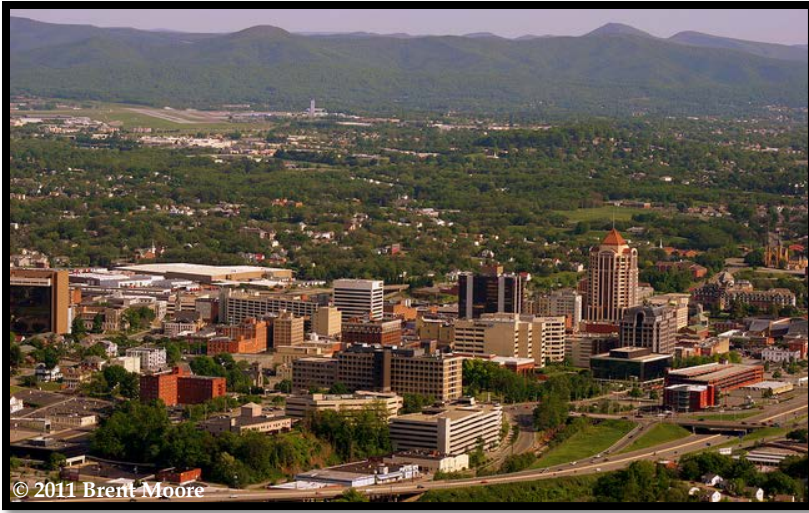
- Existing Non-motorized Facility Inventory
- Proposed Non-motorized Network

Evaluation

- Level of Service and Latent Demand Mapping

Environment - NA

Economic Vitality - NA



Roanoke, Virginia

The Roanoke regional area has a population of 274,759, according to the 2010 Census. The Roanoke regional area, consisting of eleven localities, has a diverse topography of hills, mountains, and river valleys. Active transportation users face varied mobility obstacles in the region due to the diverse topography.

In 2005, the Roanoke Valley Area Metropolitan Planning Organization (RVAMPO) adopted the Bikeway Plan for the RVAMPO.⁶⁴ The plan was developed to provide a coordinated and strategic approach to the development of a regional non-motorized network connecting activity centers and cultural resources. Additionally, the plan facilitates identifying long range non-motorized transportation investments for the region.

Strategies

Education - N/A

Encouragement - N/A

Enforcement

Active Transportation laws

Equity - N/A

Engineering & Maintenance

Facility Design and Placement Selection Guidelines

Existing Non-motorized Facility Inventory

Proposed Non-motorized Network

Evaluation

Level of Service documentation

Environment - NA

Economic Vitality - NA



Birmingham, Alabama

Based on the 2010 Census, the Birmingham regional area has a population of 1,105,132. This area, consisting of six counties, is transitioning from a manufacturing to a service based economy. Additionally, the region boasts the highest green space per capita.

In 2011 as part of the region's Long Range Transportation Plan, the Birmingham Metropolitan Planning Organization adopted the 2035 Birmingham Regional Active Transportation Plan.⁶⁵ The plan focuses on directing regional resources to provide mode-specific strategies and recommendations for the implementation of identified facilities and services, in addition to the operation and maintenance of the existing system.

Strategies

Education

- School curriculum on Active Transportation

Encouragement

- Community Events

Enforcement

- School Zone enforcement

Equity

- Planning for Environmental Justice Communities & all citizens
- Design Guidelines for Special Pedestrian Populations

Engineering & Maintenance

- Existing Conditions & Facility Inventory/Analysis
- Complete Streets Policy
- Facility Design Guidelines

Evaluation

- Bicycle Suitability Analysis
- Bicycle Level of Service

Environment

- Quality of Built Environment
- Preservation of natural environment

Economic Vitality

- Increasing mobility and access for commerce



Los Angeles, California

The Los Angeles area has a population over 18 million, based on the 2010 Census. This area, consisting of six counties, is noted as the most congested metro in the nation. Los Angeles is investing expeditiously in alternative transportation to combat congestion.

In 2012 as part of the region's Regional Transportation Plan, the Southern California Association of Governments adopted their Active Transportation Plan.⁶⁶ The plan highlights existing conditions, needs analysis, and policy recommendations. In 2010, the City of Los Angeles adopted their Bicycle Plan,⁶⁷ which is among the first plans in the nation to identify the eight E's of active transportation planning.

Strategies

Education

Youth/Adult education programs

Encouragement

- Community Awareness events (CicLAvia, Bike to Work)
- Bikeway Maps
- Active Transportation wiki/website
- Poster Campaign
- Bicycle Ambassador Program
- Bike Sharing Program

Enforcement

- LAPD Officer Bicycle Education Program
- Watch the Road Campaign
- Active Transportation Incident Reporting Program

Equity

- Complete Streets Policy

Engineering & Maintenance

- Existing Facility Inventory
- Proposed Non-Motorized Network
- Bicycle Parking Design Standards
- Construction Zone Standards for Active Transportation
- Installation of Bicycle Signal Actuation Detectors

Evaluation

- Performance Metrics
- Bicycle Advisory Committee
- Bicycle Plan Implementation Team

Environment

- Integration with Green Infrastructure

Economic Vitality

- Capital program funding



Sacramento, California

According to the 2010 Census, the Sacramento region has a population of 2,275,401. This area, consisting of six counties, has been recognized as one of the five most livable regions in America.

In 2011 as part of the region's Metropolitan Transportation Plan, the Sacramento Area Council of Governments adopted the Bicycle, Pedestrian, and Trails Master Plan.⁶⁸ The partially constrained plan contains regionally significant non-motorized investments. The plan also provides a framework for coordination and connectivity between localities. The City of Sacramento adopted the Bikeway Master Plan in 1995¹ and the Pedestrian Master Plan in 2006.^{69,70}

¹ Updates to the 1995 Bikeway Master Plan adopted in 2001 and 2004.

Strategies

Education

Youth/Adult education programs

Encouragement

Improve Bicycle Parking

Enforcement - N/A

Equity - N/A

Engineering & Maintenance

Facility Design Guidelines

Prioritization of Non-Motorized Projects

Evaluation

Performance Metrics

Environment - NA

Economic Vitality

Economic Performance Metrics



San Diego, California

The San Diego region has a population of 3,095,313 as of the 2010 Census. This area, consisting of 19 localities, is endowed with great climate, diverse topography, and many destinations conducive to active transportation.

In 2010 as part of the region's Regional Transportation Plan, the San Diego Association of Governments adopted the San Diego Regional Bicycle Plan.⁷¹ The plan provides a framework to encourage cycling in the region via various policies, programs, and infrastructure improvements. Additionally, the City of San Diego drafted a Bicycle Master Plan in 2002.⁷² This plan coordinates city planning and infrastructure improvements.

Strategies

Education

- Youth/Adult education programs
- Complete Streets Education
- Driver's Education (Active Transportation Component)
- Active Transportation Orientation at Universities/Colleges

Encouragement

- Community Awareness events
- Bike Sharing Program
- SmartTrips Program
- Employer Incentive Programs
- Regional Bicycle Map

Enforcement

- Targeted enforcement on unsafe multimodal behaviors
- Police Bicycle Patrols

Equity

- Complete Streets Policy

Engineering & Maintenance

- Existing Facility Inventory
- Proposed Non-Motorized Network
- Prioritization of Non-Motorized Projects
- Way finding Signage

Evaluation

- Performance Metrics
- Active Transportation Advisory Committees

Environment

- Climate Change / Public Health Impacts

Economic Vitality - NA



San Francisco, California

The San Francisco Bay area has a population of 7,150,739 as of the 2010 Census. This area, consisting of nine counties, is working towards a sustainable and efficient transportation system.

In 2009 as part of the region's Regional Transportation Plan, the Metropolitan Transportation Commission adopted the Regional Bicycle Plan for the San Francisco Bay Area.⁷³ The plan provides guidance on how to encourage active transportation in the region and also identify investment strategies to enhance the Regional Bikeway Network.

Additionally, the City of San Francisco adopted a Bicycle Plan in 2009.⁷⁴ This plan provides guidance on bicycle planning and implementation in the city. This plan is also accompanied by a Citizens Guide which provides a condensed easy-to-read

summary of the Bicycle Plan.⁷⁵ A similar blueprint to improve the city's pedestrian environment was adopted in 2010.⁷⁶

Strategies

Education

- Youth/Adult education programs
- Targeted Active Transportation Education
(Transit Operators/ City Staff)

Encouragement

- Community Awareness events
- Bicycling.511.org
- City Bicycle Fleet for staff
- Bicycle Sharing Program

Enforcement

- Targeted multimodal moving violations
- Court mandated Bicycle Traffic School for violations

Equity

- Multimodal Access

Engineering & Maintenance

- Existing Facility Inventory
- Active Transportation Trip/Crash Data Collection
- Proposed Non-Motorized Network
- Facility Design Guidelines

Evaluation

- Demographics of underserved populations post-programs

Environment - NA

Economic Vitality - NA



Miami, Florida

According to the 2010 Census, the Miami area has a population of 2,496,435. This area, consisting of 35 localities, is a conglomeration of diverse cultures nestled in the southeast tip of Florida.

In 2001 as part of the region's Long Range Transportation Plan, the Miami Dade Metropolitan Planning Organization adopted the Bicycle and Pedestrian Plans.^{77,78} These plans focus on identifying non-motorized investments that enhance the existing non-motorized transportation system. In 2010, the City of Miami adopted the Bicycle Master Plan to assist with the goal of transforming Miami into a bicycle friendly city.⁷⁹

Strategies

Education

- Youth/Adult education programs
- Share the Road Campaign
- City Staff Complete Streets Education
- Bicycle Ambassador Program

Encouragement

- Bicycle Sharing Program
- Community Awareness events
- Bicycle Summit
- Bikeway Map
- Online way finding tool

Enforcement

- Annual Police training on active transportation
- Police Bicycle Patrols

Equity - N/A

Engineering & Maintenance

- Existing Facility Inventory
- Proposed Non-Motorized Network
- Project Evaluation Methodology
- Facility / Parking Design Guidelines
- Bicycle Shelters / Stations

Evaluation

- Bicycle/Pedestrian Level of Service
- Latent Demand Score

Environment - NA

Economic Vitality - NA



Tampa, Florida

With a population of 1,229,226 over four localities as of the 2010 Census, the Tampa Bay area serves as the economic hub for southwest Florida. With favorable climate, active transportation stands to flourish in the region.

In 2004 and 2008, the Hillsborough County Metropolitan Planning Organization adopted the Comprehensive Pedestrian Plan and Comprehensive Bicycle Plan respectively.^{80,81} Both plans represent a practical and visionary approach to creating a balanced transportation system and ensuring the safety and accessibility of all users. The plans also include analyses of existing facilities along with identification of priority corridors for future non-motorized facilities.

Strategies

Education

- Youth/Adult education programs
- Share the Road campaign

Encouragement

- Community Awareness events
- Non-Motorized map
- Active Transportation user incentives

Enforcement - N/A

Equity - N/A

Engineering & Maintenance

- Existing Facility Inventory
- Proposed Non-Motorized Network
- Improved Signage
- Facility Design Standards
- Project Prioritization Criteria
- CPTED Design considerations

Evaluation

- Bicycle/Pedestrian Level of Service
- Latent Demand Score
- Bicycle/Pedestrian Advisory Committee
- Data Collection
- Performance Metrics

Environment - NA

Economic Vitality - NA



Boston, Massachusetts

The Boston area has a population of 3,153,590 according to the 2010 Census. This area, consisting of 101 localities, is working diligently to promote smart growth and sustainability.

In 2007 and 2010, the Metropolitan Area Planning Council adopted the Regional Bicycle and Pedestrian Plans respectively.^{82,83} The plans describe the existing non-motorized infrastructure and identify priority projects. Additionally the plans also cover programs and policies at the regional, state and local level in support of non-motorized transportation.

In 2001, the City of Boston adopted the Boston Bicycle Plan⁸⁴ to help create a better environment for bicycling in Boston. Additionally, in 2011, the City of Boston launched Hubway, a bike sharing system.

Strategies

Education

- Youth/Adult education programs

Encouragement

- Community Awareness events
- Local Planning Grant Program
- Bikeway Map

Enforcement

- Policy Framework and Recommendations
- Police training on active transportation
- Active Transportation Crash Reporting
- Active Transportation Friendly Zoning Ordinances

Equity

- Local Complete Streets Policies

Engineering & Maintenance

- Proposed Non-Motorized Network
- Facility Design Standards
- Project Prioritization Criteria
- Debris Removal guidance
- Regional Bike Parking Program
- TIP Criteria evaluating Active Transport projects

Evaluation

- Roadway Inventory File Improvements
- Centralized Non-motorized network Hazard Reporting
- Active Transportation Advisory Committees

Environment - NA

Economic Vitality

- Economic Analysis of Active Transportation in Boston



Minneapolis, Minnesota

The City of Minneapolis is noted as the #1 bicycling city in America with a diverse and vibrant cycling culture, despite adverse climate conditions. According to the 2010 Census, the Twin Cities metropolitan region that includes the City of Minneapolis has a population of 2,849,567.

In 2011, the City of Minneapolis adopted the Bicycle Master Plan.⁸⁵ The plan provides the history of cycling in Minneapolis, the policy framework, existing conditions analysis, needs analysis, and policy and investment strategies for active transportation in Minneapolis. The City of Minneapolis also adopted the Pedestrian Master Plan in 2009. The plan provides guidance and identifies implementation strategies to make Minneapolis a great city for walking.⁸⁶ Additionally in 2010, the region launched Nice Ride Minnesota, a bike sharing system.

Strategies

Education

- Youth/Adult education programs
- Safety Campaign
- Benefits of Active Transportation community education

Encouragement

- Community Awareness events
- Bikeways map
- Develop bicycle tours
- Bicycle and Pedestrian Ambassadors
- Encouragement for Environmental Justice Populations

Enforcement

- Police bicycle patrols
- Bicycle Recovery Program
- Bicycle Parking Ordinance
- Active Transportation Support Facilities
- Standard enforcement of active transportation laws

Equity

- Modal Connections
- Geographic/Demographic Equity

Engineering & Maintenance

- Project Prioritization Criteria
- Bikeway Maintenance Program
- Existing Facility Inventory

Evaluation

- Performance Metrics & Benchmarks

Environment - NA

Economic Vitality - NA



Portland, Oregon

With a population of 2,226,009 as of the 2010 Census, the Portland area is noted as the bicycling Mecca in the United States. The region, consisting of three counties, is credited with pioneering active transportation planning.

In 2010, the City of Portland adopted the Portland Bicycle Plan for 2030.⁸⁷ The plan supports the need for cycling and provides the policy framework, strategies, and an implementation method to develop the non-motorized network with programs to encourage active transportation. The City of Portland previously adopted the Pedestrian Master Plan in 1998. The plan established a 20-year framework for enhancing the pedestrian environment.⁸⁸ In 2012, the City of Portland issued a request for proposals to explore the implementation of a bike sharing system.

Strategies

Education

- Making the Case for Cycling
- Youth/Adult education programs

Encouragement

- Community Awareness events
- Active Transportation Services (maps, equip cyclists)
- SmartTrips Residential Program

Enforcement

- Car-limited Zones
- Active Transportation Building/Zoning Codes
- Enhanced Active Transportation Crash Reporting

Equity

- Modal Integration
- Equity Gap Analysis

Engineering & Maintenance

- Facility/District Classification for Active Transportation
- Facility Design Guidelines
- Existing Non-motorized Facility Inventory
- Proposed Non-motorized Network
- Maintenance Guidance
- Bikeway Implementation Criteria

Evaluation

- Performance Metrics
- Low-Stress Bike Route Gap Analysis

Environment

- Green Transportation Hierarchy

Economic Vitality

- Impact to business, employment, and tourism metrics



Memphis, Tennessee

The Memphis region has a population of 1,127,309 based on the 2010 Census. The Memphis area, consisting of three counties, is home to a vibrant music culture and a burgeoning cycling culture.

In 2011 as part of the region's Long Range Transportation Plan, the Memphis Metropolitan Planning Organization adopted the Regional Bicycle and Pedestrian Plan.⁸⁹ The plan focuses on identifying, evaluating, and strategizing improvements to the non-motorized network. The plan also provides recommendations to encourage active transportation in the region.

Strategies

Education

- Youth/Adult Education Programs
- Benefits of Cycling

Encouragement

- Community Awareness events

Enforcement

- Ordinance/Regulations inventory and recommendations
- Police training / enforcement on Active Transportation

Equity - N/A

Engineering & Maintenance

- Existing Facility Inventory
- Proposed Non-motorized Network
- Attractor and Generator Inventory
- Facility Design Guidelines

Evaluation

- Bicycle Compatibility Assessment
- Performance Benchmarks

Environment - NA

Economic Vitality - NA



Austin, Texas

As of the 2010 Census, the Austin area has a population of 1,716,289. This region, consisting of five counties, is rapidly growing around a high-tech economy supported by a growing multimodal transportation network.

In 2009, the City of Austin adopted the city's Bicycle Plan.⁹⁰ The comprehensive plan goes in extensive detail about the existing active transportation system and its connections to other modes, maintenance of the network, education, enforcement, encouragement and implementation strategies to promote bicycling.

In 2011, Texas A&M University launched Cycle Tracks Austin, a crowdsourcing bike data collection system. Additionally, Austin is planning a 2013 launch of a bike sharing system.

Strategies

Education

- Youth/Adult education programs
- Safety Campaign
- Bike Resources on City 311

Encouragement

- Community Awareness events
- Bikeways map
- Bike Stakeholder directory
- Bike Route Interactive Mapping

Enforcement

- Active Transportation training for local police
- Bicycle Traffic Course for bike violations
- Active Transportation crash reporting

Equity

- Targeted enforcement across all modes

Engineering & Maintenance

- Existing facilities inventory
- Barriers/Gaps Analysis
- Proposed Active Transportation Network
- Facility Selection guidelines

Evaluation

- Performance Metrics

Environment - NA

Economic Vitality - NA



Salt Lake City, Utah

The Salt Lake City region has a population of 1,433,509. This region, consisting of five counties, is executing a mission to redefine the region to be more sustainable, multimodal, and livable for future generations of residents.

In 2004, the City of Salt Lake adopted the Bicycle and Pedestrian Master Plan.⁹¹ The plan provides the framework of the existing non-motorized transportation network, documents the facility classifications for the region, and outlines an implementation plan that features a prioritization process.

In 2012, Salt Lake City plans to launch a bike sharing program.

Strategies

Education

- Youth/Adult education programs
- Safety Campaign
- Regional Active Transportation resource website

Encouragement

- Community Awareness events
- Bikeways map

Enforcement

- City Ordinance strategies to promote active transportation
- Police Bicycle Patrol

Equity - N/A

Engineering & Maintenance

- Existing facility inventory
- Facility classification catalog
- Project Prioritization process
- Proposed Active Transportation Network

Evaluation - NA

Environment - NA

Economic Vitality - NA



Seattle, Washington

The Seattle region has a population of 3,616,747, as of the 2010 Census. This region, consisting of four counties, is home to a vibrant high-tech economy, diverse population and topography, and a vibrant active transportation culture.

In 2002, the Puget Sound Regional Council adopted the Regional Bicycle and Pedestrian Implementation Strategy.⁹² The strategy is a series of potential actions to facilitate bicycle and pedestrian travel in the region. The strategy provides a strong and detailed framework to develop programs and policies in support of active transportation in the central Puget Sound region.

In 2007, the City of Seattle adopted a Bicycle Master Plan,⁹³ outlining the investment and policy strategies for the bike network and support facilities. The Pedestrian Master Plan was adopted by the city in September 2009.⁹⁴ The plan is a citywide action plan focused on walking with a goal of making Seattle the most walkable city in the nation.

Strategies

Education

- Youth/Adult education programs
- Safety Campaign

Encouragement

- Community Awareness events
- Bikeways map
- Travel Demand Management coordination
- Bicycle Support Facility integration

Enforcement

- Standardize law enforcement response to active transportation issues

Equity - N/A

Engineering & Maintenance

- Existing Bicycle Facilities Inventory
- Proposed Active Transportation Network
- Life Cycle Cost Facility Management Plan
- Transportation System Management / ITS coordination
- Bicycle Destinations and Corridor Map
- Bicycle Facility Maintenance Activity Plan

Evaluation

- Performance Metrics

Environment - NA

Economic Vitality - NA

NEXT STEPS



This document has provided information on the best practices in active transportation planning, as it pertains to the eight 'E's. Using the information presented so far, this chapter summarizes the steps that are currently underway or could be taken to promote active transportation in the Hampton Roads region.

Data Collection

In order to assess the active transportation network for the Hampton Roads region, there needs to be an understanding of the planning efforts and infrastructure that exist to promote regional active transportation.

Planning for active transportation is largely managed at the local level in Hampton Roads. Most Hampton Roads localities include bicycle and pedestrian planning within their Comprehensive Plan. These efforts have been highlighted in the Hampton Roads Transportation Planning Organization (HRTPO)'s 2034 Long Range Transportation Plan.⁹⁵

In terms of existing infrastructure, most localities in Hampton Roads maintain maps of existing bicycle and pedestrian trails and routes. To enhance these local efforts, an inventory of existing non-motorized facilities across the Hampton Roads region would be very useful. This inventory of existing facilities would look to identify the existence, condition, geometrics, crash statistics, and usage of the following facilities:

- Sidewalks
- Bicycle Paths
- Multi-Use Trails
- Crosswalks
- Americans with Disability Act ramps
- Pedestrian/Bicycle signals
- Bicycle Parking

The information above would provide planners with an idea of the demand for non-motorized infrastructure, gaps in the non-motorized transportation system, and priority sites to mitigate active transportation crashes.

As of this writing, the data on existing pedestrian sidewalks, bicycle paths, and multi-use trails in Hampton Roads have been collected. The data for these facilities were primarily provided by the localities. The HRTPO staff has enhanced the data by adding relevant non-motorized facilities based on a preliminary review of the existing facilities. However, the conditions, geometrics, usage, and crash statistics of these facilities remains to be documented. Further a more thorough evaluation of the data needs to be conducted to ensure consistency and standardize facility attributes across all member localities.

Smartphone Application

To supplement the data on facilities and their usage, various applications and counting efforts can be undertaken. The City of San Francisco recently developed a Smartphone application called CycleTracks to collect data on active transportation users.⁹⁶ This smartphone application gathers data on the user demographics, trip purpose, and tracks the user's route via bicycle using GPS. Following the success of this smartphone application, other cities such as Austin, Seattle, Monterey, and Charlottesville have started using smartphone applications to collect data on active transportation.

This approach can be used in Hampton Roads to collect information on the existing active transportation users and their usage of non-motorized facilities. CycleTracks is an open source application and hence modifications can be made to the application to allow the identification and tracking of various modes of transportation. At the time of this report, the Virginia

Department of Transportation and the HRTPO are coordinating efforts to analyze the feasibility of such an application.

Bike sharing



Bike sharing is a service that provides individuals short-term access to bicycles. The bicycles are made available for free or for a low rental fee from unattended bike stations. These programs are typically run by city governments, public-private partnerships, community groups, non-profits etc. Bike sharing is viewed as a strategy to increase bicycle usage, improve the connectivity for users and enhance the mobility within the urban fabric.⁹⁷

The concept of bike sharing originated in Europe (Amsterdam) in 1965 and has had slow growth. However in recent years, there has been a rapid expansion of bike sharing programs in cities around the world. Technological improvements have been one of the key impetuses of this rapid expansion. Today, most bike sharing programs publicized and visible around North America include a variety of technological improvements such as electronically-locking racks or bike locks, telecommunication systems, smartcards and fobs, mobile phone access, and on-board computers.⁹⁸ Examples of such programs in the US include the cities of Denver, CO; Minneapolis, MN; Chicago, IL and Washington, DC.⁹⁹

Within the Hampton Roads region, the City of Norfolk is currently pursuing efforts to implement a bike sharing program. The City of Norfolk has been analyzing the growth in bike sharing programs across the US for several years. The initial analysis conducted by the city shows that the downtown areas of Norfolk and Portsmouth have the demographics, business, commuters and tourism density to support a successful program. The city anticipates bicycles to become an integral mass transit enhancement to the existing bike friendly transit system.

The City of Norfolk envisions the program to essentially be a private enterprise, facilitated with non-financial municipal resources. The scope of the system could require 1.5 to 2 million dollars of capital and about half that amount per year to operate. Funding resources for the program could include grants,

advertising, sponsorships, memberships, fares and as yet unexplored opportunities.



Other elements that can be considered to enhance active transportation in this region are amenities such as bike stations. Pioneered in Europe and Japan, bikestations provide all necessary amenities for cyclists. These facilities serve as attended bicycle parking and include a repair shop, changing rooms, bicycle sales and rentals, car sharing services, and transit connections.¹⁰⁰ Bikestations are set up as pay-as-you-go or membership, depending on the local demands. Long Beach, California welcomed the first American bikestation in 1996. From Long Beach, the bikestation concept has caught on around the United States, with facilities located in cities like Seattle, Chicago, and Washington.

Deficiency/Gaps Analysis

A deficiency/gaps analysis provides a good approach to analyzing the existing system and identifying future efforts. In collaboration with local stakeholders, the region can focus efforts to identify and analyze deficiencies and gaps in the non-motorized transportation network and active transportation planning efforts. A gap analysis of the network would look to identify locations where the non-motorized transportation network does not provide continuous facilities for active transportation users. Gaps in the non-motorized transportation network can also include connectivity issues to select destinations, such as the ones listed below:

- Schools & Higher Education Institutions
- Transit Stops
- Churches
- Civic Centers
- Major Retail centers
- Dense residential communities (apartment complexes)

Other issues that cause deficiencies in the non-motorized transportation and need to be considered include deficient pavement, path obstruction, high crash rates, poor geometric design etc.

Policies and programs can also be assessed for deficiencies as well, especially when policies and programs are not achieving their purpose or getting their message across to intended audiences to promote active transportation.

Looking Ahead

The HRTPO recently completed the 2034 Long-Range Transportation Plan (LRTP) in January 2012. This document serves as the transportation blueprint for the region and identifies critical transportation infrastructure needed to maintain the region's economic vitality, competitiveness and every citizen's quality of life.

The LRTP needs to be updated every four year and the HRTPO is now spearheading efforts to kick-off the next LRTP, with a horizon year of 2040. The current focus is to identify ways to engage the public and local stakeholders in defining a vision for the Hampton Roads region. As part of this visioning effort, public and stakeholders also help identify needed multi-modal transportation projects, which feed into the LRTP.

Further as part of the development of the 2034 LRTP, the HRTPO developed a project prioritization tool to help determine regional transportation priorities.¹⁰¹ This objective methodology ranks transportation projects based on their technical merits and regional benefits using numerous evaluation criteria. As part of the 2040 LRTP, the HRTPO staff will be revising/updating the tool as needed to better reflect current conditions and account for the availability of newer data.

From an active transportation perspective, the inventory of existing conditions will provide a framework for the public and stakeholders to plan for the future active transportation system in line with the regional vision. The associated deficiency/gaps analysis could help identify project recommendations that could

bridge gaps and deficiencies in the non-motorized transportation network. These findings can also be used to enhance the existing criteria in the project prioritization tool for active transportation projects. This will provide a more thorough evaluation of active transportation projects and help in identifying appropriate funding for these projects.

Last but most importantly, while planning for active transportation in the Hampton Roads region is a comprehensive regional effort, the bulk of the planning efforts will be at the local level. This document as with other efforts at the HRTPO will help guide these efforts to ensure a multimodal transportation system for Hampton Roads.

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