BikePedRVA 2045

Richmond Regional Bicycle & Pedestrian Plan

May 5, 2022

Richmond Regional Transportation Planning Organization

SUPPORTED BY PlanRVA THE REGIONAL COMMISSION

This plan is dedicated to the memory of longtime bike-ped advocate and Henrico County resident, Lloyd J. “Bud” Vye.

For more than 30 years, Vye was one of the region’s most committed bicyclists and a pedestrian safety advocate. He was involved in bicycling with Richmond Area Bicycling Association (RABA), where he was their Advocacy Director for many years. He was also the statewide Advocacy Director for the Virginia Bicycling Federation (VBF).

Vye served on the RRTPO Citizens Transportation Advisory Committee from 1999 to 2021.

Richmond Regional
Transportation Planning Organization

POLICY BOARD AGENDA 5-5-22

BIKEPED 2045 PLAN

Richmond Regional Transportation Planning Organization

On motion by James M. Holland, seconded by Andreas D. Addison, the Richmond Regional Transportation Planning Organization (RRTPO) Policy Board approved the following resolution.

WHEREAS, the Richmond Regional Transportation Planning Organization Policy Board acknowledges the critical importance of alternative transportation modes for safe and equitable regional growth and development, and

WHEREAS, a well-planned and connected active transportation network represented by BikePedRVA 2045 and ConnectRVA 2045 will provide an essential resource for stakeholders and decision-makers to implement infrastructure priorities, and

NOW THEREFORE BE IT RESOLVED, that the Richmond Regional Transportation Planning Organization Policy Board adopts *BikePedRVA 2045*.

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This is to certify that the Richmond Regional Transportation Planning Organization Policy Board approved the above resolution at its meeting held May 5, 2022.

WITNESS:

Janice Firestone

Janice Firestone
Program Coordinator
PlanRVA

BY:

Chet Parsons
Secretary
Richmond Regional Transportation
Planning Organization

PlanRVA THE REGIONAL COMMISSION

PlanRVA is where we come together to look ahead. Established in 1969, the Richmond Regional Planning District Commission, known as PlanRVA, has been the home of cooperation among the nine jurisdictions of Central Virginia for more than 50 years. Today, we focus in areas of community development, emergency management, the environment and transportation. We are the seer of the future, convener of our member jurisdictions and regional partners, creator of plans of action and shaper of Central Virginia's future.

Key *BikePedRVA 2045* Takeaways

Introduction

- The last and only comprehensive regional bicycle and pedestrian plan was prepared in 2004
- It elevates biking, walking, and rolling for transportation
- Safety, equity, climate are key focus areas
- Motor vehicle speed is a major factor in unsafe streets for vulnerable road users

Engaging in the Planning Process

- A steering committee of the region's localities, transportation agencies, and advocates was established in 2019 to guide the process
- Public engagement for *BikePedRVA 2045 started during the process for the adopted* long-range transportation plan, *ConnectRVA 2045*
- Virtual public surveys identified safety, environmental quality, and accessibility as the top transportation priorities
- Public input also identified investments in active transportation, transit expansion, and maintenance of existing infrastructure as funding priorities

Definitions

- The current best practices for safety emphasize separation from motor vehicle traffic and enhanced use of low-stress routes for cyclists and pedestrians in shared environments
- The plan uses NACTO (National Association of City Transportation Officials) defined terms to classify regional active transportation facilities: shared use paths, cycle tracks, bike lanes, and mixed-traffic facilities

Guiding Principles

- Guiding principles are safety, multimodal, equity, choice, completion of active networks, last-mile transit, and context-sensitive design
- The vision is to provide mobility for people of all ages and abilities through a safe, continuous, recognizable, and intuitive pedestrian and bicycle network
- Benefits of active transportation are well-documented as having positive influence on the economy, climate, equity, safety, and individual and community health

Planning Approach

- Rivers, railroads, interstates, and transmission lines are both barriers and opportunities for enhanced active transportation
- Roadways with low levels of traffic stress serve as the foundation for more comfortable connections
- A significant number of pedestrian and cyclist injuries and deaths have occurred on a relatively small number of road corridors
- Connections to and within Equity Emphasis Areas and Low Health Opportunity Index Areas are priorities, as are regional activity centers and transit routes

Big Regional Ideas

- Six Big Regional Ideas provide the framework for plan implementation—create a regional active transportation spine network; prioritize equity and access; establish higher, well-recognized industry standards; focus on a pedestrian sidewalk network; strengthen local active transportation connections; and provide tools for localities

Plan Implementation

- The localities have many of the tools available to implement the plan: comprehensive plans, zoning and subdivision ordinances, Capital Improvement Plans, site plan processes
- PlanRVA's role is to help enhance these tools, create data-driven resources to help establish funding priorities, and provide educational and outreach opportunities
- The Central Virginia Transportation Authority (CVTA) enables publicly available funds to leverage a greater number of active transportation projects

Table of Contents

Richmond Regional Transportation Planning Organization (RRTPO) is a federally mandated transportation organization staffed by PlanRVA which was created as a regional planning agency by the Commonwealth in 1969, one of 21 planning districts in Virginia. References to PlanRVA and RRTPO are used interchangeably. *BikePedRVA 2045* is a product of RRTPO focused on the active transportation mode included in the *ConnectRVA 2045* long-range transportation plan.

Introduction

- Preface
- Purpose
- Safe Streets: A Call to Action

Micromobility

Micromobility includes ways of getting around that are fully or partially human-powered—such as using bikes, e-bikes and e-scooters, and mobility-assistance devices/wheelchairs.

Preface

The importance of bicycle and pedestrian modes of travel in the Richmond Region has ebbed and flowed with customs and technological advances. The advent of the internal combustion engine, which transformed non-human-powered travel from primarily horses and buggies to gas-powered vehicles, also largely transformed bicycling from a regular mode of travel to one of recreation. Still, in the early 20th century, there was a moment when bicycles were viewed with more societal utility and more on par with automobiles for personal mobility. In May 1919, *The Richmond Times-Dispatch* advertised cycling as fashionable, useful for errands, and as an opportunity to turn work into play. They were also instrumental to the modern expansion of women's rights in the U.S., as the new technology provided a fairly inexpensive way to expand mobility options in both urban and rural communities for those who had to rely on men with access to carriages and automobiles.

Over the 1920s bicycles gradually came to be considered more as toys than transportation and, by 1940, most bikes in the U.S. were made for children. Likewise, bicycling use was relegated to one of recreation as the infrastructure for the increasingly present motorized vehicle took over, allowing easier and quicker access to destinations located further and further out from the historic urban center as population and employment growth demanded. The car-dominated culture also led to the reallocation of public rights-of-way from prioritizing the individual person to the individual car, making safe pedestrian travel to destinations beyond the neighborhood much more difficult. Rampant highway construction and parking lots erased downtown blocks and urban neighborhoods, complicating active transportation planning in the Richmond region and across America over the past 50 years.

EARLY TWENTIETH CENTURY BICYCLE ADVERTISEMENT (*RICHMOND TIMES-DISPATCH*)

SCHOOLCHILDREN WALKING ALONG RIDGE ROAD IN 1959 (*RICHMOND TIMES-DISPATCH*)

Planning for cycling, walking, rolling, and other micro-mobility modes of travel in our region has a relatively short history. The Richmond Region's first official *Regional Bicycle Plan* was prepared by the Richmond Area Metropolitan Transportation Organization (formerly RAMPO, now known as the Richmond Regional Transportation Planning Organization or RRTPO) in 1982 at the suggestion of the Citizens Transportation Advisory Committee and the recommendation of a performance audit by the Virginia Department of Highways and Transportation, now called Virginia Department of Transportation (VDOT). The ***1982 Plan*** identified four principal issue areas: Education, Enforcement, Engineering, and Encouragement. The plan document was prepared,

but the "Bicycle User's Map" was not included because of "questions raised by MPO members on the liability and the potential safety hazards in using the identified bike route network." An earlier ***1977 Bikeways Plan for the Richmond Region*** by the Richmond Regional Planning District Commission (RRPDC, currently known as PlanRVA) was also not approved.

It was not until **2004** that a more complete ***Richmond Regional Bicycle and Pedestrian Plan*** incorporating public input was prepared by VDOT and a consultant working with the RRTPO staff. This effort was called for by the *2023 Long-Range Transportation Plan*:

"Basic mobility needs of the local population cannot be accomplished without a network of roadways, transit routes, pedestrian and bicycle paths, paratransit services, transportation demand management options, and other systems that enhance movement of people. Often these ways, routes, paths, services, options, and systems can be contained on the same facility, providing local residents multimodal options to make all types of work, social, recreational and educational trips. As the population and composition of the Richmond Region becomes more diverse, the transportation system must diversify to ensure adequate access and multiple mobility choices for the residents of the region."

The 2004 plan provided numerous strategies for 12 physical network improvements, four policies, six planning updates and five program recommendations. A key recommendation called for the establishment of a permanent regional bicycle and pedestrian committee staffed by the MPO to provide oversight of the plan implementation and enable ongoing public involvement and interagency and inter-jurisdictional coordination. This resulted in an informal Active Transportation Work Group (ATWG) with one associated MPO staff position formed 12 years later in 2016. The 2004 plan was filled with strategies, but short on specific implementation measures.

BikePedRVA 2045 both builds on and departs from the previous planning efforts of the past 30 years. What has changed in that time?

CYCLISTS PARTICIPATE IN A GROUP RIDE ON E. FRANKLIN ST. CYCLE TRACK

- **Investment** in infrastructure: Key bike/pedestrian improvements have been completed, namely complete reconstruction of the Huguenot Bridge with wide bikeable lanes and sidewalks on either side, completion of the Virginia Capital Trail (formerly Rt. 5 bike lanes), and completion of smaller demonstration projects called for by the 2004 plan.
- Commitment to biking as a **transportation mode**: Greater recognition and acceptance of active transportation as a mode for transportation, not just for recreational enjoyment.
- **Safety** concerns: Heightened concern for public safety of individuals walking and biking on our roadway network. Bicyclist and pedestrian fatalities in the region have increased by nearly 45 percent from 2015 to 2020.
- **Implementation**: New funding sources and commitment by state and regional leaders for the completion of shared use trails.
- **Popularity**: Increased use coupled with greater marketability by the non-motorized public for complete walkable communities and placemaking that translates into higher real estate values. The popularity of e-bikes and e-scooters has also increased in the past few years.

Purpose

The purpose of *BikePedRVA 2045* is to update the 2004 Richmond Regional Bicycle and Pedestrian Plan, document the progress that has been made in the past 16 years, and forecast a vision for the next 25 years. This plan has been prepared in coordination with the *ConnectRVA 2045* long-range transportation plan, which was adopted by the RRTPO Policy Board on October 4, 2021. The comprehensive planning effort addressed multimodal issues, needs, and future demand and is intended to be transformational. Through the process of envisioning a regional network in which active transportation plays a vital part, *ConnectRVA 2045* assigned specific performance measures by which to select a constrained list of projects that are financially possible to plan and construct over the 25-year planning horizon. These "constrained" projects serve as the foundation for the working active transportation project list included as part of the *BikePedRVA 2045* plan.

Understanding the *BikePedRVA 2045* plan as a component of *ConnectRVA 2045* plan it is important to recognize that:

***BikePedRVA 2045* is NOT:**

- A ranking of priority projects
- Focused on any one jurisdiction, rather the connection among all nine
- A finite plan that stops growing upon adoption.

***BikePedRVA 2045* is:**

- A comprehensive regional framework for active transportation
- A companion plan to *ConnectRVA 2045*
- A collection of best management practices for improving travel options
- A recognition of the need for all people to have viable means of travel for work, play, school for everyday life needs.

Big Regional Ideas

BikePedRVA 2045 is structured around six big ideas:

1. **Create a regional active transportation spine network.**
2. **Prioritize equity and access for disinvested communities in the completion of active transportation networks.**
3. **Establish higher, well-recognized industry standards for regional active transportation infrastructure.**
4. **Focus on a pedestrian sidewalk network that provides safe, accessible connections for all users from neighborhoods to transit stops.**
5. **Strengthen local active transportation connections through the use of bike boulevards and safe neighborhood streets.**
6. **Provide tools for all nine PlanRVA jurisdictions to effectively guide private sector developers to incorporate high quality active transportation infrastructure into their projects to the benefit of the regional network.**

Read more about the Big Regional Ideas

The framework of *BikePedRVA 2045* builds on a regional transportation network supported by local projects for shared use paths, bike lanes, sidewalks, neighborhood connectors, bikeable streets, and complete streets elements that create more accessible systems for people walking, rolling, scooting, cycling, or taking transit.

The recognition of the urgent equity and climate needs we currently face grounded and guided the development of this plan, details of which will be expanded through the description of the process, vision, goals, objectives, and planning framework. Investments in road safety often coincide with social and environmental justice goals. This makes a strong regional active transportation network with true accessibility a strategy with multiple benefits in the areas of economics, health, climate, equity, safety, and community vitality.

Public engagement opportunities for active transportation planning were provided through the *ConnectRVA 2045* long-range transportation plan process, including virtual opportunities supplemented by regular input from an Advisory Committee and six in-person public open houses held in area libraries before the plan was adopted by the RRTPO Policy Board on October 4, 2021. *BikePedRVA 2045* further expanded opportunities for public engagement by supplementing the feedback of the earlier process with in-person and virtual opportunities to comment on the document and to contribute to a more robust public strategy for the advancement of active transportation throughout the Richmond Region.

Safe Streets: A Call to Action

Pedestrian fatalities have been steadily increasing nationwide. The number of people struck and killed each year in the U.S. has grown by 45 percent between 2010 to 2019, according to the Dangerous by Design 2021 report by Smart Growth America (Exhibit 1). Drivers struck and killed 53,435 people walking on streets over that decade, more than 17 people per day nationwide.

Several factors of note have contributed to the increased fatality rate among pedestrians:

- **More people are driving trucks and SUVs**, which are two to three times more likely than smaller personal vehicles to kill vulnerable road users in the event of a crash.

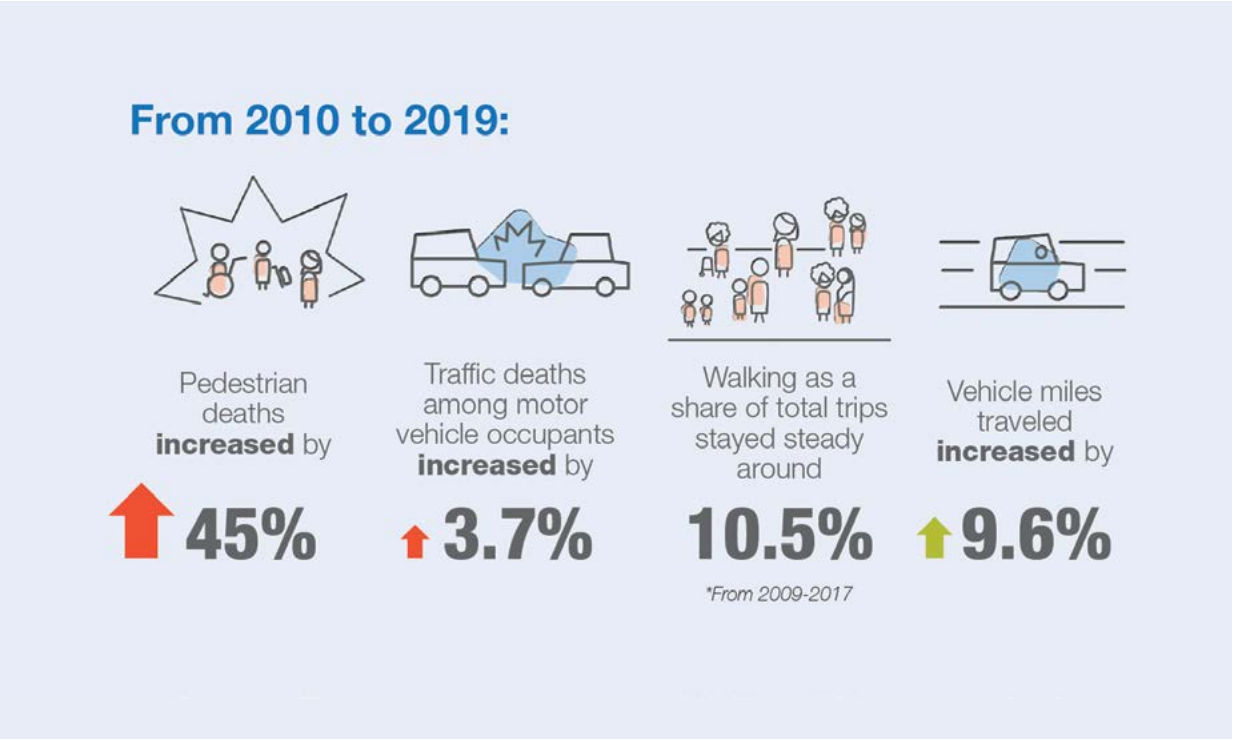


EXHIBIT 1: U.S. TRAFFIC DEATHS IN THE LAST DECADE (SMART GROWTH AMERICA)

- **Safety targets that would aggressively address the reduction of serious injuries and fatalities of pedestrians have been ignored by many states**—not including Virginia.
- **Designing roads for high(er) speeds dramatically increases the likelihood that a person struck while walking will be killed.** Studies have shown that good design leads to better driving behavior, fewer mistakes, and mistakes with less deadly impact. As Exhibit 3 illustrates, visual cues such as narrowed lane widths, a field of vision defined by strong street edges and clearly marked crosswalks with safe resting spaces and limited vehicular free-flow movement through turning actions in intersections contribute to safer pedestrian environments.

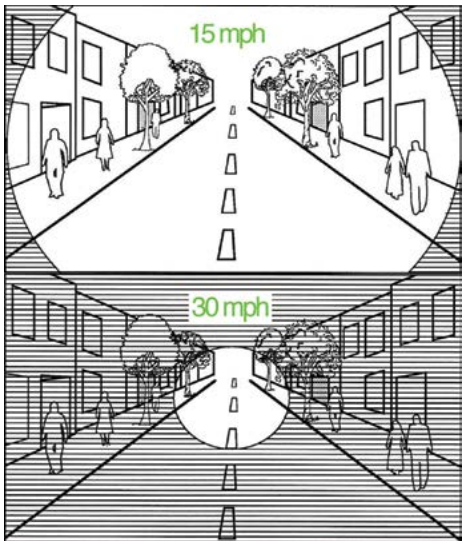
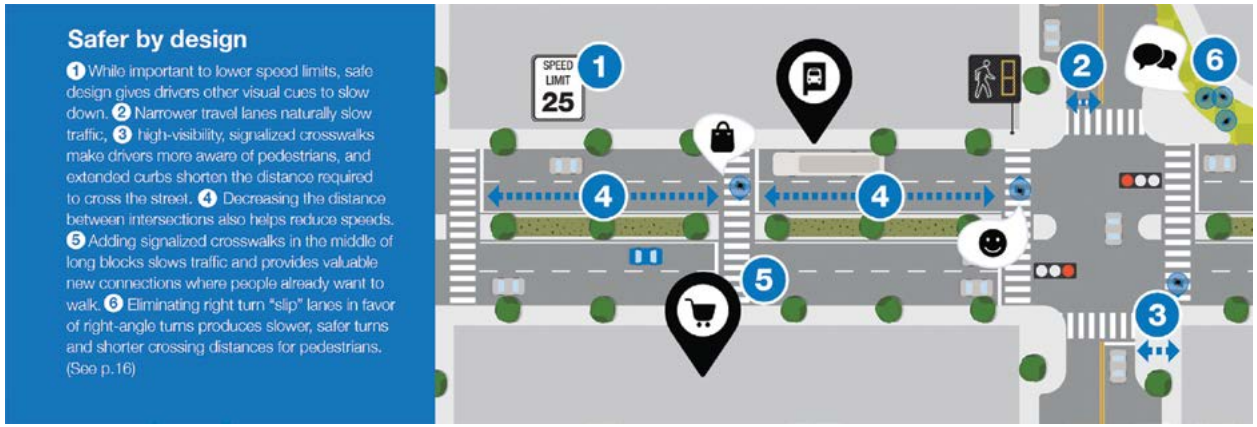


EXHIBIT 2: A DRIVER'S VISUAL FOCUS AT DIFFERENT SPEEDS (STREETS.MN)

- **Federal safety measures of automobiles have traditionally not measured the safety of people outside the vehicle.** However, the 2021 Infrastructure Investment and Jobs Act includes new safety mandates for the auto industry, including crash avoidance technology and criteria for rating vehicles on pedestrian, cyclist, and other vulnerable road user safety provisions.

During the early stages of the COVID-19 pandemic, traffic volumes and vehicle miles traveled (VMT) decreased. However, data from the National Highway Traffic Safety Administration (NHTSA) indicates that from April-June 2020 the pedestrian fatality rate increased by 32 percent, reaching its highest level in 15 years. This is during a time that the overall driving rate decreased by 26 percent. The study found that speeding went up due to more available road space.

Proactively designing more streets for slower speeds may have helped prevent such an increase. The National Safety Council also estimates the biggest increase in traffic fatality rates in 96 years in 2020—a 24 percent spike—during a year when miles driven overall was down 13 percent. In the Richmond Region, data from the Virginia Department of Motor Vehicles (DMV) indicates that 25 pedestrians were killed by vehicles while walking in 2020, the most in the last decade.



25 pedestrians were killed by vehicles while walking in the Richmond Region in 2020.

EXHIBIT 3: MAKING ROADS SAFER BY DESIGN (SEE DETAILED SLIDES FROM SMART GROWTH AMERICA AT SMARTGROWTHAMERICA.ORG/DANGEROUS-BY-DESIGN)

Vehicle speed is a culprit in all fatal crashes but difficult to control because road design commonly encourages high speed and throughput. Design characteristics such as overly wide roads, a large number of lanes, and clear sightlines enable speeding by making it more inviting for motorists to drive faster. But just a 5–10 mph difference is often the difference between life and death for a person who is struck by a moving vehicle, as shown in Exhibit 5. Continuing off these numbers, studies show that a pedestrian has only a 10 percent chance of survival when hit by a vehicle traveling at 58 mph.

Just as speed kills, so does size. Vehicle size trending upward has also meant vehicle hoods that are higher off the ground than vehicles made in the past, including older trucks and SUVs. This has led to an increase in "frontover" injuries and deaths caused by a larger blind-spot in the immediate front of a vehicle. Frontovers are particularly dangerous in driveways and parking lots, where children and smaller people may be out of the driver's sight.

Smart Growth America (SGA) calculates a Pedestrian Danger Index (PDI) by state or metro area based on the number of people killed by drivers while walking, normalized by the universe of state population residing in a metro area and prevalence of walkers for all trips and to work. Since their earlier report of 2008-2017, the 2021 report found increased PDI scores in 49 of 50 states and 84 of the top 100 metros. Virginia is ranked 25th among the 50 states and Washington DC with 1.3 fatalities per 100,000 population and a 45.2 PDI (compared to Florida with the highest 201.4 PDI and Vermont at the lowest end with a 15.2 PDI). Of concern is the increase from 2019 to 2021 of 1.9 fatalities per 100,000 population. The Richmond Metropolitan Statistical Area (MSA) is in the middle of the ranking among the top 100 metro areas at #47 with an 89.4 PDI, a 12.2 percent increase over the decade.

A DEMONSTRATION OF THE FRONT BLIND ZONE FOUND IN LARGER VEHICLES, WHICH MAY CAUSE "FRONTOVER" INJURIES AND DEATHS (KMPH-TV)

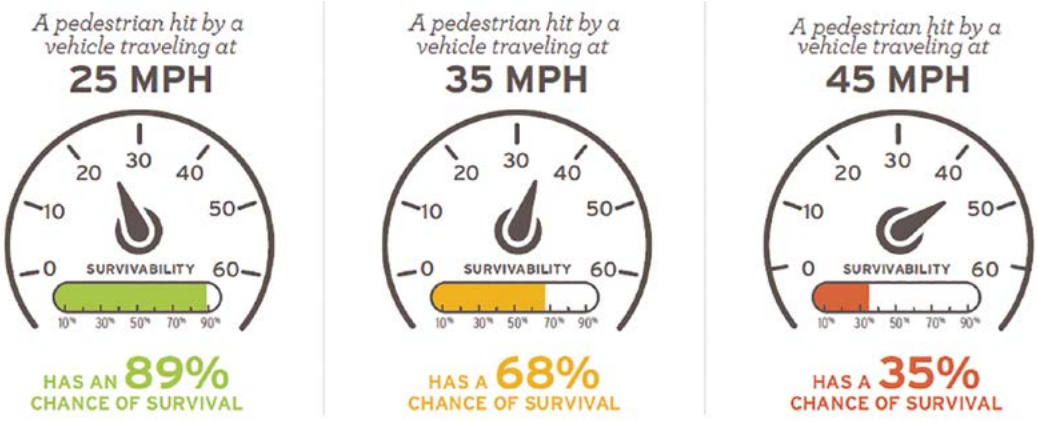


EXHIBIT 4: CHANCE OF PEDESTRIAN DEATH BASED ON VEHICLE IMPACT SPEED (FHWA)

Most vehicular crashes from 2015 to 2020 involving a bicyclist or pedestrian have occurred in the urbanized area. One-half of these crashes occurred in the City of Richmond, followed by Henrico and Chesterfield Counties. The trend for serious injuries is downward for the region. Bicycle and

pedestrian fatalities in the City of Richmond have decreased by 100 percent while they have increased in every other locality.

Over the past five years, serious injuries resulting from crashes among all modes in the region have declined by nearly 27 percent, dropping from the high of 729 in 2015 to 533 in 2020. Exhibits 5 and 6 show the following trends for bicycle/pedestrian non-motorized modes:

- 45 percent increase in fatalities;
- 45 percent decrease in serious injuries; and
- Zero fatal crashes for bicyclists in 2020.

Going forward, it will be important to look more completely at traffic safety investigations of crashes involving cyclists and pedestrians beyond the immediate police reports which were used to investigate these trends.

Focused attention on historically disinvested communities is vitally important because the residents are shown to be most vulnerable to pedestrian injury and fatalities resulting from vehicular crashes (see Planning Approach). The SGA report found that low-income households are disproportionately subjected to poorly designed pedestrian infrastructure or to no infrastructure at all. They are also significantly less likely to have access to a vehicle or live where they can reach daily needs safely and affordably without a car. Older adults—often people of color—walking in disinvested communities continue to be disproportionately represented in fatal pedestrian crashes.

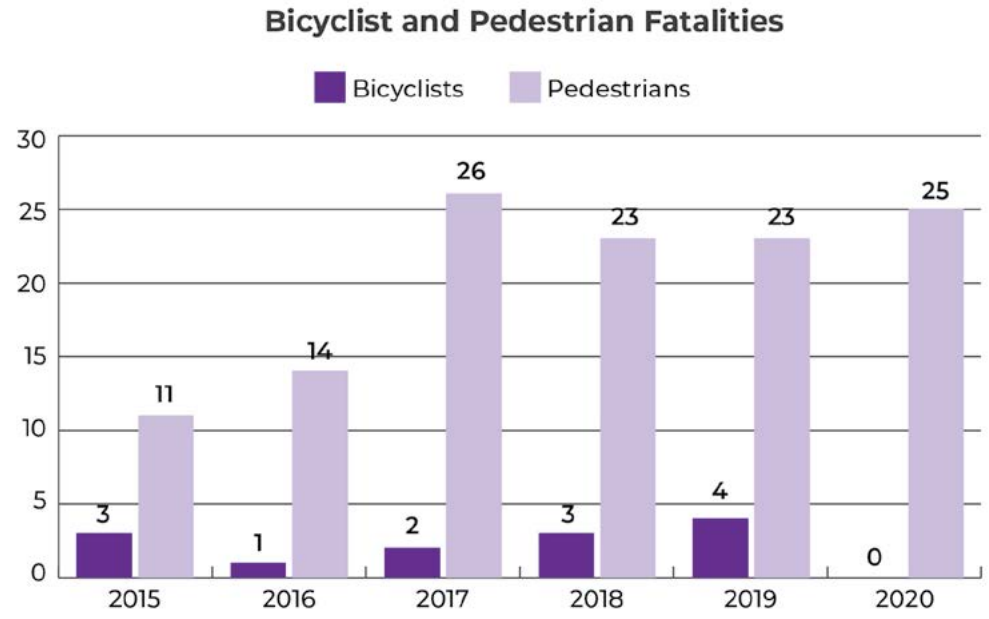


EXHIBIT 5: 2015-2020 BICYCLE/PEDESTRIAN FATALITIES IN REGION

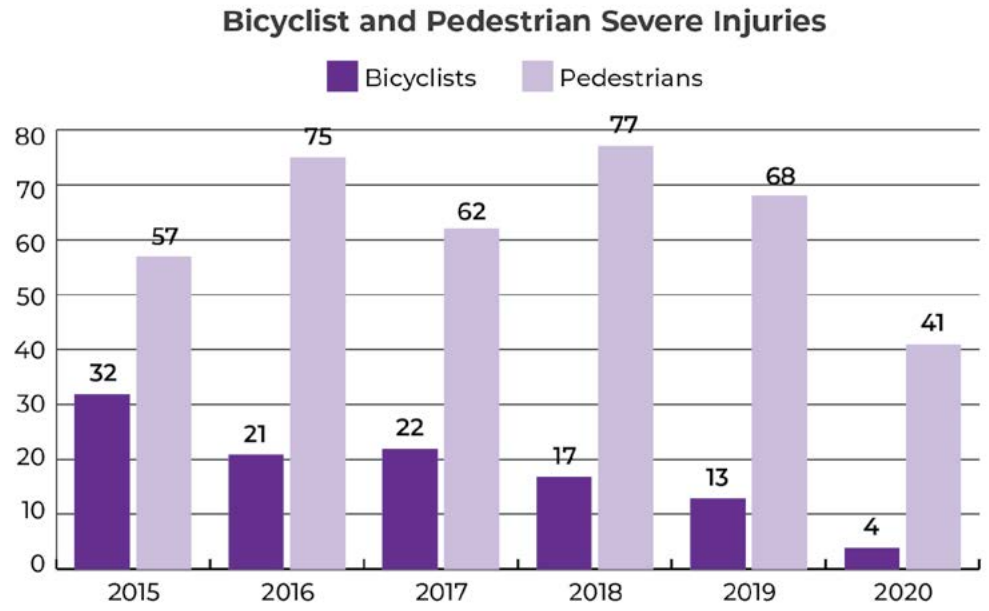


EXHIBIT 6: 2015-2020 BICYCLE/PEDESTRIAN SEVERE INJURIES IN REGION

Engaging in the Planning Process

- Steering Committee
- Public Engagement
- Plan Review/Adoption Process

Disinvested Communities

Neighborhoods where public policy has historically led to the purposeful lack of investment in infrastructure, services, housing, businesses or shared spaces— often overlapping with neighborhoods of high concentrations of lower-income, people of color, individuals with disabilities, children, and older adults. Also referred to as underserved, disenfranchised, economically excluded, or under-represented communities.

Steering Committee

A steering committee representing the region's localities, transportation agencies, and active transportation advocates was established to work with the PlanRVA staff to guide the process for *BikePedRVA 2045*. Between January 2020 and March 2022, the steering committee has met on a bi-monthly basis to discuss major issues and needs and to develop an inventory of existing and proposed infrastructure that depicts projects at different levels of scale, duration, or complexity. The underlying premises of the plan are to utilize the existing network of roadways more efficiently, respect the natural features in our region, encourage smarter development patterns, and recognize demographic characteristics to knit together a multimodal network more fully capable of supporting a truly regional and active transportation network.

The Steering Committee has involved the following individuals:

Charles City County | Rhonda Russell
Chesterfield County | Kathryn Benedict, Barb Smith
Goochland County | Tom Coleman
Hanover County | Gretchen Biernot
Henrico County | Ashley Austin
New Kent County | Kelli Le Duc
Powhatan County | Andrew Pompei, Bret Schardein
City of Richmond | Emily Dalphy, Jakob Helmboldt
Town of Ashland | Will Tucker, Nora Amos
Greater Richmond Transit Company | Patricia Robinson
Virginia Department of Transportation | Desmond Smallwood
Virginia Department of Rail & Public Transportation | Nick Ruiz
Richmond City Health Department | Sarah Shaughnessy
Virginia Capital Trail Foundation | Cat Anthony
Virginia Commonwealth University | Sera Erickson
University of Richmond | Rob Andrejewski
Richmond Area Bicycling Association | Champe Burnley
Sports Backers - Bike Walk RVA | Louise Lockett Gordon
Friends of the Lower Appomattox River | Heather Barrar
PlanRVA | Barbara Jacocks, Dan Motta, Phil Riggan, Rashaunda Lanier-Jackson

Grove and Meadow Streets, Richmond

Public Engagement

Public input has been solicited as part of the *ConnectRVA 2045* process and limited to virtual engagement almost entirely due to the pandemic. Much of the input received relates to active transportation being a vital transportation component of the network. Additionally, input was also solicited on the draft *BikePedRVA 2045* plan between February 9 and March 23, 2022. Public comment and input from over 300 groups and individuals is reflected in this plan. A summary of public input is available in the Community Engagement Report. Public input was also received via the following surveys:

Vision Survey

The public engagement process for *ConnectRVA 2045* began with the posting on March 12, 2020 of an ArcGIS map inviting public comment on transportation issues and providing the opportunity to note locations and specifics on the map. Survey participants were also asked, "Tell us about your transportation vision for the Richmond Region in one or two words." Exhibit 7 shows the words that factored prominently in the answers from the 15 respondents were "Equity," "Safety," "Green," "Bike," "Connected," "Multimodal."

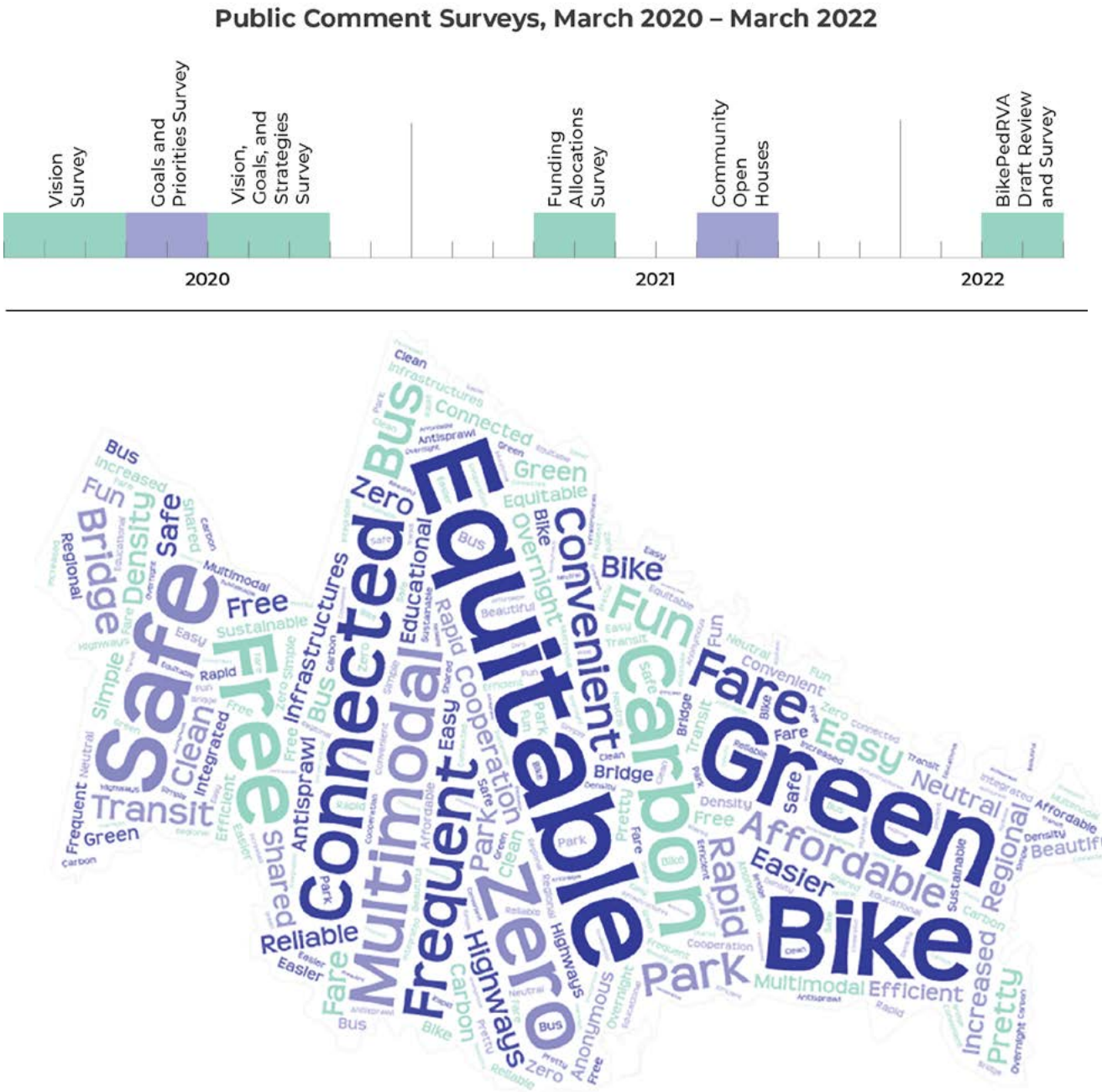


EXHIBIT 7: WORD CLOUD OF PUBLIC VISION SURVEY OPEN RESPONSES

Regional Goals and Priorities Survey

The second public survey was posted between June 24 through August 15, 2020. The 501 completed responses to the survey showed the following priorities:

As Exhibit 8 shows, of the six different priority areas, ***safety*** ranked the highest with bike/ped—transit and safer routes to schools being the most frequently mentioned. ***Environmental quality*** with protection of natural resources cited as being the most important within this category. ***Accessibility*** with a focus on sidewalks and bikeways, access for those with disabilities, better connections between transit options, and improved options for disinvested communities all equally weighted. ***Land use*** measured by priority on coordination between land use and transportation and creating walkable neighborhoods received the next highest attention. ***Economic development*** expressed in terms of connection of workers with jobs, local businesses, and improved quality of life was ranked sixth and ***congestion mitigation*** was the lowest priority with more respondents calling for attention to road maintenance and reduced travel time. The selection of priorities was not mutually exclusive and represented a close range of values that only varied by 1.1 points, with safety at 4.4 (out of 5) being the highest value and congestion mitigation at 3.3 being the lowest.

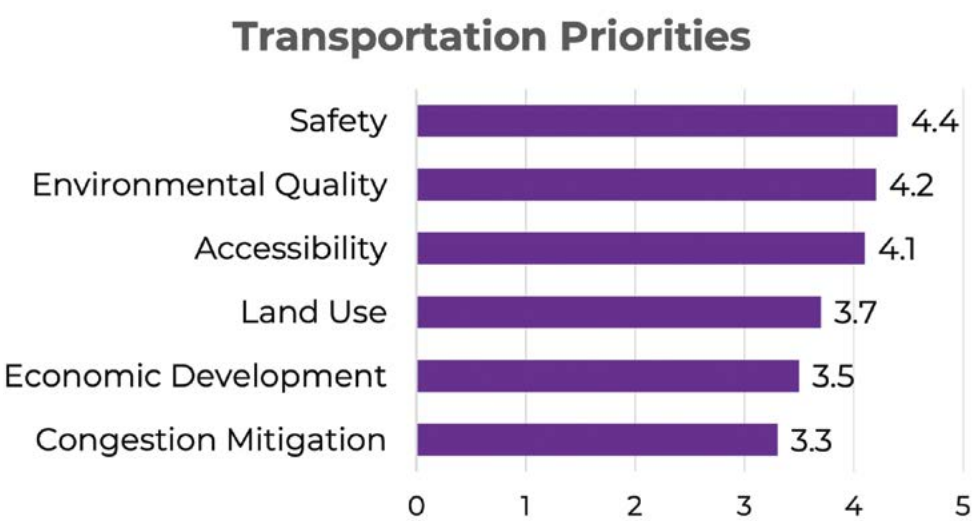


EXHIBIT 8: REGIONAL PRIORITIES IDENTIFIED THROUGH THE *CONNECTRVA 2045* PUBLIC INPUT PROCESS

Vision, Goals, and Strategies Survey

The third public survey was posted between August 15 to October 11, 2020 received 949 responses.

As in the first survey, goal selection was not mutually exclusive, allowing multiple goals to be ranked by respondents equally. As Exhibit 9 shows, the range from the lowest category of "resiliency" to the highest of "safety" was only 1.26 points. With a

EXHIBIT 9: RANKED GOALS BY PUBLIC INPUT

high of 3.48 out of 4.0, the most mentioned area of strategic emphasis within the Safety category was "evacuation routes." Health and Equity at 3.31 called for "public input" and focus on "environmental." Connectivity at 3.16 garnered the most interest in making "transit stops convenient," and strategies for better bike/pedestrian access and walkability factored highly in this category. Accessibility rated at 3.05 (out of 4.0) and suggested a focus on "community-based programs."

An open-ended question asked respondents to craft their own Vision Statement for regional transportation. A total of 265 respondents provided their answers, which helped guide the Long-Range Transportation Plan Advisory Committee and as the *BikePedRVA 2045* steering committee in devising the draft Vision Statement for discussion and input by committee members. The top word choices within their responses confirmed the priorities expressed through the survey questions and are particularly illuminating.

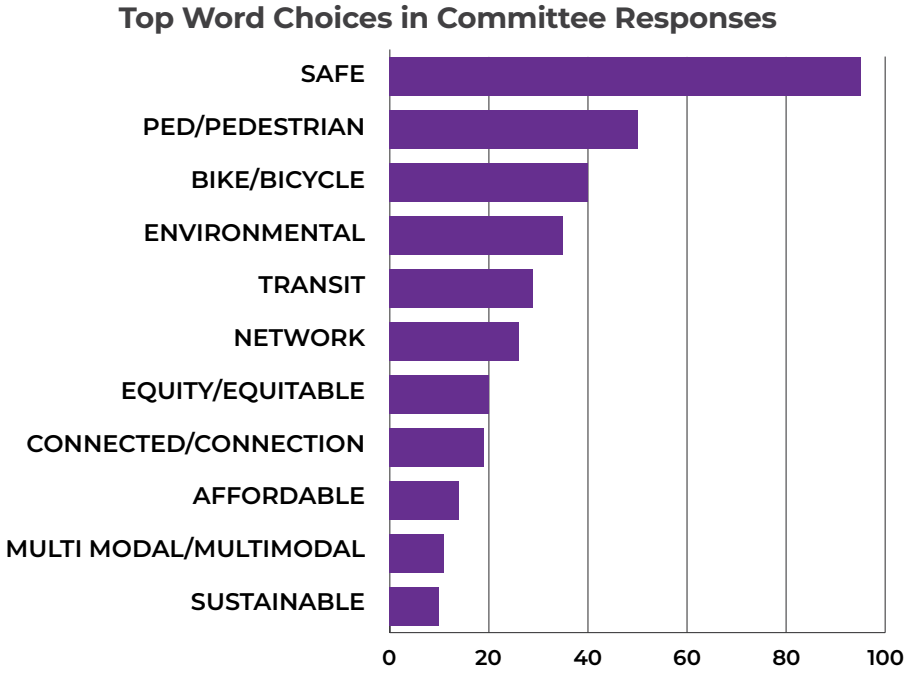


EXHIBIT 10: DRAFT VISION STATEMENT TOP WORD CHOICES

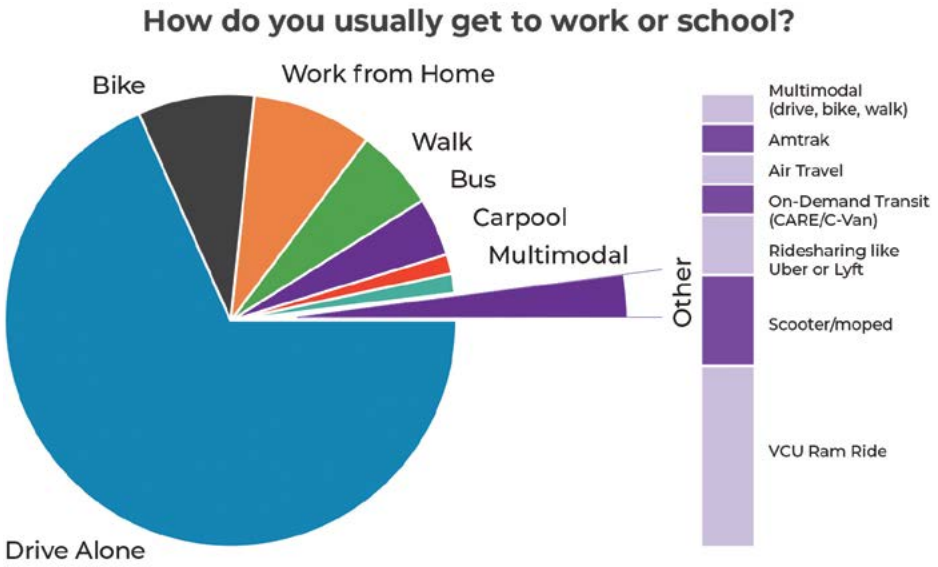


EXHIBIT 11: COMMUTE MODE BY SURVEY RESPONDENTS

How Should Our Region Spend Transportation Funds?

A fourth public survey was distributed to community groups, advocates, localities, and partners of the RRTPO. A total of 278 people participated in the survey, which was open from April 16 to May 14, 2021.

Respondents from across the region participated with the highest concentration in the center of the region. More than three-fourths of the respondents primarily travel by car, a combined 18 percent bike or walk, and 5 percent use transit (Exhibit 11).

Exhibit 12 shows the responses to the question, "How should the money be spent?" Responses are listed in order of priority based on an average amount of $100 to be allocated.

Many suggestions were made about expanding public engagement through meeting directly with stakeholders and those affected, attending festivals and farmers markets, and presenting at council or supervisor district meetings.

Plan Review/Adoption Process

Throughout the planning process, the RRTPO Policy Board, the Technical Advisory Committee (TAC) and the Community Transportation Advisory Committee (CTAC) have all been briefed and engaged in the development of *BikePedRVA 2045*. The TAC is responsible for the review and referral of the draft plan to the RRTPO Policy Board for adoption. Many of the project recommendations from this plan are included in the constrained list of projects in *ConnectRVA 2045*. In-person public engagement opportunities, which covered the *BikePedRVA 2045* plan elements of the long-range transportation plan, took place August 16 through September 15, 2021. They were hosted using a community open house format with stations on different aspects or transportation modes, inviting smaller group discussion. *ConnectRVA 2045* was adopted by the TPO Policy Board on October 4, 2021.

Upon adoption of the *ConnectRVA 2045* plan, the *BikePedRVA 2045* team recognized the extent of public interest in active transportation and the need to offer more opportunities for public engagement directly in the review and final development of *BikePedRVA 2045* as a stand-alone guide for strategic connections throughout the region. The public engagement process was expanded by six months and included outreach to groups, advocates, neighbors, and residents through community briefings and in-person meetings in January through March 2022, supplemented by virtual connections to review and comment on specific implementation recommendations and supported by an active social media campaign.

The highest priority populations within the acknowledged Equity Emphasis Areas (EEA) from *ConnectRVA 2045* are the key focus since these residents were often underrepresented through the virtual engagement process, but often are living in disinvested communities and have the greatest need for connections to employment, community services, and activities of daily life. Upon adoption, the plan will be incorporated by amendment into the *ConnectRVA 2045* long-range transportation plan and will continue to be periodically updated as an active, public-facing website, designed to be used as a guide for local and regional decision-making.

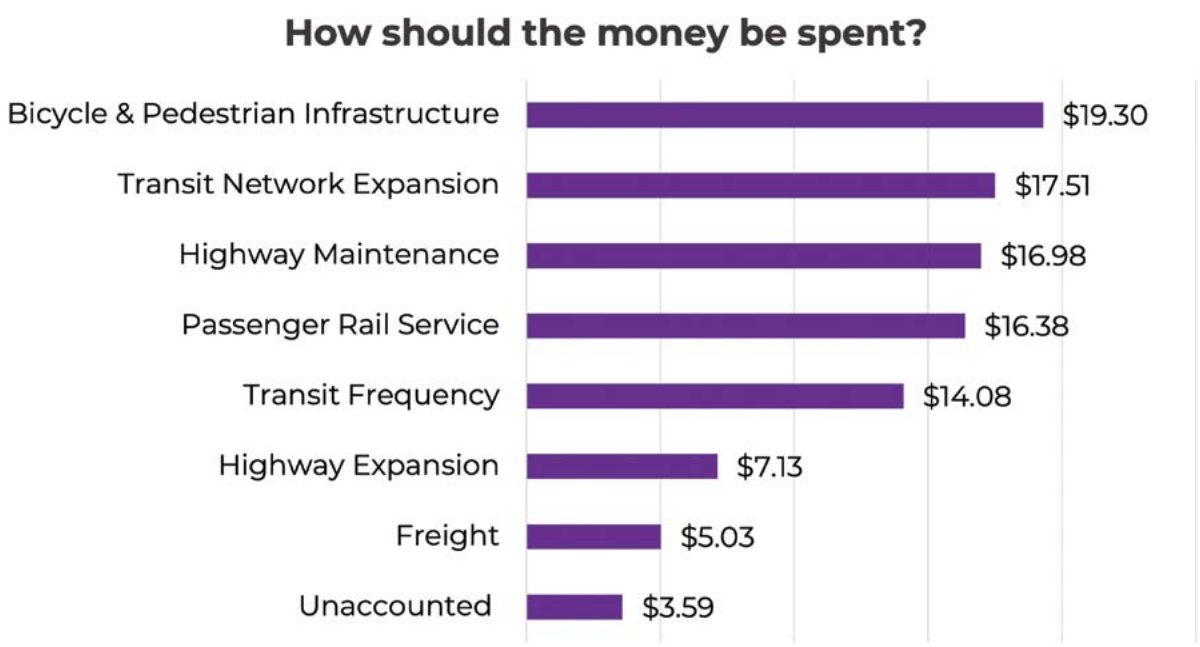


EXHIBIT 12: ALLOCATION OF HYPOTHETICAL FUNDS BY SURVEY RESPONDENTS

Definitions and Setting the Scope for Study

Shared Use Path

A shared use path is a separated off-street bicycle and pedestrian facility designed to enhance comfort and provide greater safety by removing potential conflicts between non-motorized users and motorized traffic traveling at higher speeds.

The terms “bicycle” and “pedestrian” are synonymous with “active transportation” and includes people who walk, bike, roll, scoot, or use another human-powered or assisted mobility device. The classifications used both in *BikePedRVA 2045* and its companion online story map are primarily derived from the National Association of City Transportation Officials (NACTO) with additional language from the American Association of State Highway and Transportation Officials (AASHTO) and VDOT.

This plan is centered around the evolving best practices of bikeway development that are observable through examples throughout both the U.S. and internationally. These conditions emphasize separation from motor vehicle traffic and enhanced use of low stress facilities for cyclists and pedestrians in shared environments.

Active transportation infrastructure referenced in this plan includes public sidewalks and shared use paths, as well as the continuum of bikeway facilities through four basic types of facilities. These include a variety of subtypes, but for the purposes of generalizing infrastructure at a regional level, the simplified classifications detailed on page 18 were adopted. These terms are used to classify existing infrastructure as well as future and proposed routes.

AN EXAMPLE OF *SHARED-USE PATHS* AT THE CONNECTION OF THE DOREY PARK TRAIL AND VIRGINIA CAPITAL TRAIL IN HENRICO COUNTY

***CYCLE TRACK* ALONG DOCK STREET IN RICHMOND AS PART OF THE CAPITAL TRAIL**

***BIKE LANE* ALONG ATLEE STATION ROAD IN HANOVER COUNTY**

***MIXED TRAFFIC* ON FLOYD AVE. BIKE BOULEVARD IN THE CITY OF RICHMOND**

Shared Use Path – a separated off-street bicycle and pedestrian facility.

- Often integrated into linear parks and utility or rail-to-trail corridors
- Opportunities more limited in developed urban areas
- Serves a vital pedestrian function in suburban and rural areas

Cycle Track – a fully protected one- or two-way on-street bikeway.

- Also called protected bike lanes (PBLs)
- Bicycle facilities running along or on a road
- Physically separated from motor vehicle lanes with curbs, bollards, planters, concrete dividers, or parking lanes

Bike Lane – a designated bikeway adjacent to automobile travel lanes.

- Designated for bike use by paint and signage
- Lacks physical separation, but may be buffered from traffic through use of striping on roadway
- Regulated to the edge of a roadway near the gutter, which often accumulates more sand, dirt, and debris than separated bicycle facilities, increasing risks of flat tires and possible injury

Mixed Traffic – a low-volume and low-speed street designed to encourage biking and walking.

- Can be considered a bike route if speed and volume are low
- Includes bike boulevards, walk/bike streets, or advisory bike lanes
- To be most successful, these facilities should incorporate comprehensive traffic calming techniques, such as street trees, chicanes, raised crosswalks, and traffic diverters

The above are generalized terms used for regional classification, derived from NACTO, AASHTO, VDOT, and other sources. Detailed information on facility types can be found at VDOT's Bicycle and Pedestrian Treatments webpage.

Bicycle boulevards are streets with low motorized traffic volumes and speeds, both designated and designed to give bicycle travel priority. Bicycle boulevards use signs, pavement markings, and speed and volume management measures to discourage through-trips by motor vehicles and create safe, convenient bicycle crossings of busy arterial streets. (Source: NACTO)

Certain facilities are appropriate in varying contexts across the urban, suburban, and rural areas of the region. As shown on Exhibit 13 the volume of vehicular traffic and posted

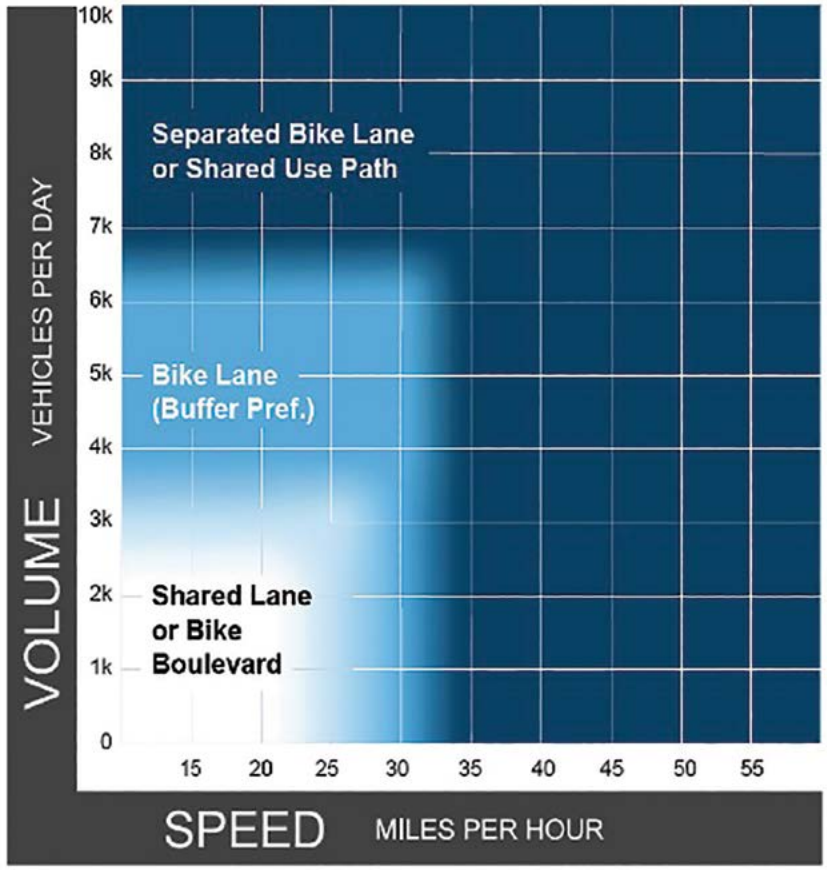


EXHIBIT 13: PREFERRED BIKEWAY TYPE BY MOTOR VEHICLE VOLUME AND SPEED (FHWA)

speed limits of the roadway system serve to define the context in which a bikeway facility is located, particularly from a safety standpoint.

Consideration for design standards and detailed specifications for bicycle and pedestrian facilities is a central objective of this plan, hoping to lead to greater regional understanding and common acceptance for future planning and design. Minimum standards are often set to guide funding as bicycle and pedestrian "accommodations" for road improvement projects to meet VDOT policy, though these standards do not account for all users and are often waived in the development process.

The policy analysis section of this document addresses the parameters of these strategies. The plan explores higher standards for safety and elevation of walking and biking as safe travel choices through better practices found in the Richmond Region and other regions that can offer a more complete transportation network capable of serving more people for active use. More detailed standards for varying context are offered by the Complete Streets toolbox and general rules for guidance related to setting higher standards.

Shared lane markings (also called "sharrows") are used in many of the region's localities to remind motorists they are in a lane used by non-motorized vehicles, but the designation does not serve as bicycle infrastructure or a bikeway in itself. Sharrows are appropriate when used for wayfinding along bicycle networks where current gaps exist. Sharrow locations are not specified on the inventory mapping for this plan, unless part of a designated national, regional, or local route.

Another alternative is available in areas of mixed traffic. In areas where traffic volume is slightly higher than a typical local street and space is not available for a conventional bike lane, "advisory shoulders" or "advisory bike lanes" can be used to designate space for cyclists and establish a street as a shared roadway.

In this treatment, white dashed lanes are used to signify defined space for bikes on the edges of the roadway, with an unmarked and undivided space for motor vehicles in the center. Motor vehicles travel bidirectionally in the middle of the road and shift into the advisory lane when meeting oncoming traffic. When the lane is occupied by a cyclist or pedestrian, the motor vehicle yields until safe to pass.

This low-cost infrastructure has been used for over 50 years in various countries as a stop-gap in areas where more separated facilities do not yet exist or are not feasible. No advisory shoulders are currently used in the region, although the City of Richmond has explored them as an option. Advisory shoulders may be appropriate in a wide range of treatments, from more active residential streets to lower-speed rural roads. The concept was recently introduced in the U.S., where communities can implement this facility through a Request to Experiment to the Federal Highway Administration.

CROSSWALK WITH A RECTANGULAR RAPID FLASHING BEACON, ASHLAND

Building better walking infrastructure from a regional perspective means encouraging (and funding) sidewalk construction in the region where residential, employment, and service-based uses coexist. This usually equates to building sidewalks on all spine, collector, and most local roads. However, this does not mean that building the same type of sidewalk in every context is appropriate. In many areas like neighborhood streets with little traffic, sidewalks five feet in width might be adequate, whereas at least 10-12 feet is often needed in more active settings or in urban areas where space needs to be reserved for street trees, benches, outdoor dining, passersby, and transit stops or stations.

ADVISORY SHOULDER SIGNS

In some rural or suburban areas, comprehensive traffic calming measures or related treatments may be appropriate in lieu of a traditional sidewalk. No matter the setting, sidewalks are only useful if they can be fully used by all types of users, including people with wheelchairs, strollers, and other mobility devices that require wider clearance. An effective sidewalk network goes beyond ADA considerations and includes curb ramps, height clearance under trees, crosswalks, safety islands, intersections, and signalized crossings where appropriate. While not directly a regional issue, sidewalk construction is vital to an accessible transit network, particularly in providing better access to bus stops.

PEDESTRIANS WALKING OUTSIDE OF POWHATAN COURTHOUSE

Guiding Principles, Vision, Goals, Objectives and Performance Measures

- Setting the Direction for Active Transportation
- Guiding Principles
- Vision
- Goals and Objectives
- Benefits of Measuring Effective Outcomes

First-Mile/Last-Mile Transit

Improving active transportation connections to bus stops to ensure your journey by foot, bike, or mobility device from your residence (first mile) and to your destination (last mile) is complete and safe. The bus stop itself should be equipped to meet the ridership needs of the area it serves.

Setting the Direction for Active Transportation

Over a series of Steering Committee meetings, PlanRVA staff led a discussion centered around the untapped value of investing in active transportation as a mode for transportation and not merely for recreational use. Part of the challenge is to address active transportation in the context of planning for the full range of transportation needs over the long term to serve the region's population. Page 81 of *ConnectRVA 2045* provides guidance in the form of Project Inclusion Guidelines, which set essential objectives for individual project types to be considered as contributing to the regional transportation network now and into the long-term future. The guidance for active transportation projects as part of the Project Inclusion Guidelines is stated below:

> "Being qualified as an eligible project through the long-range plan requires a level of project detail for individual project scoring relative to all the proposed projects for all modes to be considered in the 'constrained plan' list. The constrained plan is intended to only include regional projects for which there is identified budget from all sources of revenue for transportation projects."

BikePedRVA 2045 = Constrained Projects + Local Projects + Unrouted Projects that:

- Address one or more of Guiding Principles
- Meet Goals and Objectives
- Fill vital network connections

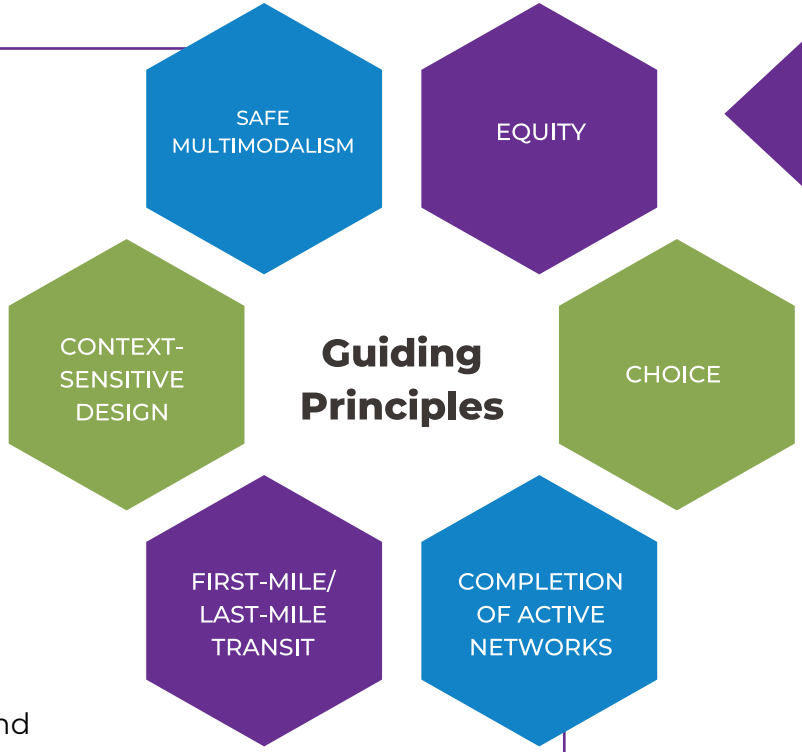
Anderson Highway, Powhatan

Constrained Project Inclusion Guidelines for Active Transportation Projects in *ConnectRVA 2045*

Projects on segregated lanes within dedicated rights-of way	**Projects of independent utility that are part of a larger multi-jurisdiction network or significantly contribute to filling identified gaps in an existing bike/ped network**	**Projects that directly connect and support the existing transit service**

Guiding Principles

Working within the framework of *ConnectRVA 2045*, the following principles were approved by the Steering Committee and have guided this process:



1. Provide a **Safe**, multimodal regional transportation system recognizing that recognizes vehicle speed and conflicts between modes lead to higher roadway injury and fatality rates.
2. Build **Equity** into all transportation planning and spending in the region with a focus on connecting historically disinvested communities to employment and essential services.
3. Promote **Choice** among all travel options (walking, biking, transit, private vehicle, etc.) regionwide.
4. Prioritize **Completion** of regional bicycle and pedestrian networks for individual and community health.
5. Make **First-Mile/Last-Mile Transit** access a priority for a more resilient transportation system.
6. Incorporate **Context-Sensitive Design** of all facilities to reduce conflict and enhance sustainable communities.

The Guiding Principles and Vision taken together help to establish specific goals, objectives, and corresponding performance measures as part of *BikePedRVA 2045*.

Vision

*The Richmond Region provides **mobility for people of all ages and abilities through a safe, continuous, recognizable, and intuitive pedestrian and bicycle network**. Efforts to make walking and biking a safe travel mode are well-integrated into all regional and local comprehensive and related plans, implementing ordinances and guidelines to equitably enhance the quality of life, strengthen local economies, and preserve the natural environment.*

Goals and Objectives

Equity/Accessibility—Provide more active transportation access to Environmental Justice (or Equity Emphasis Areas) populations which are also located in areas with a low or very low Health Opportunity Index (HOI). Prioritize active transportation access to jobs and community services for cyclists, pedestrians, and users of any mobility device across the region and offer greater connections to public transit.

Safety—Zero traffic-related pedestrian and cyclist fatalities.

Environment/Land Use/Health—Decrease the number of days with an Air Quality index above 50 as measured by Environmental Protection Agency.

Economic Development—Foster community economic vitality through improvement of bicycle and pedestrian connectivity and mobility to make multiple purpose trips possible for daily living and to promote tourism.

Mobility/Resiliency—Increase mobility and mode choice while maintaining the transportation system in a State of Good Repair (SGR).

Benefits of Measuring Effective Outcomes

Public investments in bicycle and pedestrian infrastructure improve the local economy, public health, and equity, while strengthening communities. The benefits that follow investment in sidewalks and bicycle facilities are so clearly documented that local governments can be assured of a healthy return in terms of revenue and quality of life. Facilities for walking and bicycling pay for themselves through more optimal land use and location efficient communities—areas that "require less time, money, and greenhouse gas emissions for residents to meet their everyday travel requirements." How we measure the effectiveness of these investments is vitally important to successful implementation of the *BikePedRVA 2045* plan through continued reinvestment as project priorities are set and funding decisions are made in the future.

Beyond safety, making communities more pedestrian-, cyclist-, and transit-user-friendly also frequently promotes economic development and tourism. There is a growing market demand nationwide for vibrant, walkable neighborhoods with a variety of transportation options, with employers around the country responding by moving to downtowns and walkable districts to attract and retain talent. These trends are visible not just in Richmond's Downtown but can also be seen in newer development patterns in places such as Libbie Mill, Innsbrook, the Village of Midlothian, and Chester.

S. Railroad Ave., Ashland

Economy

Communities that invest in walking and biking benefit from higher property values, better talent attraction, and boosts in retail sales as a result of more active and accessible commercial areas. Evidence shows that walking and cycling infrastructure projects create more jobs than roadway projects, with cycling infrastructure providing double the return compared to driving infrastructure. One New York study pointed to evidence that a modest biking investment of $10 million led to roughly $230 million in net societal benefit— a staggering 2,200 percent return on investment. In the Richmond Region, a 2019 report showed that the Virginia Capital Trail contributed almost $9 million in economic activity in one year alone.

Direct cost of construction and maintenance of active transportation facilities represents approximately 3 percent of the total funding devoted to the construction and maintenance of the regional transportation system. Walkable and bikeable communities provide higher tax revenue per acre and encourage transportation that does not contribute to economic costs associated with congestion, road-wear, collisions, injury, and death. Evidence points to walking and cycling being a net-positive for municipal budgets, as opposed to driving. A significant increase in cycling can positively improve air quality for all other users.

Health

By its very nature, active transportation provides significantly more health benefits than automobile use. Regular walking and biking offer an escape from the sedentary lifestyle that communities built around automobiles provide. One major study found that people biking to work had roughly half the chance of dying prematurely, developing heart disease, or developing cancer. Contributions to better walking and bicycling facilities provide direct health and safety benefits to individual users, while also expanding public health benefits.

Exposure to pollutants from motor vehicles is linked to pediatric asthma cases, an issue that disproportionately affects those of lower economic standing, who will continue to see disparate effects during the slow transition to clean renewable energy.

Physical inactivity has a direct impact on the quantity and quality of our years on Earth, accounting for approximately 3.2 million deaths annually and the loss of over 69 million disability-adjusted life years (DALYs). Dense motor traffic and the absence of parks and sidewalks are specific examples that can discourage outdoor activity. By designing our transportation networks to encourage physical activity and the joyful experience of daily travel, we can encourage healthy practices from a young age and cultivate a healthy physical environment for all stages of life.

BASIC BICYCLE PARKING AT A NEIGHBORHOOD COMMERCIAL AREA IN RICHMOND

Introducing active travel at a young age is a simple, cost-effective, and widely recognized method to improve childhood health and is the general idea behind programs like Safe Routes to School Partnerships. Benefits like place attachment, environmental literacy, and community belonging can also be established at an early age through neighborhood walking and cycling.

Stronger walking and biking networks with a focus on separated facilities can help eliminate walking and bicycling deaths caused by car crashes. Investing in stronger walking and biking networks fosters an increase in usage, which leads to a "strength in numbers effect" and lowers the rate of injury on walkways and bikeways. This makes walking and biking infrastructure a sound public health investment that can provide significant health care savings. Finally, active transportation helps reduce negative health effects from vehicle emissions, which have been shown to be the leading cause of over 200,000 annual premature deaths in the U.S.

Climate

Driving is the largest average contributor to an individual's carbon footprint and comes with a host of negative externalities on local environments. Construction of auto-dependent communities encourages the continuation of damaging development patterns at a time when a clearer picture is emerging of the immediate effects of climate change on the planet and in local communities, including here in Virginia.

A RECUMBENT CYCLIST ON THE VIRGINIA CAPITAL TRAIL AT GREAT SHIPLOCK PARK

VEHICLES QUEUING AT A SCHOOL PICKUP ZONE

Some of the effects of transportation on climate were apparent during the early stages of COVID lockdown when air quality in urbanized areas improved because of a reduction of vehicle miles traveled (VMT). Fortunately, this also coincided with a renewed interest in active transportation, including an increase in cycling and planning interventions such as open streets or even temporarily closing certain streets off to motor traffic.

In recent years, researchers looking into the effects of transportation on pollution began to measure carbon emissions per person rather than per square mile. This way of assessing energy use is called "location efficiency" and it finds that more walkable and dense communities (even in rural and suburban contexts) utilize much less energy than sprawling suburban communities where a car is required for most trips. Location efficiency is a good way to measure the

sustainability of transportation systems and the long-term costs of maintenance.

Electric cars are important tools for transitioning to sustainable transportation networks, but the technology isn't advanced enough and the cost is not affordable for most people as prices are in the $30-40,000 range. Additionally, electric cars do not solve the negative externalities associated with automobiles such as safety, health, cost, resources, and the runaway costs of auto-dependent development. Unlike electric cars, pro-walking and bicycle policies can be implemented now for immediate impact.

Building communities with walking and biking as a priority represents a cost-effective investment in the transportation system that have immense benefits for the environment. Carbon emissions from motorized transportation is the largest single source of greenhouse gases in the U.S. and worldwide gas and diesel engines still account for over 95 percent of transportation emissions. Additionally, oil and fluid runoff from motor engines enters streams and waterways, further polluting sensitive ecological and recreation areas. The acts of walking, rolling, scooting, and biking produce virtually zero emissions.

While electrifying cars and trucks is an important step in a sustainable and resilient transportation system, micro-mobility modes of transportation are proven and simple methods to lower carbon emissions that can see dramatic returns on relatively little investments. Retrofitting auto-dependent areas with separated paths, reconfigured roadways, and human-scale infrastructure can allow the freedom for an individual to go to the grocery store without needing to drive or perhaps gives them the comfort and confidence to bike to work one or two days a week. These small changes could result in significant reductions in transportation-related pollutants and contribute to a more livable community.

Equity

Active transportation offers a better option to achieve a more equitable transportation environment. As mentioned earlier, those most vulnerable to traffic-related injuries and fatalities are people walking, rolling, and biking along roadways—a group sometimes referred to as "vulnerable road users" (VRUs). These individuals spend more time traveling and face greater uncertainty about their ability to get from place to place.

VRUs are commonly part of historically disinvested communities and transportation limitations often further shut them out from access to opportunities that are afforded to people with their own vehicle. Reallocating road space to VRUs and reducing lane width will increase safety, and improving the walking

GRTC CARE VAN DRIVER ASSISTING PASSENGER

and biking environment can dramatically improve the quality of life and opportunities for people who are unable to afford a personal vehicle. Every car owner must cover the cost of transportation, but some families and individuals bear a greater burden. The cost of owning a car was estimated to be $9,556 per year in 2017, which amounts to 67 percent of the annual income for an individual living below the poverty line or 36 percent annual income for a family of four living below the poverty line. This does not consider housing costs, meaning that affordable housing (housing costing 30 percent or less of annual income) without other means of transport is not possible for an individual or family of four living below the poverty line.

A strong walking and biking network provides mobility and independence for children, the elderly, and people with disabilities—groups that often rely on others for daily transportation needs. Walking and biking infrastructure is important for all ages and abilities and ensures equitable access for all people. This increased independence can help encourage more responsible and community-minded children and simultaneously help older adults age in place and maintain their autonomy. The opportunity for purposeful physical activity resulting from walking and cycling is becoming increasingly rare among young children, as schools—a source of daily trips for most children— are being built further from neighborhood centers and are often now built next to busy spine and collector roads. Increasing the number of children cycling to schools, parks, or a friend's house "requires a comprehensive effort to build communities where children can safely ride bikes."

Exposure to pollutants from motor vehicles is linked to pediatric asthma cases, an issue that disproportionately affects those of lower economic standing, who will continue to see disparate effects during the slow transition to clean renewable energy.

Supporting cyclists and pedestrians achieves a more equitable transportation environment and translates to overall quality of life. As researchers have pointed out, "the broader transport equity issue is providing every person with access so they can fully participate in society." Improving pedestrian and cyclist safety and connectivity, and the exponential possibilities these modes bring when paired with transit, can be life-changing when it comes to individual opportunity.

Safety

Clear, separate biking and walking options provided within or alongside the regional roadway and transit system provide greater safety for all users, reducing vehicular conflicts that result in injury and death particularly for

PEDESTRIANS WITH STROLLER WALKING ALONG BETHLEHEM ROAD IN HENRICO COUNTY

the walker or cyclist. Making the roadway system more complete can produce economic benefits. A 2015 analysis conducted by National Complete Streets Coalition (NCSC) evaluated 37 projects around the country and found that projects to support walking and biking reduced crashes and injuries, as well as the costs associated with them. The analysis found that the safer conditions saved a total of $18.1 million in collision and injury costs in one year alone. A number of these projects also boosted employment levels, property values, investment from the private sector, and net new businesses.

Safe and dependable active transportation facilities also benefit those who cannot drive due to age or ability, giving more freedom to those who might otherwise depend on a driver to get them around. This allows people with disabilities to live more independently, seniors to age in place in their own community, and kids to get to afterschool activities without having to rely on parents to shuttle them.

Community Building

Beyond measurable health benefits, walking, rolling, scooting, and biking can greatly aid interaction among community members and increase feelings of connection and joy. For some, a sidewalk, bicycle, or e-bike could mean finally being able to go to the grocery store or doctor on their own. Walking and biking facilities allow people to get to jobs, shopping, and recreation along with providing places for people to meet and interact in an outdoor public space, a unique benefit of active transportation. Walkable and bikeable communities show evidence of stronger social capital, community volunteering, and trust among neighbors.

As transportation connects the community, it intersects with virtually every facet of civic life. Transportation is a vital component of land use, housing, stormwater management, and environmental health.

A COMMUNITY BIKE TO SCHOOL EVENT

Planning Approach—Building a Regional Active Transportation Network

- Planning Framework
- Existing and Planned Active Transportation Infrastructure
- Strengths, Weaknesses, Opportunities, and Challenges

Low Traffic Stress (LTS)

Casual or less experienced cyclists are more likely to be comfortable riding low traffic stress routes that include a shared use path or low-speed bicycle boulevard instead of high-speed, high traffic volume streets.

Planning Framework

A comprehensive review of regional data was performed to best understand the existing conditions and proposed network put forth in various local and regional plans. A summary of this review is laid out in the following pages and informed the resulting plan recommendations.

Rivers of Opportunity

The Richmond Region is geographically and symbolically shaped and bounded by several rivers which create a natural framework for active recreation (Exhibit 14)—the Pamunkey River is the northernmost boundary and flows into the York River, the James River is the central most dominant regional river which together with the Appomattox River serves as the southernmost boundary. The Chickahominy also flows into the James River, makes up a portion of the eastern boundary, and its wide flood plain bisects the region. Both the James and the York Rivers flow to the Chesapeake Bay, making them extremely vital to the water quality and environmental health of the Virginia Coastal Plain. All the region's rivers inspire natural extensions for active recreational trails along their banks.

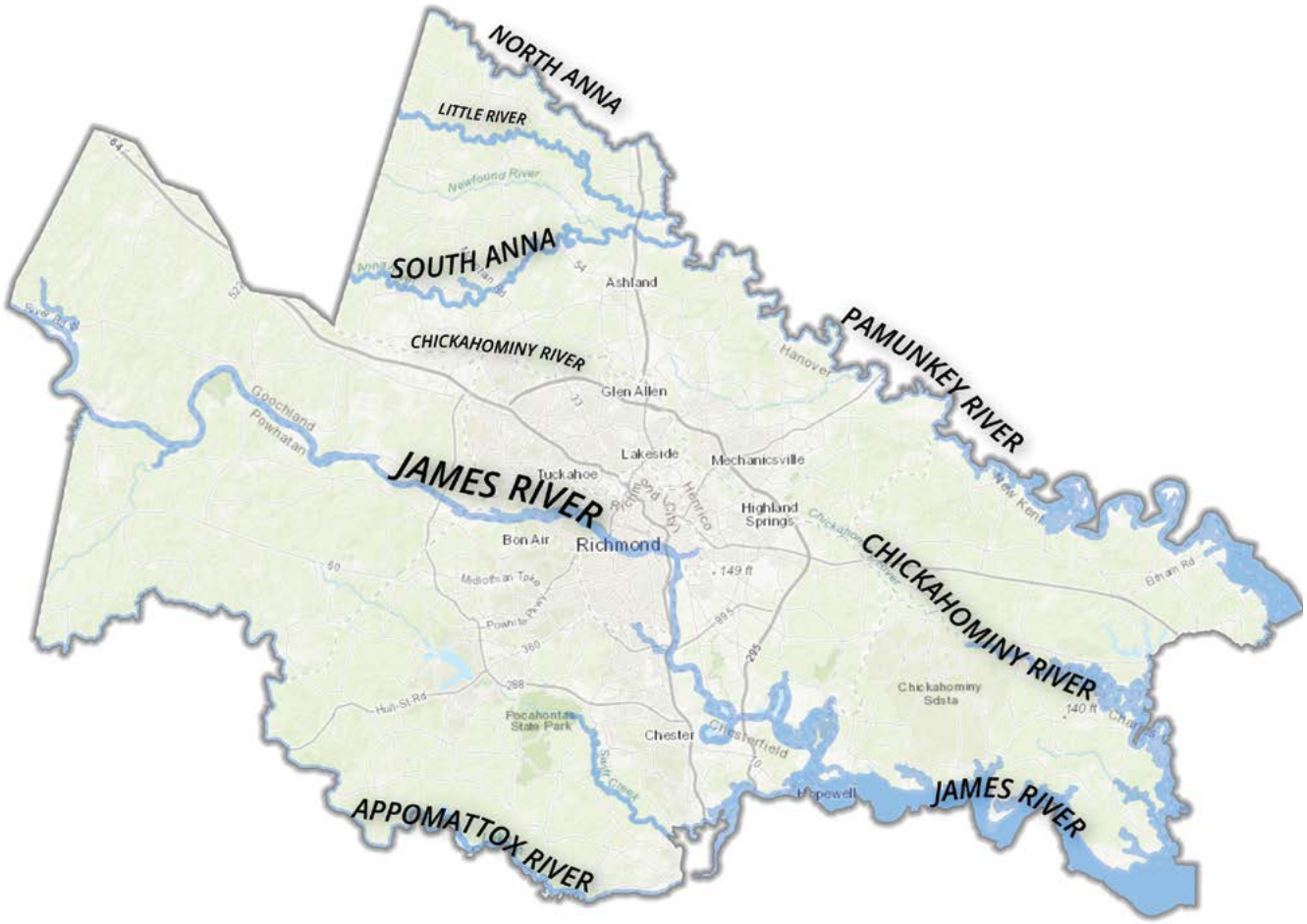


EXHIBIT 14: RIVERS ARE ASSETS FOR ACTIVE TRANSPORTATION ROUTES

The James River is the centerpiece of Richmond Region. As *The Times-Dispatch* stated in 1996, "At some point—who knows when?—Richmond remembered the value of the jewel in its midst.... great accomplishments depend on a vision. And the vision of Richmond centered on the James pleases the eye and invigorates the spirit."

BikePedRVA 2045 recognizes the James as a guidepost to expansion of not only the Virginia Capital Trail to the west, but as a destination to which many bike and pedestrian networks can be extended. The James River Park System Master Plan pays homage to the river, leapfrogging from its original footprint centered on the Falls of the James toward the west. Active transportation routes link downtown to the Huguenot bridge, the westernmost crossing available in the region. Localities conceptually plan for a "James River Heritage" trail on north and/or south banks. Popular use of undefined routes will help justify funding decisions and offer opportunities to prioritize needed route planning and improvements. As networks are extended, existing crossings should be examined for the possibility of using each for cycling and pedestrian uses. This includes the possibility of the Wiley Bridge or other less conventional crossings to be made into a safe and accessible bike and pedestrian route.

View detailed map

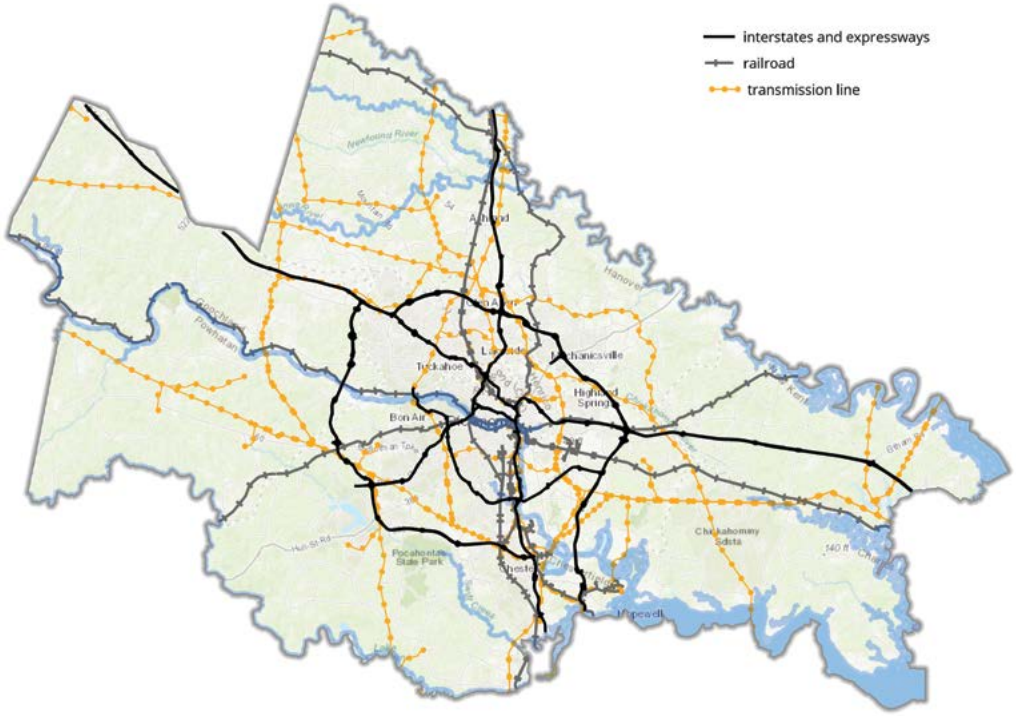


EXHIBIT 15: INTERSTATES, RAILROADS, AND TRANSMISSION LINES IMPEDE CONNECTIONS

Barriers

Understanding the components of the existing regional roadway network forms the foundational base for building a regional active transportation network. Interstates, expressways, and major spines would not be part of the existing network that accommodates active transportation without significant separation and screening from motorized traffic. Instead, this higher order of functional roadway designed for motorized vehicles traveling through the region in higher volumes and greater speeds creates barriers that must be overcome to provide functional active transportation networks. All rivers and waterways are also barriers to movement, but also serve as natural areas of recreation and important stormwater management systems that are instrumental in sustainable and resilient transportation networks. Other corridors, such as interstates, railroads, and transmission lines can form serious barriers (Exhibit 15), but sometimes can be utilized for active transportation such as shared use paths within interstate rights-of-way, rails-to-trails or rails-with-trails, or bicycle and pedestrian infrastructure within utility easements.

Level of Traffic Stress

One way to look at the regional road network is by its level of traffic stress: a generalized comfort score determined by a road segment's posted speed, average daily traffic, and number of travel lanes. Examining a roadway network by its level of traffic stress (LTS) can be enlightening, but it must be viewed in its full context and account for

individual differences. Comfort level and risk tolerance for cycling vary widely among the public. Studies show that the bicycle-riding public can be broken into four categories based on risk-tolerance and comfort with cycling, broadly generalized as (1) strong and fearless, (2) enthused and confident, (3) interested but concerned, and (4) unable/not interested (Exhibit 16). This categorization does not take into account the possibility that some people may be unable or uninterested in cycling due to the existing realities or perception of cycling. In practice, in societies where high levels of cycling are the norm, the environment is designed to provide more comfort to cyclists. This suggests that the actual level of cycling for any given place is dependent on how attractive and comfortable it is as a travel mode.

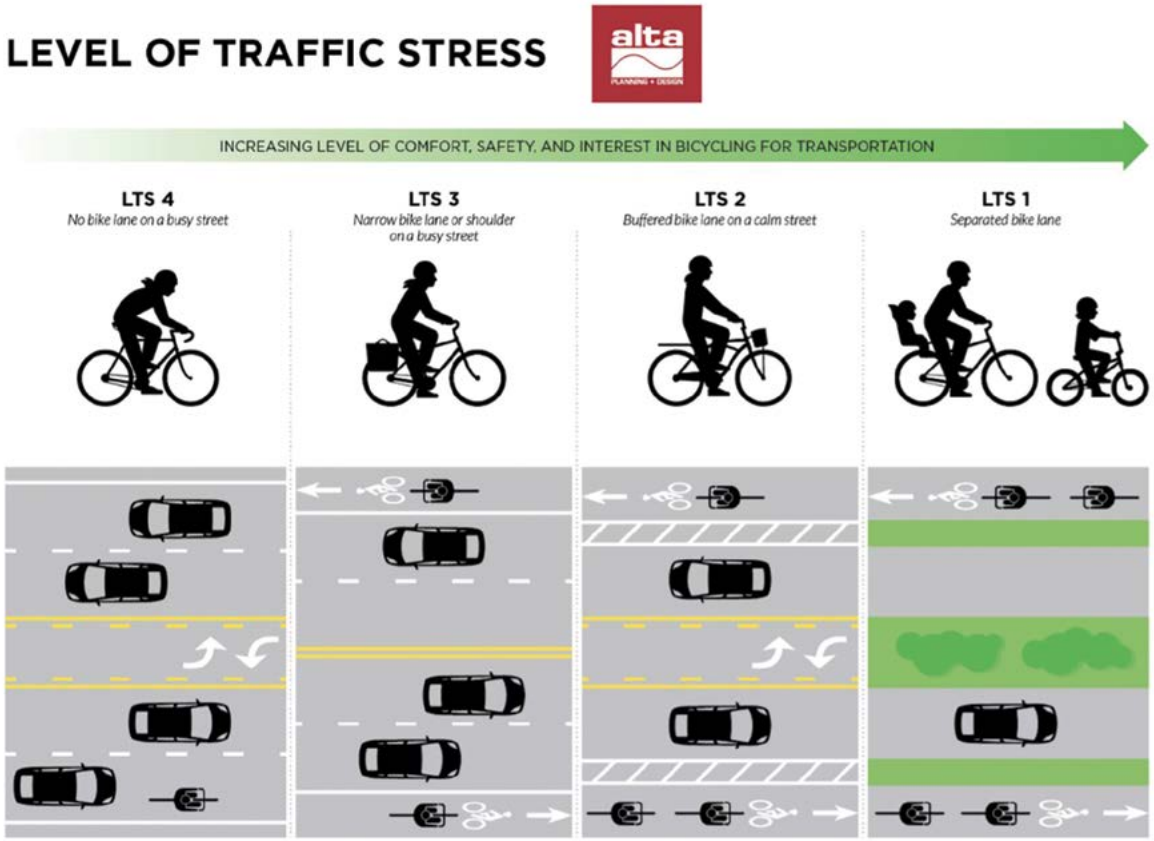


EXHIBIT 16: LEVELS OF TRAFFIC STRESS FOR BICYCLISTS (ALTA PLANNING)

Low-traffic neighborhood streets and shared use paths are often the most attractive to cyclists due to the presumed increase in safety by being removed from fast-moving vehicles. And while these low-stress routes make up a majority of the road network, their tranquility is easily and frequently disturbed. Impediments or barriers to low-stress connectivity consist of three general types, according to the Mineta Transportation Institute's Low-Stress Bicycling and Network Connectivity report:

1. **Natural and man-made barriers** that require grade-separated crossings such as interstates, railways, and waterways, whose crossings are often inconvenient, infrequent, and spaced far from each other, and shared with higher traffic volumes. This can lead to higher levels of stress.
2. **Primary, high-volume streets** whose cross streets lack the combination of a low-stress approach and a safe crossing. Often, the only safe crossing provisions are at traffic signals, where the cross streets themselves have high stress, because of turning lanes that are added on the intersection approaches.
3. **Breaks in the neighborhood street grid**, such as with cul-de-sacs and neighborhoods with limited ingress and egress for non-motorized travel. These tend to force traffic, including bicycle and pedestrian traffic, to use spines to access the local streets.

Building an effective active transportation system requires identifying and making use of low-stress networks through investment in safer facilities for people walking, rolling, or biking. The regional analysis used for *BikePedRVA 2045* uses this level of traffic stress (LTS) methodology adapted from the Mineta Transportation Institute and depicted in Exhibit 17. It is meant to aid in identifying low-stress roadways that can be used to bolster a regional cycling network. The map includes most public roadways except for interstates, expressways, and roads that prohibit bicycles.

The level of traffic stress analysis rates each linkage on a scale from one to four, with four representing a highly auto-oriented environment and one representing a low-stress environment. A casual or less experienced cyclist may be more comfortable with routes that are rated a one, such as a shared use path or a 20-mph bicycle boulevard. On the opposite end, only highly confident riders would likely feel comfortable riding on a route rated as a three or four. This analysis utilizes a simple methodology to overcome limitations in roadway data that are prevalent at a regional level.

The variables included in the analysis are: (1) posted speed limit, (2) number of travel lanes, and (3) the volume measured as the average annual daily traffic (AADT) count for each road segment. The presence of a shared use path along a route automatically gives it an LTS rating of 1. Note that the map data layer does not consider other cycling safety concerns such as the slope of the road, presence or absence of a shoulder, lighting, intersections, sightlines, or the number of curb cuts. This generalized analysis is useful for this regional scope; when examining a particular route or special area, it may be possible to collect more detailed information about the road geometry.

With its focus on equity and accessibility, *BikePedRVA 2045* is geared toward cyclists who would be likely classified as "interested but concerned" and "somewhat confident"—focusing on bike routes that are rated LTS 1 and LTS 2.

Approximately 60 percent of the regional roadway system in the Richmond Region serves low-volume, low-speed vehicular traffic making this portion of the roadway system more conducive to active transportation facilities. The map in Exhibit 18 suggests a sprawling and extensive low-stress network, though looking closely at Exhibits 19 and 20, there are many islands of low-stress street networks around the region that are cut off from the surrounding area by high-stress roadways with heavy traffic volumes, high speeds, and multiple motor vehicle lanes.

*or no AADT data available

		Mixed Traffic		
Posted Speed (MPH)	# of Travel Lanes	<3000 AADT*	3000-6000 AADT	>6000 AADT
≤25	1-2	1	2	3
	3-4	3	3	3
	≥5	4	4	4
>25 to ≤35	1-2	2	3	3
	≥3	4	4	4
>35	≥1	4	4	4

LEVEL OF TRAFFIC STRESS (LTS)

1 Presenting little traffic stress

2 Presenting little traffic stress, demanding more attention for children

3 Acceptably safe to most adult pedestrians

4 Level of stress beyond LTS 3

EXHIBIT 17: CHARACTERISTICS OF ROAD SYSTEM AT VARYING LEVEL OF TRAFFIC STRESS

View detailed map

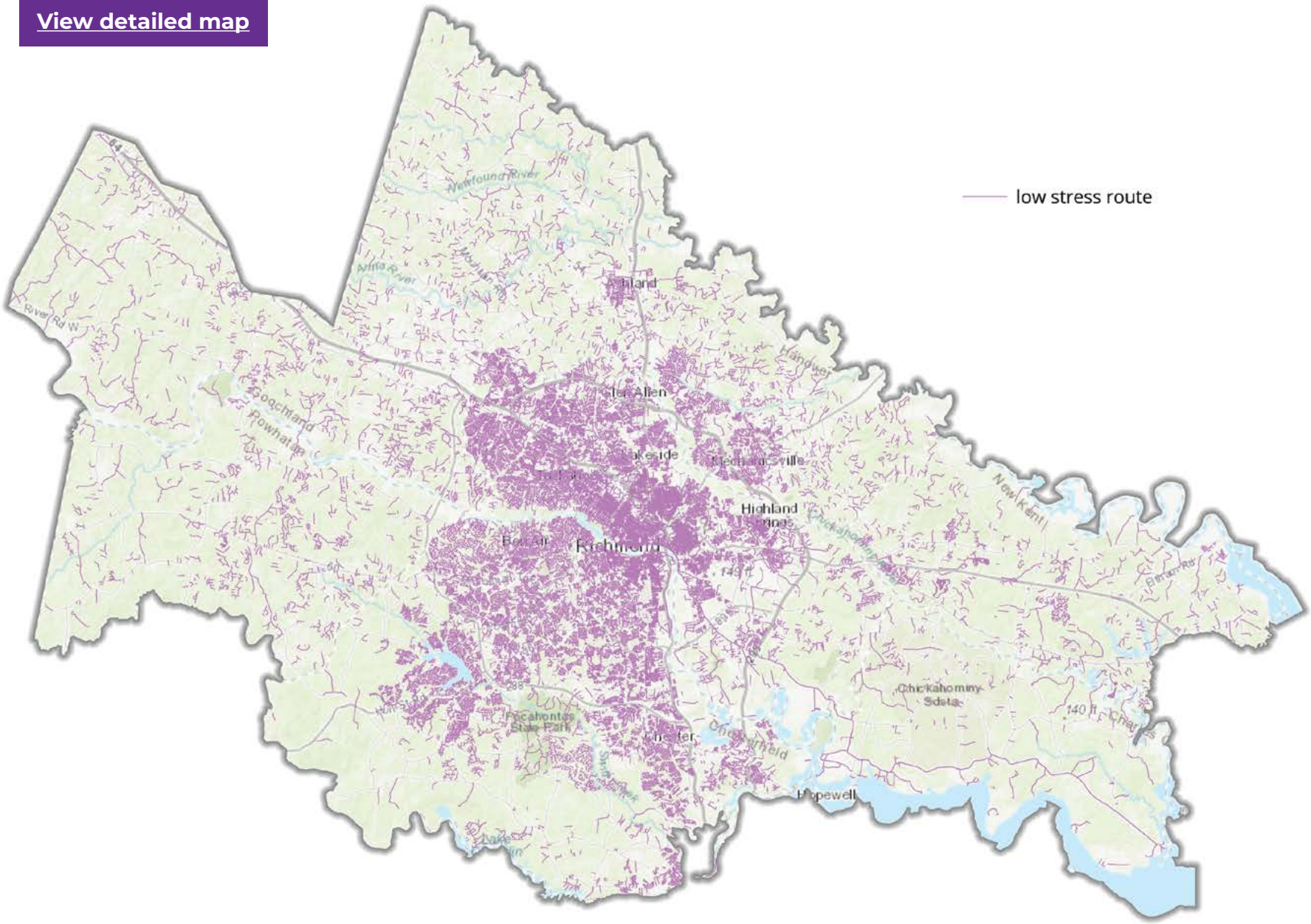


EXHIBIT 18: ROAD NETWORK DEPICTING ROUTES WITH A LOW LEVEL OF TRAFFIC STRESS (LTS 1)

View detailed map

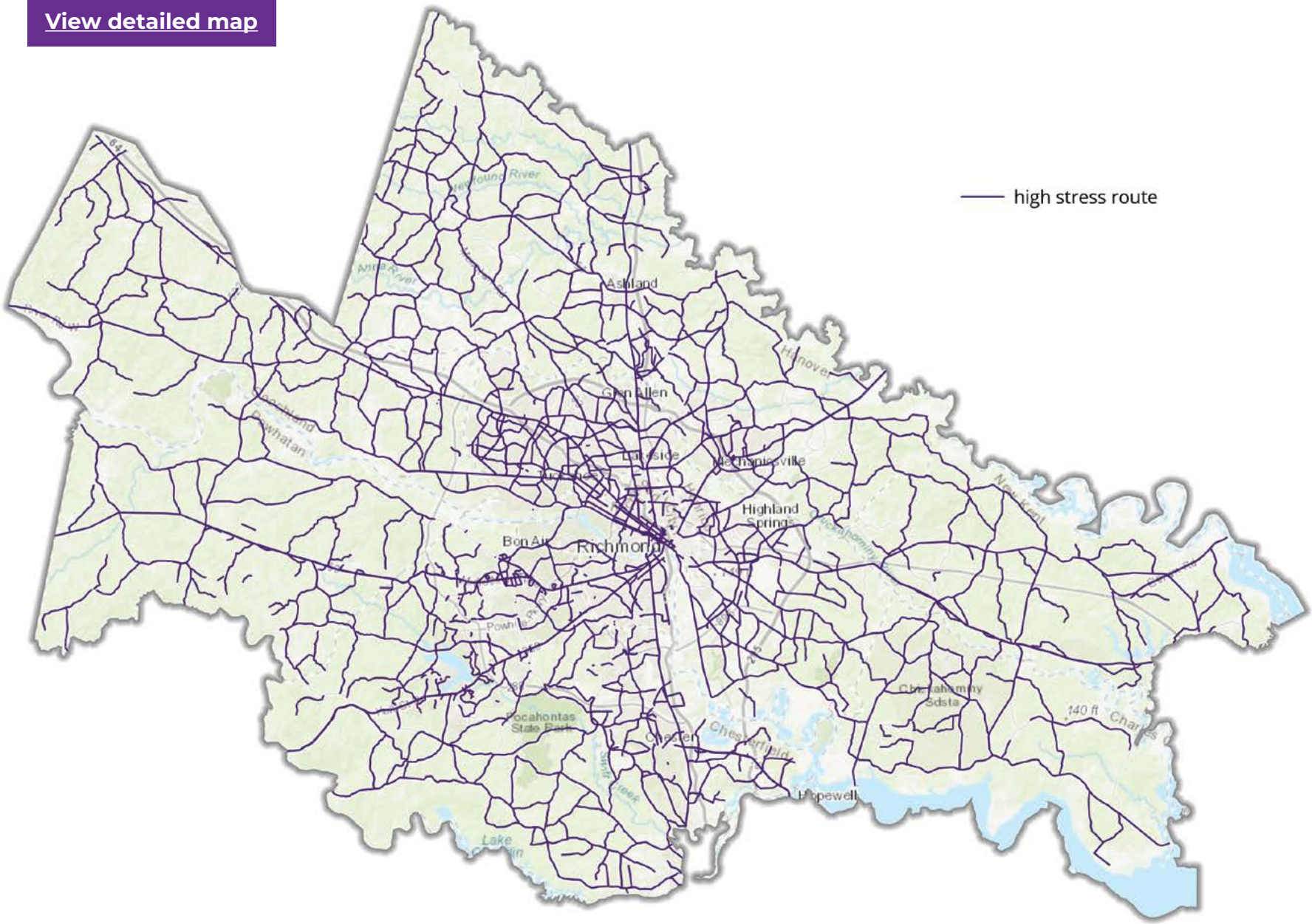


EXHIBIT 19: ROAD NETWORK MADE UP OF HIGH LEVELS OF TRAFFIC STRESS ROUTES (LTS 3 and 4)

View detailed map

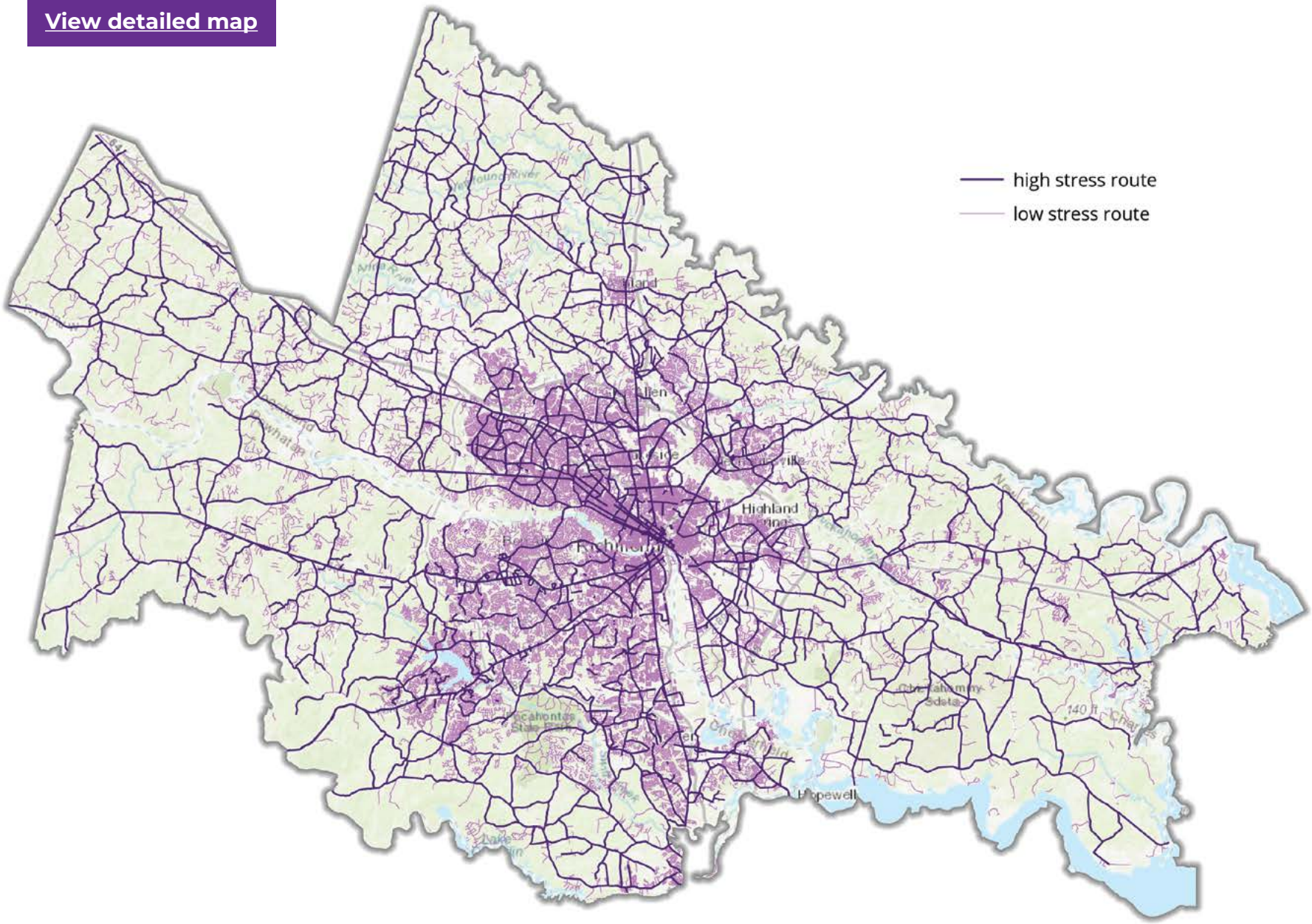


EXHIBIT 20: DISCONTINUITY OF THE CYCLING NETWORK SHOWN BY COMBINING LOW AND HIGH STRESS NETWORKS

Safety—Defining the High Injury Network

The call to action driving this plan shows how varied the number of crashes involving pedestrians and/or bicyclists are across localities and regions (Exhibits 21 and 22). The urban center and urbanizing suburbs represent the largest number of people affected, but degree of change should also be front and center of the discussion showing where extra stress points are located. The story map also pinpoints the severe injuries by location along with a call-out box with a few details. VDOT along with their consultant worked with the regional Vision Zero work group to develop a regional safety plan. At its foundation will be an assessment of the high injury network. Findings and recommendations from the safety plan will be included as a future amendment to *BikePedRVA 2045*.

Richmond Regional Transportation Safety Plan

The *Richmond Regional Transportation Safety Plan* aspires to reach a reality of zero deaths by creating a safer roadway network to allow all users to arrive safely at their destination. According to the plan, it is a "data-driven effort, outlining the primary factors preventing safe travel as well as locations where safety improvements could make a difference." The overall goal of safety analysis and planning is to help the region progress toward its safety performance targets by reducing fatalities and serious injuries from motor vehicle crashes. This progress can occur through the implementation of policies, programs, and projects that address the behavioral and infrastructure needs.

View detailed map

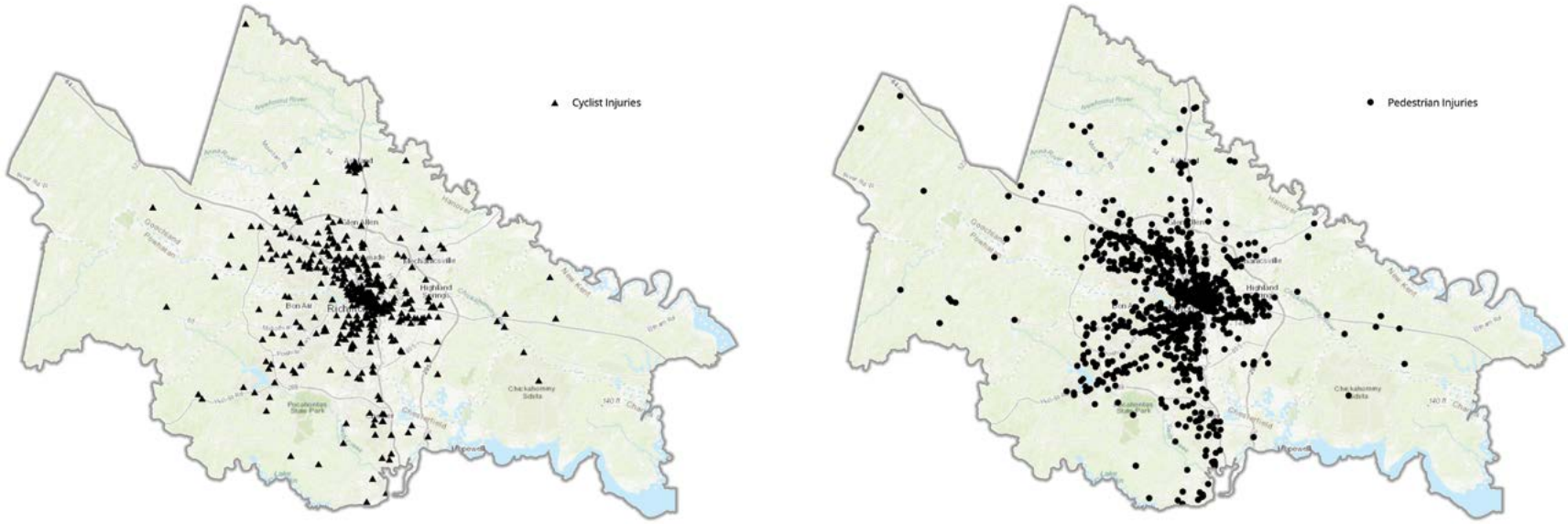


EXHIBIT 21: SEVERE INJURIES INVOLVING BICYCLISTS AND PEDESTRIANS FROM 2015–2020

The planning process included the following:

- Engagement of multidisciplinary stakeholders to review and discuss safety issues.
- Identification of safety priority areas including bicycles and pedestrians, distracted driving, unbelted driving, impaired driving, young drivers, infrastructure, and speeding.
- Identification of crash locations with the potential for safety improvements.
- Identification of solutions to address the behavioral and infrastructure needs.

The impetus for studies such as the Regional Safety Plan indicate that vehicular crashes in the region have resulted in real consequences of serious injury for at least 109 bicyclists and 308 pedestrians over the past five years. Fortunately, the number of severe injuries is declining. These maps are best viewed in the document.

Fatalities among pedestrians and bicyclists in the region over the past five years show a different picture. Over one-quarter of all fatalities in the region have been pedestrians. A total of 122 pedestrians have been killed in crashes. In 2020 the number increased closer to the former high in 2017 despite a decrease in driving during the pandemic. Bicyclist fatalities for the region were reported at zero for 2020, a hopeful sign of progress during a time of greater non-motorized activity. However, as of August 31, 2021, VDOT had reported four cyclist deaths in our region year to date. Two people were killed while cycling in Chesterfield, one in Henrico, and

View detailed map

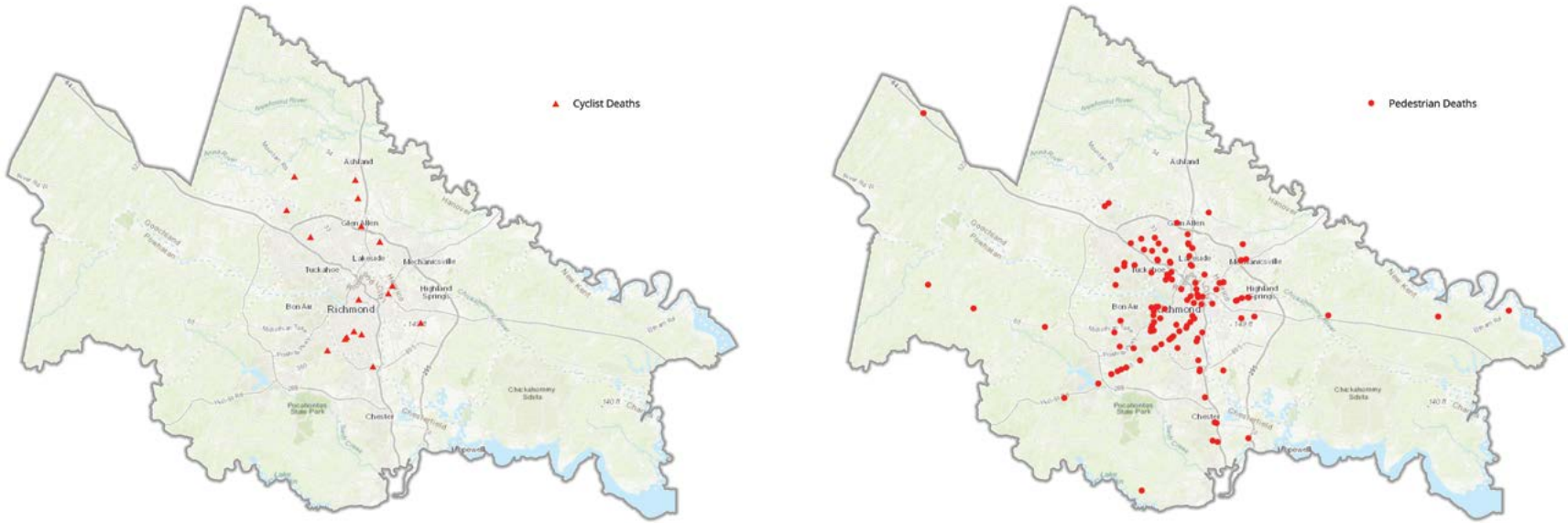


EXHIBIT 22: FATALITIES INVOLVING BICYCLISTS AND PEDESTRIANS FROM 2015–2020

one in Richmond. These statistics will be updated on BikePedRVA.org beyond the adoption of this plan.

The safe and comfortable environment for the cyclist and the pedestrian involves an integration of well-designed infrastructure, destinations that define the end points of a trip, and clearly identified priority for the motorist of the most vulnerable user: the pedestrian.

Part of the infrastructure equation also involves the availability of bikes for those who do not own one or need them less frequently for short trips around town.

The City of Richmond operates RVA Bike Share, a bike-sharing system that allows users to pay for borrowing bicycles. The program had an inaugural deployment in 2017 and now operates 220 bikes with 18 docking stations. Many of the original existing fleet was converted to electric assist. Additional bikes and docking stations are planned.

Strawberry St., Richmond

Commuters on Franklin Street Cycle Track

Environmental Justice and Health Outcomes

Every Metropolitan Planning Organization (MPO) that receives federal funds is required by Title VI of the Civil Rights Act of 1964 and Executive Order 12898 to ensure the most disadvantaged populations are protected from negative impacts and are best equipped to derive positive benefit during the planning process and evaluation. PlanRVA's Title VI Plan provides the legal framework for our nondiscrimination efforts, and our plans address environmental justice including the environmental and human health effects of federal actions on minority and low-income populations in addition to other demographic factors. For purposes of consistency between the *ConnectRVA 2045* plan and *BikePedRVA 2045*, Environmental Justice areas will be synonymous with Equity Emphasis Areas (EEA).

These historically disinvested groups traditionally include minority and low-income populations, individuals with disabilities, zero car households, elderly populations, and Limited English Proficiency (LEP) populations. The datasets for each category were accessed from 2013-2017 American Community Survey 5-Year Estimates from the U.S. Census Bureau. The EEA concentration area of each EEA population group is depicted on the regional map when its percentage exceeds its average percentage level of the region.

The steering committee emphasized the importance of using some relative measure in addition to the EEA factors that would show the need for greater exposure for certain populations to active transportation for individual and community health benefits within the region. The Virginia Health Opportunity Index (HOI), which is overlaid in red on the EEA concentrations on Exhibit 23, was developed by a team of researchers from the Virginia Department of Health.

The HOI is "a hierarchical index that allows users to examine social determinants of health at multiple

levels of detail in Virginia. The HOI consists of 30 variables, combined into 13 indicators, grouped into four profiles, which are aggregated into a single HOI. The HOI is reported at both the census tract and county/ independent city level" and selected from among the Social Determinants of Health. Each indicator, and the HOI itself, represent indications of the opportunity to live a long and healthy life in each area across the Commonwealth. The HOI map of the Richmond Region defines where the population has the lowest opportunity to live a long and healthy life, using 2016 census data grouped within four clusters:

1. Community Environment Profile – Air quality, population turn-over, density, walkability
2. Consumer Opportunity Profile – Housing and transportation affordability, educational attainment, food access, and private material resources such as personal vehicle availability to households
3. Economic Opportunity Profile – Job accessibility, income inequality, and job participation
4. Wellness Disparity Profile – Access to health care, racial and ethnic diversity

View detailed map

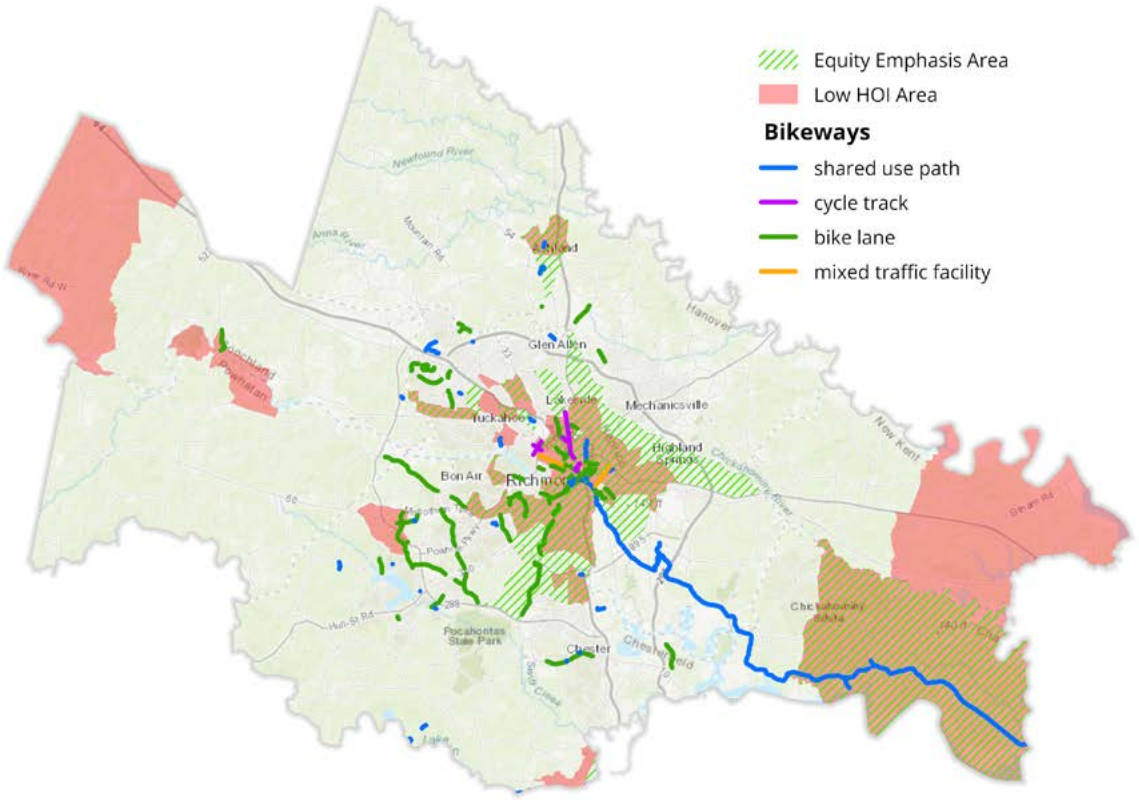


EXHIBIT 23: EQUITY EMPHASIS AREAS: ENVIRONMENTAL JUSTICE FACTORS AND LOWER HEALTH OUTCOMES (OVERLAPPING EEA AND LOW HOI AREAS DISPLAYED IN DARK PINK HATCHING)

Exhibit 23 shows where the EEA and HOI areas overlap making each of these populations stand out as the highest priority in need of access to transit and to safe and reliable options for pedestrian and bicycle connections. The separate and combined layers depicting the highest priority populations within neighborhoods or relative to existing transit stops can be best studied with the story map.

Population and Employment Growth and Activity Centers

Population and employment growth in the region are aggregated with each major update of the long-range transportation plan. For *ConnectRVA 2045* the region's demographers worked with PlanRVA staff to estimate population by Traffic Analysis Zone (TAZ) for the base year 2017 and to project the growth for 2045. Employment data from the Virginia Employment Commission (VEC) verified by local partners also was estimated and projected for the same base and horizon years. Together, population and employment estimates/ projections start to tell the story of how existing transportation systems are and should be performing in the future. They also tell the story of how the regional land use pattern is being shaped.

View detailed map

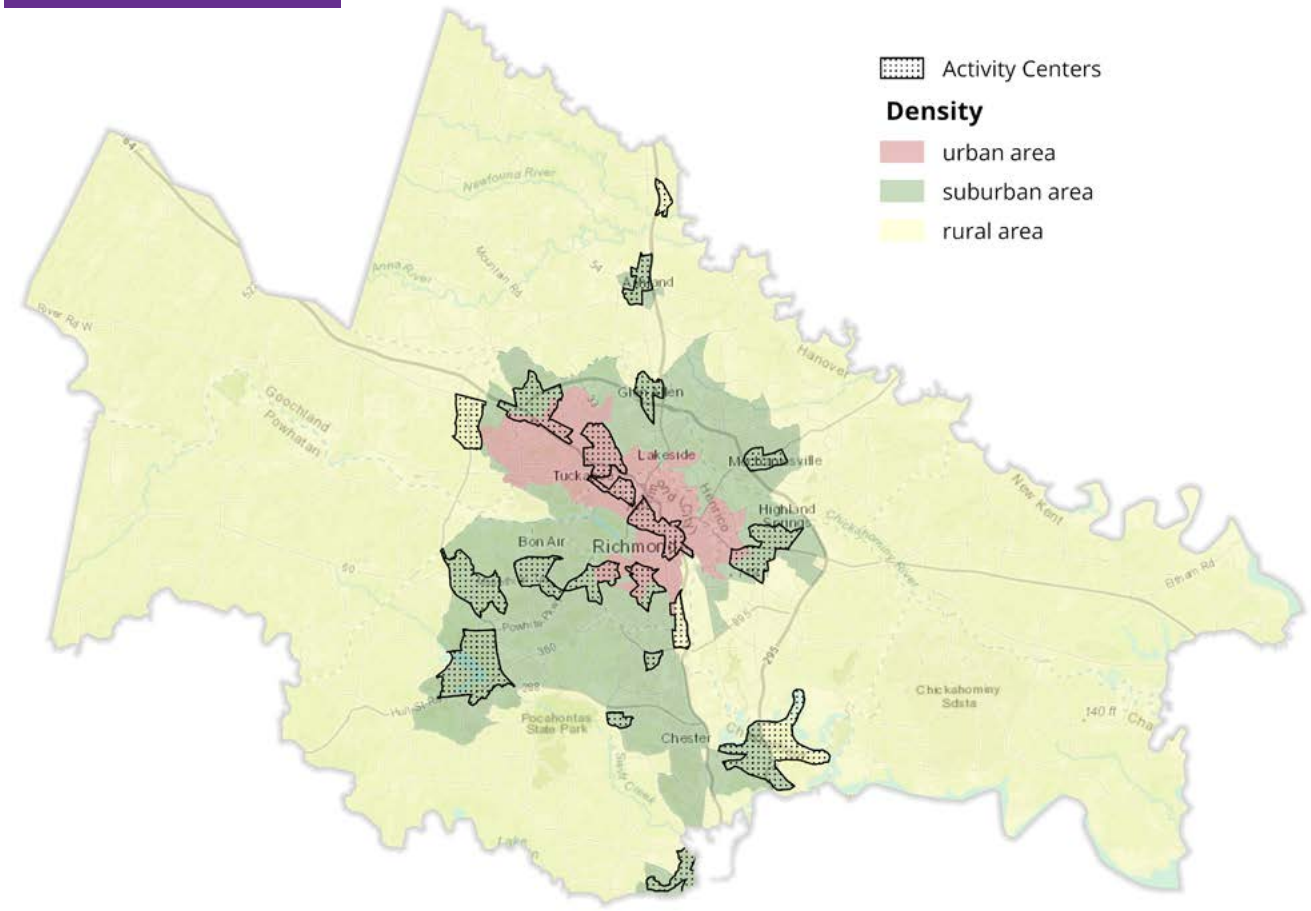


EXHIBIT 24: REGIONAL ACTIVITY CENTERS

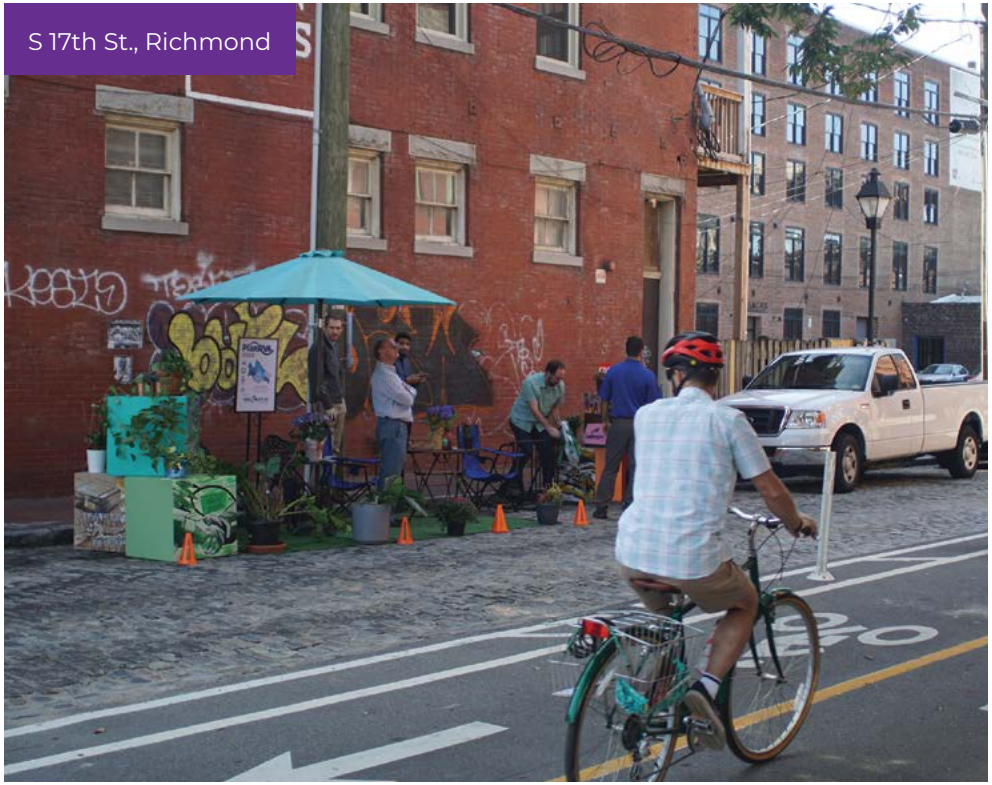
In 2017 the development pattern shows the densest areas of the region primarily focused within the City of Richmond with the emerging development pattern of high population density ring with radiating spokes. An almost complete ring around the City of Richmond has emerged around the I-295 bypass and Route 288. A north-south and east-west development pattern is apparent based on Richmond being at the crossroads of several major thoroughfares (i.e., U.S. Routes 1, 60, 250, 301, and 360) and with I-64 and I-95 intersecting in Richmond. The southeastern portion of the region reveals a noticeable departure from the concentric ring pattern. This area is separated by a natural boundary, the James River. Route 895 provides a connection between

the I-295 bypass and I-95 in this southeastern area. This highway connection could facilitate near-term and future development by 2045 with Route 288, between Route 60 and I-64, resulting in a circular development ring for the region. The areas showing the greatest amount of population density changes are at the outskirts of the I-295 and Route 288 bypasses.

Employment Density

Employment density follows a similar pattern. However, the downtown no longer serves as the region's sole employment center. Instead, a larger share of employment is expanding toward the suburbs, leading to higher instances of cross commuting. Areas with prominent employment densities include downtown and Virginia Commonwealth University campuses in the City of Richmond, Innsbrook, Short Pump and Henrico Government Center in Henrico, and Midlothian, Swift Creek, Ruffin Mill and Chesterfield Government Center in Chesterfield. Hospitals also serve as large employment centers distributed across the region. Based on past trends, it is assumed that employment growth will be oriented to the region's major transportation thoroughfares (mainly US 250, US 60, US 360, and US 1). Major employment density changes due to employment growth are in the areas adjacent to Broad Street in Henrico County, and in Midlothian in Chesterfield County. The Town of Ashland and areas around I-295 in Hanover County also show major employment growth.

Conceptually, an activity center depicts higher concentrations of population and employment density. A mixed-use urban area where the density of commercial or other land uses is highest is conducive to a wider variety of transportation options, including transit services. The size of different types of activity centers is variable based on the city or region's area size, population size, density area types (urban, suburban and rural), or its functions (shopping center, employment center, high-density residential area).



S 17th St., Richmond

The main purpose for identifying activity centers is to provide a guideline for better utilizing and prioritizing investment and funding for transportation, particularly transit projects. Depicting activity centers also provides guidance for *BikePedRVA 2045* because it clearly identifies key destinations for more active transportation connections from one to the other and within centers since they serve multiple users for a wider range of uses. Twenty such activity centers have been identified and are depicted on Exhibit 24.

Public Transit

It is vitally important to look at the transit-served areas that exist now and are projected to be in place by 2045 to coordinate with the active transportation network needed to support transit (Exhibits 25 and 26). This is particularly true when it comes to serving those who may be more transit dependent, including residents in the delineated EEA areas and those who experience lower health outcomes.

Before the pandemic, Greater Richmond Transit Company (GRTC) was projected to serve 10 million trips in FY21. Recent ridership surveys indicate more than 92 percent of the riders are going between home and work, and a majority (70 percent) walk less than three blocks to a bus stop. The demographics from the existing transit ridership survey indicate as of May 2019 more than one-half of the riders on local routes were from low-income

View detailed map

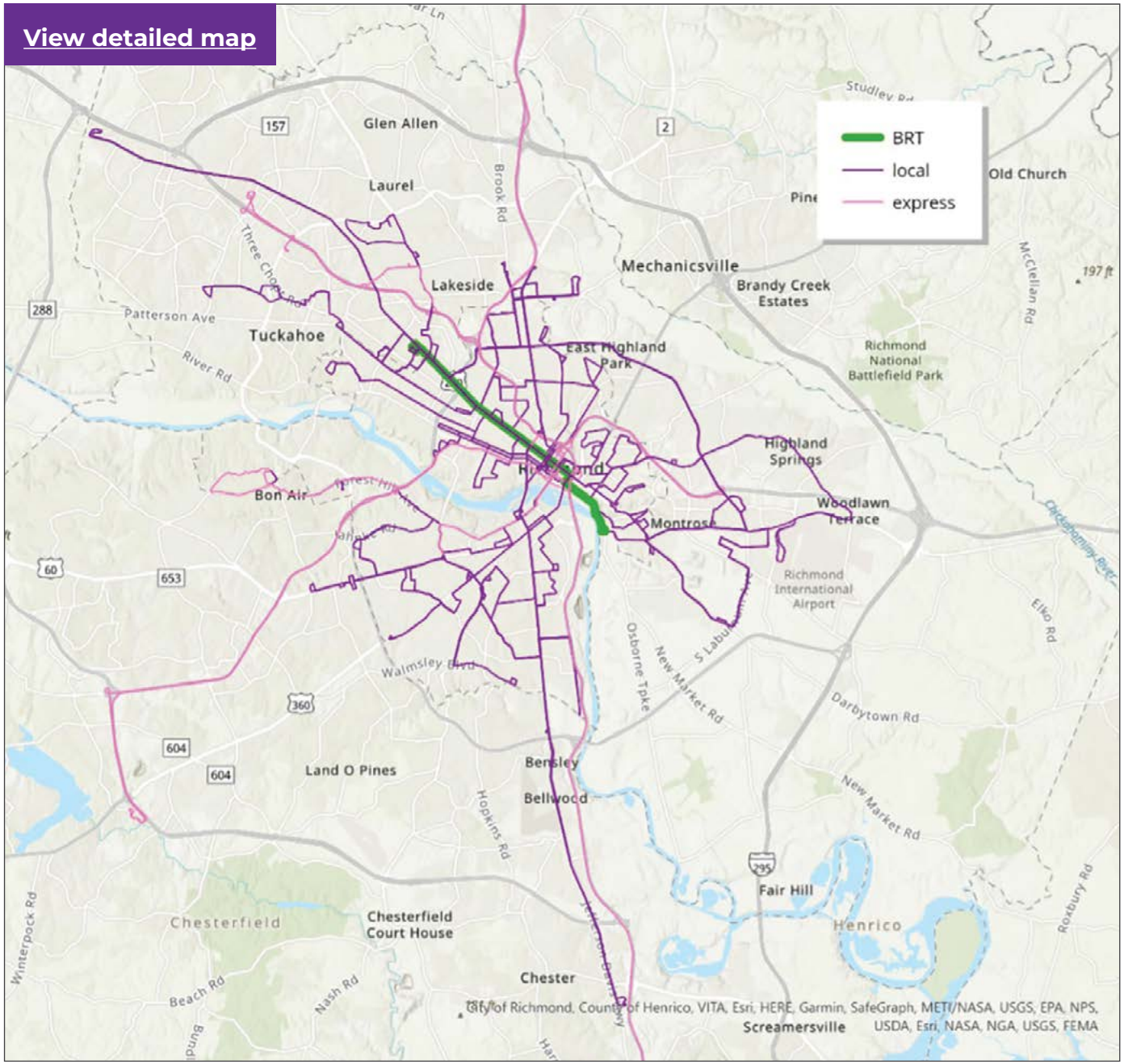


EXHIBIT 25: EXISTING PUBLIC TRANSIT SERVICES

households (less than $25,000 annually) and approximately two-thirds are are from minority populations. Further indicating transit dependency, the majority of all local transit trips were one-ride or daily fare-payers.

Adequate sidewalks and other pedestrian amenities associated with any transit service expansion whether the route is extended into a new area, or the service is enhanced with more frequency necessitates major commitment to provide the pedestrian facilities within a one-half mile buffer of transit stops/stations. In fact, the projected costs of improvement indicate that more than 50 percent of the resulting project can be attributed to the upgrade of pedestrian facilities and amenities. It is essential to find ways to prioritize the improvements over the near-term to work toward a regional future for transit that can safely and conveniently serve the public.

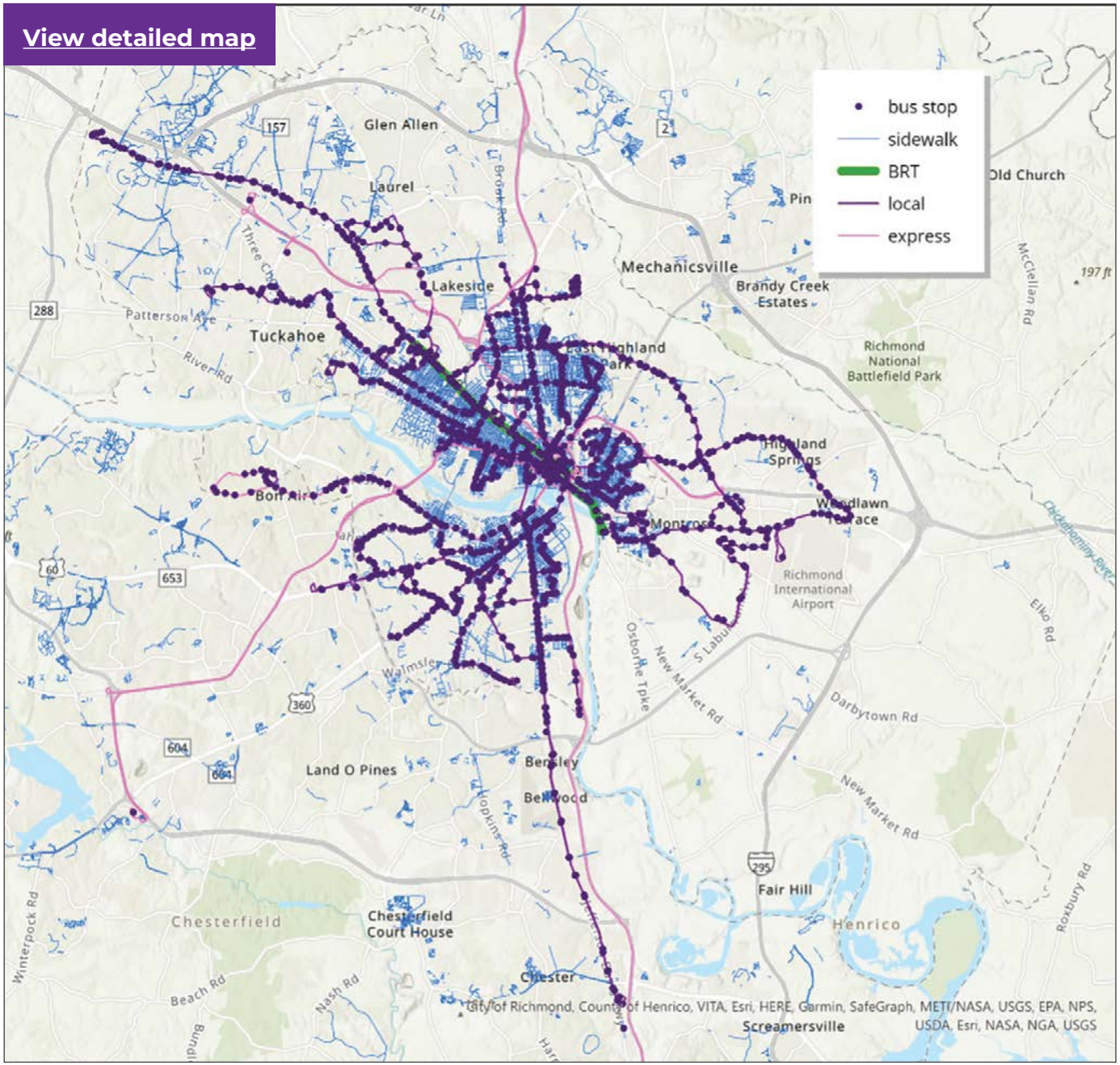


EXHIBIT 26: BUS STOPS IN RELATION TO SIDEWALK NETWORK

Existing and Planned Active Transportation Infrastructure

Regional Spines or Shared Use Paths

If active transportation improvements—including any facility or program that makes it easier and safer for those who are not driving or being transported in a private passenger vehicle—are to be effective, they need to extend across the region. Two major bicycle and pedestrian routes, or spines, are either in place or are being planned that can serve this cross-regional purpose for non-motorized transportation (Exhibits 27 and 28).

View detailed map

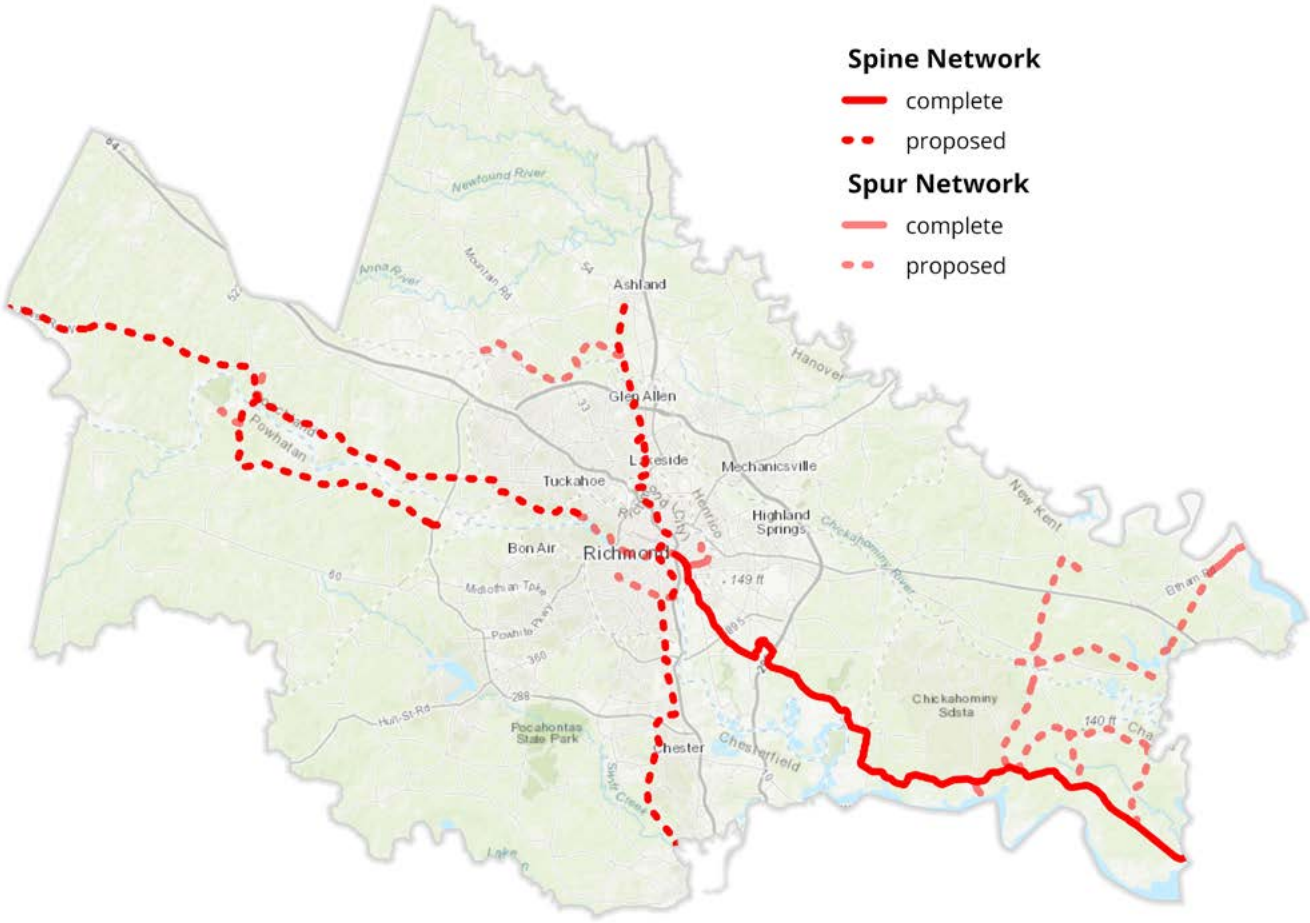


EXHIBIT 27: REGIONAL SPINE FRAMEWORK

The Virginia Capital Trail is the east-west regional spine and it presently reaches from Richmond to Jamestown/James City County a distance of 52 miles 52 miles. These potential connections could make the VCT the centerpiece of a longer distance route between Williamsburg and south across the James River toward Suffolk. The Hampton Roads Transportation Planning Organization led a two-year engineering and cost feasibility study for this effort. Planning efforts are also underway on the Three Notched Trail to connect Richmond and Charlottesville with a series of trails and on-road routes with alternative routing through the Richmond Region. While the exact routing has not been identified as of this report, options include south or north of the James River and/or using

one of several highway, railway, or utility rights-of-way. These potential connections could make the existing Virginia Capital Trail an original centerpiece of a longer distance trail route between the Chesapeake Bay and the Blue Ridge Mountains, capable of serving as a regional transportation option and beyond.

The Fall Line is a north-south regional spine being planned to traverse seven localities—including five localities in the Richmond Region—for an estimated 43 miles from the Town of Ashland to the City of Petersburg. Named for its unique geography along the trail corridor, the Fall Line denotes the area where the Piedmont Plateau and Atlantic Coastal Plain meet, resulting in several rapids and waterfalls. The Fall Line courses through Ashland, Hanover, Henrico, Richmond, Chesterfield, Colonial Heights, and Petersburg. The Fall Line is also expected to become the designated route for the East Coast Greenway (ECG) as it connects through the Richmond Region. The ECG prefers to designate shared use paths, protected bicycle lanes, and ADA-accessible paths for their routing.

View detailed map

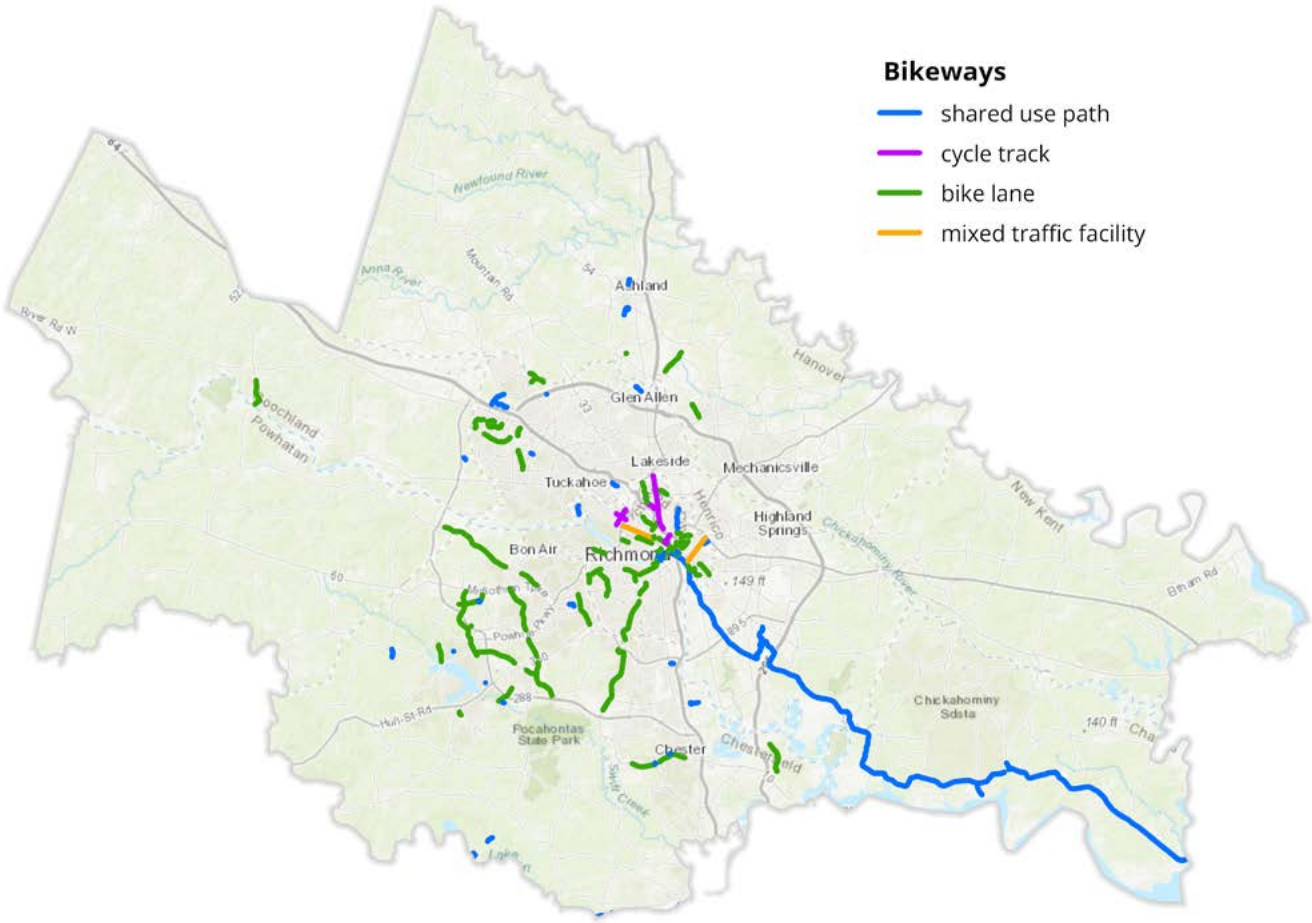


EXHIBIT 28: EXISTING BICYCLE INFRASTRUCTURE

Existing Bicycle Infrastructure Planned at Locality Level

PlanRVA and its steering committee partners reviewed local comprehensive plans, bicycle pedestrian plans, trail plans, small area plans, and community plans to inventory

existing bikeways that can lay the foundation for a regional active transportation network. These are categorized by type of facility as defined earlier in the definitions section and illustrated by the photo depiction in the Complete Streets toolbox. A complete listing of these bikeways is included in the Appendix.

In addition to these existing facilities, the *BikePedRVA 2045* process has identified a comprehensive list of proposed active transportation infrastructure outlined in the previously listed documents. These projects are depicted on Exhibit 29 and in more detail on the story map. This is considered a vision map of regional projects and includes a mix of facilities that are both proposed and in some level of development, with various levels of funding—if any at all. This map does not indicate that a project is underway or is an priority of regional project prioritization, as in *ConnectRVA 2045*.

View detailed map

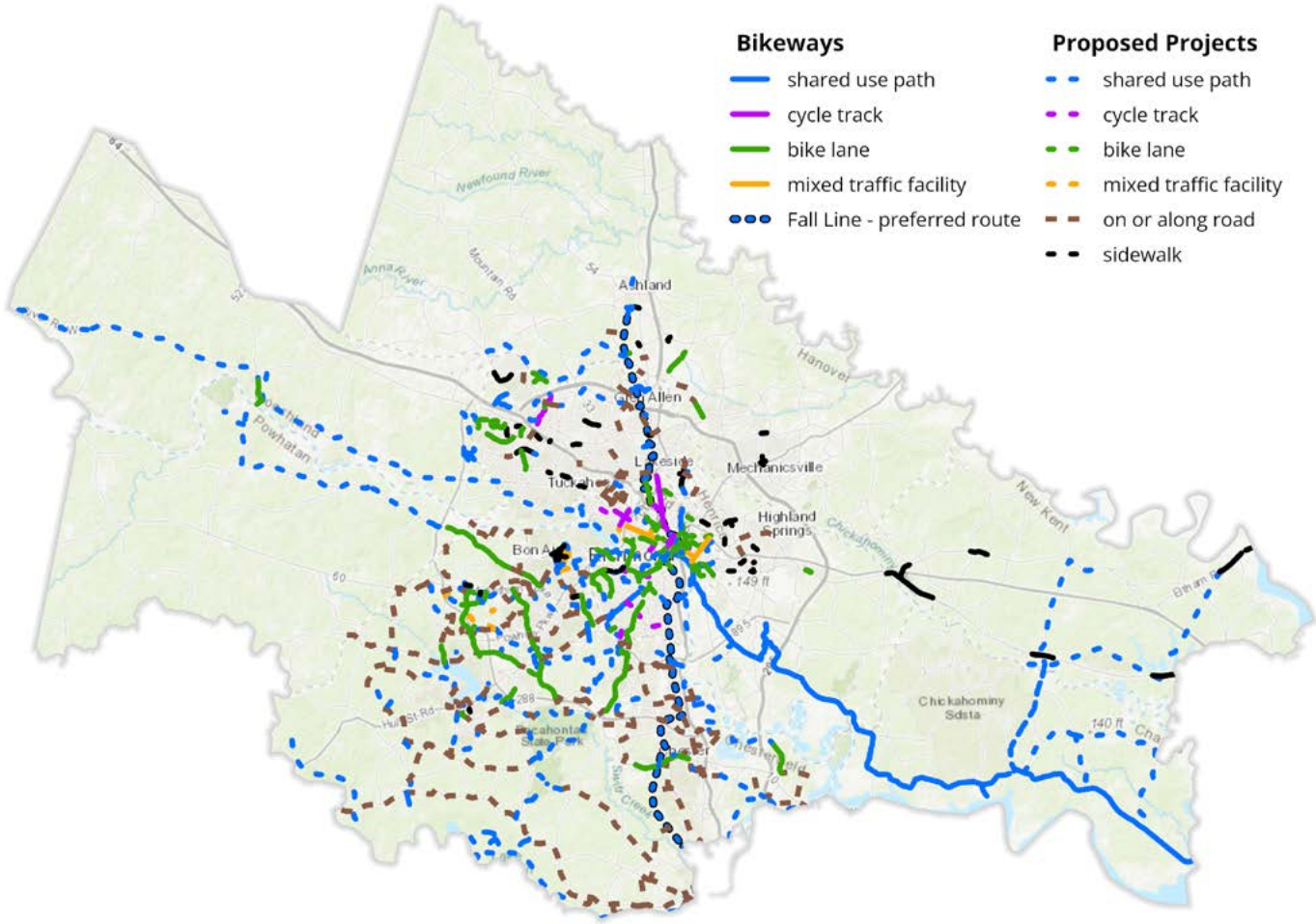


EXHIBIT 29: EXISTING AND PROPOSED BICYCLE INFRASTRUCTURE IN THE REGION'S LOCALITIES

Its value is in its visual depiction of what an accessible and comprehensive active transportation network in the Richmond Region could look like.

Strengths, Weaknesses, Opportunities, and Challenges

The planning framework explored in the previous pages present several strengths, weaknesses, opportunities, and challenges that were subsequently examined from a regional basis. This data summarized below is used to help inform this plan's outlook and major recommendations.

Strengths

The Richmond Region has over 136 miles dedicated to safer cycling infrastructure, including shared use paths, cycle tracks, and bike lanes.

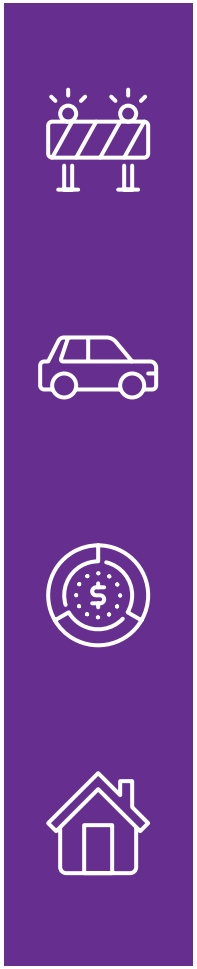
Sixty percent of the roadway system in the region are local streets meeting basic standards for Level of Traffic Stress 1.

The region has the framework of an active transportation spine network with the beginnings of a strong east-west shared use path with the Virginia Capital Trail and plans for north-south spine of the Fall Line that has popular support and is almost fully funded.

Market demand is strong for walkable communities that have mixed uses and are served with multimodal transportation options.

The Richmond Region is temperate and has access to strong natural resources and assets including rivers, wetlands, and forests. It is centrally located in Virginia and along the East Coast, making it possible to more easily link into an inter-regional network.

Weaknesses



Bicycle and pedestrian connections are often not able to keep up with transit expansions, leaving bus stops incomplete and non-functioning

Single occupancy vehicle (SOV) trips represent almost 81 percent of commutes to work, suggesting a current lack of interest or ability in cycling for transportation.

Percentage of funding dedicated to active transportation infrastructure improvement is minimal, less than 3 percent for specific facilities serving bicyclists and pedestrians

Housing shortages, especially affordable housing in developed areas close to existing transit and active transportation networks.

Opportunities

The active transportation spine network being put in place offers excellent potential to connect to historically disadvantaged neighborhoods, bringing better access to employment and community facilities to improve quality of life of those who also have lower health outcomes.

A new funding source for regional transportation through the Central Virginia Transportation Authority has energized decision makers and advocates alike allowing generous space to plan for a different future with active transportation at the forefront of change.

The Richmond Region can be known as an active transportation hub, with increasing real estate values, promotion as a popular tourist destination, and attractor of talent for community vibrancy.

The average commute to work in the region is 24 minutes, suggesting that policies and programs for expanding e-bike usage could have more potential.

Challenges

The short commute to work makes the value of using something other than a personal vehicle as a transportation mode harder to promote.

629 bicyclists and pedestrians were seriously injured or killed in the last five years in crashes with vehicles, demonstrating a need for physical safety improvements

Acceptance of active transportation as a viable transportation mode beyond recreational benefit is in its infancy in the Richmond Region and phasing, priority and costs working with private sector can be slow

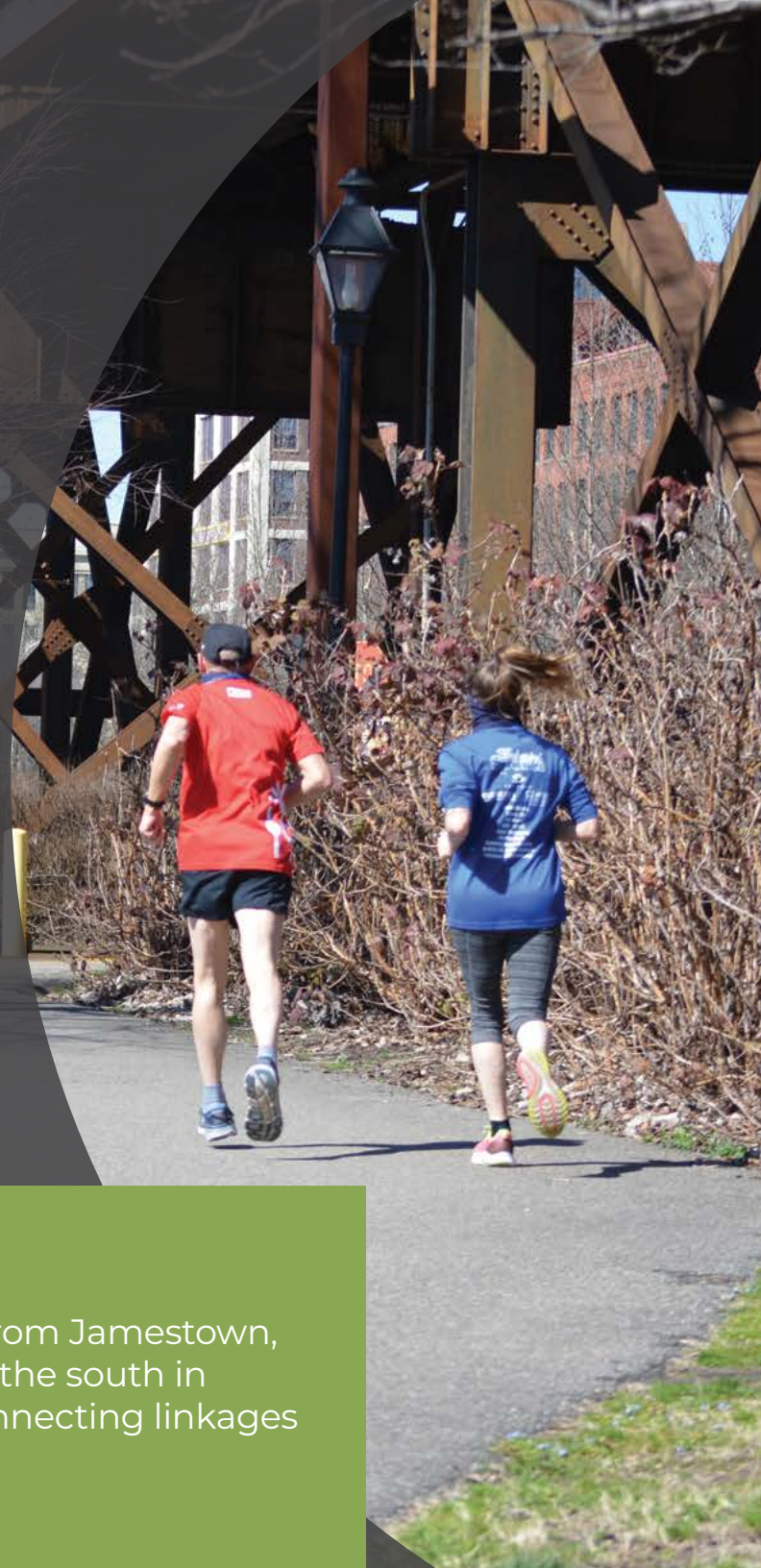
Implementation of an active transportation network feels painstakingly slow and can appear piecemeal and not well understood by the public

Maintaining momentum and funding priorities for active transportation improvements and programming requires active champions and political leadership

Policy interpretation and practice may be inconsistent throughout the region leaving unevenness in network connections and commitments to ongoing maintenance

Big Regional Ideas

- Regional Subareas
- Create a regional active transportation spine network
- Prioritize equity and access for disinvested communities
- Establish higher, well-recognized industry standards
- Focus on a pedestrian sidewalk network
- Strengthen local active transportation connections
- Provide tools for localities



Active Transportation Spine Network

Within the next decade, 95 miles of shared use paths will stretch from Jamestown, west into downtown Richmond, and from the north in Ashland to the south in Petersburg setting in place a framework from which to extend connecting linkages into the community for safer, more active living.

Big Regional Ideas

The framework for implementing a regional active transportation plan over a long planning period involves a series of short- and mid-term steps. Priorities are guided by the guiding principles, goals, and objectives to achieve the long-term plan. But how does one get started? How does the region develop actionable strategies to take in unison? This plan offers six Big Regional Ideas, or major recommendations, around which to start implementing the plan in the immediate term. For each Big Regional Idea, we highlight the benefits, goal alignment, and actions required to achieve it. These concepts are also illustrated through seven subareas located throughout the region.

Big Regional Ideas

1. **Create a regional active transportation spine network.**
2. **Prioritize equity and access for disinvested communities in the completion of active transportation networks.**
3. **Establish higher, well-recognized industry standards for active transportation infrastructure.**
4. **Focus on a pedestrian sidewalk network that provides safe, accessible connections for all users from neighborhoods to transit stops.**
5. **Strengthen local active transportation connections through the use of bike boulevards and safe neighborhood streets.**
6. **Provide tools for localities to effectively guide private sector developers to incorporate high quality active transportation infrastructure into their projects to the benefit of the regional network.**

Regional Subareas

Seven subareas incorporate representative characteristics about safety, connections to community assets, and addressing barriers and provide more context and substance to the plan's recommendations. Each of these subareas illustrates one of the six Big Ideas toward building a more complete and accessible network.

Many of the gaps and opportunities identified for the Richmond Region's active transportation system build from the existing network of regional trails, shared use paths, bike lanes, and segments of connecting facility improvements. Addressing the priority objectives of safety, equity, and multimodal connections for the region naturally lends itself to the region's core where much of the population lives and works. A focus on gaps and opportunities through this series of snapshot views on pages 54 and 55 and taken from story map (Exhibit 30) to be viewed in more detail is not meant to ignore the outer reaches of the region, but to illustrate first steps toward implementation of an overall regional network. These same steps offer logical parallels that can be carried beyond this core focus to courthouse centers, villages and hamlets, spur trail connections to the Virginia Capital Trail and future Fall Line, and safe routes to schools from neighborhoods and community facilities. The Virginia Capital Trail itself is a testament to the benefits of active transportation in a rural setting.

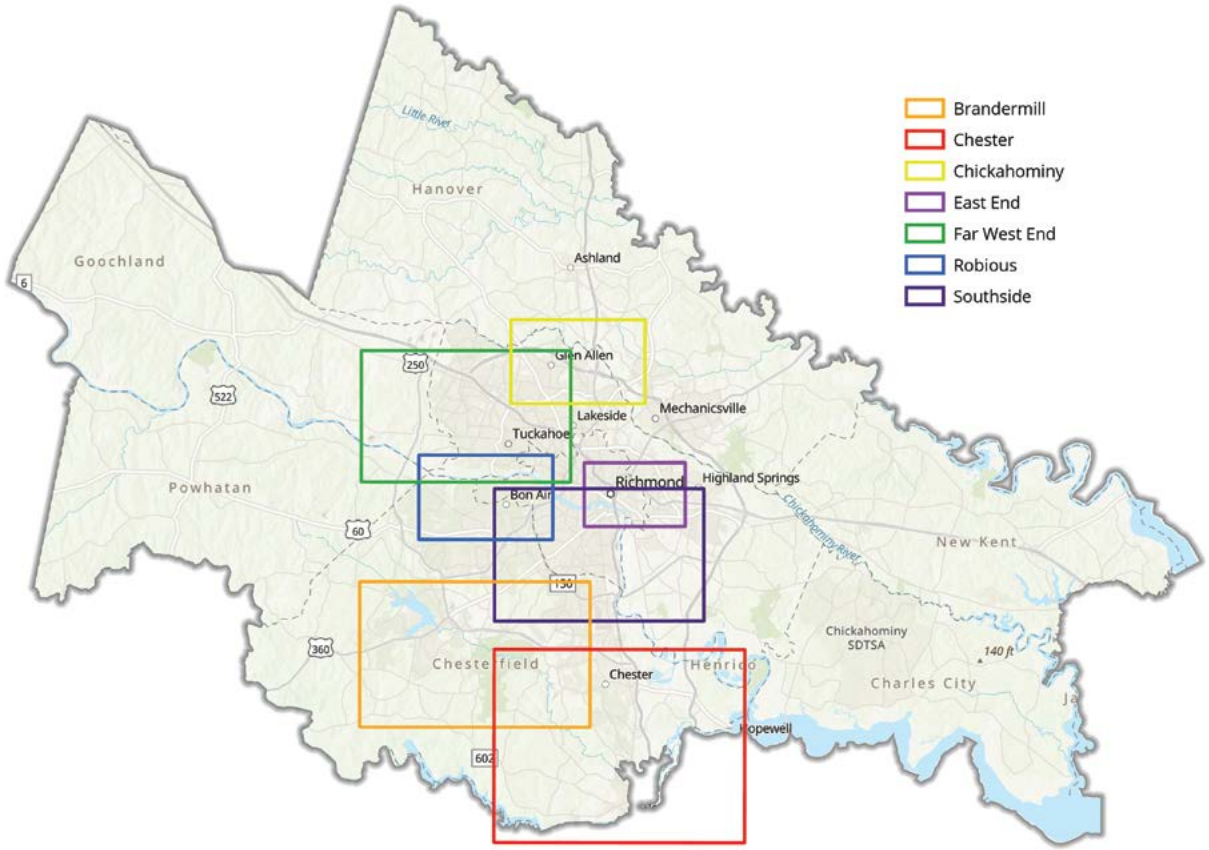


EXHIBIT 30: KEY MAP OF REGIONAL SUB-AREAS

Each of the seven subareas are relevant to established goals and were selected to illustrate defining characteristics that can be found elsewhere in the region. Therefore, lessons-learned and recommendations are meant to safely be applied to another area with relatively little modification. The subareas offer a mix of geography, history, and demographics. Their character is influenced by the type of roads (or functional classification), the posted speed and traffic volume on the roads that pass through their boundaries. Proximity to different localities influence these subareas, as did their level of transit coverage and land use type.

Brandermill

Illustrating Big Idea #1

This subarea is mostly made up of population in Chesterfield, the region's most populous locality. It encompasses the area around Brandermill east to Iron Bridge Road, Pocahontas State Park separating the two. It is entirely suburban ranging from an urban to rural feel. Much of the area only recently developed in the last 50 years and benefits from proximity to parks and green land cover. Bike facilities are fractured and sidewalks almost non-existent outside shopping centers, though many planned communities have good internal paths and miles of natural paths cross the state park. Focusing on improving and connecting existing assets and utilizing new development to build sustainable systems could make this a model of active mobility for other similar areas in the region.

Chester

Illustrating Big Idea #1

This subarea consists largely of Chester Village south to Petersburg (out of PlanRVA boundaries), with the entire southern end defined by the Appomattox River. It is mostly suburban and urban, with traditionally rural areas to the west. Much of the eastern two-thirds of this area is largely developed, though there is opportunity for infill particularly along spines. The planned Fall Line is routed down the middle of the Chester subarea, making it an example for the importance of a major active transportation spine—or spine—for the purposes of defining a regional network.

Chickahominy

Illustrating Big Idea #6

The Chickahominy subarea centers on Route 1 and the border between Henrico and Hanover Counties, near the junction of I-95 and I-295. This area is largely developed, but is attracting significant redevelopment, particularly around Virginia Center Commons and the southeast corner of the interstate junction, at the site of the planned "Green City". Particularly with the strong presence of the future Fall Line, it is vital to best plan for private development to tie into and expand existing active transportation facilities.

East End

Illustrating Big Idea #2

The East End of Richmond and part of Henrico County makes up this central subarea. It is heavily urban, with Downtown Richmond on the western edge moving into historic urban neighborhoods and county suburbs to the Richmond International Airport. The urban core has the most extensive active transportation network in the region, but it quickly dissipates going east into Church Hill and Union Hill. Strides are being made to expand bicycle and pedestrian mobility in this area and it is an example where prioritizing active transportation interventions in traditionally disinvested areas can not only contribute toward transportation goals, but also toward greater transportation equity and justice.

Far West End

Illustrating Big Idea #5

The Far West End subarea includes parts of Richmond's West End, Henrico, and part of Eastern Goochland. It consists of streetcar suburbs blending into automobile suburbs with traditionally rural areas developing into suburban. While there are major gaps in the formal bicycle and pedestrian network, this area has many slow, low volume neighborhood streets networks that have limited connections due to high stress roadways and cul-de-sacs. Utilizing neighborhood streets for local connections directly serves that community but also ties into a broader regional network. A good focus area is on establishing safe routes to school and to everyday community facilities such as grocery stores and shopping centers.

Robious

Illustrating Big Idea #3

The Robious subarea includes swaths of northwest Chesterfield with Henrico to the north and Richmond to the north and east. The University of Richmond is located in the top right corner, just south of which the Huguenot Bridge serves as the only non-motorized crossing of the James River in this area. Though this is a highly populated area, few facilities exist beyond traditional bike lanes on parts of Robious Road. Though Huguenot Road serves as an important connection between four localities and passes by the James River Park System, Stony Point, Bon Air, Robious/Huguenot, and Chesterfield Towne Center, there is virtually no accessibility to people outside of an automobile. These glaring gaps in the active transportation network make regional (let alone local) bicycle and pedestrian transportation all but impossible. This necessitates higher standards.

Southside

Illustrating Big Idea #4

This subarea consists mostly of Richmond's southside and its various connections to Chesterfield. While Henrico County borders Richmond and Chesterfield in this subarea, the James River acts as a barrier to all non-motorized traffic to everything east of Downtown Richmond. Some of the busiest corridors run through this area and the fractured sidewalks and bike facilities make non-motorized traffic dangerous and stressful. However, its proximity to Downtown Richmond, large residential populations, and several activity centers make this area ripe for improving foundational connections to transit.

1 Create a regional active transportation spine network

This first Big Idea is to establish the Virginia Capital Trail and the Fall Line as main regional spines for active transportation (Exhibit 31), and work with localities to align connections at jurisdictional boundaries. This has three interrelated, component parts setting the framework for a truly regionally reaching bicycle and pedestrian network. The beauty of viewing the full network is that it can serve a variety of trip purposes for a wide variety of users, i.e. neighborhood sidewalks provide universal accessibility for residents to safely take a short walk to a bus stop, but also provide access by bike for a neighborhood resident to commute across town for work without encountering conflicting vehicular traffic.

View detailed map

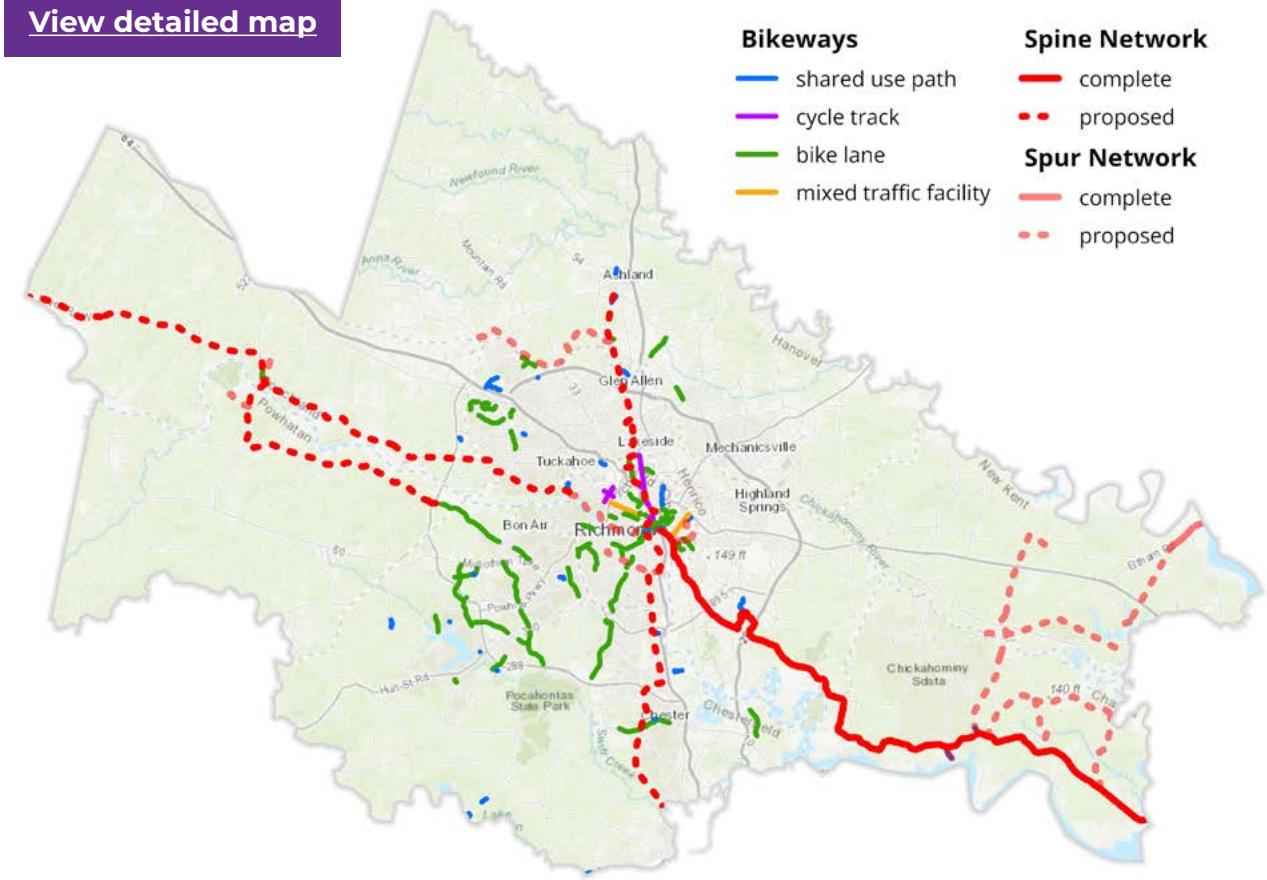


EXHIBIT 31: REGIONAL SPINE FRAMEWORK WITH EXISTING BICYCLE INFRASTRUCTURE

Establish the Virginia Capital Trail and the Fall Line as main regional spines for active transportation.

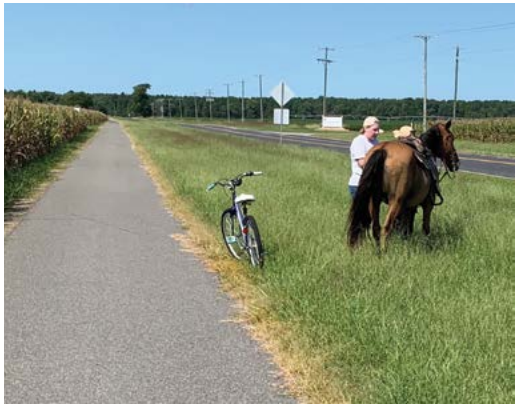
The Virginia Capital Trail and the proposed Fall Line together can create a “major spine” or inter-regional system of the regional spines around which all other active transportation improvements will be based. This system should be uninterrupted and separated wherever practical from motorized traffic. Connections to these long-distance active transportation trails tying communities and neighborhoods to opportunities for safe access for non-motorized users will further a truly regional network to serve the regional population with connections to employment, schools, community facilities for daily living. The regional trail network will attract tourists from outside the region leading to a greater return on investment for the region’s localities.

This series of photos (right) demonstrates how separated bikeways can traverse through and connect different types of communities.

The **Virginia Capital Trail** is a 51.7-mile, separated, shared use, fully paved trail that runs through four jurisdictions (City of Richmond, Henrico County, Charles City County, and James City County). The trail was constructed by VDOT as a complimentary trail to Route 5, a Virginia scenic byway, and was completed in October 2015.

The Virginia Capital Trail connects Richmond to Jamestown, forming the beginnings of an east-west spine route for the Richmond Region. The plan for **Fall Line** is a shared use path that would extend between the Town of Ashland and the City of Petersburg, approximately 44 miles, largely following along the Route 1 corridor. Other localities along the corridor include Chesterfield, Hanover, and Henrico counties, the City of Richmond, and the Town of Colonial Heights.

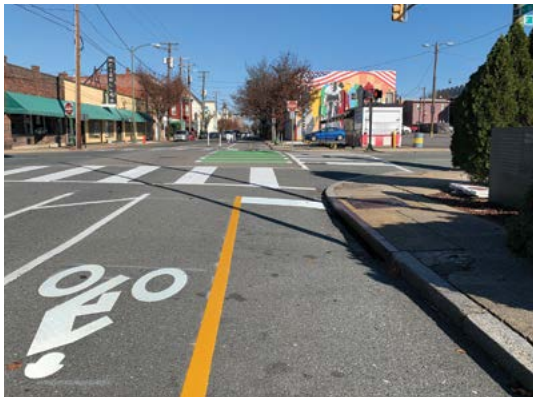
While the land along the Capital Trail is mostly rural, much of the Fall Line will pass through densely populated areas of the Richmond region. The Fall Line provides an opportunity for a large number of residents along the corridor to connect with transit and to provide more walkable and bikeable communities. The Fall Line will connect to many points of interest, including parks, public schools, colleges and universities, plus hundreds of businesses, churches, and area attractions. Portions of the potential trail would also be a logical reroute for national bicycle routes like the East Coast Greenway and U.S. Bicycle Route 1 as the signed routes pass through the Richmond Region. The success of any regional trail will depend on the land use planning of localities to enable compact, walkable communities to thrive with connections to the trail.



A RURAL SECTION OF THE VIRGINIA CAPITAL TRAIL (VCT)

AN EXISTING SUBURBAN POWER LINE EASEMENT THROUGH WHICH A PREFERRED SECTION OF THE FALL LINE MAY RUN

A SPUR OF THE VCT THAT CONNECTS THE CHARLES CITY COURTHOUSE TO THE COUNTY SCHOOL COMPLEX



1ST STREET IN RICHMOND AS AN EXAMPLE OF HOW A REGIONAL TRAIL CAN NAVIGATE THE COMPLEX URBAN ENVIRONMENT, SUCH AS THIS EXAMPLE OF A CYCLE TRACK

Fall Line would represent a north-south route for the region to complement the Capital Trail, with the two trails meeting in downtown Richmond. For the Richmond region to best take advantage of the opportunities these trails present, continuing a trail similar to the Capital Trail with a route west through Richmond and into Henrico and Goochland counties (north of the river) or through Richmond and into Chesterfield and Powhatan (south of the river) would be the next logical phase for the region.

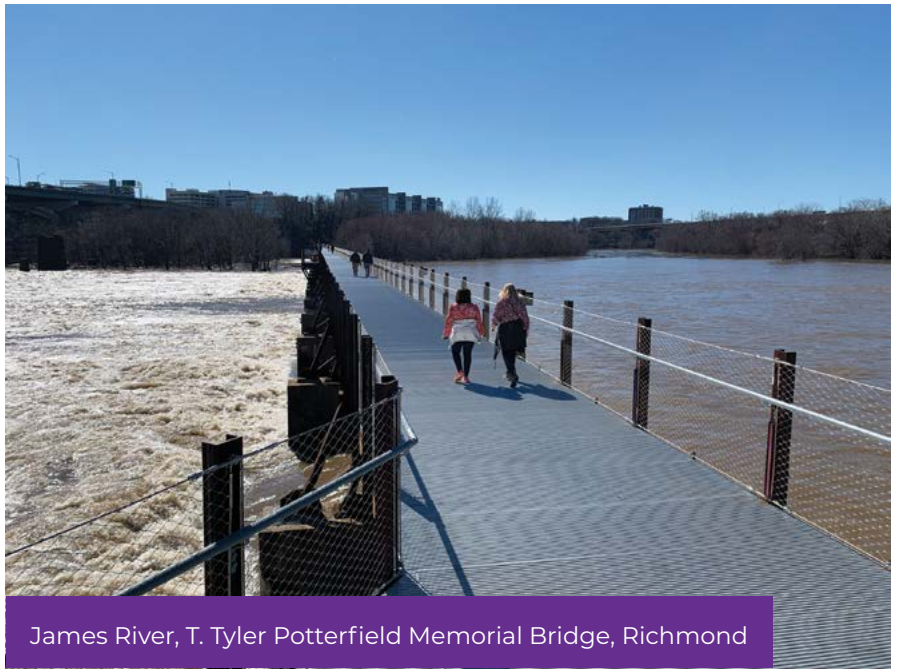
Use the James River to shape future extensions of the east-west spine

Several potential options are available to extend the VCT through Richmond and continue west. The Virginia Department of Conservation and Recreation (DCR) continues to work with Richmond area localities in the planning of the James River Heritage Trail, a statewide trail network running along or near the James River. South of the river, the potential trail corridor could traverse the northern portion of Powhatan County along the Huguenot Trail/ Route 711 corridor. Moving to the north side of the river, an extension along River Road or along the bank of the James River in Henrico County could connect to Route 6 through Goochland County.

Long-term, a trail connection extending beyond Richmond to Charlottesville is being discussed by regional partners. The Three Notched Trail is a proposed paved and shared use path through Charlottesville and west to the Blue Ridge Tunnel in Afton. The trail could connect users to the University of Virginia, the Blue Ridge Parkway, Shenandoah National Park, Skyline Drive, and the Appalachian Trail. The trail is seen as a part of a larger trail effort, connecting the Blue Ridge Mountains to the Chesapeake Bay, tying together the Virginia Capital Trail and the proposed Birthplace of America Trail, which connect in Jamestown. This effort would create a continuous trail nearly 200 miles long.

Work with localities to align connections across jurisdictional boundaries

Multiple opportunities for the localities to align their own efforts to provide better active transportation connections across jurisdictional boundaries hold tremendous promise. Uniformity of alignment enables strategic planning and funding, a combination that is essential for creating a



James River, T. Tyler Potterfield Memorial Bridge, Richmond

regional network widely accepted as a transportation mode for both long and short trips. A network provides connections between multiple destinations, and makes travel across the region on foot, wheelchair, scooter, or bike more accessible and safer. The starting point for alignment is best achieved by coordinating locality comprehensive plans, small area plans, and corridor studies.

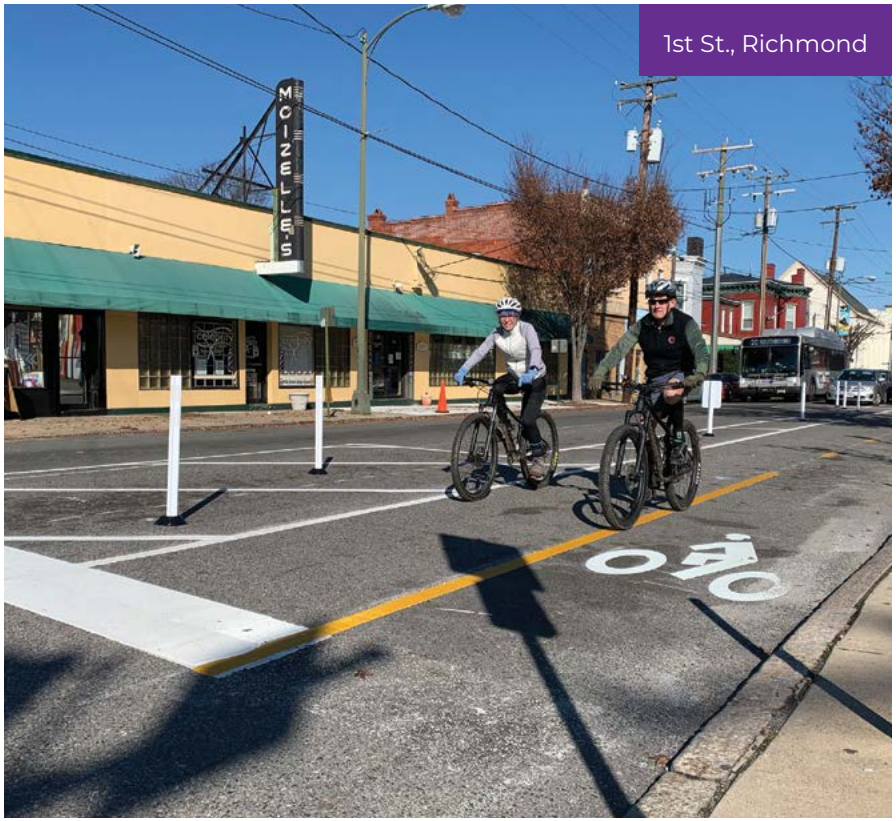
East End and Connection between Henrico and Richmond

The VCT provides transformational connections into eastern Henrico County from the City of Richmond. The separated, shared use path connects through the East End of the Richmond and Henrico, and has provided residents and visitors another way to travel and recreate safely.

Improvements to the bicycle and pedestrian network are still needed between eastern Henrico and Richmond.

Bicycle lanes have been added on Williamsburg Ave./Rd. in the city, but those connections end before they reach the county. The sidewalk network is also inconsistent. Henrico County is extending the sidewalk network eastward along Williamsburg Road.

Richmond developed the Cannon Creek Greenway, which connects Shockoe Bottom toward the Henrico line along the Richmond-Henrico Turnpike corridor. Henrico County has plans to continue this network with a shared use path along with an expansion of the roadway between Laburnum Avenue and almost to the Hanover County boundary, where the road is known as Meadowbridge Road. If these connections are realized, continuing into Hanover could also prove to be beneficial to active transportation.



1st St., Richmond

Other areas with potential network connectivity improvements:

- Nine Mile Road corridor
- Creighton Road and Fairfield Avenue
- Continued pedestrian improvements along Mechanicsville Turnpike/Route 360

Continuation of City of Richmond signed bicycle routes into counties

The City of Richmond began the development of on-road bike routes to help orient and assist cyclists. This includes an east-west Route 2 that connects from the University of Richmond mainly along the Grove Avenue and Floyd Avenue corridor through downtown to Church Hill. It has also designated a north-south Route 3 that connects along the Arthur Ashe Boulevard and Hermitage Road corridor from Byrd Park to Bryan Park. (NOTE: There is no "Route 1" out of consideration for U.S. Bicycle Route 1.) These routes include occasional destination signage with distance to significant points of interest along the way. This signed network could be extended into the counties of Henrico and Chesterfield and the number of routes and spur connections expanded to serve as wayfinding to direct cyclists to routes throughout the region, recognizing that signs alone do not make a route safe.

Far West End and Connections between Goochland and Henrico

Henrico County is conceptually planning a "James River Heritage Trail" in the western part of the county along or near the River Road corridor. Considering connection to this conceptual trail route with the Virginia Capital Trail if extended west through the city network into and through western Henrico is vitally important, especially if it can be aligned with the proposed "East End Trail" in

West Creek in Goochland County. As these trails are considered, connecting them somewhere along the Patterson Avenue/ Route 6 or River Road corridors would be beneficial to residents as a commuter or recreational transportation route. Potentially, this corridor would serve as a connection in the Richmond area toward the Charlottesville area with the proposed Three Notched Trail, a future study route, that is expected to somewhat follow the traditional Three Chopt Road/US Route 250/Three Notched Trail corridor between Charlottesville and Richmond.

Chickahominy River and Connections between Hanover and Henrico

The proposed Fall Line provides a north-south spine route for the Richmond Region, connecting Ashland to Petersburg principally along the US Route 1 corridor. The proposed connection over the Chickahominy River between Henrico and Hanover counties is expected to be along the former Trolley Line corridor just west of US Route 1. This route has a few planned spur connections to parks, residential, and commercial areas in northern Henrico around the Virginia Center Commons area and the proposed Green City development east of Interstate 95 and north of Parham Rd.

These spur trails would also lead to better bicycle and pedestrian connections into the Sliding Hill Road/Atlee Station Road area by way of potential improvements along Telegraph Road and Kings Acres Road which traverse some of the lower-lying areas along the Chickahominy River.

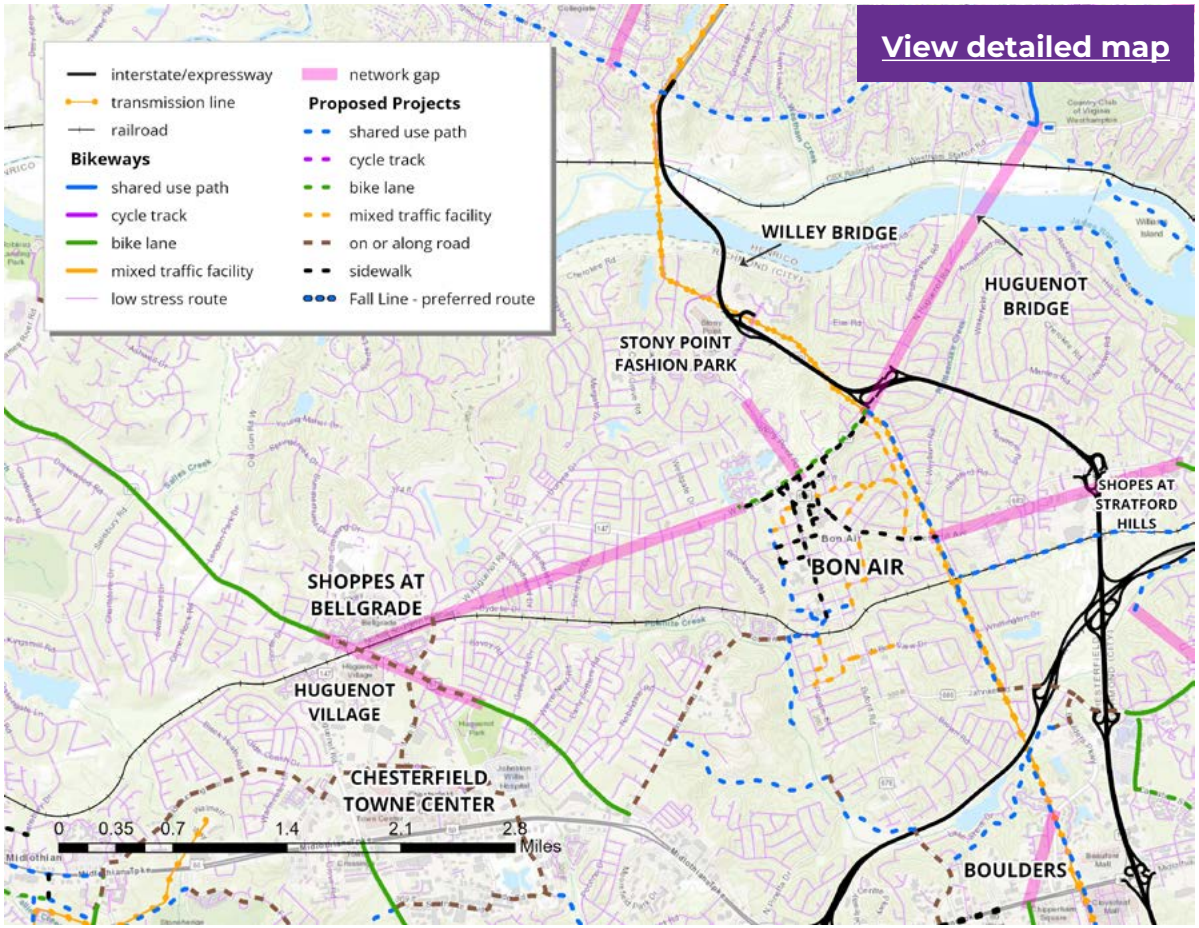


EXHIBIT 32: ROBIOUS NETWORK GAP ANALYSIS

Robious Road and Connections between Powhatan, Chesterfield, and Richmond

Exhibit 32 shows bicycle lanes along much of the Robious Road corridor in the western portion of Chesterfield County. These bicycle lanes present an active transportation route between Powhatan County and the Huguenot Trail/Route 711 corridor into the Midlothian community, with potential connections into the City of Richmond at Bon Air and across

the Huguenot Bridge into Henrico County as well. Improvements along the Huguenot Road corridor (or nearby alternatives) both north and south of Robious Road and the increased density of the commercial and residential developments in this corridor make it particularly beneficial to active transportation users to provide clearly marked routes for travel.

Chesterfield County has expressed interest in potentially realigning Polo Parkway with a roadway reconfiguration to better accommodate bicycles and direct them away from the heavily trafficked intersection of Huguenot and Robious roads, which also includes a rail line through the center. Connecting from Polo Parkway and the Belgrade Shopping Center along Huguenot Road to Cranbeck Road could provide a safer lower-traffic alternative. Improvements to Huguenot Road to accommodate pedestrians and bicyclists between Robious Road and Forest Hill Avenue would be transformational for improved safety access for residents. Additional connections or alternative routes between Bon Air and the James River along the Huguenot Road corridor or transmission line as called for by the Bon Air Plan would expand the regional active transportation network.

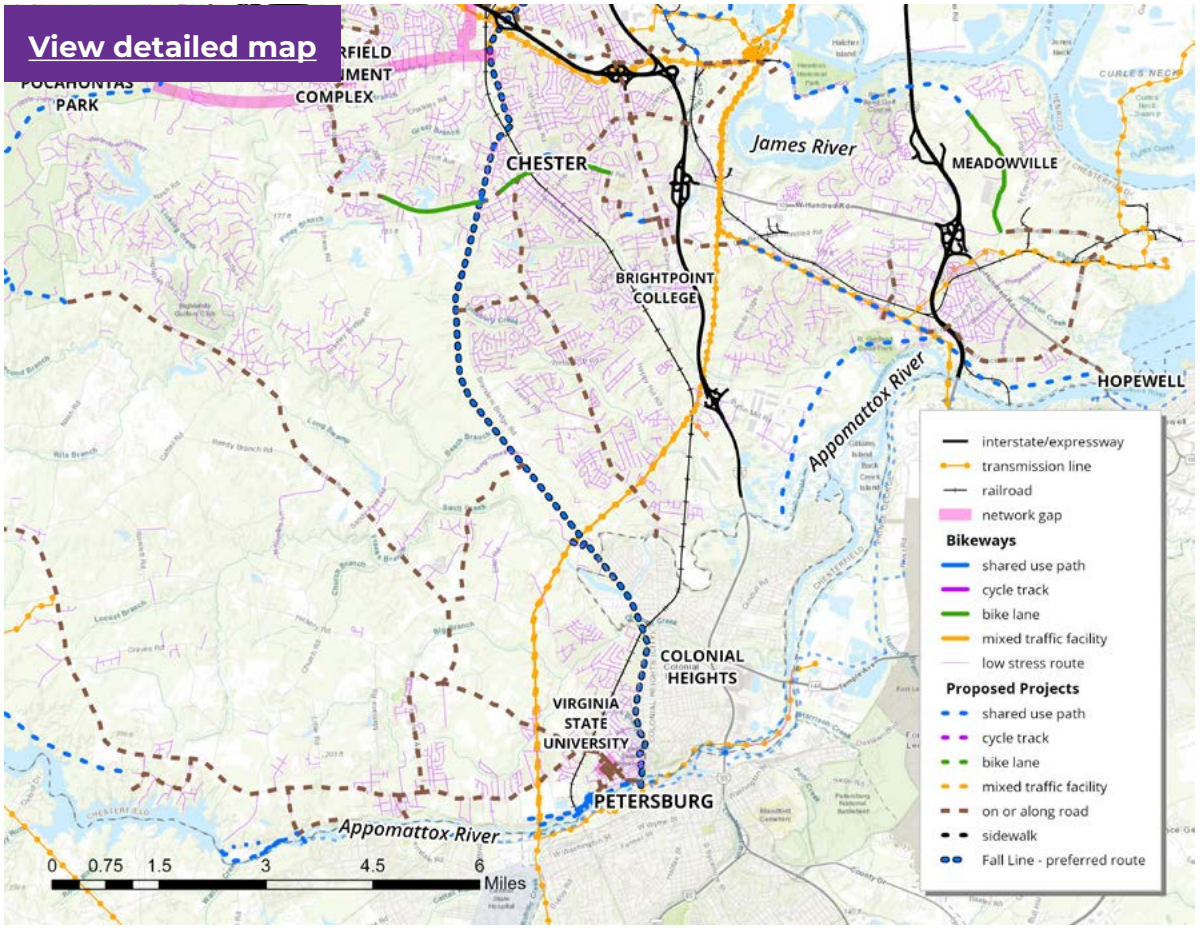


EXHIBIT 33: CHESTER NETWORK GAP ANALYSIS

Chesterfield's Trail Efforts with FOLAR and the Appomattox River Trail

Friends of the Lower Appomattox River (FOLAR) began in 2000 as an all-volunteer group as an outcome of recommendations from a study that addressed a variety of growing water resource issues, commissioned by the Crater Planning District Commission. The group led the effort to create the Appomattox River Trail (ART) Master Plan, completed in 2017. It is a guide to locating and prioritizing shared use paths with a coordinated signage system through the six municipalities that border the lower Appomattox River. The area encompasses the counties of Chesterfield, Dinwiddie and Prince George, and the cities of Colonial Heights, Hopewell and Petersburg, as shown in Exhibit 33.

The ART Master Plan envisions a 23-mile trail from the George F. Brasfield Dam on Lake Chesdin to the confluence of the Appomattox River with the James River that occurs on both the northern and southern banks of the river with a system of bicycle and pedestrian bridges. The planned regional trail and signage system offers walkers and cyclists safe, enjoyable connections to recreational opportunities, green space and nature, as well as connections to historic sites and structures, businesses, jobs, schools and transit. As of this writing, approximately 11 miles of this trail are complete, including approximately two miles in Chesterfield County. The ambitious and ongoing efforts of FOLAR are recognized as foundational, and connections between the two regions across the Appomattox is incorporated as part of *BikePedRVA 2045*.

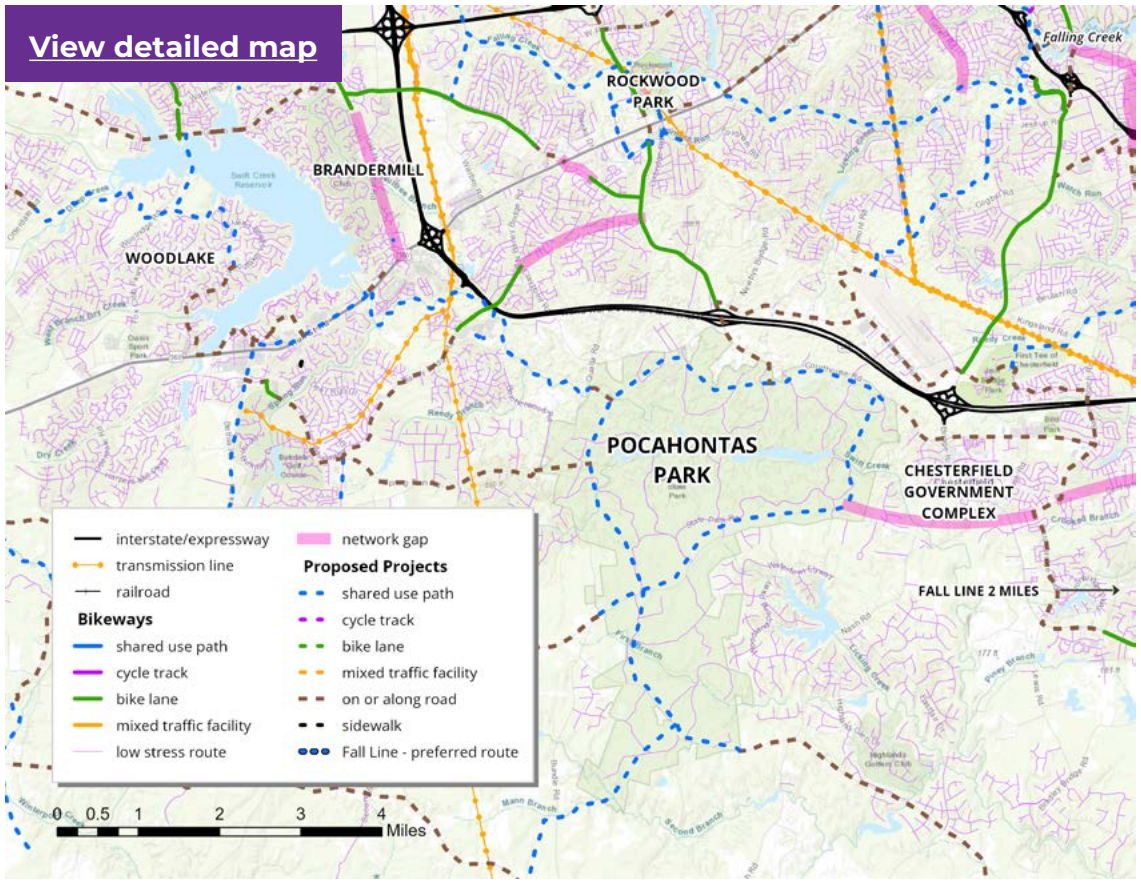


EXHIBIT 34: BRANDERMILL NETWORK GAP ANALYSIS

East Coast Greenway as an Organizing Element

The East Coast Greenway (ECG) is a walking and biking route stretching 3,000 miles from Maine to Florida, connecting America's most populated regions. Approximately 60 miles of the spine route connects through the Richmond Region between Hanover County and the City of Petersburg, traversing five localities of the Richmond MPO. Most of the current route is aligned along existing roadways as an on-road route. The goal of the East Coast Greenway Alliance is to designate the trail along safe corridors for active transportation, generally with shared use paths, protected bicycle lanes, and through park segments separated from vehicular traffic. As the proposed Fall Line is developed, the expectation is that the ECG alignment would shift from the current on-road routing to follow the same route to serve trail users along the 43 miles of mostly protected and separated trail which make up the Fall Line. Chesterfield also plans an off-road route utilizing a shared-use path along their boundary with the City of Richmond to Pocahontas State Park that would run through the park and along Woodpecker Road to connect with Petersburg. The planned route could serve as a spur to the ECG/Fall Line connecting at Route 10 or as Chesterfield's preferred envisioned route for the East Coast Greenway.

2 Prioritize equity and access for disinvested communities in the completion of active transportation networks.

By completing sub-regional/spur networks that can immediately tie into the Regional Spine System the most vulnerable neighborhoods are recommended to be served as the highest priority. The central portion of the region stretching south of the James River into Chesterfield County has some of the highest concentrations of environmental justice populations (or EEAs) with relatively low health outcomes. This is also true of outlying areas in Charles City and New Kent counties to the east and extreme western Goochland County. The best way to illustrate the opportunities that are possible to build on for creating connections to active transportation is to focus in more detail on the East End and Southside where the highest concentration of the vulnerable population is living.

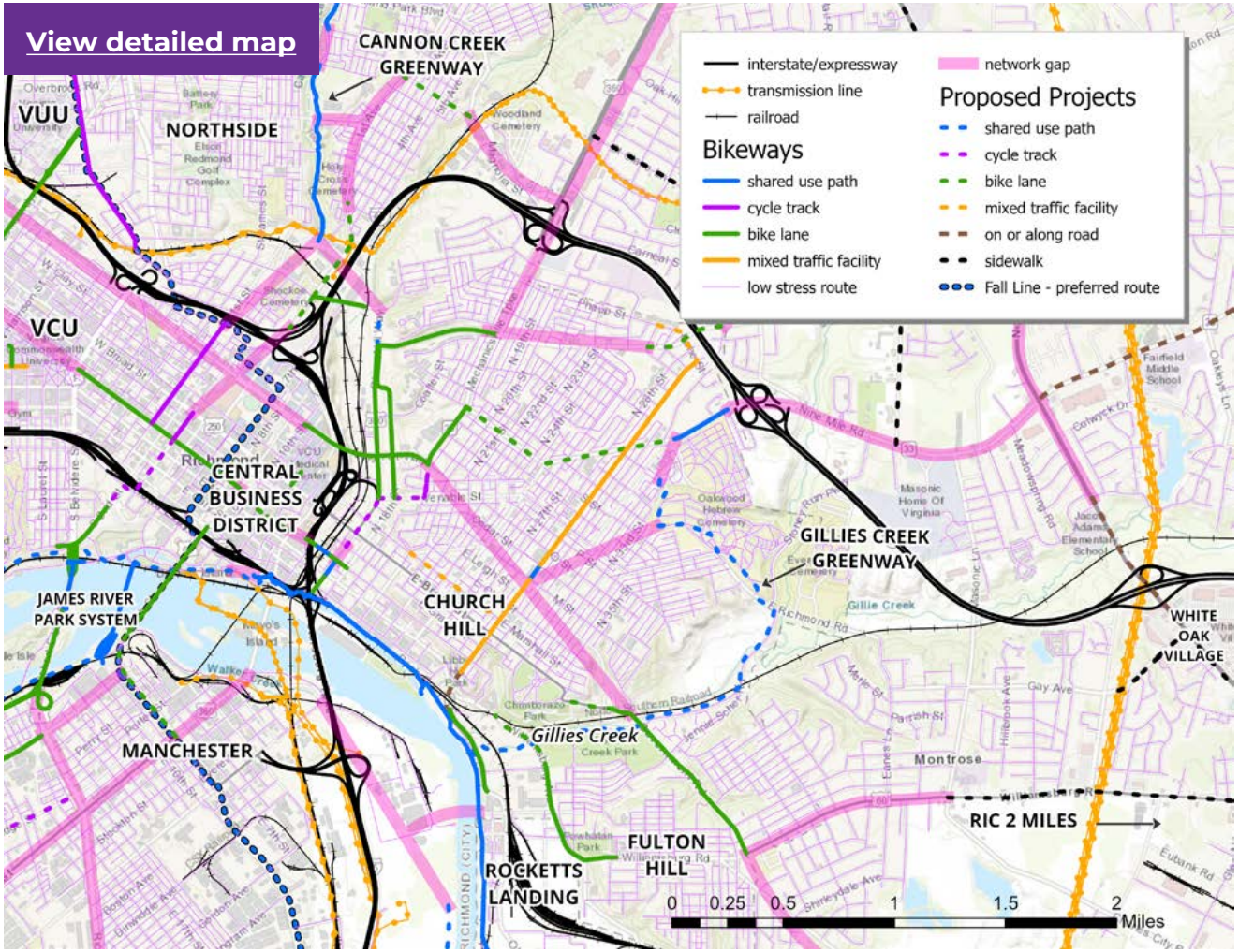


EXHIBIT 35: EAST END NETWORK GAP ANALYSIS

Exhibit 35 features the East End of Richmond extending into Henrico County with the beginning of a strong network of neighborhood sidewalks and bikeways.

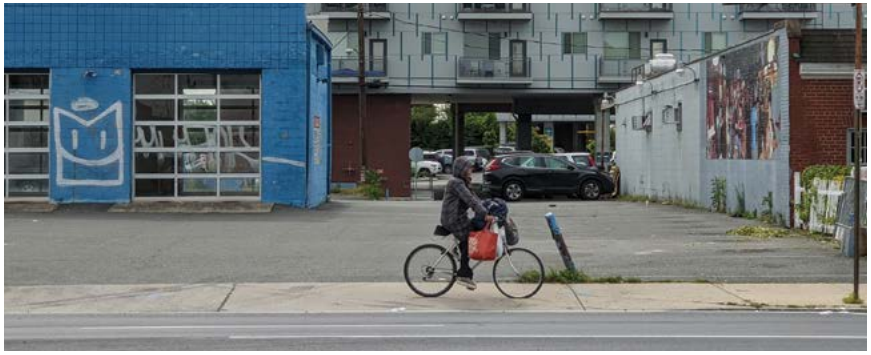
The gridded pattern of the older neighborhoods allows for greater connectivity, and as one travels beyond the city boundary northeast of I-64, the roadway system starts to divide the area into pie-shaped segments. The entire area excluding the hill portion of Church Hill is considered an area of concentrated environmentally and low health challenged population.

Both regional spines—the Virginia Capital Trail and proposed Fall Line skirt the southern and western edges. Extending from the spines up into the neighborhoods are Cannon Creek Greenway and the proposed Gillies Creek Trail. Bike lanes along Nine Mile Road over to Leigh Street/MLK bridge start to knit the neighborhoods from east to west, crisscrossing the 29th Street bike boulevard which will connect the Capital Trail along the river's edge to Fairfield Avenue north out Creighton Road into Henrico County.

Opportunities to connect end points of existing or proposed bikeways can contribute to greater neighborhood access to the major spines and emerging neighborhood bikeways:

- Cannon Creek to 1st Street down to Franklin cycle track
- Shockoe Valley connector to bike lanes of Fairfield and Oliver Hill Way
- Gillies Creek (proposed) to Nine Mile Road bikeway
- Extending Williamsburg Road bikeway from Montrose Heights into Henrico County

Similar opportunities exist on the southside of the river within and among the neighborhoods which developed in the 1950s and 1960s associated with employment centers along the I-95 corridor. The Fall Line route extends through the area along Commerce and Route 1, intersecting with the proposed James River Branch line trail from Route 1 to the west crossing Midlothian Turnpike and running parallel to Belt Boulevard. This primary trail system provides cross-neighborhood bike and pedestrian access, connecting residential areas with commercial and employment centers.



A CYCLIST RIDING ALONG ARTHUR ASHE BLVD. IN RICHMOND

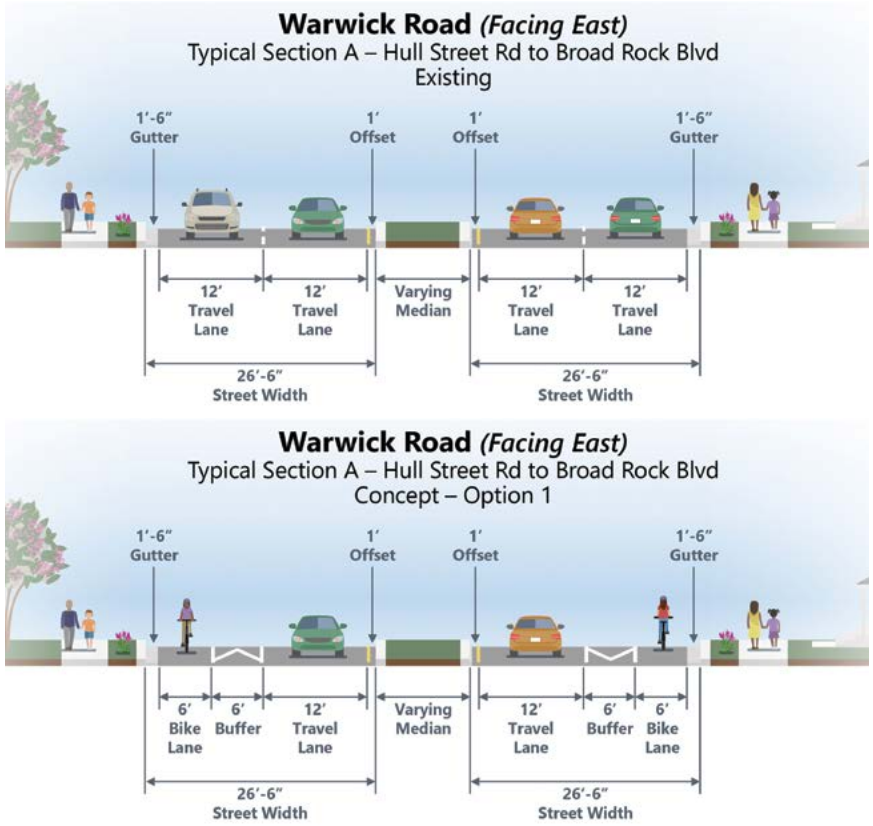


EXHIBIT 36: CROSS SECTION OF WARWICK RD., SHOWING BIKE LANE OPTION (CITY OF RICHMOND PUBLIC WORKS)

Both Warwick Road and Walmsley Boulevard offer wider cross-sections for potential bike lanes that can connect from the Fall Line to the west into many neighborhoods that lack active transportation options.

3 Establish higher, well-recognized industry standards for active transportation infrastructure.

A primary purpose of *BikePedRVA 2045* is to present design alternatives to our partners to reach common acceptance of a higher level of standards for bicycle and pedestrian facilities with industry recognized standards for varying context (urban, suburban, and rural).

BIKE LANES ON LOMBARDY ST. (RICHMOND) AND IRONBRIDGE RD. (CHESTER)

This plan provides guidance in the Implementation Section (and related Complete Streets guidance tool box) for upgrading or replacing older, traditional bike lanes within existing roadways to safely address current-day conditions, i.e. increased traffic volumes, road dimensions, land uses served and speed, which change the whole function of the roadway and use by cyclists.

SHARED USE PATHS AS PART OF AUSTIN WOODS DEVELOPMENT ON ROUTE 10 IN CHESTERFIELD COUNTY

One case to illustrate the changing nature of the regional road network is the bike lane along Route 10 in Chesterfield County from Chippenham Parkway west to the Courthouse. The bike lane was part of a widening and improvement project in 1993-1994. The traffic volume on Route 10 from Chippenham Parkway to Cogbill Road has increased by 35 percent over the past 25-years. Much of this relates to the tremendous growth and changes in land use. The original signed bike lane installed in 1993-94 when Route 10 was widened to four lanes with a center median meets VDOT standard but without any separation from moving traffic. What was considered reasonably safe for a bicyclist in 1995 is now recognized as less safe and comfortable, partially due to traffic volume trends, widenings, increased vehicle size,and land use changes over last 25 years.

As new development occurs along Route 10 in the County, staff is working closely with developers to require additional right-of-way and install separated shared use paths, as shown here with the Austin Woods apartment homes near Iron Bridge shopping center. This treatment will ultimately replace the existing bike lane for a safer solution and can lay the groundwork with further extension by the County or private development to logical termini like the shopping center.

Not only do opportunities exist to enhance the full utilization and function of the existing roadway system through expansion in conjunction with new development as along Route 10, reconfiguring the cross-section of an existing road offers the opportunity for localities to work with VDOT to retrofit within the right-of-way additional space for the inclusion of a marked bike lane. Roadway configuration and road diets are covered as important implementation tools in practice in the Richmond Region as part of this plan. Reallocation of space for multimodal use in routine repaving programs is a more cost-effective approach to add bike lanes, thereby, reducing crashes, speed, and crossing conflicts.

In addition to roadway configurations which are considered by FHWA and VDOT to be proven safety countermeasures, the recent *Richmond Regional Transportation Safety Plan* (February 2022 draft) outlines infrastructure countermeasures which will employ higher, well recognized and adopted design standards, including a selected sample from the implementation section of the safety plan (pp. 54-55) that relate most specifically mixed-traffic roadways for cyclists and pedestrians:

- Provide high visibility and wider markings to make it clear where each of the users should be in the space

BIKE LANES RECONFIGURED ON TURNER ROAD IN CHESTERFIELD COUNTY

- Reduce frequency and severity of intersection conflicts through traffic control and operational improvements
- Improve access management
- Install roundabouts and/or traffic circles
- Provide enhanced and advanced warning signing of unsignalized intersections
- Install or upgrade traffic and pedestrian signals
- Construct pedestrian refuge islands and raised medians
- Provide crosswalk enhancements
- Install flashing beacons or leading pedestrian interval at signals
- Install traffic calming on road sections and/or intersections

GROVE AVENUE RAISED CROSSWALK

SAFE ROUTES TO SCHOOL AT LINWOOD HOLTON ELEMENTARY

HENRICO COUNTY MADE SPACE FOR BIKE LANES WITH A ROADWAY RECONFIGURATION ON THAMESFORD WAY

4 Focus on a pedestrian sidewalk network that provides safe, accessible connections for all users from neighborhoods to transit stops.

Since all trips begin at the home, safe and accessible pedestrian infrastructure are basic support facilities needed for public transit. Infrastructure in this case usually means sidewalks but could also be a shared use path or advisory shoulder, where appropriate.

Since pedestrians and cyclists are most vulnerable when crossing a street, safe road crossings are needed where known conflict occurs, with more comprehensive design elements needed in cases of high speed and volume of motorized traffic. Physical infrastructure such as pedestrian safety islands and curb extensions can make it easier for individuals to cross streets where there are wide rights-of-way. Traffic warning and control devices such as a rectangular rapid flashing beacon (RRFB) or a pedestrian hybrid beacon (PHB) should be considered to strengthen pedestrian networks integrated into transit, increasing comfort and reliability. Not every part of the region is served by fixed-route public transit—in this case, GRTC—so in these areas care should be made to make appropriate connections to village and activity centers.

STANDING WATER AS A BARRIER FRAGMENTING THE NEIGHBORHOOD SIDEWALK NETWORK IN RICHMOND

Provision of a sidewalk network essentially followed the street pattern in the urban core and older neighborhoods of Richmond, Ashland, and Henrico County. Though this network is comparatively complete, maintenance backlogs in many of these older areas leave the pedestrian facilities effectively inaccessible to those with mobility issues and people with disabilities. Maintenance

issues in current sidewalks can sometimes form barriers, especially for people with mobility issues, but could be an opportunity to strengthen connections and even introduce green stormwater infrastructure improvements. Other obstructions such as signs, trash cans, and parked cars can also render a system partially unusable to some, calling for a mix of physical interventions and enforcement of current rights-of-way. Proper intersection and crosswalk treatments are also vital but are much more of a local issue since each location requires examination and analysis.

These challenges are particularly noticeable in much of Richmond's Southside, and most of Chesterfield and Henrico have pedestrian connectivity issues to transit. Many newer residential areas designed in the middle of the twentieth century were built without sidewalks, allowing them to be built quicker and cheaper, all while deferring costly infrastructure needs. Most of Richmond's Southside that is served by transit has an incomplete sidewalk network despite having one of the highest concentrations of households with low-vehicle ownership. This is true for most of the areas of Henrico and Chesterfield served by transit.

Prioritizing bus stops not connected to sidewalk network should be a regional priority. Many of these locations can be extremely stressful in the best of conditions and essentially inaccessible to all people in extreme or less than ideal conditions. Many of the neighborhoods on the Southside (Exhibit 37) between Hull Street/Route 360 to the west and Route 1 to the east in the area bounded by

EXAMPLES OF A POORLY EQUIPPED BUS STOP ON LABURNUM AVE. AND A MORE COMPLETE BUS STOP ON WILLIAMSBURG AVE.

Warwick on the north and Walmsley on the south are served from primary routes by transit, but the neighborhoods lack sidewalk or safe connections back to the transit stops on the primary routes. Gridded block patterns of these neighborhoods would lend themselves to interconnecting sidewalks if open ditch cross-sections common to the 1940s-style neighborhoods could be also reconstructed. Broad Rock Boulevard running through the center of this entire area is a median divided roadway actively served by transit with a sidewalk on either side. Richmond300 calls for the boulevard to be reimagined as a grand boulevard which links Southside Plaza serving as a future transit hub on the north ultimately to Ironbridge Road/Route 10 into Chesterfield County.

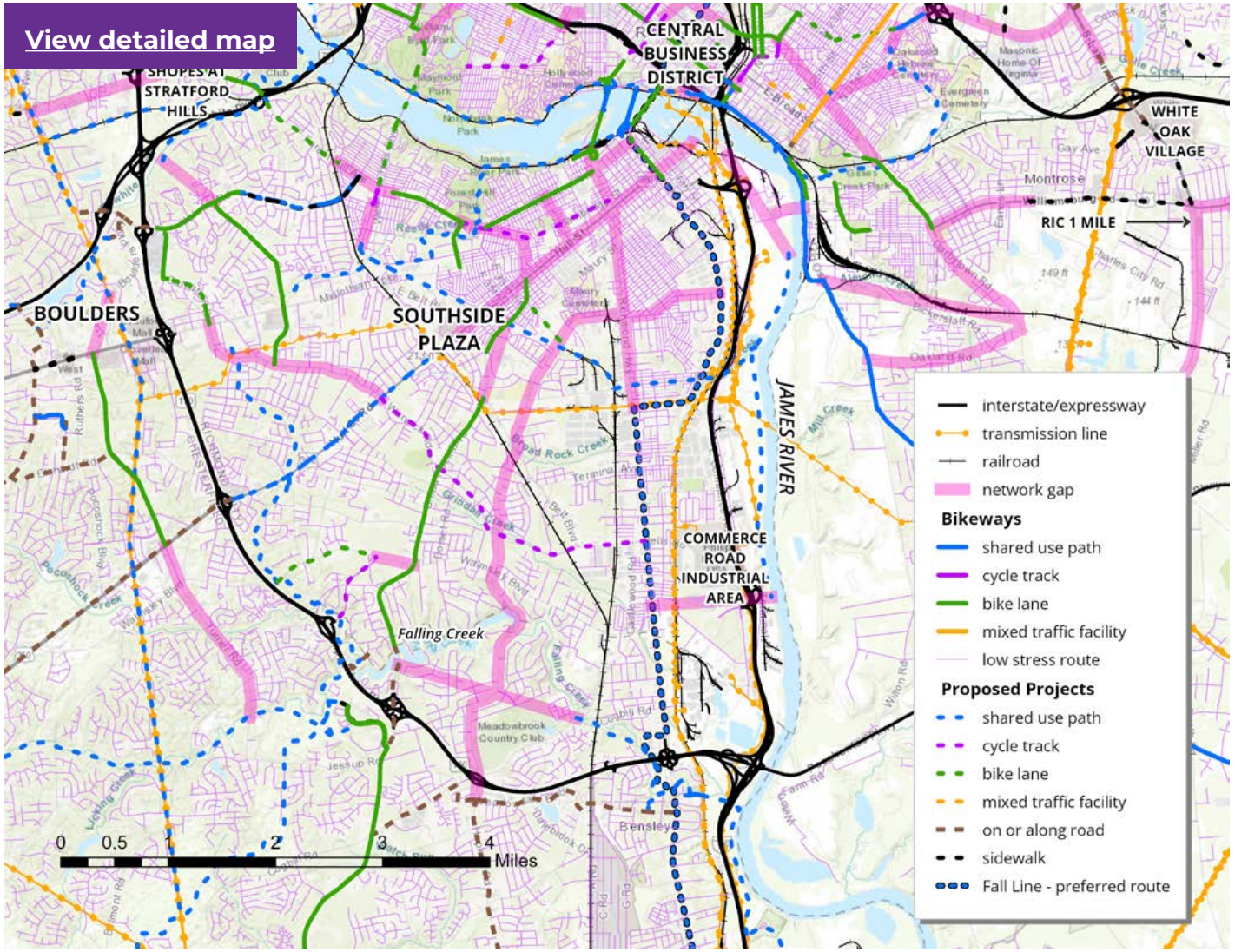


EXHIBIT 37: SOUTHSIDE GAPS

Ensuring new sidewalks are built along with appropriate connections to existing transit infrastructure is an opportunity all localities can embrace, though the effect is more pronounced for larger single-family developments in areas outside of the City of Richmond. Henrico County has an Updated Design Manual that calls for sidewalks and concrete bus pads with new development.

5 Strengthen local active transportation connections through the use of bike boulevards and safe neighborhood streets.

Tie neighborhoods together to expand reach and use of bike boulevards, starting with safe routes to schools and parks, neighborhood streets with short bicycle and pedestrian connections, and neighborhood byway signage.

Invest in traffic calming measures along comprehensively planned routes using strategies to maximize comfort and connectivity. Consistent sign and pavement markings can help new and experienced riders identify low-stress bike routes and remind motorist that they are traveling in a shared environment with other roadway users.

Speed management techniques such as speed tables, curb extensions and chicanes help slow down motorized traffic, while traffic diversion measures should be used to discourage cut-through traffic, keeping the volume down. Street trees are beneficial to traffic calming while providing a pleasant environment and serving as keystones for green stormwater management strategies. Green infrastructure to help more sustainably manage stormwater as a community resource should be more integrated with transportation projects.

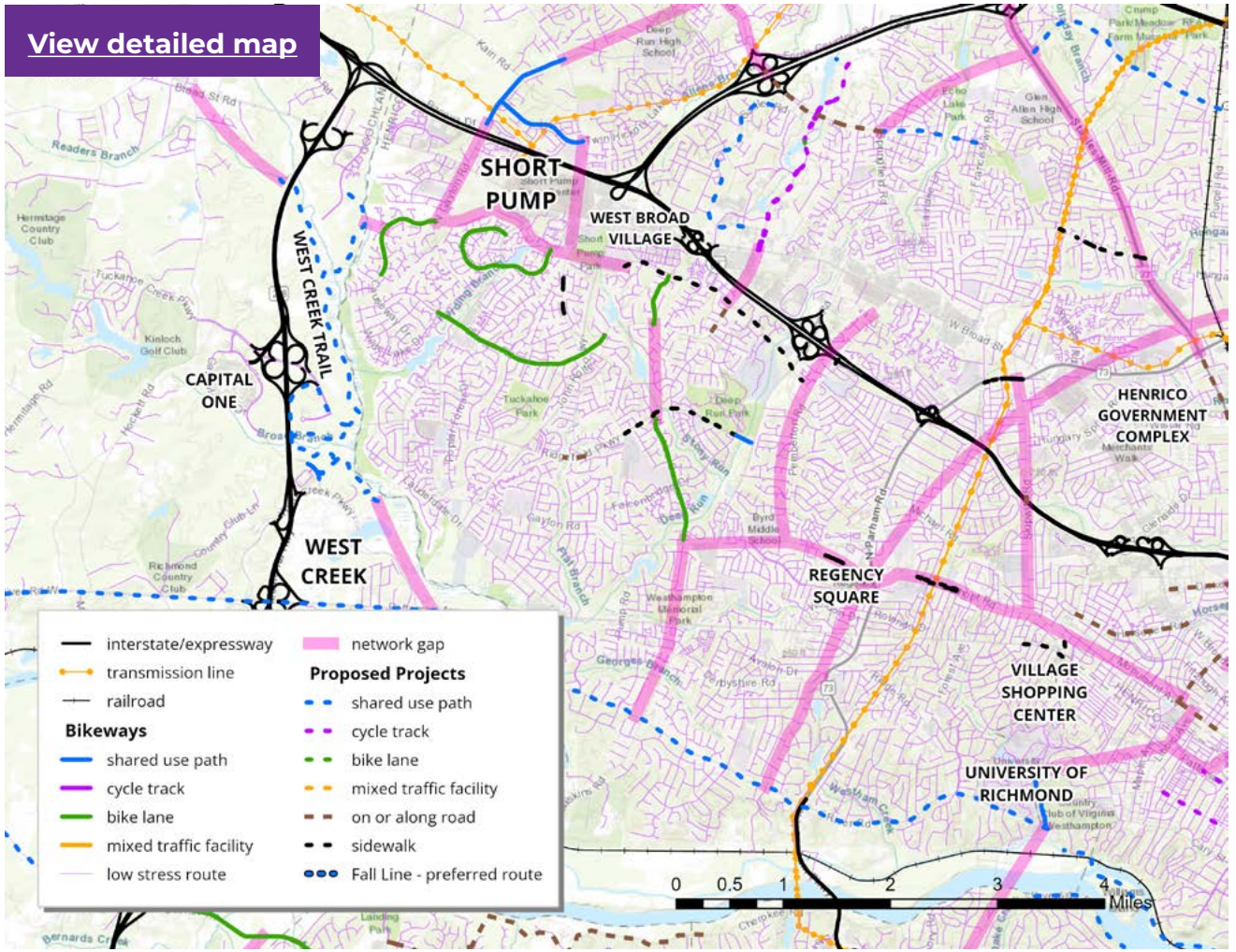
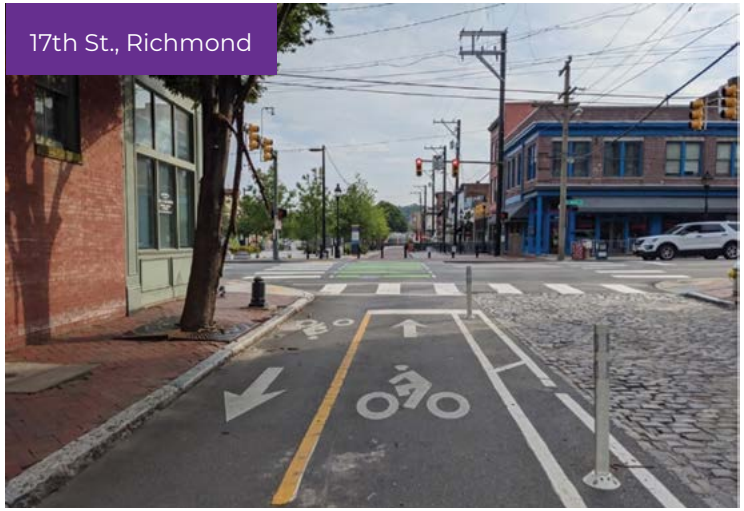


EXHIBIT 38: FAR WEST END CONCEPTUAL CONNECTIONS

The far West End of Henrico County into Goochland presents an illustrative example of the late 1990s into the early 2000s pattern of growth with major regional retail centers surrounded by single family subdivisions

connected by major thoroughfares and collectors. Varying timeframes for development formed islands of cul-de-sacs departing from a traditional gridded street pattern. Interstate 64 and the limited access Route 288/Interstate 295 along with the wide floodplain of Tuckahoe Creek have set up barriers for limited opportunities for separated and safe crossings.

Cannon Creek Greenway, Richmond


17th St., Richmond

Into this landscape are road segments with bike lanes, existing and proposed which start to lay the foundation for an active network connecting neighborhoods. Exhibit 38 shows possible connection among various end points of existing infrastructure, for example:

Williamsburg Rd., East End, bike lanes are a start

- North-South connector-Thamesford Way bike lane intersecting with the Three Chopt sidewalk presents an opportunity to extend southward toward Ridgefield Parkway and Raintree Drive, connecting to Patterson Avenue over time by way of neighborhood bicycle boulevards.

Chester Linear Park, Chesterfield County

- East-west connector—Three Chopt Road sidewalk improvements extended through Short Pump Park and Park Terrace Drive connector path to Causeway Drive at North Gayton Road.
- A future bike-ped only footbridge over the Tuckahoe Creek floodplain and connecting to the proposed east end trail in West Creek/ Goochland. An alternative would be existing Patterson Avenue bike infrastructure that could accommodate a connection to the north toward the east end trail.
- Extending north of I-64 may be possible long-term using Pouncey Tract to connect just north of I-64 to Liesfield Farm Drive to intersect with the recently completed North Gayton shared use path. Ultimately Twin Hickory improvements could present further opportunity to tie into this network if North Gayton path is extended.

NEIGHBORHOOD CONNECTION IN CHESTERFIELD

NEIGHBORHOOD CONNECTION IN HENRICO

OPPOSITE VIEW OF CONNECTION ABOVE, NEAR FALL LINE ROUTE

TWIN HICKORY BIKE LANES IN HENRICO

6 Provide tools for localities to effectively guide private sector developers to incorporate high quality active transportation infrastructure into their projects to the benefit of the regional network.

Finally, this plan provides resources for tools for localities to effectively guide private sector developers to incorporate high quality active transportation infrastructure into their projects to the benefit of the regional network. This plan and implementing guidelines through the Complete Street toolbox are intended to support the localities' work with private sector developers to capitalize on economic development projects which are building new or redeveloped centers of activity. The tools that localities use to guide development and influence the placement, design, and shared funding of active transportation improvements are extensively covered as practical implementation guidance in the next section of this plan.

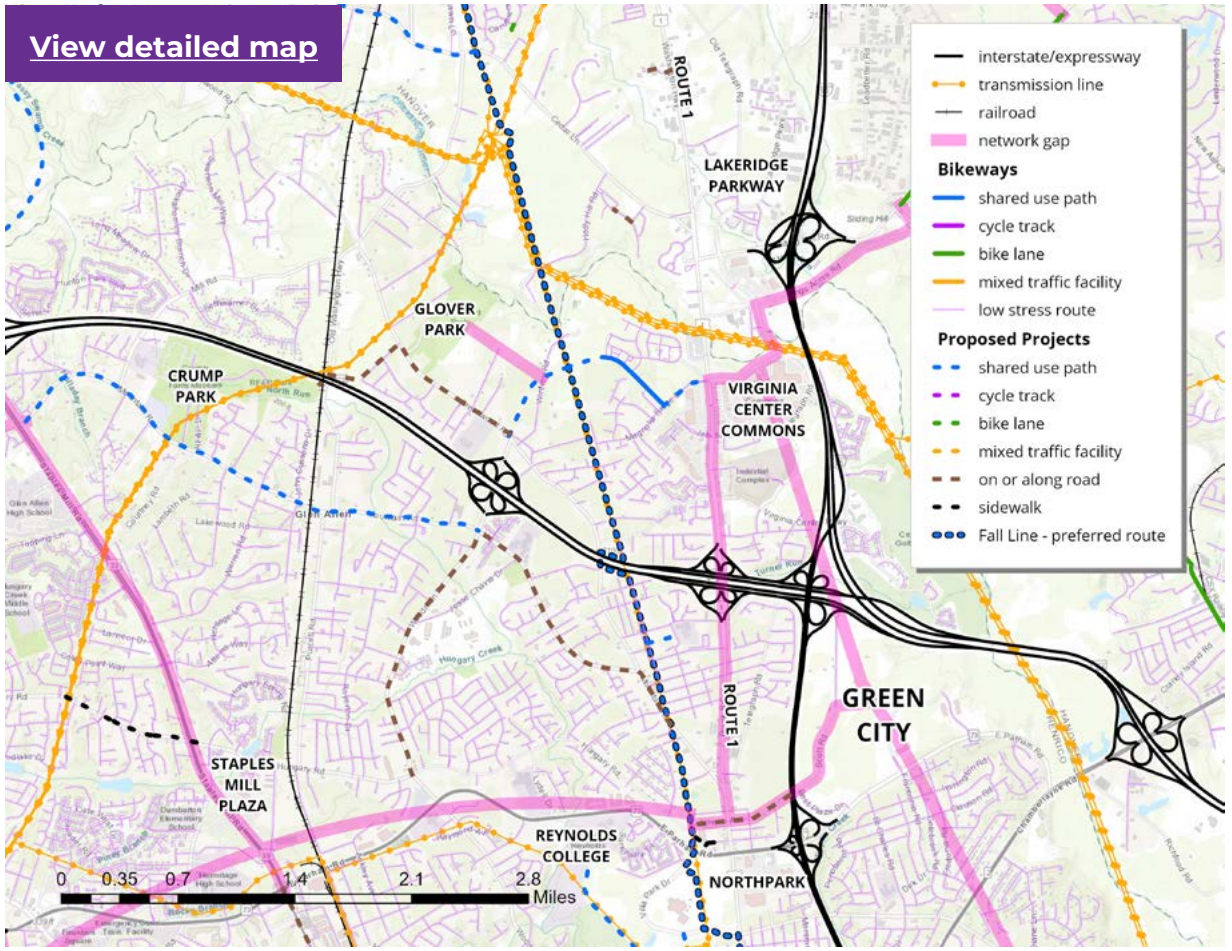


EXHIBIT 39: GREEN CITY/VIRGINIA CENTER COMMONS AND CHICKAHOMINY GAPS

Market conditions are such that high-quality walkable, mixed-use projects are economically supported particularly on the larger projects such as Green City (Exhibit 39). Older, smaller redevelopment projects may offer more of a challenge. All projects need to be enhanced with high quality active transportation infrastructure within and connecting to the existing surrounding community fabric to create a strong sense of place.

To make more communities walkable and help more people walk enough to reap health benefits, Active People, Health Nation, an initiative led by the Centers for Disease Control and Prevention, is working with state and community-based organizations to get 27 million Americans more physically active.

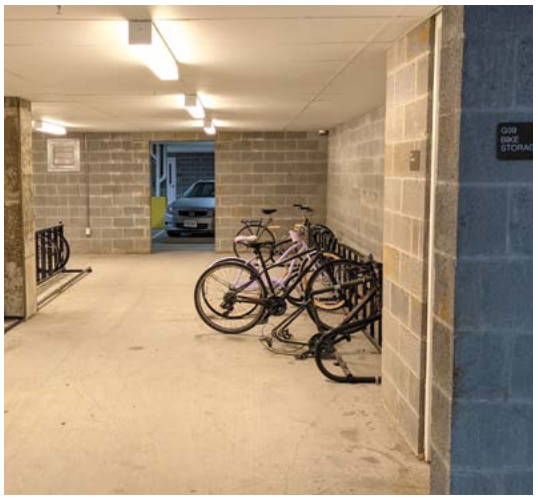
Shared use path on Willis Rd. in Chesterfield shows how industrial areas can promote employee health

The initiative aims to create opportunities for active transportation and leisure time physical activity by:

- Promoting social support interventions such as walking groups that strengthen social networks to help people increase their physical activity.
- Enhancing or creating pedestrian master plans to make walking a safer, more convenient, and more realistic travel option.
- Adopting Complete Streets policies for safe and convenient access to community destinations.
- Participating in Safe Routes to Schools programs to create safe, convenient, and fun opportunities for children to bicycle or walk to and from school.

Another way for developers to aid in the development of a regional active transportation network is by the addition of secure bicycle parking facilities in new multi-family and mixed-use development. The City of Richmond has adopted requirements for bike parking and storage as described in the Implementation section. One major barrier to the adoption of bicycle use by more people is the lack of storage, even where facilities provide space for automobiles.

Without secure storage theft is more likely to occur, which is a deterrent to bike use, especially in a commute context where dependable transportation is vital. With some e-bikes and cargo bikes, a theft can set someone back thousands of dollars and leave them disillusioned. Bike storage rooms and lockers have gone from amenity to general infrastructure that the market is expecting to see more often. With the growing popularity of e-bikes, bike storage with access to electrical power is an additional aspect to consider.



BIKE STORAGE ROOM IN PARKING GARAGE

BIKE STORAGE SHED OUTSIDE APARTMENT BUILDING

Plan Implementation—Policy, Planning, Practice & Guidance

- Implementation Introduction
- Proposed Projects
- Funding Considerations
- Policy Framework
- Zoning Ordinances
- Subdivision Ordinances
- Capital Improvement Program (CIP)
- Development Incentives
- Design Guidance
- Regional Partnerships
- Public Awareness and Safety Programs

Leveraging Funds

With the creation of the Central Virginia Transportation Authority (CVTA) the Richmond Region has been provided a tremendous tool for more competitively leveraging transportation funds not only for regional active transportation projects, but also for impactful, multi-jurisdictional transportation projects that move people, goods, and commerce within and between regional centers.

Implementation Introduction

Implementation of the *BikePedRVA 2045* plan is largely dependent on the region's localities activated as champions for projects supported by their own local policies, comprehensive plans, small area plans, corridor studies, and safety analyses. Projects are strengthened for competitive funding when they remove obstacles and address opportunities for inclusion of active transportation as a mode of travel. Implementing ordinances such as zoning, subdivision, site plan review processes, Capital Improvement Programs (CIPs), and design standards or guidelines are the main tools available for the localities to direct and justify funding requests that support active transportation facilities and programs.

The *BikePedRVA 2045* plan intends to support these local tools by highlighting positive contributions and progress made using those local tools and illustrating best practices. The plan also serves as a resource with specific examples from outside the region, suggested practice improvements, and phasing of network improvements to strategically guide implementation decisions.

Effective use of wide buffers for utilities and pedestrians in Goochland County

The Big Ideas are considered by the *BikePedRVA 2045* plan to be the most important priorities to organize the region's efforts for effective improvement and expansion of the regional active transportation network, but what are the key recommendations for making them a reality? We start with a summary list of proposed active transportation improvement projects at the core of the plan and address available funding sources at the heart of implementation feasibility.

Proposed Projects

Regional and local bicycle and pedestrian projects considered to be part of the *BikePedRVA 2045* plan and mapped as proposed projects along with existing facilities (Exhibit 40) include only those projects from the following sources:

1. Constrained projects of the *ConnectRVA 2045* plan, as adopted by the TPO Policy Board on October 4, 2021;
2. Nominations from each of the nine localities to be considered a part of the *BikePedRVA 2045* plan based on local knowledge of projects in the planning stages or from adopted plans, studies, or by the locality; and
3. Regional plans or planning efforts related to trail visioning within and beyond the Richmond Region for which no specific routing has been identified.

It is important to note that the potential gaps depicted for illustration purposes through the Big Ideas are not captured on the proposed project list unless nominated to be included on this foundational list. Many of the identified potential gaps address the spirit of this plan to meet key objectives and provide future strategic linkages between trails, bike ways and neighborhood connectors. These identified gaps are part of the overall *BikePedRVA 2045* plan but may not have associated funding identified.

View detailed map

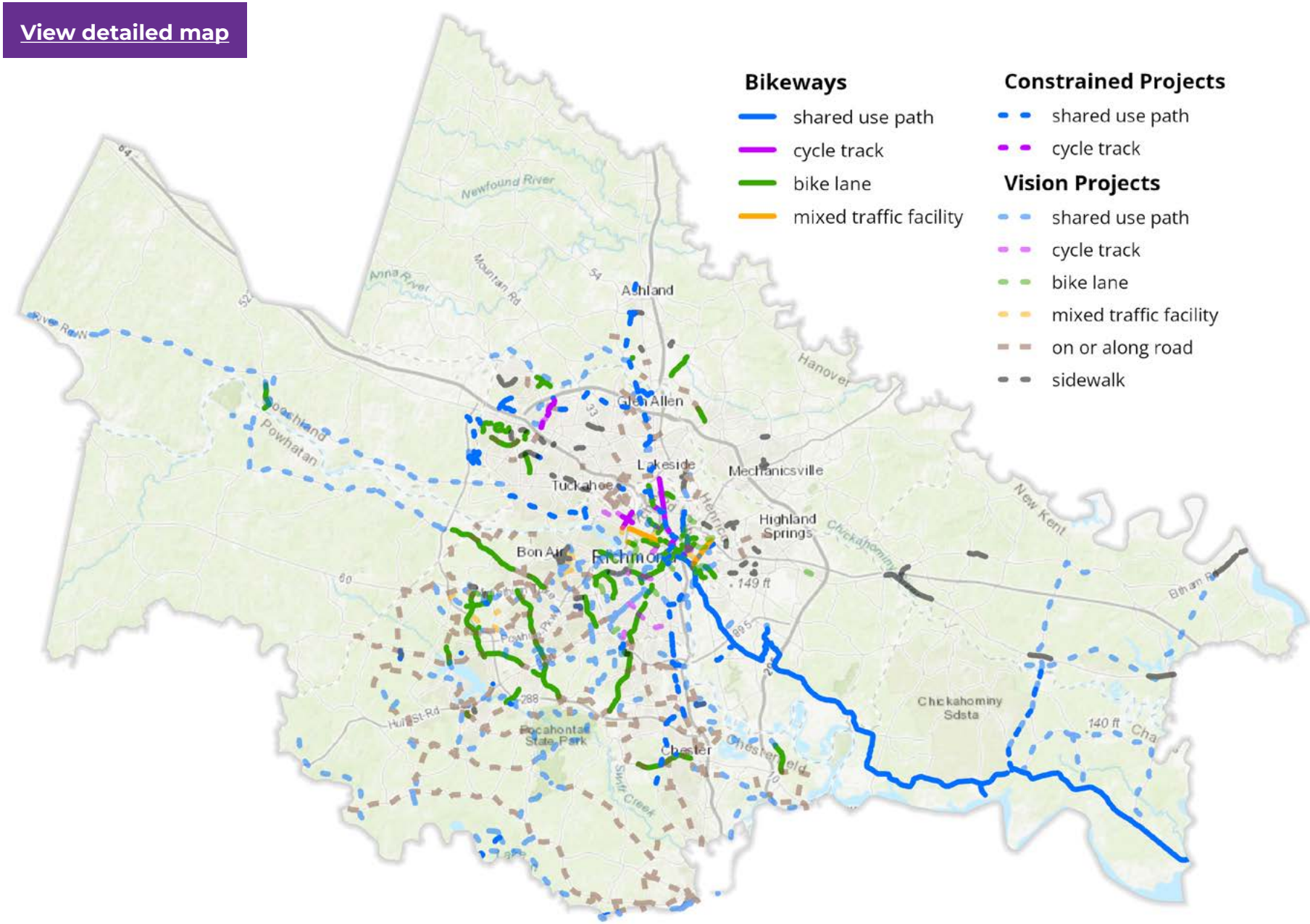


EXHIBIT 40: PROPOSED FACILITIES INCLUDING CONSTRAINED AND VISION PROJECTS

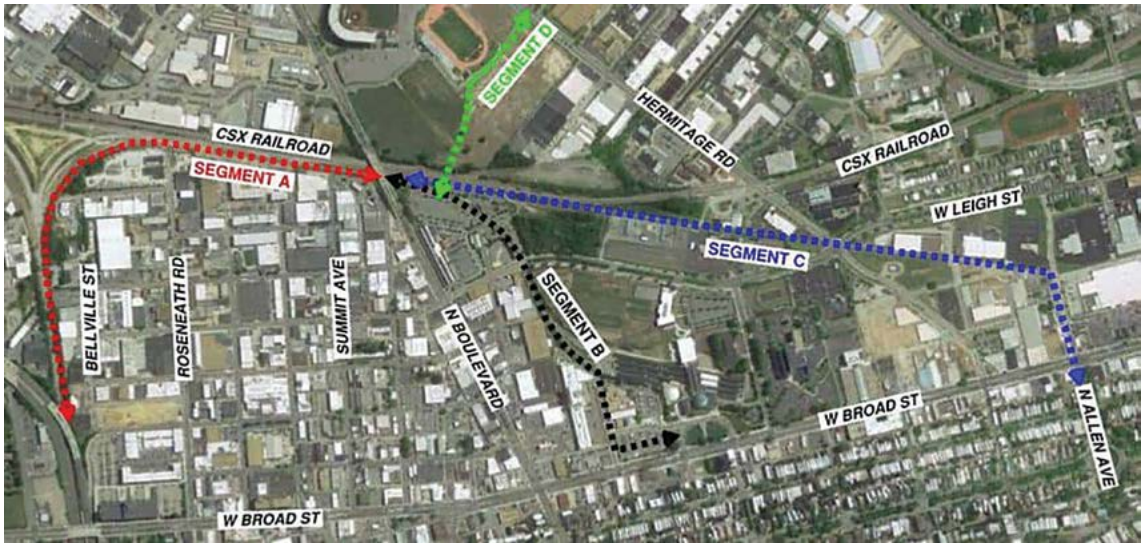
The ProtoPath

The Science Museum of Virginia is committed to sustainably developing the exterior space surrounding the historic building. This includes development of The Green, a 6-acre public greenspace on the former site of a surface parking lot along Broad Street, and the ProtoPath, a pathway for cyclists and pedestrians that has been installed on Science Museum property along a former rail line. This route serves as a prototype for a longer route into Scott's Addition, Carver, and beyond, tying into an existing bike lane on Leigh Street and setting the stage for future connections into the Diamond District.

The ProtoPath is an example of how small interventions can help slowly fix network gaps and be a catalyst for further projects.

It is not only big plans like the Capital Trail or Fall Line that create a regional system, but also opportunities like this that grow the network from neighborhood to municipal to regional.

Just shy of one-fifth of a mile, this project directly benefits the Science Museum, its guests, and its neighbors by applying green stormwater infrastructure and native plantings to create a transportation route with utility that is also comfortable and pleasant to use. These sustainable practices benefit transportation, environmental health, and quality of life as they present one answer to accessibility while also bringing more natural spaces to a wider segment of the population.



MAP OF PROPOSED CONNECTIONS BETWEEN SCOTT'S ADDITION, THE FAN, AND THE DIAMOND DISTRICT WITH THE PROTOPATH FILLING IN MUCH OF SEGMENT B (SOURCE: RVA HUB)

SOUTH ENTRANCE TO THE PROTOPATH AT THE SCIENCE MUSEUM OF VIRGINIA

Funding Considerations


E. Franklin St., Richmond


Sidewalk Gap, Richmond

A wide variety of capital and operating funding sources as shown on the Transportation Funding Matrix have been identified for which bike-ped facility projects are an eligible activity. These sources include those administered by the RRTPO, VDOT, Central Virginia Transportation Authority (CVTA), the Virginia Department of Conservation (DCR), and the localities. An annual budget is estimated as per the Financial Plan detailed in *ConnectRVA 2045*'s Technical Report F. The funding programs are competitive based on criteria of each of the administrators. A general assessment is provided based on how successful bike-ped projects have historically been in competing for the funds. The CVTA is embarking on the process for the first round of funding made available this fiscal year and has started with a strong commitment to designate the completion of as many segments of the proposed Fall Line regional trail as possible within early rounds and is using this commitment to leverage additional funds.

The potential for funding opportunities for transportation are bolstered by the adoption of the Federal Infrastructure Investment and Jobs Act, including key provisions that:

- Create a new **Reconnecting Communities** pilot program with $ 1 billion over 5 years. $150 million of this would be available for studies on the impact of removing or mitigating physical barriers within communities to improve accessibility and another $350 million for capital construction grants to eliminate physical barriers for accessibility.
- Create a new competitive grant program to address **threats to pedestrians** in the amount of $25 million over 5 years.
- Create a **Healthy Streets program** with $500 million over 5 years for localities with a disproportionate number of communities of color. Eligible projects include the installation of cool and/or porous pavements and the expansion of tree cover with the goal of reducing urban heat centers and improving air quality.
- Establish a new **Safe Streets and Roads for All** grant program at $5 billion over 5 years for competitive awards to support and implement local safety initiatives to prevent death and serious injury on roads and streets, known as Vision Zero and Toward Zero Deaths national strategies. It must be noted that only $200 million is authorized with $1 billion in annual appropriations anticipated.

Transportation Funding Matrix

Program	Estimated Annual Budget	Description
Regional Surface Transportation Block Grant (STBG)—administered by the RRTPO	$20M	Provides funding for a broad range of capacity, operational, and congestion mitigation related improvements. Allocated directly to the regional MPO
Congestion Mitigation and Air Quality Improvement Program (CMAQ)-administered by the RRTPO	$7.5M	Provides flexible funding for congestion reduction and air quality improvement projects and programs; funding only available for areas not meeting federal air quality standards or maintenance areas
Transportation Alternative (TA) Set-Aside-administered by the RRTPO	$1.1M; FY 23-24 TBD	Provided for bicycle and pedestrian facilities through the Surface Transportation Block Grant. A set aside from each state's allocation of STBG funds must be used for Transportation Alternatives activities.
Recreational Trails-competitive grant program of Virginia Department of Conservation and Recreation (DCR)	$1.4M	80%-20% matching reimbursement program for recreational trails and trail-related facilities with funds from Federal Highway Administration (FHWA).The RTP program requirements mandate that each year's funds be divided among three categories: 30% for motorized trail uses, 30% for non-motorized trail uses, and 40% for shared use/ diversified trail uses.
Smart Scale-administered by VDOT	Last round (Round 4) was $1.3 billion split between District Grants and High Priority Grants	Virginia's SMART SCALE (33.2-214.1) is a competitive program with an objective method of scoring planned projects included in VTrans that are funded by House Bill 1887. Funding comes from construction District Grants Program and the High-Priority Projects Program established in 2015.
Highway Safety Improvement Program (HSIP)-administered by VDOT	variable; 10% of Highway Maintenance and Operating fund minus admin costs	HSIP is a core Federal-aid program with the purpose of achieving a significant reduction in fatalities and serious injuries on all public roads.
Revenue Sharing-administered by VDOT	max $100M; max $5M per locality/yr	Established by the Code of Virginia and governed by policies of the CTB, provides additional funding for use by county, city or town to construct or improve the highway systems; matching funds for qualifying projects.
Central Virginia Transportation Authority (CVTA)- Localities	about $100M across all localities	The CVTA is a newly created authority established by the 2020 General Assembly to administer transportation funding generated through the imposition of additional regional sales, use and wholesale taxes; 50% of the fund is to be returned proportionally to each locality in PDC 15
CVTA Regional-administered by the CVTA	$65M	35% of the fund is to be retained by the CVTA to be used for regionally significant transportation purposes benefiting the localities in PDC 15

continued on next page

Transportation Funding Matrix (cont.)

Program	Eligible Sponsors	Applicable Bike/Ped Project Types	Success Rate for Bike/Ped Projects
Regional Surface Transportation Program (RSTP)-administered by the RRTPO	All Localities; GRTC; CRAC; RideFinders	Recreational Trails; SRTS programs; Bike/Ped facilities	Medium
Congestion Mitigation and Air Quality Improvement Program (CMAQ)-administered by the RRTPO	Ashland, Charles City, Chesterfield, Hanover, Henrico, Richmond	Bike/Ped Facilities	Medium
Transportation Alternative (TA) Set-Aside-administered by the RRTPO	All Localities; School Districts; Tribal Governments; Natural Resource/Land Agencies; Transit Agencies	1. Construction of on-road and off-road facilities non- motorized transportation users 2. Construction of infrastructure of safe routes for non-drivers 3. Conversion and use of abandoned railroad corridors 4. Construction of turnouts, overlooks and viewing areas 5. Inventory, control or removal of outdoor advertising 6. Preservation/rehabilitation of historic transportation facilities 7. Vegetation management practices in rights-of-way 8. Archeological activities of project impacts 9. Environmental mitigation activities 10. Wildlife mortality mitigation activities 11. SRTS projects and programs 12. Interstate to Boulevard conversion	High
Recreational Trails-competitive grant program of Virginia Department of Conservation and Recreation (DCR)	All localities	• Construction of new recreational trails • Development/rehabilitation of trailside, trailheads, linkages; • features for access and use of trails by persons with disabilities; • Maintenance and restoration of existing recreational trails; • Lease of recreational trail construction and maintenance equipment; • Acquisition of easements and fee simple title to property for recreational trails or recreational trail corridors; and • Assessment of trail conditions for accessibility and maintenance.	High
Smart Scale-administered by VDOT	All localities; RRTPO; GRTC	Bike/Ped Facilities are eligible	Medium
Highway Safety Improvement Program (HSIP)-administered by VDOT	All localities	Targeted funding for areas with high crash rates; can be used for bike/ped improvements	High
Revenue Sharing-administered by VDOT	All localities	State match for local dollars—can be combined with CVTA local or general fund dollars to build projects	High
Central Virginia Transportation Authority (CVTA)- Localities	All localities	Can be used for any transportation projects including bike/ped	High
CVTA Regional-administered by the CVTA	All localities	Regional Trail Networks: (1) multijurisdictional trails; (2) support infrastruction, (3) spur trails; funding applications are competitive based on the criteria established by the CVTA in consultation with the localities	Medium

Policy Framework

Understanding the policy framework is important to make active transportation improvements a reality as a vital part of the multimodal functioning of travel by people for a variety of purposes, to work, school, community services, and for play. Federal, state, regional, and local policy sets the stage for the planning, funding, programming, and maintenance of facilities.

The Federal Highway Administration (FHWA) provides a good summary of the policy framework and why it is important. The FHWA Bikeway Selection Guide suggests that policies help to define specific goals and expectations for the bicycle network and define who the primary bikeway system should serve.

FHWA recommends that additional policies address overall objectives of the Vision statement from any plan, such as those calling for safer conditions through selection of projects as part of a strategy to reduce fatalities and serious injuries. Policies should also explain how bikeway selection fits in with all transportation activities and funding programs outlined by the region's long-range transportation plan.

As part of *ConnectRVA 2045*, *BikePedRVA 2045* is shaped by key planning factors that, when woven together, create a continuous network. As expressed by the call for "mobility for people of all ages and abilities," the plan is geared to the "interested but concerned" and "somewhat confident" bicyclist starting with the lower Levels of Traffic Stress (LTS 1 or 2)-rated roadways and adding separated shared use bike-ped paths where such roadways cannot provide low stress in mixed traffic situations.

Policy Priorities

The *ConnectRVA 2045* plan set the foundation for performance metrics to quantitatively compare the individual projects for funding consideration based on their ability to meet key objectives. As outlined by *BikePedRVA 2045*, the Guiding Principles, Vision, Goals & Objectives establish how effectiveness of overall systems should be measured, setting up a way to track how projects make positive and negative contributions to overall goals. The focus of the metrics against which projects are scored is on safety (crash data involving cyclists and pedestrians), service to EEA populations, and connections to and within existing regional activity centers. Projects that address

Semmes Ave., Manchester

these key metrics are more competitive for funding through the available resources.

The planning framework leads to Big Regional Ideas for implementation. It sets the context for appropriate design, describing conditions for varying design treatment, accessibility requirements and other specifications for the physical improvements as depicted by the companion Complete Streets toolbox. The goal of this plan is to establish a clear regional roadmap to guide the decision-making process, and a practical process for amendment or exception. Progress toward implementation will require additional feasibility and scoping of many projects recommended by the plan. It is also through policy that bikeways can best be integrated into routine maintenance activities, such as those offered by the State of Good Repair (SGR) and roadway resurfacing projects, by outlining a specific process for identifying and capturing opportunities for increasing and enhancing bike and pedestrian facilities as an integral part of the roadway system.

A foundational principle of this plan is to increase and enhance safe access for cyclists and pedestrians. Expanding access and increasing the number of non-motorized users is an overall good policy and practice for a safer, healthier, and more equitable region.

Traffic Volumes and Safety of Vulnerable Users

Over the last few decades, research suggests that bicyclist risk decreases as the number of bicyclists increases. This phenomenon is known as "safety in numbers." Greater safety attracts more bicyclists, resulting in safer cycling conditions overall. Multiple studies show that the presence of bikeways, particularly low stress networks, and connected bikeways, positively correlates with increased bicycling. This in turn results in improvements in bicyclists' overall safety.

Safety Policy and Practice

Legislative Authority and Posted Speed Limits

Speed is an issue unto itself, and a universal challenge for all the region's localities. During the pandemic, traffic volumes went down and as a result, speeding picked up. The hazard that excessive vehicular speed poses to the non-motorized public is particularly alarming. A pedestrian has an 89 percent chance of surviving if the motorized vehicle is traveling at 25 mph, but only 35 percent if that same vehicle is traveling at 45 mph. A very high proportion of our roadway network that is also used by pedestrians is posted for 45 mph.

> *"One thing is for sure: Delegate Betsy Carr's 15mph bill is one solid step toward reducing speeds. Localities in Virginia will be able to lower speed limits in Residential and Business districts to 15mph (previously the minimum was 25mph) to encourage safe walking and driving at home or on the way to the store. Beyond that, VDOT and our localities can continue to lower speed limits, shorten crossing distances, mark crosswalks, and build dedicated biking and walking infrastructure that is removed from car travel and proximity to drivers."*
>
> *Brantley Tyndall, Bike Walk RVA Director of Outreach, March 18, 2021*

HB1903 was signed into law in July 2021 with an eye toward safety for pedestrians and cyclists. It allows localities to reduce speed limits in residential and business districts to 15 miles per hour. Interviews with our locality partners indicate that none have taken advantage of this new enabling legislation, but it was very recently enacted. The City of Richmond, Henrico County, and the Town of Ashland already had the authority to reduce speed limits below 25 mph because these jurisdictions maintain their own roadways.

Practical Application

In interviews with locality partners, we heard common concerns expressed about speeding and safety of bicyclists and pedestrians:

- In the rural areas of the region, two-lane roads with open ditch sections and sharp curves with limited sight distance and 45 mph posted speed limits are one of the dominant concerns. **Charles City County** staff reported three fatalities of residents hit while picking up their mail in the past two years. **New Kent County** staff expressed similar concerns, especially in Barhamsville on Route 30 where speed limits have been reduced to 50 mph. New Kent is also concerned about measures related to the safety of bicyclists who frequent the roadways heading north from the VCT. All the smaller jurisdictions expressed the need to provide sidewalks in their courthouse villages and to connect schools and other community facilities with safe bike-ped facilities.

Speed or safety studies are frequently requested after complaints from the public, but they often confirm the posted speed limits are sufficient. Where studies warrant a reduction in posted speed limits, the reductions have not been dramatic. Local partners also recognize and include the enforcement side of the equation when devising solutions for better safety. A reduction in posted speed must be backed up with sufficient enforcement to make it a worthwhile solution.

Unmarked pedestrian crossing at intersection of Route 10, Chesterfield County

Sometimes correcting a design deficiency or relocating roadside mailboxes offer better solutions.

- **Henrico County** has been lowering to 25-30 mph on certain roads for some time, but has not reduced speed limits below 25 mph. Their focus has been on identifying residential roadways that would be safer moving from 35 to 25 mph, and collectors from 45 to 35 mph.
- **Powhatan County** is taking advantage of their lower speeds and the roundabout in the Courthouse area by allowing golf carts to safely use the roadway system.
- Other regions and cities elsewhere in the U.S. have taken aggressive, coordinated approaches to comprehensively address the need to lower speed limits. Austin, Texas offers one such example that has yielded good results.

HB 2262 from the 2021 Session of the General Assembly requires motorists to change lanes when passing a bicyclist if the travel lane does not allow three feet of distance between the motor vehicle and the bicycle. The new bike law also applies to those riding electric personal assistive mobility devices, mopeds, animals, or animal-drawn vehicles. The previous 3-feet passing law was enacted in 2014 and allowed, but did not require, motorists to move into the other lane when passing a bicyclist to ensure at least three feet of distance between the bicyclist and overtaking vehicle. HB 2262 also allows cyclists to ride two-abreast at any time. Riding side-by-side is more compact, so it potentially would take a motorist less time to pass the bicyclists. Riding two-abreast also physically discourages drivers from passing bicyclists in the same lane and would force the motorist to change lanes, as now required by law. [However, SB362 of the 2022 Session of the General Assembly "requires such persons to move into a single-file formation as quickly as is practicable when being overtaken from the rear for a faster-moving vehicle" which, if signed into law, would weaken HB2262.] This is evidence of the need for strong advocacy for bike and pedestrian safety.

Traffic Calming

While the localities of the region have challenges with excessive speed on roadways, the more readily accepted solution has been to construct physical traffic calming infrastructure rather than to look only to lowering posted speed limits.

Temporary traffic circle for pilot project, Henrico County

Practical Application

A few examples are cited as positive steps toward implementation of improvements that can make roadways safer for cyclists and pedestrians:

- Roundabouts proposed for Fairgrounds and Sandy Hook Roads in **Goochland County** and the new roundabout in **Hanover County** at Studley and Rural Point Roads is intended to address the number of fatal and serious vehicular crashes. **New Kent County** has installed a new roundabout for traffic calming at the Food Lion at Route 249 in Quinton. Guidelines for roundabout design in varying contexts are addressed by VDOT guidance and included in the Complete Streets toolbox.
- **Henrico County** is focused on creating new crosswalks with flashing beacons and has allocated $1 million of CVTA local funds in FY22 to implement crosswalk improvements and speed tables in residential areas which are warranted by safety studies.

VDOT Policy Guidance on Infrastructure and Practice

Commonwealth Transportation Board (CTB) Accommodations Policy

Effective in 2004, state policy adopted by the Commonwealth Transportation Board acknowledges the foundational need for starting with the existing roadway network to build better and safer multimodal options. VDOT plans to include bicycle and pedestrian accommodations for projects where it is feasible, consistent with state/federal laws, and there has been a need established by the locality. VDOT will promote bicycle and pedestrian accommodations in transportation activities at local, regional, and statewide levels.

The policy goes on to say that the decisions made by VDOT and localities for the provision of bicycle and pedestrian travel must be consistent with state and federal laws regarding accommodations and access for bicyclists and pedestrians. Accommodations should be provided except where one or more of the following conditions exist, and the conditions are further clarified by the process proposed in February 2017 and outlined "in order to institutionalize the exception process and provide guidance for project managers":

- **Scarcity of existing/future population**, travel, and attractors indicate an absence of need—as defined by locality comprehensive plan for existing and future uses, traffic volume increase and expected densities; no active transportation use present or evidence of worn paths;
- **Environmental or social impacts** outweigh the need for accommodations—additional right-of-way would require displacement of existing uses, or impact cultural, historic or sensitive environmental resources;
- **Safety would be compromised**—reduction of lane width for vehicular travel would be below acceptable standards; termini of accommodations would encourage unsafe bike/ped activity;

- **Total cost of accommodations** would be excessively disproportionate to need for facility—more than 10 percent of total cost if not a designated bike/ped facility, or 20 percent of a designated bike/ped facility; more than 10 percent of major projects over $500 million;
- **Purpose and scope of the specific project** do not facilitate provision of such accommodations as in the Rustic Rural Road program where paving gravel roads automatically makes bicycling possible, or Industrial Access Road projects are not compatible to bike/ped use, or projects are so minor that bike/ped will not add value, or project does not impact a bridge substructure; or
- **Bicycle and pedestrian travel are prohibited by state or federal laws**—including interstates without physical barrier, limited access highways that do not permit bicycles and pedestrians but may be include accommodations on parallel facilities to limited access highways that do not permit bicycles and pedestrians.

Traffic calming, Maple St., Richmond

Practical Application

Interviews with locality partners indicate a growing acceptance for inclusion of bike-ped improvements as part of all roadway improvement projects, although funding applications often do not specify bike-ped components as part of the project. They acknowledge political acceptance of bicycle accommodations as part of roadway projects is a relatively recent trend, and one that is welcomed when rights-of-way and budgets are adequate.

Pole Green Road is an example of a recently funded road widening project that will meet VDOT accommodation policy. Working with VDOT, **Hanover County** staff initially planned for 14-foot shared travel lanes in combination with new sidewalks. The final design yielded a more imaginative approach with an 8-10-foot shared use path along the south side of Pole Green combined with new sidewalk on the north side connecting existing residential and a shopping center on Bell Creek Road. A signalized crosswalk at the intersection will make safe crossing practical.

Rarely are waivers requested, but challenges still exist when retrofitting new standards into existing rights-of-way. The expected enactment of the new Federal Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way may make this especially challenging for design and approval of construction documents and add costs when bike-ped accommodations are included in roadway projects. **Questions asked during the *BikePedRVA 2045* planning process: Is the CTB Accommodations policy up-to-date given current conditions? Does it need to be strengthened to bring it into closer alliance with VDOT's State of Good Repair program?**

Roadway Shoulder Wedging

Numerous policy and practice directives are available for making improvements that can make roadways safer for the motorized traveler and at the same time for the shared space for cyclists or pedestrians. According to VDOT's Asset

Management's Best Practice Manual, roadways can be widened to improve safety: "The paving of shoulders should be considered where there is frequent rutting or erosion along a shoulder and it is determined to be more cost beneficial to pave the shoulder than to continue to re-grade it. Providing a pavement shoulder wedge is intended to enable drivers who drift off the highway to return to the road safely." Roads that fit this description are often found in more suburban and rural settings. A shoulder wedge can prevent dangerous drop-offs and may provide a sloped surface at the edge of pavement, providing a strong, durable transition for vehicles."

Drop-offs also impact the safety of bicyclists and pedestrians and VDOT recommends a minimum of 2-feet width of shoulder to be considered along any roadway that is in the paving schedule that meets one of the following:

- Roadway is in an adopted transportation plan as a bicycle facility and no appropriate accommodation for bicyclists exists along the roadway
- Roadway has been identified in a traffic engineering study relating to bicycle and pedestrian crashes or crash data on bicycles and pedestrians identifies a safety hazard
- Locality has requested a paved shoulder for that roadway and VDOT agrees a provision of a paved shoulder is appropriate
- Paving the shoulder will provide a connection between existing facilities

VDOT policy and practice suggests that shoulder paving to accommodate bicycle and pedestrian activity shall use at least 2 percent of the district's pavement budget limited only to roadway sections that have adequate unpaved shoulder width to accommodate the paving without the adjustment of utilities. It goes on to say the District Administrator must document if less than 2 percent of the pavement budget is spent on shoulder paving.

Practical Application

Hanover County has actively employed shoulder wedging as a safety improvement for most if not all for the County's primary routes, including Routes 54, 301, and 33. These improvements are not considered to be bike lanes. Hanover has set aside $3.5 million in local CVTA funds annually for shoulder wedging and rural road paving; staff is now working on first year recommendations for main secondary roadways and developing a methodology for setting priorities. **New Kent County** continues to pursue shoulder wedging improvements along Route 155 with the addition of a 3-foot paved shoulder marked with a white line and bike awareness signage. The first phase from Route 60 in Providence Forge north to the Minetree Glen subdivision has been completed, and Old Forge Road to I-64 is slated for this year. **Charles City County** has elected to forego funding for their portion of the Route 155 shoulder wedge improvement, which would have extended from the schools complex to meet the New Kent improvement.

BikePedRVA 2045 does not specifically map or consider a traditional shoulder wedge improvement to adequately serve as a bike lane in most situations.

Luck's Ln. shared use path, during construction, Chesterfield

VDOT State of Good Repair Program

Code of Virginia (§ 33.2-369) defines Virginia's State of Good Repair (SGR) program as "improvement of deficient pavement conditions and improvement of structurally deficient bridges." The program provides funding for deteriorated pavements and structurally deficient bridges maintained or owned by the VDOT and/or localities, as approved by the Commonwealth Transportation Board (CTB). Bridges eligible for SGR funding are Structurally Deficient Structures listed on the National Bridge Inventory (NBI) and deteriorated pavement on interstate and primary highways.

To develop a "priority ranking system" for the allocation of SGR funds, CTB approved the project prioritization process methodology including the scoring formula on May 16, 2018. The formula is based on five factors: Importance, Condition, Design Redundancy, Structure Capacity, and Cost Effectiveness.

NORTHERN APPROACH TO NICKEL BRIDGE, RICHMOND

The opportunity to reconfigure a bridge deck slated for replacement offers the potential to localities working with VDOT on constrained and vision bridge projects which are eligible for SGR funding to provide better bicycle and pedestrian connectivity if the approaches on either side of the bridge can also accommodate the new active transportation mode. This requires advance planning and close coordination with VDOT for those bridges programmed to be replaced or rehabilitated. A number of VDOT bridges (33 total) within all of the region's localities are listed as eligible for SGR funds when funding is available. A total of 65 bridge or culvert structures in the region are in structurally deficient condition. For more information, see the *ConnectRVA 2045* Technical Report C Richmond Regional Structural Inventory & Assessment Report 2020.

The structural report provides a list of structures eligible for SGR funds for FY-2021, and includes the following bridges which are part of the National Highway System and included in the *ConnectRVA 2045* plan:

1. U.S. 1 over Ashton Creek
2. I-64 east and westbound at Airport Drive
3. I-195 at VA-197 (Westwood Avenue) and CSX Rail
4. Parham Road over CSX Rail
5. US-60 eastbound over Toe Ink Swamp
6. Broad Street over I-95
7. Cary Street over I-195 and CSX Rail
8. 14th Street over James River (Mayo Bridge)
9. Broad Street over abandoned CSX spur line
10. I-64 westbound over I-95
11. I-195 southbound over VA-76, CSX Rail, and Ramp S
12. I-64 at 5th and I-95 south
13. North Arthur Ashe Boulevard over CSX Rail
14. Westover Hills Boulevard over James River (Nickel Bridge)

It will be important for better active transportation accommodations to be included in the design of renovations or replacement of many of these bridges, particularly the Mayo Bridge, North Arthur Ashe Boulevard/ CSX, and the Nickel Bridge. Barriers to safe access caused by out-of-date design, excessive slope, and poor approaches or connections at either end can be removed with creative repurposing of existing bridge cross-sections.

Practical Application

Both Pemberton Road and Skipwith Road interstate bridges were identified several years ago as candidates for State of Good Repair upgrades to extend their service lives. **Henrico County** staff worked with VDOT to redesign the existing cross-section of each bridge to better accommodate bike/ ped: 1) Skipwith will have two 11-foot travel lanes with 8-foot shoulders on each side tied back to meet the existing pavement on either approach, and 2) Pemberton will have two 11-foot travel lanes with 3-foot shoulders on each side and a 6-1/2-foot sidewalk on the east side, connected to existing sidewalk on the south and paved shoulder on the north. Henrico staff is taking similar approaches with repurposing unused pavement related to the replacement of the Wilkinson Road bridge, which is three culverts, and with Lakeside Avenue with an 8-foot shoulder and travel lane to begin to provide a connection to the Fall Line.

TRAIN PASSING UNDER ARTHUR ASHE BLVD. NEXT TO UNUSED TRACKS IN RICHMOND

Roadway Reconfiguration

Many localities in the Richmond Region and VDOT have adopted the approach of creating bicycle lanes by way of roadway reconfiguration, formerly known as a "road diet." Roadway reconfiguration is a broad term that can be defined as any striping change that alters a roadway's layout, according to VDOT. These actions generally involve removing one or more travel lanes from a roadway and utilizing the space for other uses or travel modes. The practice is often done during the repaving and restriping of the roadway, rather than more expensive efforts to widen roadways or purchase the right of way.

HENRICO COUNTY IS WORKING WITH VDOT TO IMPROVE PEDESTRIAN ACCESS TO THE I-64 OVERPASS ON PEMBERTON RD.

Prior to a 2017 legislative change (Code of Virginia § 33.2-319), cities and towns receiving state maintenance payments for roads may have been hesitant to complete road diets because such projects could lead to reduced funding due to the funding formula's definition of "moving-lanes," which excluded bicycle lanes and center turn lanes, according to a VDOT report. "The legislative revision explicitly allowed conversion of moving lanes to bicycle lanes with no loss of funding, with some limits that no localities had reached as of summer 2019; this may have added momentum for local road diet projects."

VDOT considers the implementation of striping and marking changes with the repaving program to be a more cost-effective approach for adding bike lanes and improving safety by reducing crashes, speed, and crossing conflicts for pedestrians. VDOT works with localities across the commonwealth interested in implementing roadway reconfigurations either as independent projects or as restriping during repaving projects. Roadway reconfigurations have been considered a tool to address safety issues and are designated as a proven safety countermeasure by FHWA.

VDOT works with Virginia localities interested in implementing roadway reconfigurations either as independent projects or as restriping during repaving projects. VDOT has created a story map to track the roadway projects across the Commonwealth.

For candidate road diets, the VDOT Multimodal Programs Section plans to create a GIS tool to flag road segments with at least four lanes and ADTs under 20,000. The Multimodal Programs Section will determine a format for the inventory of existing and candidate road diets (e.g., tabular, interactive map, booklet, etc.) and an update schedule. VTRC could provide technical assistance for these initiatives as needed.

HENRICO COUNTY MADE SPACE FOR BIKE LANES WITH A ROADWAY RECONFIGURATION ON TWIN HICKORY RD.

Practical Application

Interviews with locality partner staff indicate how essential working knowledge of VDOT or local road repaving schedules can be to repurpose existing rights-of-way for active bike-ped use:

- With repaving and maintenance of roadways primarily in-house, **Henrico County** has been able to work in advance to justify the need or feasibility of narrowing vehicular travel lanes to make space for bike lanes through simple restriping. The County would like to work well in advance to be ready with complete studies and restriping plans for

pre-determined roadways. It has been possible to pause a repaving plan to give enough time for study and design. These pieces of bike lanes can ultimately be knit together to provide connections between neighborhoods or to future private sector development.

- **The City of Richmond** also formulates plans with knowledge of paving schedules, programming in advance key corridors where traffic volumes, available right-of-way, population density, and destinations provide a backdrop for future bike lanes or sidewalk improvements. Five separate corridors of phased segments for bike/ped accommodations owing to repaving were the subject of study and design in 2021. Alternative cross-sections were shared online to obtain feedback from residents and resulted in two of the corridors (Walmsley and Warwick) moving into repaving with buffered bike lanes or wider shoulders in two areas of the city in need of better active transportation connections.
- **Chesterfield County** works closely with VDOT with benefit of an advance look at the repaving schedules for roadways being able to conduct the required traffic studies, public outreach, and redesign. A 2-mile corridor, Turner Road from Midlothian Turnpike to Hull Street was reconfigured from four lanes down to two travel lanes with a center-turn lane, and bike lanes on either side. While this stretch of roadway serves many adjacent neighborhoods and several schools, it has not been actively used in these early stages, but future connections from either end to destinations such as the James River to the north will be possible as the master plan for extension and connection is carried out.
- In contrast, **Hanover County** repaving is occurring mostly on roadways that are not candidates for road reconfiguration.
- **New Kent County** learns about repaving after-the-fact but realizes opportunities may exist with many of the wider, newer roadways which could share their right-of-way in the future with cyclists in addition to the sidewalks already provided in the development.
- **Goochland County** staff pointed out that the installations of road edge rumble strips can be included in repaving's as "maintenance" for improved safety. In combination with 2-3-foot shoulders, such additions are not positive for cyclists and would not be a good component for unbuffered bike lanes immediately adjacent to the travel lane. Safety and design concerns stemming from rumble strips are well-documented and specific designs should be considered for bike safety.

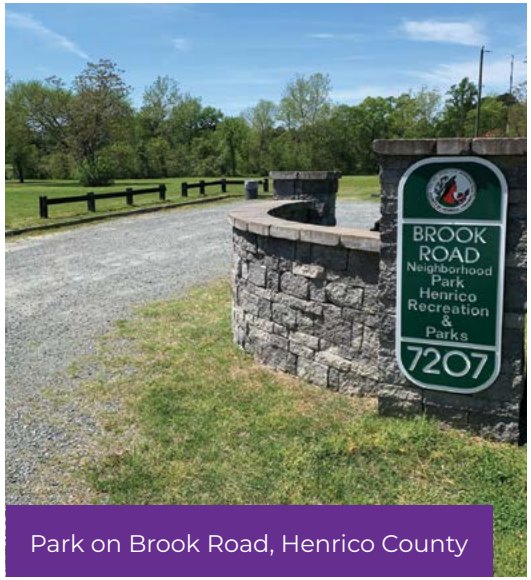
Pedestrian crosswalk outside of Administration Building, Powhatan County

Regional Planning Tools

ConnectRVA 2045 represents the 25-year vision for the community's transportation needs and expectations. It considers all types of travel and identifies projects that will best serve bicyclists, pedestrians, people using public transportation, and occupants of single occupancy vehicles, as well as ensure the efficient movement of goods and services.

ConnectRVA 2045 uses performance measures to both identify priority projects and evaluate project effectiveness. The plan is an active tool used by decisionmakers to prioritize and implement regional transportation projects, contributing to a better quality of life for the Richmond Region. The 15 performance measures developed for assessing expected benefits of a project relative to the plan's vision and goals were applied to all active transportation projects along with the other modes. To maximize the benefit of the available revenues over the life of the plan, the project benefit was divided by the estimate cost in tens of millions. The resulting cost-benefit score was used to prioritize projects.

Of the 34 active transportation projects considered to meet regional project inclusion criteria, 33 projects were included in the "constrained" plan, for a total of $195 million for off-road trails, the Fall Line segments, a segregated bike lane and shared use paths. The constrained project list became the starting point for identifying viable regional active transportation projects for inclusion in *BikePedRVA 2045*. Additional vision projects consisting of locally nominated segments or smaller scale projects are included by reference in the BikePedRVA plan, which will be a component plan of *ConnectRVA 2045* upon adoption. This inclusion recognizes each project's contribution toward creating a regional network over the long term and positions projects to better compete for future funding.



Park on Brook Road, Henrico County

The importance of the *ConnectRVA 2045* plan was elevated with the creation of the **Central Virginia Transportation Authority (CVTA)** as an active regional partner with separate funding sources expected to fuel much of the regional and local highway and transit network improvements over the next generation. Projects which are included in the constrained list will be more competitive along with those also included in local comprehensive plans, capital improvement programs, and those leveraging additional funding. The scoring and prioritization process for selecting projects will be similar to that used for projects on the constrained list. Active transportation projects can compete very effectively owing to their relatively lower costs which yield higher cost benefit scores, especially for those serving to address a safety issue or located within an Equity Emphasis Area or activity center.

The ***2022 Richmond Regional Transportation Safety Plan*** provides each of the localities with corridor specific data for pedestrian safety based on the highest use and a risk assessment. This data is used to assign priorities relative to the locality and to the region for focused improvements to the pedestrian safety corridors. These data sets and priority measures are recommended to be simplified and considered as one additional measure of relative project impact in the decision-making process for future funding applications.

Local Planning Tools

Comprehensive, small area, and community plans

Addressing the public safety, convenience and welfare needs of all Virginians is a fundamental reason the Commonwealth of Virginia has mandated that all local governments plan for the future. The Code of Virginia Title 15.2, Chapter 22 outlines the legislative intent of the state with respect to the laws and statues every county, town, and city must follow regarding the planning, zoning, and subdivision of land within its political boundaries:

> "This chapter is intended to encourage localities to improve the public health, safety, convenience, and welfare of their citizens and to plan for the future development of communities to the end that transportation systems be carefully planned; that new community centers be developed with adequate highway, utility, health, educational, and recreational facilities....residential areas be provided with healthy surroundings for family life; that agricultural and forestall land be preserved; and that the growth of the community be consonant with the efficient and economical use of public funds."

A locality's comprehensive plan and related small area/ specialized area and community plans are the primary vehicles for coordinating the use of land and the systems intended to serve the population within its boundaries. The local jurisdictions of the Richmond Region all use their comprehensive plans to guide daily decision making on land use, transportation, utilities, community facilities, environmental, and a host of public facilities. The comprehensive plan serves as their strategic growth blueprint and can be particularly valuable setting forth community aspirations for the future. Transportation is central to this planning effort and must be closely coordinated with land use to be effective in implementation.

Practical Application

Updated at least every five years, the comprehensive plan and related plans set the tone and serve as a policy guide. With regard to active transportation, several examples from Richmond Region localities are highlighted:

The **City of Richmond's** blueprint for its 300th birthday on 2037, Richmond300 devotes Chapter 3 of the plan to Equitable Transportation with 10 key objectives and a large emphasis on making walking, biking and transit options safe, reliable, equitable, and sustainable through specific improvements ranging from restoring severed neighborhood connections across interstates to acknowledging Great Streets that can serve all users within their confined rights-of-way.

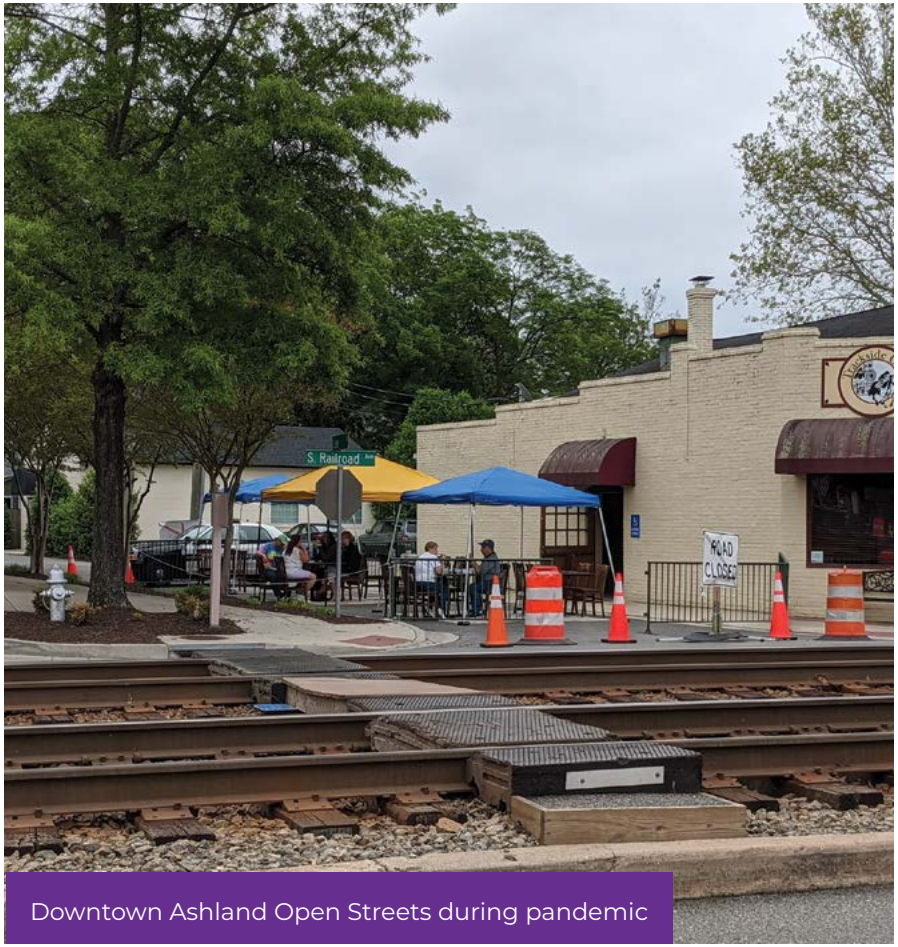
Chapter 5 of **Goochland County's** Major Thoroughfare Plan highlights providing multimodal facilities such as sidewalks, shared use paths and bikeways as a guiding principle which is a key element to any healthy community's transportation system. The plan calls for 1) review of landscape requirements for appropriate buffers and provisions for bike/ ped, and 2) consideration of funding through the Capital Improvements Budget for public amenities. The County is engaging with the public to focus on the Centerville area of eastern Goochland using funding provided by Office of Intermodal Planning and Investment for designated Urban Development Areas.

In their most recent Comprehensive Plan update, **Hanover County** addressed objectives and strategies essential for healthy living, including collaboration among all department to align policies, design standards and funding resources to promote active communities.

Chesterfield County prepared small area plans of focus as amendments to their comprehensive plan to influence implementation of complete streets and neighborhood nodal connections. The McRae Road sidewalk and Phase 2 trail through the Bon Air Community is currently being

implemented in phases to connect neighborhoods to schools, the library, and local retail in accordance with the Bon Air Special Area Plan.

The 2017 **Town of Ashland** Parks and Recreation Plan provides a "walkability guiding objective" and builds on their existing sidewalk and trails infrastructure to make parks, schools and community facilities more accessible and connected and shows residential parcels within a 10 minute walkshed of a public park facility and potential shortfalls for populations who fall outside of a walkshed.



Downtown Ashland Open Streets during pandemic

Zoning Ordinances

As one of the primary implementation tools for the Comprehensive and related plans, it is important for the implementing ordinances and guidelines to be closely correlated with the locality's Comprehensive Plan. As pointed out by the *APA VA Managing Growth and Development in Virginia*:

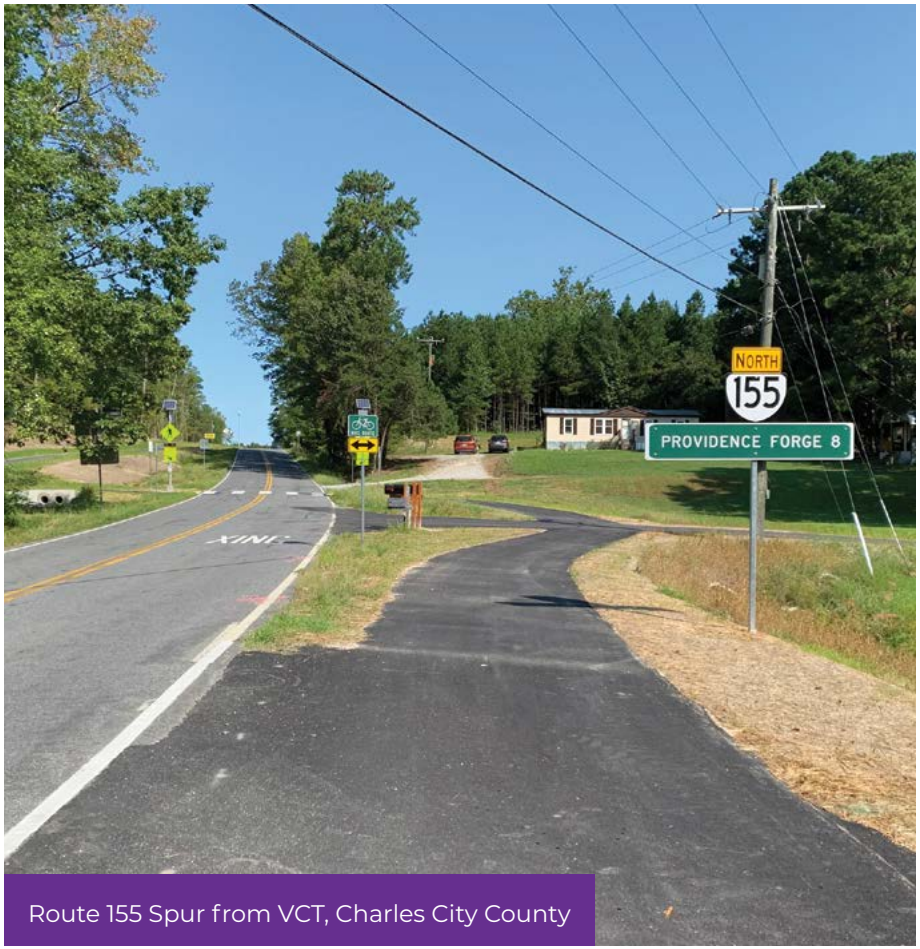
> "Better decisions and better communities, arguably, would be the byproduct of enhanced plan and ordinance consistency. This does not necessarily mean that a locality should "zone to the plan" by rezoning property on their own motion to conform to the planned future land use map. Rather, it means that the development standards pertaining to various districts and land uses should reflect the goals and policies set forth in the Comprehensive Plan…by separating structures and land uses, conventional zoning regulations tend to reinforce dispersed settlement patterns, which many localities are finding to be less than desirable when compared to compact, pedestrian-friendly historic areas. By softening zoning's hard edge, by creating situation-based development standards, and by encouraging localities to adopt flexible techniques such as traditional standards modeled after historic neighborhoods, zoning may become truly a 21st century tool for planning."

Ordinances making use of form-based codes offering greater flexibility to the specifics of land use are the primary tools used to implement Traditional Neighborhood Development (TND) and New Urbanism development formal concepts. As defined in the APA VA Toolbox, form-based zoning codes "add the details of relationship between buildings and the public realm of the street, the form and massing of buildings in relation to one another, and [most important for active transportation] the scale and types of streets and blocks."

Practical Application

Effective September 2021, the **Henrico County** Zoning Ordinance update offers positive steps toward more flexible provisions that will support walkable/bikeable communities, particularly:

- Division 3 Zoning District additions of the form-based overlays specifically for VA Center Commons, Brookfield, Williamsburg Road, Broad/Parham, and Short Pump Town Center



Route 155 Spur from VCT, Charles City County

- Division 5 on Development Standards with specific and well-illustrated standards including items such as street cross-sections, buffer requirements, bike parking, etc. Connectivity of neighborhoods is greatly enhanced with disincentives for cul-de-sacs, large lot connections; grid design unless impractical, and a new cross-access requirement.
- Parking requirements have been reduced and the former Urban Mixed Use (UMU) zoning category has been reformulated as a Community Mixed Use category placing greater emphasis on setting a pattern for development followed by feasibility analyses.
- Environmental incentives are included in the form of bonuses for energy conscious design and green infrastructure.

Chesterfield County is in the process of comprehensively updating their Zoning Ordinance, recognizing that the Comprehensive Plan has changed over time to reflect the growth and development vision for the county while much of the ordinance has not changed since the 1970s.

City of Richmond Zoning Code, Sec. 30-730.2 bicycle parking requirement provided for long-term bicycle parking for multifamily dwellings containing 10 or more units, and for parking decks and garages serving nonresidential uses.

Subdivision Ordinances

Each local government in Virginia is required to adopt a subdivision ordinance to assure that land development occurs in an orderly and safe manner. The subdivision ordinance establishes the procedures, platting and design requirements, as well as surety guarantees for public infrastructure improvements such as streets and utilities associated with the subdivision of land into parcels or lots of development. It is particularly important for the implementation of active transportation improvements

for subdivision ordinances to address the coordinated network of streets, particularly to ensure connections for the future development.

Practical Application

To discourage lack of connection between existing and new subdivisions without accessing a spine or primary roadway, **New Kent County** does not allow cul-de-sacs in their subdivision ordinance; instead many of the subdivisions being developed in projects originally zoned as Planned Unit Developments such as Vinterra Farms at New Kent call for a divided boulevard instead of cul-de-sacs.

The **Hanover County** subdivision ordinance requires stub road connections for new subdivisions and requires a physical sign to be placed on location where new rights-of-way are planned or platted for future connections or extensions to adjacent land which is not yet developed.

Capital Improvement Program (CIP)

The CIP is an integral component of a locality's overall growth management program because it outlines the multi-year scheduling of public physical improvements and related costs to help guide the locality's decisions on how to allocate available funds over a five-year period. Localities must have a CIP if they exercise the authority to accept proffers of cash or physical improvements that benefit the community outside the immediate development associated with the proffers.

Practical Application

Goochland County has taken an assertive approach, developing a 25-year CIP that enables the County to effectively evaluate the potential impacts of growth through a Capital Impacts Model. The model provides county staff with a mechanism to make specific calculations of the impacts on public facilities—including schools, parks, public safety, transportation, library, courts, general government and environmental services—expected from a proposed development and make data-driven decisions that can help to offset the public costs of infrastructure to support that growth.

As stated in the CIP's executive summary, "Cash proffers are one-time voluntary monetary commitments made at the time of rezoning to offset the impact on certain public facilities from new residential development. The funds ultimately collected from cash proffers are used to construct capital improvements to mitigate capital impacts with the goal of maintaining levels of service. Funds can only be used for capital improvements that provide additional capacity, not operations or maintenance. Cash proffers are calculated using level of service standards to account for infrastructure that may currently have excess capacity."

Site Plan or Plan of Development (POD) Plan Review Standards

Localities in the Richmond Region require site plan or plans of development for any type of development—residential, commercial, or industrial—that meet certain thresholds. The purpose of the review is to ensure development complies with all applicable standards, including environmental, zoning, conditional use, special uses, etc. It is through this review process that localities can work with the private sector developers to implement more specific parcel criteria that can accommodate active transportation improvements. Enforcement of the requirements through construction can be assured through performance agreements.

Practical Application

Chesterfield County uses the Bikeways and Trails chapter of their Comprehensive Plan as a guide for site plan review on a case-by-case basis so that developers will actively implement

bike-ped improvements related to their projects in concert with County plans and as strategically envisioned by the staff for the corridor. The County bikeways committee is a multi-departmental group of staff that meets either weekly or based on a particular site plan case to reach consensus on the design parameters and location of the improvement.

Ensuring the continuity of corridors as illustrated by the County's approach to Route 360/Hull Street from Woodlake to the east at Commonwealth Center is always a work-in-process as each case comes forward, and may appear to be piecemeal until fully implemented many years down the road. The Route 360 approach has also influenced how connections are made to Winterpock Road extending from Route 360 to the Birkdale Country Club where a shared use path is being included within the right-of-way improvements.

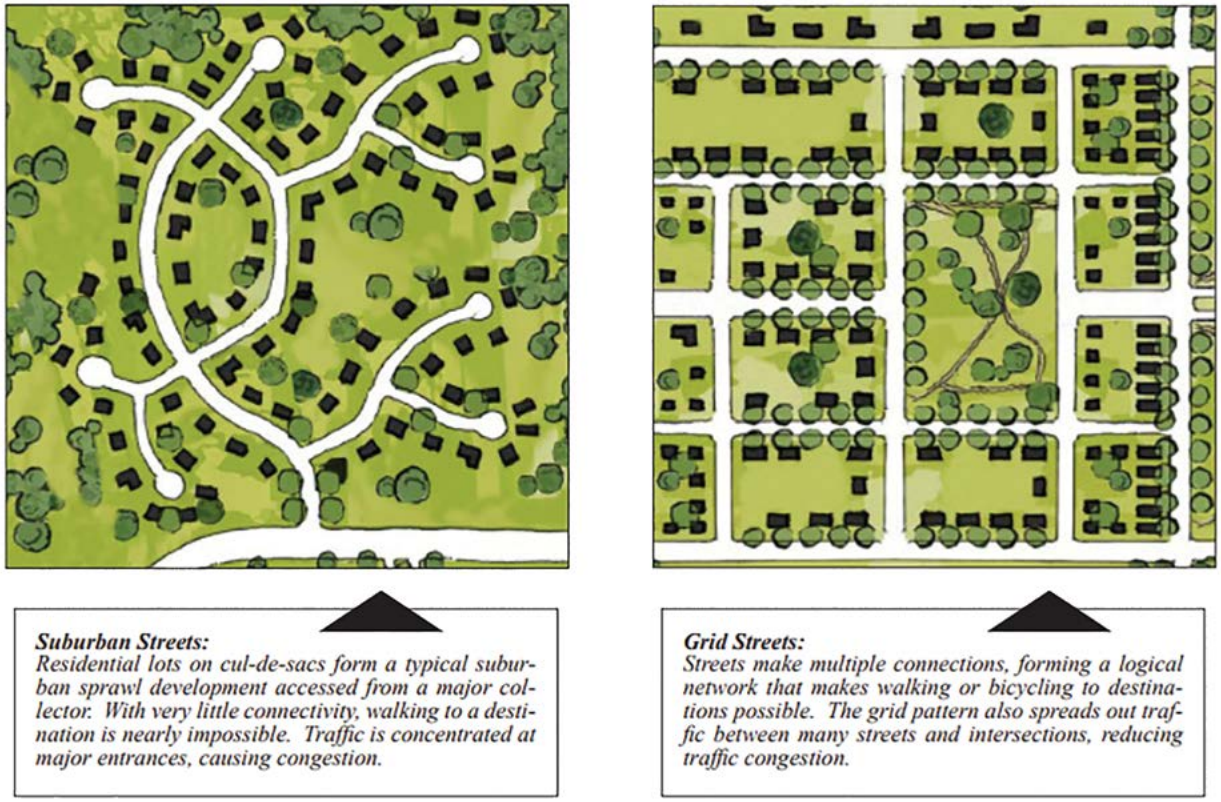
Chesterfield staff does not limit the opportunity to add bike-ped improvement to commercial and residential areas. A recent shared use path installed at the Pepsico manufacturing plant at Willis Road has led to other adjacent property owners doing the same for the benefit of their employees.

Complete Streets Policies and Practices

Complete Streets are streets that are designed for people walking, biking, driving, using mobility devices, and taking transit. These streets are "more complete" and improve safety, promote community health by encouraging physical activity, improve resilience, support local economic vitality, make efficient use of the existing roadway infrastructure, increase social opportunity, and contribute to more livable neighborhoods.

Practical Application

Localities (and some regions) turn to Complete Streets policy, design, and practice to address a safety crisis and to reduce cyclist and pedestrian deaths and serious injury. Market demand calls for vibrant, walkable neighborhoods and multimodal transportation options. The Complete Streets toolbox is just one step toward a regional response which many of our localities are incorporating in their plans



ASHLAND SUBDIVISION SUBURBAN STREETS VS. GRID STREETS (TOWN OF ASHLAND DEVELOPMENT GUIDELINES HANDBOOK)

and implementing ordinances as the previous review of locality interviews reveals. Best practice examples in the Richmond Region include:

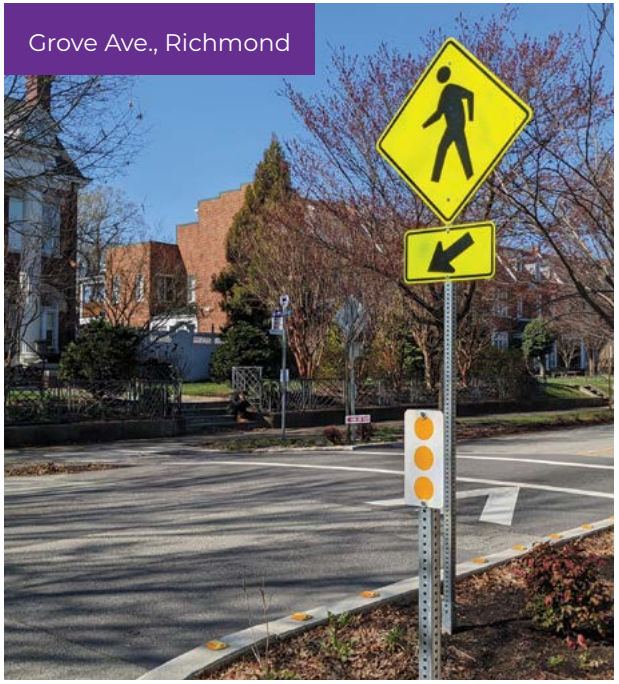
The **City of Richmond** adopted a Complete Streets Policy on October 2014. The City is part of the Vision Zero Network which "espouses the belief that traffic related deaths and serious injuries are preventable". The City has developed a Better Streets Manual that provides guidance for designing, constructing, operating, and maintaining complete streets throughout the City. This manual serves as an excellent resource to both the city and peer communities as a regional Vision Zero workgroup begins its work.

Henrico County Public Works issued a Design Manual concurrent with the zoning ordinance effective date in September 2021, "Intended to serve as a procedural design guide which is to be used in conjunction with specifications, standards and policy directives from other County agencies as well as design manuals published by the American Association of State Highway and Transportation Officials (AASHTO) and the VDOT." The manual lays out specifications for different contexts and uses, along with applicability and design requirements for public streets.

The **Town of Ashland** has prepared a Development Guidelines Handbook as a resource to guide public and private sector development with regard to community character, landscape design, signage, lighting, sidewalks and pedestrian trails. Subsequent additions to the original 2004 guide provide guidance on street layouts, lot dimensions, garages, alleys, architectural and environmental sensitive design features.

Powhatan County offers a Countywide Development Guidebook of architectural standards and guidelines for commercial and mixed-use development with far reaching models of different architectural styles, massing, color palettes, and signage which provide illustrative guidance for specific provisions in the zoning ordinance.

Development Incentives


Grove Ave., Richmond

Economic development incentives offered locally or through state and federal programs often encourage good design practices that translate to better bike-ped improvements, particularly in older areas or corridors in need of revitalization. Public education and appropriate regulation, when coupled with practical incentives for use of new travel modes, broadens non-motorized travel options for a wider variety of users. Newer technology options such as e-bikes are encouraged.

Practical Application

The Henrico Investment Program extends incentives similar to Virginia's enterprise zone program to other areas of the county. Many of the areas that are included in the new program have been identified as places in need of bicycle and pedestrian improvements, and most touch or lead into adjacent localities—providing a framework to implement a stronger regional network from within **Henrico** by establishing clear incentives to developers. New areas included in the program include Patterson Avenue, Staples Mill, Williamsburg Road, and Laburnum Avenue.

E-Bike Financing and Rebates

Electric bikes (e-bikes) are personal transport devices that have been gaining popularity in the last 20 years, particularly with delivery workers in dense cities. More recently they have become more mainstream as more communities introduce them into bikeshare systems and the technology has become more accessible to consumers in the U.S. Models range from simple light-weight styles that look like normal bikes to larger "cargo bikes" that are designed to carry heavier loads, sometimes including other people.

This innovation is already revolutionizing the way people get around and localities are just scratching the surface of the enormous benefits associated with e-bike ridership. Practical and academic research points to strong social, health, and economic advantages stemming from increased e-bike usage, something that parallels those associated with "normal" bike usage. Perhaps unsurprisingly, a battery-powered bike can multiply the benefits of biking by increasing a rider's trip radius and effectively flattening hills. Riding an e-bike is freeing for users with limited mobility and those facing other transportation barriers. Since e-bike riders take longer trips compared to regular cyclists, research has found that physical activity gains from active travel are on par with cyclists using regular bikes.

E-bikes can be a useful tool to reduce CO2 emissions, noise and air pollution and traffic. Their use may also result in voluntary car-free or one-car households. While not practical for many, even moving the needle a few points in mode share would result in significant cost savings associated with traffic, pollution, and the negative health externalities associated with automobiles. The strategy of increasing e-bike mode share within a given region can be used with confidence as a tool to help meet carbon emission reduction goals. There are also associated equity benefits as most bike facilities can also be utilized by people using mobility aids.

Existing research suggests implementing e-bike subsidy programs and building infrastructure for charging and parking can help obtain necessary mode share for emission reductions. Localities individually or through the CVTA could establish e-bike financing, rebates, or subsidies to help offset the cost of purchasing an e-bike, similar to benefits offered to individuals purchasing cars.

A FAMILY RIDING ELECTRIC BIKES ALONG DOREY PARK PATH IN HENRICO

E-Bikes in Virginia

Virginia has a three-class e-bike law similar to other states with legislation on the subject. E-bikes are regulated like bicycles and the same rules of the road apply to both e-bikes and human-powered bicycles. This means they are not subject to registration, licensing, or insurance requirements.

There are three legal classes of e-bikes:

- Class 1: Bicycle equipped with a motor that provides assistance only when the rider is pedaling, and that ceases to provide assistance when the e-bike reaches 20 mph.
- Class 2: Bicycle equipped with a throttle-actuate motor, and that ceases to provide assistance when the e-bike reaches 20 mph.
- Class 3: Bicycle equipped with a motor that provides assistance only when the rider is pedaling, and that ceases to provide assistance when the e-bike reaches 28 mph. Must be 14 years or older to operate a Class 3 e-bike.

E-bikes may be ridden on bicycle lanes and multi-use paths where bicycles are permitted. All operators and passengers of Class 3 e-bikes under 14 years must wear a helmet.

A city, town or state agency that has jurisdiction can restrict where e-bikes are allowed though no locality in the region has done so. (46.2-904.1. Electric power-assisted bicycles.)

- *Except as set forth in this subsection, an electric power-assisted bicycle may be ridden in places where bicycles are allowed, including streets, highways, roads, shoulders, bicycle lanes, and bicycle or shared use paths.*
- *Following notice and a public hearing, a locality or state agency having jurisdiction over a bicycle or shared-use path may prohibit the operation of class one or class two electric power-assisted bicycles on such path, if it finds that such a restriction is necessary for public safety or compliance with other laws.*
- *A locality or state agency having jurisdiction over a bicycle or shared-use path may prohibit the operation of class three electric power-assisted bicycles on such path.*
- *A locality or state agency having jurisdiction over a trail may regulate the use of electric power-assisted bicycles on such trail. For purposes of this subdivision, "trail" means a trail that is specifically designated as nonmotorized and that has a natural surface tread that is made by clearing and grading the native soil with no added surfacing materials.*

Practical Application

While no examples of e-bike financing or rebate programs exist in Virginia, Vermont and Colorado both have options set up to help individuals purchase e-bikes, which can cost upward of $1,000. The "Can Do Colorado eBike Pilot Program" was initiated in 2020 in response to the COVID-19 pandemic. The Colorado Energy Office committed $500,000 toward "increasing access to eBikes for low-income and essential workers" and gave these primary benefits of e-bikes as the justification for the pilot project:

- More easily bike greater distances and across harder terrain
- Commute with groceries, small deliveries and children
- Ride at an older age or with mobility issues
- Set aside worries about arriving sweaty at their destination
- Reduce their carbon footprint

A similar local or regional grant-based program or one that partners with utilities, banks, or credit unions could be implemented in the Richmond Region.

A MOBILE ESPRESSO BAR BUSINESS UTILIZING AN E-BIKE

Design Guidance

The *BikePedRVA 2045* plan has made use of a host of guidelines as resources for best practice standards and to provide design specifications and illustrative examples that can be used by the Region's localities to implement active transportation projects and programs, including:

Bikeway Selection Guide (FHWA)

Federal guidelines on bikeway selection and planning, focusing on design flexibility to assist transportation agencies in developing safe and accessible networks for all.

Bicycle and Pedestrian Treatments (VDOT)

Information on bicycle and pedestrian treatments intended to improve safety and mobility for all road users. Includes guidance on specific facilities including intersections and crossing treatments.

Complete Streets Guidelines (VDOT)

Robust guidelines focusing on finding context-sensitive solutions for complete street interventions. Includes bicycle and pedestrian facility guidelines, bus stop design, and parking guidelines.

Complete Streets Toolbox (PlanRVA/RRTPO)

A story map with a general overview of complete streets policy and practice in the Richmond Region. Includes a toolkit with targeted resources.

Guide for the Development of Bicycle Facilities (AASHTO)

A guide for the development of safe, convenient, well-designed, well-maintained facilities and the basic infrastructure needed to support bicycling. Under revision.

Roadway Reconfigurations (VDOT)

General resources on roadway reconfigurations, also known as road diets, from a Virginia perspective and taking guidance from FHWA designations and standards.

Roadway Reconfigurations Guidance (FHWA)

General federal guidelines on roadway reconfigurations, also known as road diets, and includes information on road diet workshops. Last updated in 2016 at time of this publication.

Small Town and Rural Multimodal Networks Guide (FHWA)

A resource focused on small towns and rural communities wishing to support safe and accessible travel for people of all ages and abilities in a specific non-urban context.

Edge Lane Roads/Advisory Bike Lanes

A repository of information on edge lane roads, also known as advisory bike lanes or advisory shoulders. Includes design guidance, case studies, and FHWA experimentation information.

Urban Bikeway Design Guide (NACTO)

A guide for bikeway design aimed at cities and urban communities. Guidelines can generally be applied to all urban areas of the region and sometimes be scaled to less dense localities.

Urban Street Design Guide (NACTO)

A guide for street design aimed at cities and urban communities. Guidelines can generally be applied to all urban areas of the region and sometimes be scaled to less dense localities.

Regional Partnerships

A bicycle and pedestrian advocacy/action committee (BPAC) is one of the most effective ways to guide an adopted active transportation plan through implementation, and to ensure on-going maintenance and programming in accordance with the plan. Such a committee would be appointed by the elected officials and be responsible for providing input to decision makers on active transportation projects, policies, and programs. BPACs are especially beneficial for the internal communication of the regional public agency working with the federal, state, and local jurisdictions to impact priorities and funding decisions. A BPAC can be one big step toward integrating an active transportation network into a multimodal network that better serves all the needs of the region's population.

The RRTPO established an informal Active Transportation Work Group comprised of locality and advocacy representatives as a work group of the TPO Technical Advisory Committee. The Work Group meets quarterly to exchange ideas and share information of common interest, but it is not a formal implementation committee with bylaws or appointed members.

Fall Line field work at the Chickahominy in Hanover

Other regions in the Commonwealth have formed BPACs that operate to implement regional plans, advance best practices, and maintain facilities. These include:

- Historic Triangle Bicycle Advisory Committee is a regional body formed in 1993 by the James City County Board of Supervisors, the Williamsburg City Council and the York County Board of Supervisors. Citizen appointees and staff from the three localities, the National Park Service, the Colonial Williamsburg Foundation, and the College of William and Mary serve on the HTBAC. The HTBAC is responsible for recommending bike way projects for implementation in accordance with the adopted Regional Bikeways Plan; recommending amendments to the plan; and developing and implementing promotional, informational, and safety initiatives related to bicycling.
- The Fredericksburg Area Metropolitan Planning Organization (FAMPO) has a BPAC comprised of local residents, planners, advocacy group representatives, and government staff (including VDOT) with the purpose of connecting with the public and advising the FAMPO Policy Committee and staff on active transportation issues, including walking, biking, universally accessible transportation, skateboarding, and e-mobility devices.

Locality interviews indicated mixed interest in forming a more formal BPAC when the following questions were posed:

- Has your locality created a bike ped advisory committee? With inter-departmental staff and/or Including members of the public outside of the staff?
- Would you be in favor of the RRTPO working toward the creation of a regional BPAC to advance regional bike-ped priorities and projects in accordance with a regional plan?
- Do you have other ideas to share about the best ways to advance regional bike and/or pedestrian networks?

Summary of Feedback on BPAC

Locality staff expressed the challenges given the overall time commitments they already have to RRTPO and CVTA committees for regional collaboration, but acknowledged that such a work effort would be valuable and did not discourage further exploration. Specific suggestions that merit research beyond this plan:

River Road, Henrico County

- Activate the existing ATWG of the RRTPO with specific representation to broaden the participants to include 1) people with disabilities, particularly those dependent on wheelchairs, scooters, and specialized transport; 2) additional representation from the regional higher educational institutions; 3) active transportation advocates.
- To strengthen the input and connection of the Committee members to their respective decision-making bodies, consider constituting an ATWG comprised of appointed representatives.
- Tailor the agenda for the ATWG to include specific focuses on 1) key corridors that cross jurisdictional boundaries; 2) state legislation and help in supporting advocates working on specific issues; 3) serving as strong educational awareness champions, carrying the message to the public and helping to provide training.

Public Awareness and Safety Programs

Programming to recruit more active transportation users and encouraging those who are users to make more frequent trips for a wider variety of purposes is as important as the improvements themselves. This can be accomplished by helping to establish good habits early, sharing knowledge of safe routing through wayfinding and apps and making known the health benefits and safety improvements through hands-on training, events and partnerships.

Safe Routes to School (SRTS)

Greater Richmond Fit4Kids hosts the Safe Routes to School (SRTS) program for the City of Richmond. The program works to engage parents, teachers, students, and other partners to work together to promote safe, active transport to and from school. The team focuses on disinvested communities and students attending Title I schools in Richmond. They are committed to:

- Promote and encourage health and wellness through physical activity
- Impart sustainable bike and pedestrian skills and safety education for students and faculty
- Engage the community through education, marketing, and promotional activities
- Evaluate efforts to ensure continuous quality improvement
- Cultivate relationships with stakeholders to bolster sustainability
- Encourage active transportation as a viable and environmentally sustainable form of school transportation

As of this publication, the targeted elementary schools for improvements include Chimborazo, Woodville, Fairfield Court, Barack Obama, Ginter Park, Linwood Holton, Mary Munford, and Oak Grove-Bellemeade.

CROSSWALK ON LABURNUM AVE. AT HOLTON ELEMENTARY SCHOOL IN NORTHSIDE

Bike Advocacy

Sports Backers is a non-profit organization and the leader in the Richmond Region providing leadership in the areas of organizing, advocating and inspiring people from all walks of life to live healthy and active lifestyles. Bike Walk RVA is a program of Sports Backers that advocates for comfortable and connected places to bike and walk for people of all ages and abilities.

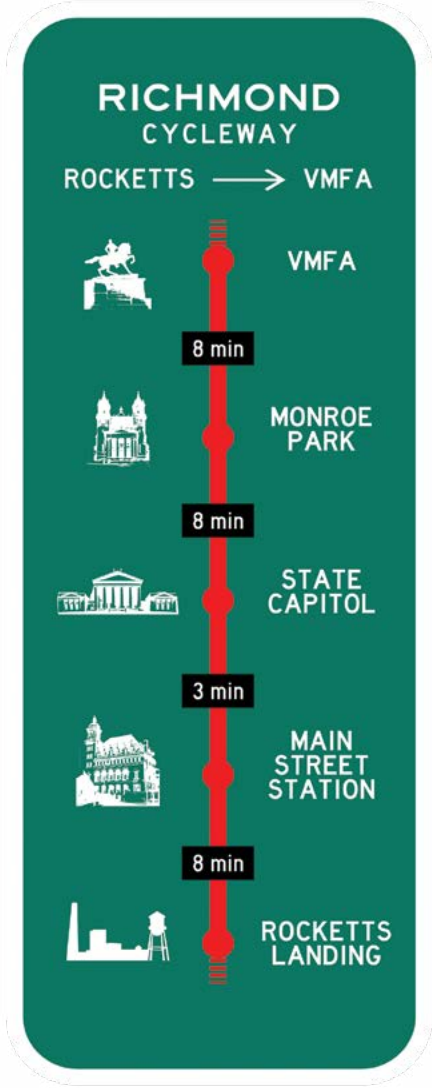
One of the main annual events around bicycling that Bike Walk RVA promotes is Richmond Bike-to-Work-Day. It is typically held in May in conjunction with National Bike to Work Day and brings cyclists together to take part in a group ride into downtown Richmond to meet with elected officials.

The organization also promotes the annual RVA Bike Month, which features a full calendar of bike-related events. Bike Walk RVA, with the help of dozens of volunteers and advocates from across the Richmond Region, organizes and lists the events.

Virginia Capital Trail Foundation serves to "protect, promote, and enhance the Virginia Capital Trail, and to serve as a resource, community builder, and connector to other trails throughout the Commonwealth." They host the annual Cap2Cap ride, which offers a variety of ways to participate in rides to raise money for the Capital Trail and promote cycling.

Common Signage/ Wayfinding

The City of Richmond has a wayfinding bicycle route network to help orient and assist cyclists within the city limits. This includes an east-west Route 2 that connecting the University of Richmond mainly along he Grove Avenue and Floyd Avenue corridors through downtown and into Church Hill. A north-south Route 3 connects along Arthur Ashe Boulevard-Hermitage Road



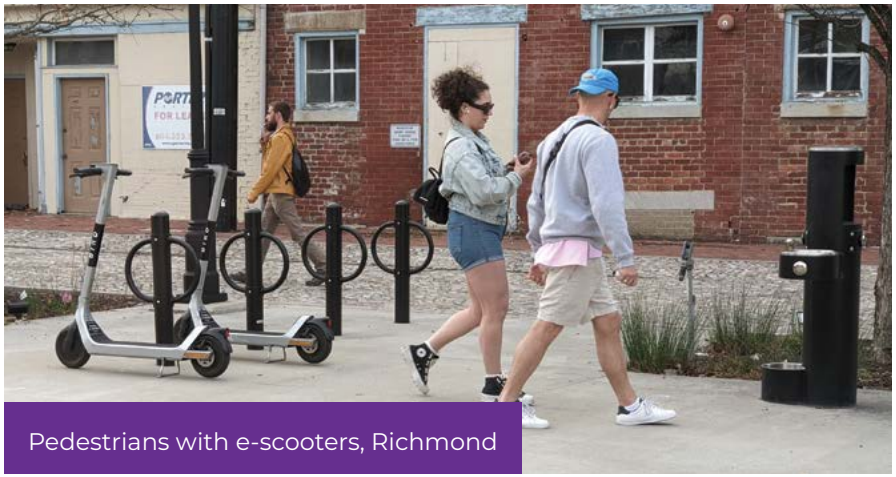
EXAMPLE WAYFINDING SIGN BASED ON MODERN PARISIAN DESIGN

corridor from Byrd Park to Bryan Park. These routes include occasional destination signage to significant points of interest. (NOTE: There is no “Route 1” out of consideration for U.S. Bicycle Route 1).

These signed wayfinding routes are recommended to be shared and extended into the counties of Henrico and Chesterfield, and the number of routes and/or spur routes could be increased to create a more connected and informative bicycling network throughout the region. Simple and standardized signage goes a long way in orienting system users, especially tourists or those new to cycling. Regional coordination on wayfinding signage can promote community engagement and ensure that network users can reach their destinations with certainty.

Apps for Cyclists and Pedestrians

A number of apps to help cyclists and pedestrians navigate or plan their route in advance are available in the market. The first step for bicyclists, runners, walkers, and other users is knowing where you are going before you start your trip—especially since you are under your own body power. The preferred route to your destination as a motorist is likely not the best and safest route for active transportation.



Pedestrians with e-scooters, Richmond

Elmont Rd., Hanover County

Identifying the safest and most skill-appropriate routes for your trips is essential. Many cyclists and pedestrians, particularly visitors and tourists who are less familiar with the region, use cell phone apps and GPS devices to assist with route selection and navigation. Recommended apps with free features include:

- Bikemap (bikemap.net)
- Citymapper (citymapper.com)
- Google Maps (maps.google.com)
- Map My Ride (mapmyride.com)
- People For Bikes (ridespot.org)
- Ride With GPS (ridewithgps.com)
- Strava (strava.com)
- TrailLink (traillink.com)
- Transit App (transitapp.com)”

City-specific or region-specific specialized apps developed for other areas as best practice examples are being researched for possible or practical application given the resources in the Richmond Region. There are also helpful devices, such as Garmin and Fitbit, for measuring the distance of bicycling, running, and walking routes.

Summary of Plan Recommendations

- Policy
- Planning
- Priorities
- Practice

Key Plan Recommendations

Short Term (2-3 years)

1. Equip a restructured regional Active Transportation Work Group to carry out the implementation of this plan, including operation, and maintenance of facilities and programs.
2. Develop and maintain regional performance measures to gauge the environmental impacts and benefits of active transportation projects to make them more competitive for funding.
3. Be a resource for the community in efforts to update policies and practices that support walkable communities.

Medium Term (3-5 years)

4. Work with PlanRVA localities to put Complete Street tools into regular practice at the local level.
5. Develop tools using the Regional Transportation Safety Plan that analyze crashes on the highest regional priority pedestrian safety corridors and intersections and develop design interventions that will make these locations safer.
6. Equip the regional Vision Zero Workgroup with practical tools to work toward the aspirations of zero deaths for bicyclists and pedestrians.
7. Identify the top ten most important multi-jurisdictional active transportation corridors and focus on clear alignment and shared implementation strategies for projects that connect across boundaries.
8. Research safety impacts of application of posted speed limits coupled with traffic calming measures.

Long Term (ongoing and beyond 5 years)

9. Engage PlanRVA localities to implement pilot projects that demonstrate how Level of Traffic Stress 2 mixed-traffic roadways improvements can result in fewer crashes that negatively affect bicyclists and pedestrians.
10. Help PlanRVA localities identify candidate roadways for reconfiguration or road diet, and work together to implement improvements.
11. Work closely with GRTC and other transit providers to make full access to fixed-route and specialized transit available to the identified Equity Emphasis Areas populations.

The *BikePedRVA 2045* plan operationalizes our region's vision of providing mobility for people of all ages and abilities through a safe, continuous, recognizable, and intuitive pedestrian and bicycle network. Considering the breadth of implementation partners, the plan does not dictate solutions but sets shared expectations and provides resources that will be frequently updated and communicated throughout the planning and implementation process.

The plan recognizes the need for accurate, reliable information in decision making at key points along the way over many years. The value of a digital expression of planning tools is the practicality of building a plan with resources that are frequently updated, value-added justification of benefits for funding consideration, and recommendations for further study.

Policy

- The **2004 Commonwealth Transportation Board Policy for Integrating Bicycle and Pedestrian Accommodations** requiring the presumption of active transportation as part of every highway improvement project was crafted in 2007. It can be diluted with exceptions and waivers which can reduce the likelihood that active transportation improvements will be at the forefront of every plan and design of each and every funded project. This plan does provide guidance on the characteristics and types of roads most conducive to bike-ped accommodations. Some have suggested this policy be revisited and refreshed with the benefit of the last 15 years of practice. This is worth exploring with VDOT and with local partners in the Richmond Region and other regions over the next year as a key recommendation of this plan, especially as new funding sources through the CVTA and the Federal Infrastructure Bill open up greater opportunity to think holistically about the existing road system.

2nd St., Jackson Ward

- **Complete Streets principles** are well documented through active practice and application in countless cities and regions throughout the world, including 90 percent of the 40 largest cities in the U.S. Guided by our localities, PlanRVA initially opted not to focus on adopting or dictating policy, but the need to focus on education and good practice examples that illustrate the benefits. The basis for a toolbox of guidelines has been underway by PlanRVA for the last three years as a primary means for supporting the implementation of the *BikePedRVA 2045* plan. Complete Streets community workshops were held in 2019. This effort needs to be expanded and strengthened with additional standards, dimensioned graphics, and public outreach involving the decision-makers in the region. The City of Richmond offers a strong example and serves in a leadership role both through their Better Streets Manual and Vision Zero policy engagement.

- **Vision Zero policy** represents an uncompromising value statement of zero deaths and serious injury from preventable traffic crashes. Regional discussion, sponsored by RRTPO, started through the Regional Vision Zero Work Group in 2020. One immediate result of these discussions is the Regional Safety Plan prepared in cooperation with VDOT. Products from this plan are recommended to be used to undergird specific safety improvements and set priorities for project funding.

Motorist in cycle track, Richmond

Brook Road cycle track markings, Richmond

- **Posted speed limits** are only as good as the amount of enforcement needed to back them up, as indicated by our initial conversations with locality staff. A recommendation of this plan is to continue to be open to a more comprehensive review of posted speed limit effectiveness with a focus on roadway types in context, i.e. urban, suburban, rural locales by specific road classifications. Speed is a big factor in the survivability of cyclists and pedestrians involved in a vehicular crash, but too much is unknown at this point to make a recommendation for a comprehensive regional study beyond established design interventions to reduce vehicle speed.

Planning

With the central goal of increasing and enhancing active transportation options for all users, regional and locality comprehensive plans need to put the greatest emphasis on coordinated land use and transportation system planning coupled with implementing ordinances that make mixed-use, nodal form-based development standards, and creative market-driven flexibility at the forefront. The *BikePedRVA 2045* plan recommends that early steps for actualizing this goal are readily available and should be prioritized:

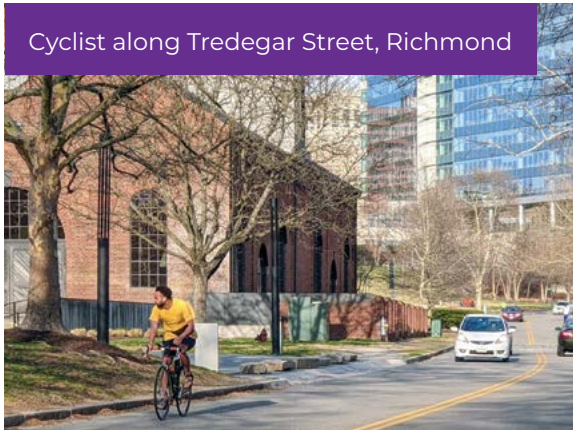
- **Building on the 60 percent of the existing system** that consists of relatively low-volume and low-speed mixed traffic roadways enables planners to focus on making smaller, less costly and sometimes incremental alterations to connect neighborhoods to schools, to community facilities, retail and other neighborhoods more safely. The story map includes a data layer of specific roadways which is characterized as level of traffic stress (LTS) 1, more comfortable for most cyclists and walkers.
- Another avenue of opportunity is **reconfiguring the wider roadways which have lower volumes than original design**, connect multiple destinations, and can accommodate bike lanes, wider shoulders with or without buffer, and/or sidewalks, especially at time of repaving.
- **Reconfiguring the deck designs of bridges or culverts slated for repair or replacement** through State of Good Repair programs offers an opportunity to serve cyclists, pedestrians and/or non-motorized assistance, and to remove barriers across high volume roadways, waterways, rail or other barriers that interrupt connections.
- **Programmed extensions or expansion of transit routes** are recommended as priorities for concurrent improvements affording full and safe access to planned bus stops especially within areas that serve EEA populations.

Realizing this hierarchy of opportunities for more immediate implementation provides earlier successes which can support greater use and gains in popularity necessary to justify planning the more costly network improvements. Early wins offering shorter trip connections can more readily entice early adopters among demographic groups that are less likely to bike, walk or use transit to get to work, shopping, school, or other community facilities if the car option is available. Longer planning horizons and funding are required to create shared use paths, buffer-separated from the existing roadway system to provide longer ranges of uninterrupted travel as offered by the Virginia Capital Trail (VCT) and planned Fall Line. Enhanced roadway improvements which connect to and provide alternative spurs from the regional trails offer the greatest opportunity for building a truly regional network. Plans for the James River Heritage Trail extending the VCT west and beyond can proceed based on the success of the trail network already underway.

Priorities

As shown on the Transportation Funding Matrix, active transportation projects and programs are reasonably competitive relative to all types of projects, but their ability to compete head-to-head is hampered by the disassociated nature of some active transportation facilities from the existing roadway system, location in lower population areas, and projects that often are without quantifiable data to measure impacts. The relatively lower cost of such active transportation projects when compared to the more expensive projects such as highway interchanges is what gives active transportation projects an edge when calculating cost-benefit scores, but other advantages need to be recognized in scoring methodologies.

Crash data for all vehicular crashes on roadways provides comparable quantifiable data of safety. The data relative to crashes which involve a cyclist or pedestrian on a shared use path, trail or bikeway is not as quantitatively impactful as for all fatalities or serious injuries resulting from vehicular crashes. Crash statistics for cyclists and pedestrians on facilities that do not yet exist leave the "what-if" conjecture an open question without measurable data for apples-to-apples comparison with all projects. It is recommended that setting priorities for active transportation as expressed through project scoring methodologies consider additional factors such as:



Cyclist along Tredegar Street, Richmond

- **Statistically supported data** showing the key pedestrian safety corridors needing improvement as part of the Regional Transportation Safety Plan identifying intersections and road segments with the highest incidence of and trends in fatal and serious injuries involving cyclists and pedestrians, and clearer priorities among these crashes.
- **Refining environmental benefit calculations** to account for additional measurable, positive, cumulative impacts on air quality by virtue of reduced carbon emissions.
- Impact calculations that consider **scoring bonuses for Equity Emphasis Area** population benefits.
- Inclusion of bonus points for **advance planning** of projects that include bike-ped improvements as part of the overall improvement, not later in the preliminary engineering phase based solely on availability of right-of-way.
- **Expansion of bike-share into EEA** into areas that serve EEA populations.

Practice

Momentum is building for more acceptance and thereby greater inclusion of bicycle and pedestrian improvements as a vital part of the overall Richmond Regional transportation system. Acceptance will be more readily supported if improvements are practical, economical, easily understood and result in greater safety gains. As more projects and programs are implemented the good examples from best practices will multiply and strengthen the next project if the execution is performed in a timely fashion, under budget and with minimal disruption to normal routine. Design guidance from well-recognized and accepted sources are recommended for building partnerships of joint action by the public and private sectors. Plans, regulations, and processes that set clear expectations for private sector improvements will carry the public investment further. Capital improvement budgets that foresee and plan for public sidewalks that potentially bolster other sources like Safe Routes to School, transit investments or known private investment can leverage this change.

The Fall Line partnership of nine jurisdictions (five of which are in the Richmond Region) along with VDOT, the Governor's Office, and advocates serves as an excellent example for restructuring the present-day **Active Transportation Work Group (ATWG)** of the RRTPO with the following guidance:

- **Reshape the representation** to be more inclusive, and endorsed for membership by the RRTPO Policy Board as advised by the Technical Advisory Committee;
- Establish specific broad **goals and objectives** of the ATWG;
- Narrow the focus for the initial restart on the **highest priority cross-jurisdictional corridors**;
- Use the *BikePedRVA 2045* plan to help guide the **scenario planning** for the next phase of the regional long-range transportation plan; and
- Develop and carry out **active user/public education programs** modeled after those already being employed successfully in the region to involve more people, more leaders and active beneficiaries of the programs.

BikePedRVA 2045 is not meant to be a static document simply reflecting a compilation of local plans, policies, and projects. It updates and refreshes the 2004 plan in an effort to make it more digitally interactive and relevant to the changing technological environment. It presents tools and an ever-developing map with layers of infrastructure, demographic data, and physical features for consideration by the region's localities as they collaborate on specific improvements. Our hope is that this plan guides and supports the development of a regional interconnected network of safer and more complete roadways, shared use paths, and connected access to transit.

New bikeway extension under Main Street Station, Richmond, allows continuous connection

Appendix

- Related State, Regional, and Local Plans
- State and Regional Park and Trail Systems
- Local Plans
- Colleges and Universities

Related State, Regional, and Local Plans

The following represents a summary of state, regional and local plans that were consulted in preparing the *BikePedRVA 2045* plan.

State Plans

Virginia Outdoors Plan

The Department of Conservation and Recreation's (DCR) Virginia Outdoors Survey is the Commonwealth's comprehensive plan for land conservation, outdoor recreation, and open-space planning. The 2018 Virginia Outdoors Survey shows significant demand for walking and bicycling in the Richmond Region.

"Walking for pleasure" was by far the most popular and desired activity for Richmond area residents. Many of the activities on the list require sidewalks, pathways, and trails protected from automobile traffic. "More trails" is listed as the third highest in the most-needed outdoor recreational opportunities.

Throughout the region, localities listed at least a quarter of their residents facing adult obesity issues (Body Mass Index (BMI) over 30) and approximately 20 percent of adult residents suffer from physical inactivity.

Many of the potential trails and bicycle and pedestrian projects listed in that study are also echoed in this bicycle and pedestrian plan for the Richmond Region.

VTrans Virginia Multimodal Surface Transportation Plan

Pursuant to Section 33.2-353, VTRANS is developed by the Commonwealth Transportation (CTB) with assistance from the Virginia Office of Intermodal Planning and Investment (OIPI) and serves as the Virginia Multimodal Surface Transportation Plan. VTrans conducts a comprehensive assessment of transportation needs and long-term risks and opportunities to guide all modes of transportation. The CTB has established a policy to identify and prioritize transportation needs known as "mid-term needs" which are used to screen funding applications for the SMART Scale program and prioritize funding requests received for the BVOT's Revenue Sharing Program. The CTB establishes prioritized locations based on the mid-term needs. OIPI, VDOT, DRPT and local and regional partners develop solutions for Priority 1 and 2 locations.

VDOT State Pedestrian Policy Plan

The Virginia Department of Transportation (VDOT) supports the provision of a multi-modal transportation system that addresses the needs of pedestrians. "The development process for the State Pedestrian Policy Plan involved coordination with key stakeholders and agency staff within VDOT as well as other agencies. The effort was led by an internal working group that consisted of VDOT staff and an external working group that was comprised of representatives of localities, Metropolitan Planning Organizations and the Federal Highway Administration. In addition, the Virginia Bicycle and Pedestrian Advisory Committee provided comments to refine this document."

VDOT State Bicycle Policy Plan

This policy plan is based on the premise that "People who ride bicycles on a regular basis can improve their health and quality of life. In addition, bicycling is a mode of travel that creates no emissions and has minimal impact on transportation infrastructure." The Virginia Department of Transportation (VDOT) supports the provision of a multimodal transportation system that addresses the

needs of non-motorized users. This VDOT plan was the first of three plans, with the purpose to "establish a vision for the future of bicycling in the Commonwealth and to advance the bicycle element of the policy consistently, appropriately, and cost-effectively."

VDOT Richmond Region Safety Plan (February 2022 Draft)

Vision Zero policy represents an uncompromising value statement of zero deaths and serious injury from preventable traffic crashes. Regional discussion and education about what the full import of this policy means started through the Regional Vision Zero Work Group in 2020. One immediate result of these discussions is the Regional Safety Plan prepared by VDOT with the help of consultant VHB which has been reviewed by the Vision Zero work group. Products from this plan are recommended to be used to undergird specific safety improvements and setting priorities for project funding.

Virginia Scenic Byways

Three corridors in the Richmond Region are designated as Virginia Scenic Byways, including Route 5, Route 711 and Route 6.

A Scenic Highway is defined by the 1966 State Scenic highway and Virginia Byway Act as "a highway designated by the Commonwealth Transportation Board within a protected scenic corridor located, designed, and constructed in a manner to preserve and enhance the natural beauty and cultural value of the countryside."

The City of Richmond has designated Riverside Drive as a locally significant scenic byway and the on-road Riverside Trail follows along portions of that corridor as it travels west to Chesterfield County. Other localities in the region also have scenic road designations.

Tourism – National, Regional, and Local Bicycle Touring Routes

The Richmond Region is traversed by several existing and emerging national, regional, and local bicycle touring routes.

U.S. Bicycle Routes 1 and 76: The U.S. Bicycle Route System (USBRS) is a developing national network of bicycle routes connecting urban and rural communities via signed roads and trails. Created with public input, U.S. Bicycle Routes direct bicyclists to a preferred route through a city, county, or state—creating opportunities for people everywhere to bicycle for travel, transportation, and recreation. Over 14,000 miles are currently established in 27 states and Washington, D.C.—and many routes are signed.

Virginia was one of the first states with a U.S. Bicycle Route designated by the American Association of State Highway and Transportation Officials (AASHTO). U.S. Bicycle Route 1 is a north-south signed route linking Washington, D.C., to North Carolina through the Richmond Region, passing through parts of Hanover, Henrico, Chesterfield, and Powhatan counties, as well as the Town of Ashland and the City of Richmond. U.S. Bicycle Route 76 links the Commonwealth to Kentucky in Southwest Virginia. It traverses the region through Hanover, Henrico, and Charles City counties and connects to the Virginia Capital Trail before terminating at Yorktown. The trail is a part of the TransAmerica Route which extends to Astoria, Oregon. U.S Bicycle Route 176 is a 17-mile bypass that connects routes 1 and 76 in eastern Henrico County along the Capital Trail into downtown Richmond.

Sections of the signed routes in Hanover, Chesterfield, and Henrico, and Richmond, indicate that alternate routes might be safer where warranted by current traffic and road conditions. Localities and advocacy groups continue to work with VDOT to identify areas where route signs are missing, opportunities to relocate the route to updated or safer routes, or where the signed route does

not match the mapped route. Localities are likely to apply for sections of routes 1 and 76 to be realigned along Fall Line once completed.

Regional routes: The East Coast Greenway (ECG) is a walking and biking route stretching 3,000 miles from Maine to Florida, connecting America's most populated corridor. The East Coast Greenway Alliance's goal is the designation of trails connecting 15 states and 450 communities for the purpose of promoting active and healthy lifestyles, sustainable transportation, community engagement, climate resilience, and tourism. The ECG is a collaborative effort that has attracted more than $1 billion in public investment in its first 25 years as it offers a safe place for bicyclists, walkers, runners, and more—of all ages and abilities—to commute, exercise, and visit new destinations.

The ECG has approximately 283 miles along the spine route in Virginia, connecting Alexandria to the North Carolina border in Mecklenburg County. As of early 2020, more than 57 miles of that route are protected greenway with a half-dozen officially designated sections of the greenway as it passes through the Richmond Region. Development of the Fall Line (formerly Ashland to Petersburg Trail) offers many new opportunities for the ECG to be re-routed and will likely change the current mapped route through the region to a better protected and safer corridor.

The Historic Coastal Route (139 miles) of the ECG is an alternate route that connects from Richmond to Wilmington, N.C. It follows the Virginia Capital Trail along a traffic-separated greenway through a region steeped in history and natural beauty. This route connects with the Dismal Swamp Canal Trail to bring travelers over the border into North Carolina.

Virginia Capital Trail

The Virginia Capital Trail is a 51.7-mile, fully paved, shared use trail that runs through four jurisdictions (City of Richmond, counties of Henrico, Charles City, and James City) with dozens of parks, plantations, and other attractions along the route. The trail was completed in October 2015 and connects Richmond to Jamestown along historic Route 5, a Virginia Scenic Byway. Runners, walkers, bicyclists, and many more active transportation users can visit the trail, which is also used as a transportation route for people who live along this regional asset. The Virginia Capital Trail Foundation works with localities and the Virginia Department of Transportation to maintain and enhance the trail.

The Virginia Capital Trail has been a success as a both a recreational asset and transportation route for the Richmond region. An economic study by the University of Richmond prepared for the Virginia Capital Trail Foundation found the total economic activity stimulated by the trail in the Commonwealth during FY2018-19 was approximately $8.9 million. Roughly 95 percent of this economic activity occurred within a 50-mile radius of the trail. The study also showed that the trail was responsible for roughly $3.6 million in wage and salary income in Virginia.

Nine counters along the path record users each time the counter is passed, and people can be counted multiple times as they pass a counter. Not all counters have been consistently recording data since the entire trail opened, but they give a representation of the number of people using the trail each day. The counter on Dock Street near the western trailhead averages more than 1,100 users daily. Another at Four Mile Creek Park in Henrico County averages more than 300 users daily. Nearly 150 users daily are counted near Charles City Courthouse. The counter closest to the eastern trailhead at Jamestown averages more than 350 trail users daily.

Portions of the potential trail would be a logical reroute for national bicycle routes like the East Coast Greenway and U.S. Bicycle Route 1 as they pass through the Richmond Region.

Fall Line: VDOT's Ashland to Petersburg Trail Study

The Ashland to Petersburg Trail Study (ATP) was conducted by the Virginia Department of Transportation (VDOT) to identify a preferred corridor for a shared use path that would extend between the Town of Ashland and the City of Petersburg, approximately 44 miles. Other participating localities include the counties of Chesterfield, Hanover, Henrico, the City of Richmond, and the Town of Colonial Heights. Results of the study were released Feb. 4, 2020. In October 2020, the trail was officially branded as the Fall Line.

The study identifies the preferred corridor for a shared use path, an evaluation of the existing conditions and identifying a corridor least impactful to environmental resources with feedback from state and federal agencies, affected localities, special interest groups, and the general public. The study was a collaborative effort on behalf of VDOT and a Stakeholder Technical Advisory Group consisting of government agencies, and special interest groups that included metropolitan planning organizations, planning district commissions, and other stakeholders. The study also had an Environmental Agency Working Group (EAWG) that was comprised of government agencies with jurisdiction, oversight and regulatory responsibility for future project implementation. Members of the EAWG included the Federal Highway Administration (FHWA). U.S. Army Corps of Engineers, and Virginia Department of Environmental Quality.

The stated purpose of VDOT's ATP Trail Study is "to identify a preferred corridor for a shared use path facility that would enhance the active transportation network in the Richmond Region, by improving bicycle and pedestrian safety, expanding non-motorized travel choices, and providing increased system linkage and connectivity to population centers, as well as key local and regional destinations, consistent with state, regional, and local transportation planning initiatives."

State and Regional Park and Trail Systems

Pocahontas State Park

The Virginia Department of Conservation and Recreation (DCR) planners and State Park staff conducted the Pocahontas State Park master plan update to outline the desired future condition of the park during a 30-year planning horizon. With the addition of the Richmond Regional Ride center at Pocahontas, the plan emphasizes the need to improve the bicycle and pedestrian connectivity between the park and other destinations. "Support is recommended for the further development of the East Coast Greenway, which could provide an on-road connection from Pocahontas State Park to the James River Park system and other Chesterfield County and regional bike and trail networks," according to the plan. The plan was recommended for adoption by the Board of Conservation and Recreation in September 2017. As required by the Code of Virginia, it must be revisited every ten years to ensure that the development objectives outlined in the plan continue to meet the recreational and conservation needs of the citizens of the Commonwealth.

Powhatan State Park

The Powhatan State Park opened in Powhatan County in 2013. The original park master plan was adopted in February 2007 and the update was adopted in 2012. "An advisory committee comprised of Powhatan County residents, adjacent landowners, government officials, user groups, and local businesses crafted the plan with the guidance of the public. As part of the development of the park master plan, goals and objectives and a park purpose statement were developed," according to the plan. Potential for connections via the proposed James River Heritage Trail were included in the plan and connectivity issues and concerns to the roadway networks beyond the park boundaries along routes 522 and 617 were addressed.

James River Park System

The Friends of the James River Park coordinated the effort to develop a James River Park master plan in partnership with Falls of the James Scenic River Advisory Committee, James River Association (JRA), rvaMORE, James River Outdoor Coalition (JROC), James River Advisory Council (JRAC), the James River Work Group of the Capital Region Collaborative, and the City of Richmond. The plan was adopted by Richmond City Council in January 2020 as part of the Richmond 300 Master Plan. As it relates to transportation, the plan included improvements for greenways and community connections to and through the James River Park System.

Appomattox River Trail System

The Appomattox River Trail (ART) Master Plan was completed in 2017. It is a guide to locating and prioritizing shared use paths with a coordinated signage system through the six municipalities that border the lower Appomattox River as it flows toward the confluence with the James River. The area encompasses the counties of Chesterfield, Dinwiddie and Prince George, and the cities of Colonial Heights, Hopewell and Petersburg. The planned regional trail and signage system offers walkers and cyclists safe, enjoyable connections to recreational opportunities, greenspace and nature, as well as connections to historic sites and structures, businesses, jobs, schools, and transit.

Advocate Plans

As an advocacy group, the Richmond Area Bicycling Association (RABA) has published cue sheets and maps for suggested recreational routes based on various sightseeing themes. RABA also leads a variety of weekly and monthly tours for a wide range of cyclists and riding abilities. The Williamsburg Area Bicyclists (WAB) group has mapped various routes in New Kent and Charles City counties.

In 2012 Sports Backers created Bike Walk RVA to advocate for the growth of cycling and pedestrian infrastructure and to help normalize biking and walking throughout the Richmond Region. The program advocates for comfortable and connected places to bike and walk for people of all ages and abilities. The organization advocates for protected bike lanes, paved shared use paths, safe intersections, and calm neighborhood streets which have been proven to get people biking and walking on a regular basis. Since 2014, Bike Walk RVA has worked with volunteers to collect data twice a year (May and September) on the number of people biking and walking in Richmond in order to help demonstrate and account for the effects of protected bike infrastructure. The group has also maintained a map and database to track the development of bicycle routes throughout the Richmond Region.

Local Plans

Locality comprehensive plans, including transportation, small or special area plans, corridor plans, and complete streets plans, have been consulted as part of the *BikePedRVA 2045* plan preparation. Each of the nine localities have made planning commitments to improve walking and bicycling through their comprehensive plans, special bicycle, pedestrian and trail plans, and small area or special area plans:

Town of Ashland

The Town of Ashland completed the 2040 Transportation Plan for its comprehensive plan in 2020. Ashland also has a Parks and Recreation Master Plan. Ashland had been the pilot community for a Complete Streets planning effort with PlanRVA. Ashland's segment of the Fall Line should be completed in Spring 2021.

Charles City County

Charles City County has a comprehensive plan with guidance for bicycles and pedestrians. The county already has a strong east-west shared use path with the Virginia Capital Trail and has developed a spur trail from the Capital Trail to connect with Lawrence Lewis Park. The county worked with VDOT on a paved half-mile spur trail off the Capital Trail from the courthouse complex with a push-button crossing that connects across Route 5 and extends to the county schools along Route 155.

Chesterfield County

Chesterfield County has a Bicycle and Trails chapter of the county comprehensive plan, which was adopted in May 2019. The county is implementing their bike/ped plan through the ongoing development process, working to tailor each developer's own site plan by collaboratively setting specifications for bike/ped infrastructure as part of each case. The county has also begun to work with VDOT on selecting streets for potential roadway reconfigurations to trim over-built roads to include bicycle infrastructure, such as with the addition of two miles of bike lanes on Turner Road in 2020.

Chesterfield also has several specific area plans incorporated by reference into the county's comprehensive plan that are to remain in effect until such time as they may be amended by the Board of Supervisors.

Specific area plans (remaining in effect):

- Jahnke/Chippenham Development Area Plan (adopted 1983)
- (Eastern) Route 360 Corridor Plan (adopted 1995)
- Eastern Midlothian Plan (adopted 1998)
- Chester Plan (adopted 2005)
- Northern Courthouse Road Community Plan (adopted 2008)

Specific area plans that were amended in 2021 after adoption of the 2019 countywide plan:

- Ettrick Virginia State University Special Area Plan (adopted 2015)
- Bon Air Special Area Plan (adopted 2015)
- Northern Jefferson Davis Special Area Plan (adopted 2018)
- Midlothian Community Special Area Plan (adopted 2019)
- Genito/288 Special Focus Area (in development as of April 2022)

Goochland County

The Goochland County 2035 comprehensive plan includes guidance for bicycle and pedestrian infrastructure through the Major Thoroughfare Plan (MTP). The MTP identifies the transportation assets and needs for motorists, bicyclists, pedestrians, and transit. While Goochland is rural, its east end continues to develop, and the county is focused on improving the pedestrian network with sidewalk and trails.

Hanover County

Hanover County's comprehensive plan has an Active and Healthy Living Neighborhoods chapter that addresses planning for bicycle and pedestrian infrastructure. There are three large nodes of sidewalk infrastructure, mainly centered along developed areas in Mechanicsville, the Rutland community along Atlee Station Road, and the community of Elmont, south of the Town of Ashland. Hanover is also participating in the development of the Fall Line.

Henrico County

Henrico is working on a bicycle and pedestrian plan chapter that will be part of the County's comprehensive

plan update. Henrico is focused on bicycle and pedestrian infrastructure as the county expects developers to implement the county's sidewalk network as part of their individual projects. The chapter is also expected to complement the Richmond Regional bicycle and pedestrian plan and to focus on regional connectivityHenrico has a 4–5-year goal of completing their 7.5 miles of the Fall Line by 2025–26.

Henrico has several special area plans:

- Glen Allen Small Area Study
- Public Design Charrette
- Route 5 Corridor/Marion Hill Study
- Short Pump Town Center Virtual Design Charrette
- Virginia Center Commons Design Charrette
- Westwood Small Area Study

New Kent County

New Kent County's comprehensive plan was adopted in 2012 and addresses bicycle and pedestrian infrastructure and safety concerns. The county has no dedicated separate bicycle facilities or shared use pathways and has few sidewalks, mostly clustered in the Courthouse and schools area.

Powhatan County

The Powhatan County comprehensive plan includes guidance for bicycle and pedestrian infrastructure. The plan states that bicycling, for both commuting and recreational purposes, is an important component of the county's transportation system. Powhatan Courthouse now allows golf carts with the 25 mph limits of the courthouse area and has sidewalk through the courthouse with plans to continue that network west along Old Buckingham Rd. (Route 13).

City of Richmond

The City of Richmond has the Richmond Bicycle Master Plan (2014), the Better Streets plan, and Vision Zero plans complete, and the Richmond 300: A Guide For Growth. A Capitol Square plan is also expected in the coming years. The city provided nearly 50 miles of dedicated bike infrastructure by the end of 2020 with much of that done by implementing strategic roadway reconfigurations to increase the bicycle network. The city continues to implement strategies to improve the sidewalk network and close gaps, especially in the South Richmond area.

Other related plans

- Pulse Corridor Plan
- Virginia Union University/Chamberlayne Neighborhood Plan
- Hull Street Revitalization Plan
- Downtown Master Plan
- Richmond Riverfront Plan

Colleges and Universities

Reynolds Community College

Reynolds Community College Strategic Direction is aligned with Opportunity 2027, the new strategic plan of the Virginia Community College System "to achieve equity in access, learning outcomes, and success for students from every race, ethnicity, gender and socioeconomic group."

Downtown Campus
700 East Jackson Street

Parham Road Campus
1651 East Parham Road

Goochland Campus
1851 Dickinson Road

The Kitchens at Reynolds (Church Hill)
2500 Nine Mile Road

Community Connections: The Downtown Campus is in the heart of the VCU medical community and the Virginia Biotech Park, connected to transit and well-served for bicycle and pedestrian connections. The Kitchens at Reynolds is part of the North Church Hill community and focused on culinary resources. The Parham Road campus is more commuter drive based, but also close to future transit connections and possible bicycle and pedestrian connections of the proposed Fall Line. The Goochland campus offers potential to be better connected to the County Administration building and Courthouse complex.

Brightpoint (formerly John Tyler) Community College

Strategic Plan: Opportunity 2027 is also guided by the Virginia Community College System's Opportunity 2027 Strategic Plan

Chester Campus
13101 Jefferson Davis Highway
Chester, Virginia 23831-5316

Midlothian Campus
800 Charter Colony Parkway
Midlothian, Virginia 23114-4383

Community Connections: The auto-centric Midlothian campus has limited sidewalk connections. The Midlothian campus has sidewalk along N. Woolridge Rd. and both bike lanes and sidewalk from Charter Colony Pkwy. The Chester campus is now connected to transit through the Chesterfield extension of the Route 1 transit route.

Randolph-Macon College

114 College Ave
Ashland, VA 23005

The Randolph-Macon College Strategic Plan 2009-2022 centers around four primary goals, the most relevant is Goal 1: Improve Facilities, calling for major campus expansion with two new residence halls, newly aligned football field, other athletic facilities and laboratory and library expansions.

Community Connections: RMC is the largest employer in the Town of Ashland, and the campus dominates much of this small community. The campus provides a park-like setting and is well served by bicycle and sidewalk connections to town. Pedestrian signal crossings could help make crossing England St. safer for pedestrians. Bike and pedestrian connections to the proposed Fall Line are also possible. More traffic calming and bike lockers/parking for the dormitories could also be considered in future plans.

Virginia Commonwealth University

ONE VCU Master Plan is the first master plan in VCU's history to set a unified vision for all VCU properties on both the academic campus and the medical campus. It is guided by principles that "place a strong emphasis on mobility, safety, campus unification, synergy among programs, and celebrating VCU's unique urban setting and rich history."

Community Connections: For the Academic Campus centered around Monroe Park, bike lanes along Franklin St. and the Floyd Ave. bike-walk boulevard help with east-west travel. Bike lanes on the Belvidere Bridge, Lombardy St., and drop and more help improve the north-south travel. For the Medical Campus, bike lanes along Leigh St. and connections across the Martin Luther King Bridge help with east-west travel, as do the bike lanes on E. Franklin St. under Main Street Station. Bike lanes and connections along 12th/ Governor St. help with north-south travel.

Due to the urban nature of both campuses, pedestrians and bicyclists will likely be entering at multiple junctures and access conflicts may remain a concern. More pedestrian signal crossings would be helpful, especially for those connecting to residences and parking lots in Shockoe Bottom along Broad St. More traffic calming could prove to be beneficial as well.

Virginia Union University

1500 N. Lombardy Street
Richmond, VA 23220

Virginia Union University Strategic Plan is centered around five strategic goals with measurable outcomes, the most relevant calling for the development and implementation of a comprehensive master plan. The plan recognizes the campus' contribution to the Richmond community, the need to upgrade building systems and reduce the deferred maintenance of campus facilities.

Community Connections: Bike lanes on Lombardy St. and Brook Rd. connect to the campus area. The Brook Rd. bike lanes are expected to be part of the Fall Line, along with sidewalk connections and traffic speed control (roundabout). More pedestrian signal crossings would help as this area continues to grow and become more densely populated with residential buildings and commercial businesses.

Virginia State University

Campus located in Ettrick, Chesterfield County
Administrative Offices
1 Hayden St.
Petersburg, VA 23806

Virginia State University Master Plan outlines the 2015 campus Master Plan which focuses on "unifying and connecting the perimeter campus zones through a new central green space and student center north of the library. The new student hub links key pedestrian paths and strengthens the campus' sense of place and identity."

Community Connections: Pedestrian signal crossings and sidewalk have been added along the perimeter of the campus, including along Chesterfield Ave., East River Rd./ Dupuy Rd. A pedestrian bridge for the proposed Fall Line could provide a safer connection across the Appomattox River into the campus from Petersburg and could also provide safer connections from Colonial Heights and Chesterfield. More pedestrian crossings and improved traffic calming near the campus could be beneficial.

University of Richmond

410 Westhampton Way
Richmond, VA 23173

University of Richmond Campus Master Plan states that the "true driving force behind all future designs is the campus' inherent natural beauty." The campus master plan builds on the natural setting focused on topography, hydrology, open spaces and the connections within and beyond. The campus itself serves the surrounding community as a park-like setting with recognition that some roadways, sidewalks and paths are typically too narrow to safely accommodate bicycles and pedestrians. The master plan acknowledges the need to reduce the number of single-occupied commuter vehicles traveling to campus, reduce the need for cars on campus and support campus sustainability efforts.

Community Connections: Access is provided via the Grove Avenue bike lanes (City of Richmond's Route 2) from the east with a push-button signal crossing at Three Chopt Rd. and Towana Rd. Gamble's Mille Eco-Corridor provides safe connection toward Huguenot Road and Huguenot Bridge, which connects to the James River Park System and south Richmond. The University of Richmond should continue to make improvements to the auto-centric intersection at Huguenot Rd. and River Rd. at the beginning of Gambles Mill Trail. Additionally, provide a pedestrian signal crossing along River Road at College Drive. Consider highlighting connections into the low-traffic neighborhoods to the west, north, and east of the campus.

Notes

Notes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Semmes Ave
RIGHT LANE

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