National Capital Region
# Transportation Plan

# VISUALIZE 2050

National Capital Region
**Transportation Planning Board**

Approved December 17, 2025

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Development of Visualize 2050 took place under the direction and guidance of the TPB, led by TPB Chairs: Pamela Sebesky, Prince William County, 2022; Reuben Collins, Charles County, 2023; Christina Henderson, District of Columbia, 2024; James Walkinshaw and Walter Alcorn, Fairfax County, 2025.

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# About the TPB

The National Capital Region Transportation Planning Board (TPB) is the federally designated metropolitan planning organization (MPO) for metropolitan Washington. It is responsible for developing and carrying out a continuing, cooperative, and comprehensive transportation planning process in the metropolitan area. Members of the TPB include representatives of the transportation agencies of the states of Maryland and Virginia and the District of Columbia, local governments, the Washington Metropolitan Area Transit Authority, the Maryland and Virginia General Assemblies, and nonvoting members from the Metropolitan Washington Airports Authority and federal agencies. The TPB is staffed by the Department of Transportation Planning at the Metropolitan Washington Council of Governments (COG).

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Kanti Srikanth

VISUALIZE 2050

National Capital Region Transportation Plan


**Primary Authors**

Cristina Finch
Jamie Bufkin
Sergio Ritacco
Eric Randall
Kanti Srikanth
Lyn Erickson

**Contributing Editors**

Andrew Austin
Laura Bachle
Rachel Beyerle
Sara Brown
Tim Canan
Hilary Chapman
Robert d'Abadie
Michael Farrell
Pierre Gaunaurd
Greg Goodwin
Thomas Harrington
Charlene Howard
Kenneth Joh
Mark Moran
Erin Morrow
Ian Newman
Janie Nham
Jane Posey
Katherine Rainone
Dan Sheehan
Dusan Vuksan

**Technical Contributors**

Andrew Burke
Anant Choudhary
Nazneen Ferdous
Marc Moser
Wanda Owens
Jinchul (JC) Park
Renee Ritchey
Meseret Seifu
Jessica Storck
Ho Jun (Daniel) Son
Feng Xie
Jian (Jim) Yin

**Design By**

Clark Communications


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The plan's chapters take the reader from the present to the future. Perspectives on technical, societal, and financial topics are shared. Ultimately the plan identifies what can be done with the resources available, how that shapes transportation in 2050, and where the region's future transportation planning efforts are needed moving forward.



**Legend for Callout Boxes**

Reader's Note | Educational Note | Highlight | Priority Strategy

**NOTE**: Supplemental information to support Visualize 2050 is available online at visualize2050.org. Look for these icons:

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throughout this plan and visit the website to view interactive maps and additional content.


- National Capital Region Multimodal System (2023)
- Current and Future Accessibility to Jobs
- Maintenance of Roadways and Bridges
- Forecast of Population and Employment Growth, Activity Centers, and Activity Density
- Vulnerability of the Transportation System to Natural Hazards
- Environmental Inventory
- Electric Vehicle Charger Siting
- Future Transportation System
- Future Roadway Network
- Future Railway and Bus Transit Network
- Future Pedestrian, Bicyclist, and Micromobility Network


- Existing Stations, Systems, and Providers (2023)
- * Future Transportation Investments in Projects and Programs
- List of New HCT Stations (2050)

The transportation planning process to develop Visualize 2050 is documented under separate cover and available online at **visualize2050.org**.

# Chapter 1:
# Introduction

The National Capital Region—encompassing the District of Columbia, suburban Maryland, and Northern Virginia—is home to many communities that depend on a safe, reliable, and efficient transportation network for commuting, transporting goods, and navigating daily life. As one of the largest metropolitan areas within the 6th largest regional economy in the United States, the ability to move people and goods safely, reliably, and seamlessly within and through the region is critical for enhancing quality of life for everyone who lives, works, and visits the region and for sustaining economic vitality.

The National Capital Region Transportation Planning Board (TPB) is federally designated as the Metropolitan Planning Organization (MPO) and is entrusted with the responsibility to develop a long-range transportation plan for the region. The TPB developed Visualize 2050 to meet the federal requirement for MPOs to develop a metropolitan transportation plan.

Cristina Finch/COG

The TPB's planning area, shown in Figure 1.1, spans approximately 3,500 square miles across 22 local jurisdictions and is formed by:

- Natural features including the watersheds of the Potomac River, the Anacostia River, and the Occoquan River.
- Two states, one district, eight counties, and 14 cities and towns.
- Decisions around development, land use, transportation infrastructure policies, and investment priorities.

**Figure 1.1:** National Capital Region Planning Area


At the center of the region is Washington, DC, home to the federal government and national and historic monuments that draw global attention. The National Capital Region's 5.9 million residents and 3.3 million employees are what make the region vibrant and prosperous.

## The National Capital Region Transportation Plan

The TPB and its member agencies develop the region's long-range, multimodal transportation plan looking at least 20 years into the future and update the plan at least once every four years to stay current on the changing nature of travel in the region. The plan, called Visualize, reflects a point-in-time of a robust, ongoing, and performance-based transportation planning and programming process.

A review of the process used to develop this latest version of the long-range plan, Visualize 2050, is documented under separate cover. The process document details the work behind the information shared within this plan. The TPB invites interested parties to read the "Visualize 2050 Planning and Programming Process" document available on the plan website, **www.visualize2050.org**, and learn about the extensive work that has taken place to inform this version of the plan and prepare the National Capital Region's transportation system for the future.

BeyondDC/Flickr

Elvert Barnes/Flickr

## Visualize 2050

Developed between 2022 and 2025, Visualize 2050 documents the current state of transportation in the region, the many topics planners and engineers consider when analyzing transportation and related issues, the amount of money anticipated to be available through the plan's horizon year (2050), and priority investments that will address challenges and enhance future travel by making it safer, faster, more convenient, and more reliable. In addition, the plan includes TPB's policy framework including the vision statement, values, goals, priority strategies, performance measures, and targets for ongoing regional transportation planning.

The TPB's Visualize 2050 goals align with the transportation goals in the District of Columbia's *moveDC*, Maryland's The Playbook, and Virginia's *VTrans* plan and reflect the transportation goals of the nation as outlined through the federal Moving Ahead for Progress in the 21st Century Act (MAP-21).

## TPB'S VISION STATEMENT

*The metropolitan Washington region remains a vibrant world capital, with a transportation system that provides efficient movement of people and goods. This system promotes the region's economy and environmental quality and operates in an attractive and safe setting—it is a system that serves everyone. The system is fiscally sustainable, promotes areas of concentrated growth, manages both demand and capacity, employs the best technology, and joins rail, roadway, bus, air, water, pedestrian and bicycle facilities into a fully interconnected network.*

## TPB'S VALUES

**ACCESSIBILITY** All people who use the transportation system in the region should have reasonable physical and affordable access to travel by road, transit, biking, walking, micromobility, ferry, and to housing choices.

**PROSPERITY** The regional transportation network should be an asset to attract high quality employers, minimize economic disparities, and enhance each jurisdiction and the region through balanced growth and access to high quality jobs and education for all levels.

**SUSTAINABILITY** Transportation infrastructure and programs in the region should be environmentally, structurally, and financially viable.

**AFFORDABILITY** Readily available multimodal travel options throughout the region that enable safe and efficient access to jobs, housing, services, and other destinations.

**LIVABILITY** Vibrant, healthy, and safe neighborhoods with a range of travel and housing choices that support economic well-being.

## TPB'S GOALS

**SAFETY** Pursue the safety of all users, including travelers and maintenance and operations personnel alike, on every transportation mode.

**WELL-MAINTAINED INFRASTRUCTURE** Maintain the transportation system's infrastructure in a state of good repair to provide reliable, safe, and comfortable mobility to all its users. Maintaining the existing system is a top priority that takes precedence over creating new systems.

**TRAVEL TIME RELIABILITY** Enable reliable travel times on all transportation options to get the traveler to their destination on time every time.

**EFFICIENT SYSTEM OPERATIONS** Implement efficient transportation systems management and operations within and across different travel modes.

**AFFORDABLE AND CONVENIENT MOBILITY OPTIONS** Provide affordable, practical multimodal options.

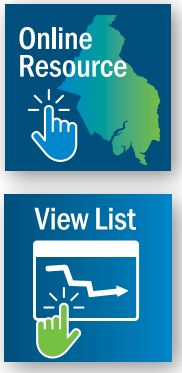
**ENVIRONMENTAL PROTECTION** Provide and incentivize methods that build, operate, and maintain the transportation system in a manner that provides for healthy air, water, other environmental factors, and mitigates the effects of extreme weather.

**RESILIENT REGION** Facilitate mobility for people in the face of one or more major obstacles to normal transportation system functionality. These obstacles could include extreme weather events, major crashes and incidents, and equipment or infrastructure failures.

**LIVABLE AND PROSPEROUS COMMUNITIES** Support regional economic competitiveness, opportunity, and a high quality of life for all people.

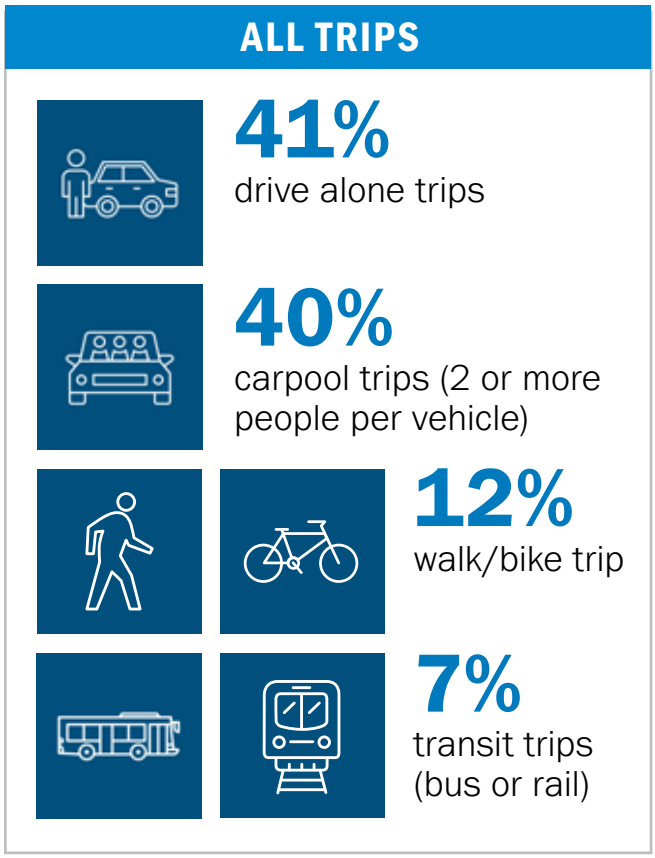
# Chapter 2:
# Transportation System Today

The National Capital Region has a multimodal transportation system made possible through the substantial investments of public and private agencies. The region's well-established transportation network supports the movement of people and employees as drivers and passengers, public transportation riders, pedestrians, bicyclists, and other travelers with an array of transportation options.[1] The system, as of 2023, may be viewed on the **National Capital Region Multimodal System (2023)** map with more details available on the ***List of Stations, Systems, and Providers (2023)***.




The onset of the coronavirus (COVID-19) pandemic in 2020 brought significant changes to travel patterns, and five years later, the patterns continue to evolve from pre-pandemic norms, particularly due to rates of teleworking and economic conditions. These evolving travel habits and patterns make it challenging to track changes in travel behavior in real time and reconcile them with existing pre-pandemic surveys and models.

In 2025, it is estimated that more than 18 million trips will be made daily across different modes of transportation.[2] Of these trips, the travel model estimates that approximately 41 percent are people driving alone, 40 percent are in a vehicle with two or more people, 12 percent are by walking or biking, and 7 percent are riding bus or rail transit.




Travel mode shares vary by trip purpose. The percentages reported above are across all trip purposes on a typical weekday. For work purpose trips originating at home, transit mode share is typically over 20 percent.[3] For commuting and other trip types, people continue to use all modes of transportation, making choices based on availability and what best suits their needs at any given time.

1 Metropolitan Washington Council of Governments. June 14, 2023. Round 10.0 Cooperative Forecasts of land activity. **https://www.mwcog.org/documents/2023/11/03/cooperative-forecasts-employment-population-and-household-forecasts-by-transportation-analysis-zone-cooperative-forecast-demographics-housing-population/**

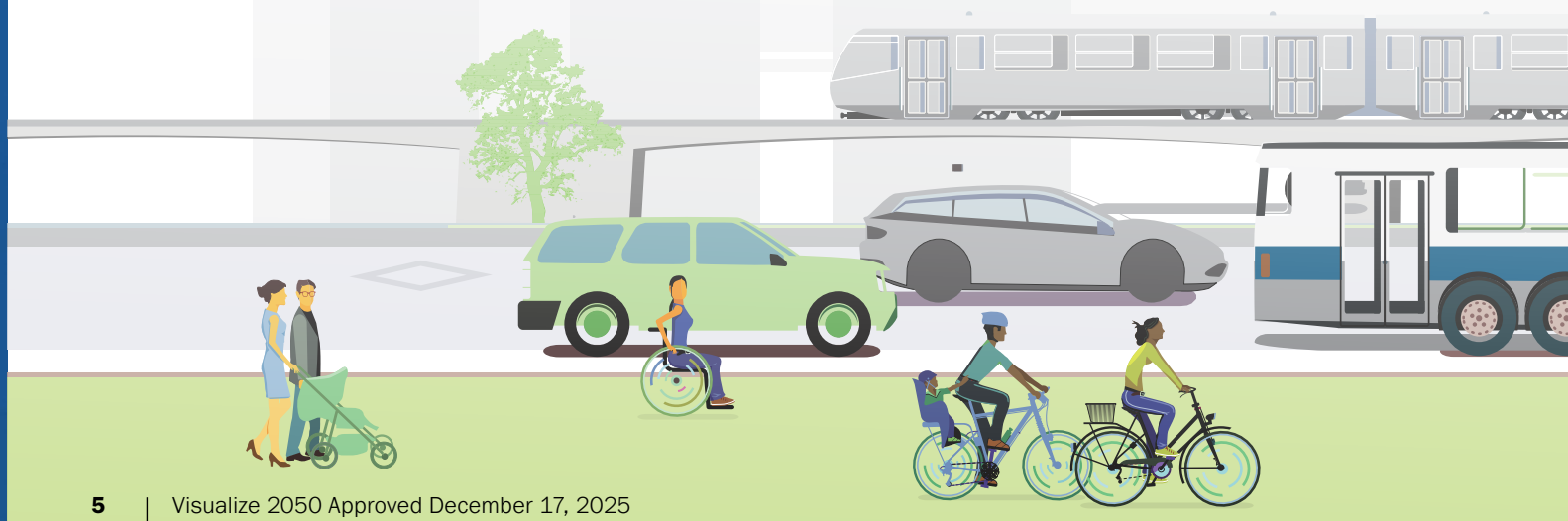
2 System performance analysis of Visualize 2050, 2025 simulation, which made use of the Gen2/Ver. 2.4.6 Travel Model and the Round 10 Cooperative Forecasts of land activity.

3 See, for example, Jane Posey, "Air Quality Conformity Analysis of the 2022 Update to Visualize 2045, Full Report" (Washington, D.C.: National Capital Region Transportation Planning Board, Metropolitan Washington Council of Governments, June 15, 2022), 13, **https://visualize2045.org/plan-update/approved-2022-plan**

## WITHIN ITS BOUNDARIES, THE NATIONAL CAPITAL REGION IS CURRENTLY SERVED BY:

- More than 17,000 lane miles of highways and major roads including:
  - 39 lane miles of High-Occupancy Vehicle (HOV) for vehicles with 2+ people
  - 255 lane miles of roadways with High-Occupancy Toll (HOT), dynamically priced express lanes to ensure a minimum travel speed with free use for carpool with 3 or more people and publicly operated transit vehicles
  - 296 lane miles of toll roads
- Three intra-regional rail systems
  - 1 urban heavy rail (Metrorail)
  - 2 commuter rails (MARC and VRE)
- 15 intercity bus providers and 34 intercity bus stations
- 318 miles of High-Capacity Transit (HCT)[4]
  - 129 miles of Metrorail
  - 173 miles of commuter rail
  - 14 miles of bus rapid transit
  - 2 miles of streetcar
- 172 HCT transit stations
  - 98 Metrorail stations
  - 38 commuter rail stations
  - 28 bus rapid transit stations
  - 8 streetcar stations
- 15 local and 3 commuter bus system providers
- 11 paratransit providers
- 100+ specialized transit service providers
- One intercity passenger rail provider, Amtrak, and 10 intercity rail stations
- Two Class I railroads—CSX Transportation and the Norfolk Southern Corporation transporting freight over 250+ miles of mainline track
- 800+ miles of off-street paved trails and paths for walking and biking
- 400+ miles of bike lanes
- Eight micromobility (bikes/scooters) providers
- 1,586 electric vehicle (EV) charging stations and 4,276 EV plugs
- One water taxi provider
- Three major airports with extensive domestic and international connections, Baltimore/Washington International Thurgood Marshall Airport (BWI), Ronald Reagan Washington National Airport (DCA), and Washington Dulles International Airport (IAD)

4 HCT, also known as fixed-guideway transit, is defined as Metrorail, commuter rail, light rail, streetcar, and bus rapid transit (BRT). Distances are centerline miles, not route miles.



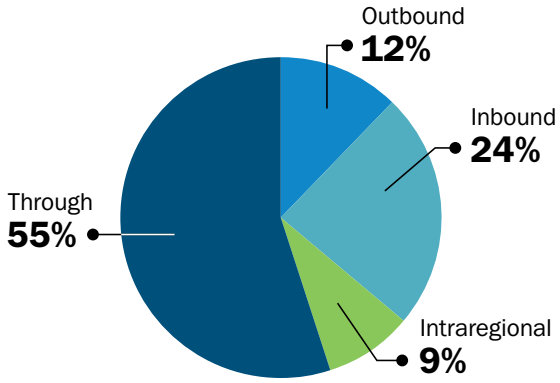
## Roadways

A long history of transportation and land development policies and decisions since the region's inception have produced an extensive regional roadway network with over 17,000 lane miles of highways and major roads, more than 550 of which are tolled lanes. This network now accommodates about 81 percent of the more than 18 million trips across the region, including single-occupant and high-occupancy vehicle trips.[5] It also serves vital freight movement, via trucks. Many roadways include space for additional purposes including transit stops, bicycling, delivery services, and on-street parking.

Each year hundreds of millions of tons of freight valued in billions of dollars move across the region's roadways, contributing to the economic vitality of the National Capital Region. By value, more than 50 percent of freight on the region's roads is simply passing through, while twice as much freight travels into the region than travels out. Only 9 percent of freight moves solely within the region.[6]

Nearly every physical thing—food, clothing, medicine, furniture, and more—has been transported by truck on the region's key corridors at some point before reaching local stores and residences. Over 160 million tons of goods each year are moved along these roadways. With the rise of e-commerce, more people are choosing home delivery, driving even greater demand for small-scale freight transportation, such as cargo vans.

**Figure 2.1:** Value of Freight by Direction

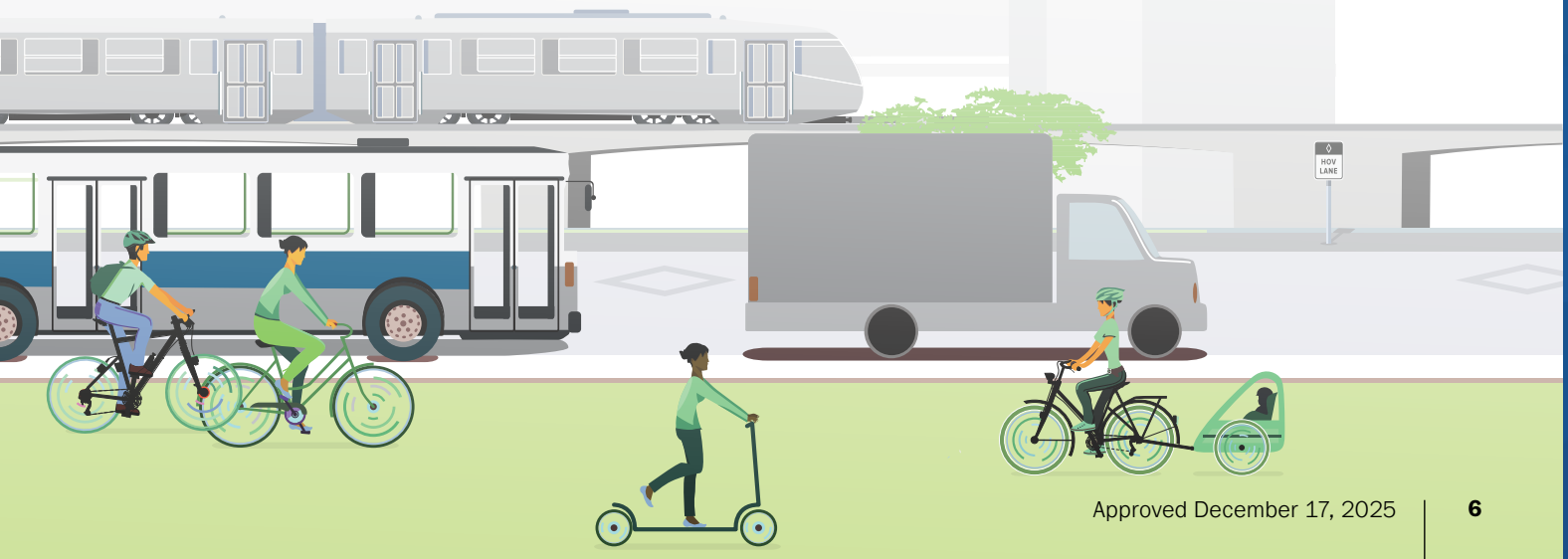



Today, automobile travel is frequently selected by many people in the region for most, if not all, daily vehicle trips. On an average weekday, residents travel approximately 97 million vehicle miles, where 41 percent of trips are single occupancy and 40 percent of trips are carpool (2 or more people per vehicle).[7]

5 Air quality conformity analysis of Visualize 2050, using the Gen2/Ver. 2.4.6 Travel Model and the Round 10 Cooperative Forecasts of land activity.

6 National Capital Region Transportation Planning Board. (2023) *2023 National Capital Region Freight Plan Update*. **https://www.mwcog.org/documents/2023/07/19/national-capital-region-freight-plan-freight/#:~:text=The%20draft%202023%20Update%20to,by%20the%20TPB%20in%202016**

7 Air quality conformity analysis of Visualize 2050, using the Gen2/Ver. 2.4.6 Travel Model and the Round 10 Cooperative Forecasts of land activity.



To keep the roadways usable, routine maintenance is needed and accounts for a large share of state department of transportation (DOT) budgets. Some parts of the region continue to experience new roadway construction or extensions, typically in combination with accommodations for other modes, as local neighborhood plans are fulfilled. Other roadways undergo retrofitting to enhance safety, expand mode choices, and optimize traffic engineering functions to meet the needs of today.


Maryland Department of Transportation/Flickr

Prior to the COVID-19 pandemic, weekday vehicle miles traveled (VMT) per capita was increasing at a slower rate than the increase in the region's population; however, VMT significantly decreased at the onset of the pandemic in early 2020. Since 2021, there has been a rebound in VMT levels. With these VMT increases, planners continue to reassess how vehicle lanes can safely and efficiently accommodate travelers using various modes within limited rights-of-way.

Alongside personal automobile travel, rideshare, taxi, and ridehail services like Uber and Lyft provide an option for people to share rides or use a vehicle as needed rather than invest in a vehicle. While only one percent of all weekday trips in the National Capital Region are by taxi and ridehailing, these shared trips comprise three percent of all weekday trips in the regional core of District of Columbia, Arlington County, and the City of Alexandria.[8]

## Railways

The National Capital Region is uniquely positioned along the East Coast north-south and east-west freight rail corridors. Two Class I freight railroad companies, CSX and Norfolk Southern (NS), operate within the region along 250 miles of mainline track that carry over 6.7 million tons of local freight by rail each year, leading them to be key freight transportation providers in the region.[9]

Local, commuter, and passenger rail services play a critical role in providing affordable transportation options within and through the region. Rail transportation supports economic vitality, provides high-quality alternatives to driving, builds communities, and reduces harmful environmental impacts. The region's 318-mile system of high-capacity rail transit is one of the busiest in the country, ranking third in average unlinked rail transit trips.[10] Together, the Washington Metropolitan Area Transit Authority (WMATA) Metrorail, Maryland Area Regional Commuter (MARC), and Virginia Railway Express (VRE) moved 492,000 people on an average weekday in 2023 (compared to 650,000 pre-pandemic in 2019) and accounted for about 49 percent of all intra-regional transit trips.[11]

8 National Capital Region Transportation Planning Board (April 22, 2022) *Regional Travel Survey In-Depth Analysis*. **https://www.mwcog.org/documents/2022/04/22/regional-travel-survey-in-depth-analysis-featured-publications-regional-travel-survey/**

9 Federal Highway Administration. (2020) *Freight Analysis Framework*. **https://ops.fhwa.dot.gov/freight/freight_analysis/faf/**

10 American Public Transportation Association (2023). *Fourth Quarter 2023 Ridership Report*. **https://www.apta.com/wp-content/uploads/2023-Q4-Ridership-APTA-Update-1.pdf**

11 National Capital Region Transportation Planning Board staff collection and analysis of weekday ridership estimates reported by the region's transit operators. Ridership from 2019 is reported due to incomplete 2020 ridership data. 2023 average weekday ridership data comes from information reported to APTA. See 2023 annual ridership data is calculated using monthly ridership information sourced from the April 2024 NTD Monthly Ridership Time Series. See **https://www.transit.dot.gov/ntd/data-product/monthly-module-adjusted-data-release**


Cristina Finch/COG

Additionally, Amtrak connects people from the National Capital Region directly to places as far north as St. Albans, Vermont, and Boston, as far west as Chicago and as far south as New Orleans and Miami.

Metrorail ridership peaked in 2009 and remained stable through the early 2010s.[12] However, since 2015, ridership has declined, following national travel trends. The decline worsened due to COVID-19, with Metrorail ridership dropping from 229 million trips in 2019 to just 36.6 million in 2021. Commuter rail saw a similar decline, falling from 13.6 million in 2019 to 1.2 million in 2021.[13] Fortunately, ridership began to recover in 2022. By 2023, Metrorail reached over 144 million trips, and the commuter rail system recorded 5.2 million trips.[14]

An increase in residential and commercial density around many regional railway stations is yielding higher rail ridership. Throughout the rail network,

Adam Fagen/Flickr

underutilized properties near stations present opportunities for infill development, allowing for more vibrant communities to be built and for more people to take advantage of the region's valuable rail resources.

12 Unless otherwise noted, public transit ridership data comes from the following source: National Capital Region Transportation Planning Board. (2023) *2023 State of Public Transportation Report*. **https://www.mwcog.org/committees/regional-public-transportation-subcommittee/**

13 National Capital Region Transportation Planning Board. (2023) *2023 State of Public Transportation Report*. **https://www.mwcog.org/committees/regional-public-transportation-subcommittee/**

14 April 2024 NTD Monthly Ridership Time Series. See **https://www.transit.dot.gov/ntd/data-product/monthly-module-adjusted-data-release**

## Bus Transit

The region boasts an extensive bus transit network providing mobility and connectivity to communities operated by 15 agencies. In 2023, 12 of these agencies facilitated over 450,000 local and commuter bus trips each weekday.[15] While these trips represent unlinked trips only, or vehicle boardings, many travelers combine multiple modes of transportation in a series of linked trips—often connecting to rail services—in a series of linked trips to reach their destinations.

Pierre Gaunaurd/COG


Elvert Barnes/Flickr

According to 2023 data from the National Transit Database (NTD), approximately 52 percent (141 million) of unlinked passenger trips in the region were by bus, making it the primary form of public transportation.[16] In 2023, of the 9.6 percent of commuters that used public transportation, approximately 35 percent rode bus transit per Census Bureau estimates.[17] Metrobus, operated by WMATA, accounted for 74 percent of bus ridership in the region, followed by 10 percent of riders using Ride On in Montgomery County.[18] Although the COVID-19 pandemic significantly impacted bus ridership, every agency has reported an increase in ridership since 2021.[19]

Community members with disabilities and other special needs are served by 11 paratransit services and over 100 other specialized transportation providers, offering on-demand and shuttle rides to complement fixed-route public transit. These paratransit services provide flexible mobility for any trip purpose. The largest of these is WMATA's MetroAccess, a shared-ride, door-to-door service designed to ensure accessibility and convenience for its passengers.

15 National Capital Region Transportation Planning Board staff analysis of average weekday unlinked passenger trips reported in the National Transit Database's Agency Profiles (2023). This does not include ridership data from DC Circulator, RTA of Central Maryland, VRT, or MTA. **https://www.transit.dot.gov/ntd/transit-agency-profiles**

16 National Capital Region Transportation Planning Board staff analysis of unlinked passenger trips reported in the National Transit Database's Agency Profiles (2023). This does not include ridership data from DC Circulator, RTA of Central Maryland, VRT, or MTA. **https://www.transit.dot.gov/ntd/transit-agency-profiles**

17 U.S. Census Bureau. (2023) *2023 American Community Survey 1-Year Estimates, Table B08301, Washington –Arlington, DC–VA–MD Urban Area* (2020). **https://data.census.gov/table/ACSDT1Y2023.B08301?g=400XX00US92242**

18 National Capital Region Transportation Planning Board staff analysis of unlinked passenger trips reported in the National Transit Database's Agency Profiles (2023). This does not include ridership data from DC Circulator, RTA of Central Maryland, VRT, or MTA. **https://www.transit.dot.gov/ntd/transit-agency-profiles**

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The region also benefits from 64 commuter bus routes operated by MTA Commuter Buses, Ride On, Fairfax Connector, OmniRide, and Loudoun County Transit. These services provide vital connections from communities such as Frederick, Maryland; Dale City, Virginia; and Leesburg, Virginia—as well as counties beyond the National Capital Region—to major employment centers including the Pentagon, Foggy Bottom, and Capitol Hill. High Occupancy Vehicle (HOV) lanes in Maryland, such as those on I-270 and U.S. 50, enhance the reliability of Ride On and MTA commuter bus routes.

On each weekday in Virginia, the I-495/395/95 Express Lanes carry approximately 1,200 bus trips, while the I-66 express lanes outside of the Beltway handle an average of 1,400 weekday bus trips.[20] The express lanes provide more reliable transit travel times, giving people a reliable alternative to personal vehicle trips.

Intercity buses operated by private providers, including Greyhound, Megabus, Peter Pan, and others connect the National Capital Region as far north as Boston, as far west as Chicago, and as far south as Miami. These buses serve thousands of trips daily operating from intercity stations or stops across the region.

## Pedestrians

Walking is one of the most fundamental and widely used forms of transportation. Standard practices have evolved over the last few decades, and transportation investments now routinely include pedestrian accommodations for people to reach their destinations with ease.

**NOTE**: The terms “pedestrian” and “walking” in Visualize 2050 refer to people traveling by foot, using a wheelchair, a stroller, or similar mobility.

M.V. Jantzen/Flickr

The region values healthy, pedestrian-oriented, Americans with Disabilities Act (ADA)-accessible community design. Most local governments have adopted Complete Streets policies and routinely build sidewalks and related pedestrian accommodations with new developments and roads. The region is growing its network of off-road ADA-accessible multimodal trails, including the National Capital Trail Network, which featured 752 miles of trails as of 2023, which is almost 50 percent of the desired 1,549-mile network.[21]

Regionally, pedestrian transportation is concentrated in or around Regional Activity Centers (RACs)—locations identified in local government plans targeted for future household and employment growth. The density of people working and living near their destinations or in mixed-use areas naturally facilitates walking due to short distances and travel times. Where trip time and distance, in addition to other factors, lends itself to walking, people throughout the region choose to walk above using other modes. While pedestrian network enhancements continue to improve travel safety and ADA-accessibility, in general, people can walk to nearby places, if desired. As of 2019, about 3.3 percent of work trips in the region were pedestrian

20 Virginia Department of Transportation. (May 07, 2024) *I-495 Southside Express Lanes Project Response Letter to TPB Chair Christina Henderson and the Transportation Planning Board*.

21 National Capital Region Transportation Planning Board. (2023) *National Capital Trail Network 2023 Update, Progress Toward Completion*. **https://national-capital-trail-network-mwcog.hub.arcgis.com/**

trips.[22] Walking is fundamental to multimodal activity, and pedestrians who utilize another mode can accomplish longer distance trips more quickly.

## Bicyclists & Micromobility

The region is a national leader in bicycle-friendly community design. Many community members choose to bike or use micromobility options for their commutes and daily trips, not only for convenience, but also for health and enjoyment. Among major U.S. cities, the District of Columbia ranks third in the percentage of bicycle commuters, with 3.3 percent of residents regularly biking to work—testament to the District's efforts to making biking a viable option for everyday travel.[23]


Mike Maguire/Flickr

Much of the increase in the share of bicycle trips over the last decade can be credited to continuous investment in bicycle infrastructure, as Complete Streets policies have been implemented in various forms across the region. Today, over 800 miles of bike paths and over 400 miles of bike lanes provide community members with convenient opportunities to choose cycling and micromobility options. Projects that convert vehicle lanes into bike lanes or build segments of the envisioned National Capital Trail Network are knitting neighborhoods across the region together with an integrated bicycle network.

Elvert Barnes/Flickr

The region's shared micromobility bicycle and scooter programs continue to be well used. Capital Bikeshare is the largest shared micromobility provider in the region. Since its inception in 2010 as one of the nation's first systems of its kind, Capital Bikeshare has grown from 1,100 bikes at 114 stations in the District of Columbia and Arlington County, to over 7,000 bikes at 770+ stations in eight jurisdictions today.[24]

Capital Bikeshare ridership has recovered and grown since the pandemic. At 4.4 million trips, 2023 was Capital Bikeshare's best year since inception.[25] The program introduced electronic bikes in 2018, providing travelers with a faster, less strenuous alternative to traditional bikes. Capital Bikeshare docks are conveniently located near most Metrorail stations, with nearly every station in DC, Arlington County, and the City of Alexandria having one within walking distance. In Fairfax, Montgomery, and Prince George's counties, most Metrorail stations are located within walking distance of a Capital Bikeshare station.

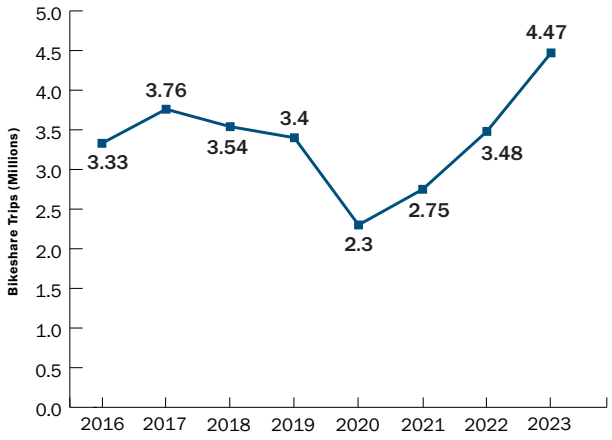
22 U.S. Census Bureau. (2020) *American Community Survey, 2015-2019 American Community Survey*. **https://www.census.gov/newsroom/press-kits/2020/acs-5-year.html**

23 Bike League. (2022) *Rates of Biking and Walking Benchmarking Report*. **https://data.bikeleague.org/data/cities-rates-of-active-commuting/**

24 Capital Bikeshare. (2024) *Capital Bikeshare DC*. **https://capitalbikeshare.com/**

25 National Capital Region Transportation Planning Board. (2024) *Dockless Bike and Scooter Share – Transportation – Events*. **https://www.mwcog.org/events/2024/06/03/dockless-bike-and-scooter-share-workshop-bicycling-bikesharing-complete-streets-walking/**

**Figure 2.2:**
Total Annual Capital Bikeshare Trips




Privately operated dockless e-scooter and e-bike services, offered by companies such as Lime, Lyft, Spin, and Veo, are also available in the District of Columbia, Arlington County, Alexandria, and the University of Maryland/College Park. These services see ridership levels comparable to Capital Bikeshare in these areas. DC leads with 12,000 e-scooters and 6,000 e-bikes in operation, followed by Arlington County with 1,800 e-scooters and 350 e-bikes, and Alexandria with 1,200 e-scooters and 100 e-bikes. With a larger fleet of vehicles, dockless micromobility accounts for the most shared micromobility trips in the region. The trips tend to be short—averaging 1.3 miles per trip for bikes and 0.9 miles for scooters.[26] These trends highlight the strength and continued growth of bicycle and micromobility transportation in the region.

## Transportation Demand Management

Transportation Demand Management (TDM) promotes alternatives to solo driving to reduce traffic congestion and improve air quality. In the National Capital Region, the Commuter Connections program provides a range of commuter services, including ridesharing assistance, the Guaranteed Ride Home (GRH) program, and various commuter incentive programs that encourage carpooling, vanpooling, transit use, and active transportation. Among these services, SmarTrip transit benefits and transit/vanpool subsidies are the most widely used.[27] Additionally, collaboration with a regional network of 26 agencies has significantly reduced daily vehicle trips by nearly 100,000 and associated vehicle miles traveled (see Table 2.1).[28]

50 YEARS 1974-2024 COMMUTER CONNECTIONS
A SMARTER WAY TO WORK
commuterconnections.org

**Table 2.1:** Commuter Connections Program Daily Impacts 2020–2023

| Measure | Reduction |
|---|---|
| Vehicle Trips | 99,790 |
| Vehicle Miles of Travel | 1,855,412 |

The HOT and HOV travel networks in the region have also been effective in providing travelers with transit and carpooling alternatives and benefits. The Northern Virginia Transportation Commission's Commuter

26 National Capital Region Transportation Planning Board. (2023) *National Capital Trail Network 2023 Update, Progress Toward Completion*. **https://national-capital-trail-network-mwcog.hub.arcgis.com/**

27 National Capital Region Transportation Planning Board. (August 14, 2023) *2022 State of the Commute Survey Report*. **https://www.mwcog.org/documents/2023/08/14/state-of-the-commute-survey-report--carsharing-state-of-the-commute-telework-travel-surveys/**

28 Metropolitan Washington Council of Governments. FY 2021-2023 Commuter Connections Transportation Demand Management (TDM) Analysis Report. **https://www.mwcog.org/documents/2023/11/21/commuter-connections-transportation-demand-management-tdm-analysis-report-carsharing-commuter-connections-commuting/**

Choice program has invested $108 million from Virginia's express toll lane revenues in public transit and other transportation projects since 2017.[29]

Employer-provided commute services play a crucial role in encouraging employees to choose alternative transportation options over driving alone. Employees with access to free parking are more likely to drive alone, whereas those without free parking are more inclined to use various alternative modes. This is especially true for transit use. According to the 2022 State of the Commute survey, transit mode share among respondents without free parking was 18 percent when no commute benefits or services were offered—but increased to 36 percent when such benefits were available.[30]


Joshua Roberts, International Monetary Fund/Flickr

The COVID-19 pandemic significantly impacted the use of TDM strategies in the region. By 2022, 66 percent of regional commuters were teleworking at least occasionally—nearly double the 35 percent reported in 2019. Meanwhile, transit mode share declined across all geographic and demographic groups for commuting.[31] As the region continues to recover from the pandemic, more employers have implemented policies for in-office work requiring employees to commute for some or all workdays resulting in a mix of benefits and burdens personally and regionwide. Throughout the transitions, TDM strategies have continued to deliver positive benefits, helping to support more transportation options and reduce congestion.

## Surface Connections to Airports

Three major commercial airports—Baltimore/Washington International Thurgood Marshall (BWI), Ronald Reagan Washington National (DCA), and Washington Dulles International (IAD)—serve the region and, as shown in Figure 2.3, together handled more passengers in 2023 than pre-pandemic with over 38 million annual passenger boardings, distributed nearly evenly among them.[32]

Rachel Beyerle/COG

29 Northern Virginia Transportation Commission (NVTC). (2023) *Commuter Choice 2023 Annual Report*. **https://novatransit.org/uploads/Projects/CommuterChoice/CCReport2023.pdf**

30 Footnote 28 National Capital Region Transportation Planning Board. (August 14, 2023) *2022 State of the Commute Survey Report*. **https://www.mwcog.org/documents/2023/08/14/state-of-the-commute-survey-report—carsharing-state-of-the-commute-telework-travel-surveys/**

31 Footnote 28 National Capital Region Transportation Planning Board. (August 14, 2023) *2022 State of the Commute Survey Report*. **https://www.mwcog.org/documents/2023/08/14/state-of-the-commute-survey-report—carsharing-state-of-the-commute-telework-travel-surveys/**

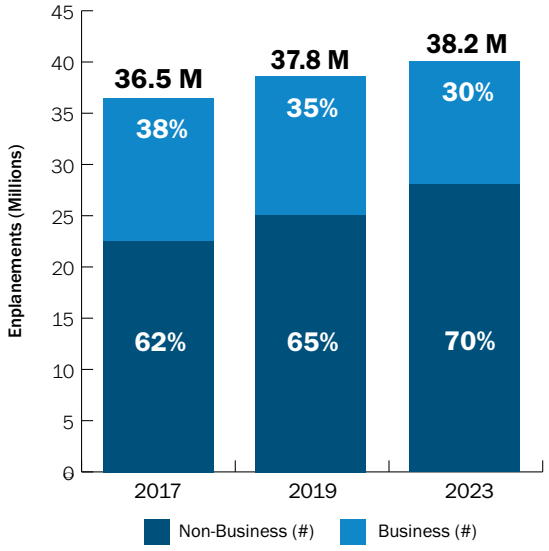
32 Total enplanement data for DCA and IAD come from the Metropolitan Washington Airports Authority (MWAA) and total enplanement data for BWI comes from the Maryland Aviation Administration.

In 2023, most air travelers began their trips from private residences (61 percent) or hotels and motels (31 percent).[33]

In 2023, private cars remained the most common mode of ground access to airports in the region, accounting for 45 percent of trips. However, there was a notable difference in usage between home and non-home locations, with 55 percent of trips from home originating by private car, compared to just 11 percent from non-home locations. The use of ridehail or transportation network companies (TNCs) like Uber and Lyft to reach the airports has steadily increased, rising from 14 percent in 2017 to 26 percent in 2023 as a percentage of airport ground access trips. Among passengers traveling from non-home locations to the airport, 37 percent used TNCs, while 28 percent of home-origin trips used TNCs. TNC usage has grown at all three major airports, while taxi use has steadily declined, particularly since 2019.

Between 2017 and 2023, the share of airport ground access trips made by passengers on non-business travel rose from 62 percent to 70 percent, while the share of trips by passengers on business travel declined from 38 percent to 30 percent.[34] These trends, as illustrated in Figure 2.3, could be partly attributed to the impacts of COVID-19, which allowed more business activities to be conducted remotely. The increase in leisure travel may also reflect more improved financial conditions for many individuals and a heightened desire to travel in the post-pandemic era.

**Figure 2.3:** Air Travel Trips




The share of passengers using transit to access airports remained largely stable from 2019 to 2023, with no change at BWI (4 percent), a slight decrease at DCA (13 to 12 percent), and an increase at IAD (3 to 5 percent). DCA has long been served by Metrorail, while the 2022 opening of the Silver Line added service to IAD likely leading to the increase in transit use at that airport. BWI is directly accessible from the National Capital Region on rail via MARC and Amtrak.

## Pipelines

Pipeline networks support the movement of freight travel, particularly natural resources and commodities in the energy sector, due to their efficiency and cost effectiveness. By using pipelines, the demand for space on interstate highways and rail systems is reduced, easing congestion and allowing for more efficient use of other transportation modes.

33 Unless otherwise noted, air travel data comes from the following source: National Capital Region Transportation Planning. (2023) *2023 Washington Baltimore Regional Air Passenger Survey*. **https://www.mwcog.org/transportation/planning-areas/airports/casp-elements/air-passengers/**

34 National Capital Region Transportation Planning. (2023) *2023 Washington Baltimore Regional Air Passenger Survey*. **https://www.mwcog.org/transportation/planning-areas/airports/casp-elements/air-passengers/**

The Colonial and Plantation pipelines serve the National Capital Region and are part of the network of petroleum, natural gas, offshore well, and product pipelines that carry more than 48 million tons of freight annually, making pipelines the second-most used freight mode in the region by weight after truck freight.[35] Compared to the proportion of freight movement nationally, the region's nearly 22 percent of total freight moved by pipeline is greater.[36] The reliable movement of fuel through these pipelines directly impacts the ability of individuals to consistently access fuel for motor vehicles.


Cory Hancock, International Monetary Fund/Flickr

## Waterways

The Potomac River is a scenic, navigable waterway in the region, though only a limited number of commodities, either by weight or value, are transported by water. Typically, goods that are less time-sensitive or difficult to move by land are transported along the Potomac River. The Port of Baltimore and the Port of Virginia, the region's closest major ports, are outside the TPB's freight analysis framework.[37]

In addition to freight, the Potomac River is home to passenger water vessels. The Potomac Water Taxi operates from March to December, providing transportation options for travelers between The Wharf and Georgetown in the District of Columbia, Alexandria City Marina in Virginia, and National Harbor in Maryland. In 2023, more than 15,000 trips were made up and down the Potomac River between these destinations, carrying over 260,000 passengers with the most popular routes those carrying passengers to and from Alexandria to destinations in Maryland and District of Columbia.

Emma K Alexandra/Flickr

35 Federal Highway Administration. (2020) *Freight Analysis Framework*. **https://ops.fhwa.dot.gov/freight/freight_analysis/faf/**

36 Air quality conformity analysis of Visualize 2050, using the Gen2/Ver. 2.4.6 Travel Model and the Round 10 Cooperative Forecasts of land activity. National Capital Region Transportation Planning Board. (2023) *2023 National Capital Region Freight Plan Update*. **https://www.mwcog.org/documents/2023/07/19/national-capital-region-freight-plan-freight/#:~:text=The%20draft%202023%20Update%20to,by%20the%20TPB%20in%202016**

37 Staff analysis of 2023 City Cruise Potomac Water Taxi passenger count data.

# Chapter 3:
# Current Transportation System Performance

The National Capital Region has an extensive, multimodal transportation network with new components continuously being added to improve system performance. Despite these advancements, people experience challenges when moving throughout the region. Challenges create barriers to achieving shared regional goals, but they also show planners and decision-makers where to focus and prioritize collective improvement efforts and limited resources.

Regional transportation challenges include multimodal accessibility of destinations, congestion's effect on roadway and transit travel time reliability, safety while navigating the transportation system, infrastructure and equipment maintenance, and managing transportation system operations efficiently. These challenges, particularly for public transportation, walking, and bicycling, have rendered travel by personal automobile the most used means of navigating the region, effectively limiting alternatives for both residents and visitors. The TPB works to address these challenges by both building upon the existing foundation and creating opportunities to make changes to the system in an effective, efficient, and sustainable manner.

The TPB has adopted a set of goals to guide its work on addressing the region's transportation challenges. The TPB is also guided by federally required or regionally developed targets related to transportation and other sectors such as land use, environment, and economy. The TPB tracks the system's performance using a set of measures to assess progress towards these adopted goals and targets. This chapter reports on the performance of the current transportation system and the extent to which TPB is meeting its goals and targets. The findings allow the region to reflect on past transportation investments and policies, as well as a few non-transportation strategies (e.g., land use), and identify changes to the approaches to help the region address the remaining challenges in a manner that will sustain and enhance the system into the future. Chapter 5 presents planned investments to improve current conditions, and Chapter 7 identifies key challenges beyond what this plan can accomplish.

**NOTE**: As one reviews this chapter, 2022 represents a period in the region when the travel and commute patterns were beginning to readjust after the massive disruption to travel caused by the 2020 COVID-19 pandemic. The pattern of travel prior to the pandemic was disrupted and has yet to be re-established. As available at the time of this writing, observed data is provided in this chapter; where observed data is not available, modeled data is provided for the base year, 2025.

## Access

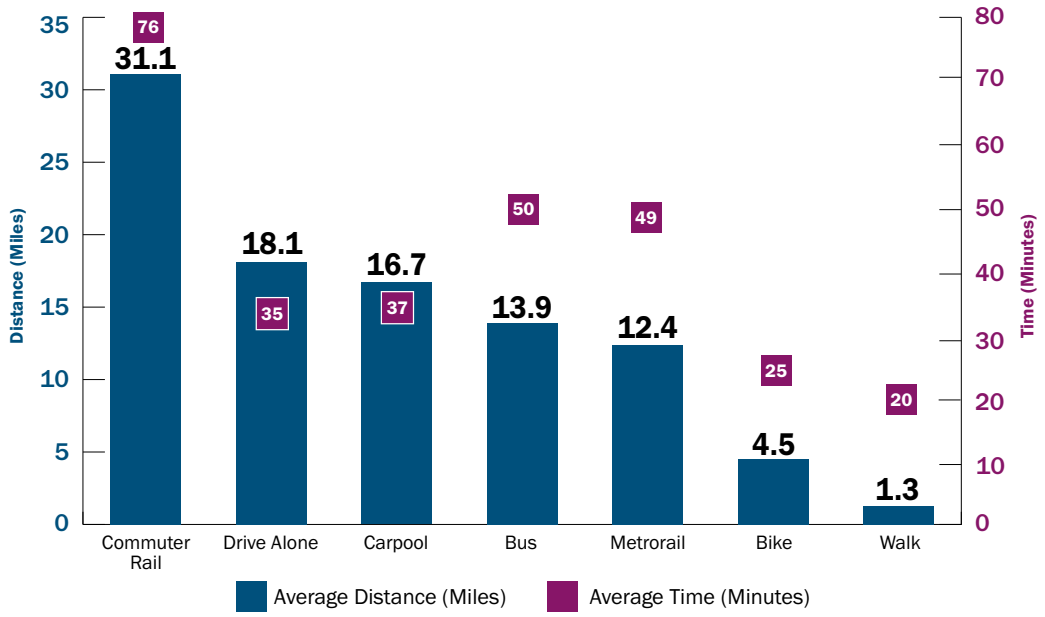
Accessibility to destinations is a fundamental need shared by everyone and is often measured by the ease with which a person can access various destinations by one or more modes of travel, such as auto or transit, during a defined period. Whether the purpose of the trip is to get to work, meet family and friends, or interact with services, there are plenty of reasons people need to travel, and the region's transportation system offers many options, though there is still room to improve destination accessibility.

**NOTE**: When referenced in this section, the accessibility analysis uses travel time information from the TPB's Regional Travel Demand Forecasting Model (TDFM), the Gen2/Ver. 2.4.6 Travel Model, and land use information comes from the COG Cooperative Forecasts (Round 10.0).

Many people travel to work, and much of this travel occurs in the A.M. and P.M. peak periods. The TPB's 2022 State of the Commute Survey identified average commute distance and commute times by primary mode as shown in Figure 3.1.[1]

1 Metropolitan Washington Council of Governments (August 14, 2023). *2022 State of the Commute Survey Report*. **https://www.mwcog.org/documents/2023/08/14/state-of-the-commute-survey-report--carsharing-state-of-the-commute-telework-travel-surveys/**

**Figure 3.1:** Average Commute Distance and Commute Time by Primary Mode




Commuter rail has the longest average travel distance (31 miles) and average travel time (76 minutes) per commute. The mode of travel with the second longest commutes by distance is Drive Alone while Bus and Metrorail have second longest commutes by time. Travelers generally choose a mode of travel based on travel time, travel cost, or convenience.

## Drivers and Passengers

Most residents in the region use personal motor vehicles as their primary mode of transportation, driving, or sharing rides to reach their daily destinations. Access to jobs by auto varies throughout the region and is influenced by travel conditions and people's proximity to jobs.

According to the current accessibility analysis, in 2025, on average about one million jobs are accessible by auto within 45 minutes for a resident of the region, during the A.M. peak period.[2] The distribution (by traffic analysis zone) of accessibility to jobs by auto is shown in the map, **Current and Future Accessibility to Jobs**.[3]


A vast majority, 92 percent, of the households in the region have one or more motor vehicles available, with 39 percent owning two, 34 percent having one, and 19 percent with three or more vehicles (Figure 3.2).[4] Whether by choice or necessity, eight percent of regional households do not own a vehicle. Within the core, where density and transportation options are among the highest in the region, about one-quarter of households have no vehicle available.[5]

2 System performance analysis of Visualize 2050, 2025 simulation, which made use of the Gen2/Ver. 2.4.6 Travel Model and the Round 10 Cooperative Forecasts of land activity.

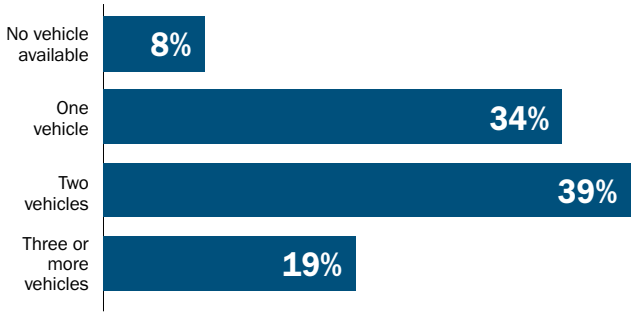
3 TPB (2025). *Visualize 2050: Access to Jobs by Auto (A.M. Peak, 45-Minute Commute)* [Interactive Map]. **www.mwcog.org/V50JobAccessForecastMap**

4 National Capital Region Transportation Planning Board (2019). *2017/18 Regional Travel Survey*. **https://www.mwcog.org/transportation/data-and-tools/household-travel-survey/**

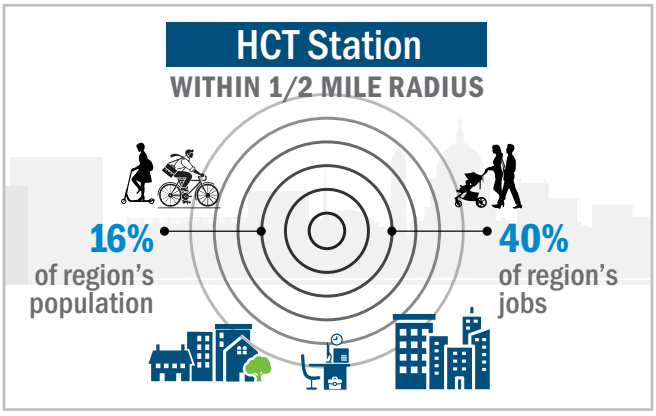
5 National Capital Region Transportation Planning Board (April 22, 2022). *Regional Travel Survey In-Depth Analysis*. **https://www.mwcog.org/documents/2022/04/22/regional-travel-survey-in-depth-analysis-featured-publications-regional-travel-survey/**

The 2023 vehicle registration data indicates there are approximately 4.2 million registered motor vehicles in the region.[6]

**Figure 3.2:** Household Vehicle Ownership in the Region




The choice to travel by auto is affected by many other considerations including vehicle availability, driving ability, convenience, weather, distance, cost, or the number of people or things to transport. The housing location choice, which is also dependent on several factors, affects the travel mode choice. Living further away from multimodal transportation options makes it more challenging to reach opportunities and daily needs without access to a vehicle. Vehicle ownership presents high fixed costs that not everyone can afford. The development and investment legacy has led to a high reliance on personal automobile travel in the inner and outer jurisdictions. The region demonstrates the effectiveness of investing in public transportation and development more conducive to active modes of travel, especially in its core jurisdictions where well-connected multimodal options offer attractive alternatives to personal auto use and ownership.




## Rail and Bus Transit Riders

The region's HCT system is nationally recognized and frequently used by residents, employees, and visitors to access destinations every day.[7] Intercity and commuter rail and bus service—often combined with local transit travel—are available options, though multi-modal transit trips may involve longer wait times and indirect routes, resulting in lengthy trips.

According to the TPB's current accessibility analysis, in 2025, on average about 400,000 jobs are accessible by transit within 45 minutes for a resident of the region during the A.M. peak period, much less than the one million accessible by auto travel with the same travel time. This is because 40 percent of the region's jobs are located within a half mile of HCT transit stations while only 16 percent of the population reside within this area.[8] The varying levels of job accessibility by transit is shown in the map, **Current and Future Accessibility to Jobs**.[9]


Transit service is designed to provide access to many opportunities in the region, which enhances the region's economic competitiveness. For example, low-income households in the region have relatively good access to bus stops, with 74 percent living within a quarter mile of a stop compared to only

6 National Capital Region Transportation Planning Board Technical Committee (October 4, 2024). *Agenda Item 9: Analysis of 2023 Vehicle Registration Data*.

7 HCT, often used synonymously with fixed-guideway transit, is defined as Metrorail, commuter rail, light rail, streetcar, and bus rapid transit (BRT).

8 System performance analysis of Visualize 2050, 2025 simulation, which made use of the Gen2/Ver. 2.4.6 Travel Model and the Round 10 Cooperative Forecasts of land activity.

9 TPB (2025). *Visualize 2050: Access to Jobs by Transit (A.M. Peak, 45-Minute Commute)* [Interactive Map]. **http://www.mwcog.org/V50JobAccessForecastMap**


Pierre Gaunaurd/COG

**Low-income households have better access to bus stops and transit service with a 15-minute or better frequency compared to the whole region.**

60 percent of the region overall. Additionally, 31 percent of low-income households have access to transit service with a 15-minute or better frequency during the morning peak period, compared to only 21 percent for the whole region. Low-Income household transit access on the weekend, defined as midday Saturdays with thirty-minute service, is 46 percent compared to 32 percent for the whole region.[10]

The travel needs of people with disabilities are often served with paratransit or on-demand services. This form of public transportation often provides door-to-door service from origin to destination, making transit a more viable option by connecting all parts of the trip. Curbside management and optimized ADA design features improve connections at transit stops. WMATA's MetroAccess is the largest paratransit operator but many of the local bus systems in the region provide this service as well. Additionally, there are several public serving non-profit organizations that provide such a service including those that are supported by funding from the TPB's Enhancement Mobility program. The full list of specialized service providers is included in the ***List of Stations, Systems, and Providers (2023)*** available on the Visualize 2050 website.


Challenges with transit in the region do exist, a survey conducted during the DMV*Moves* Initiative identified distance to and from transit stops and service frequency as top challenges when using rail transit. For bus transit riders, service frequency is identified as a bigger challenge in the core and inner suburbs whereas distance to and from stops is a bigger challenge for people in outer suburbs.[11] The variety of transit providers, fare systems, and travel modes can also make it difficult for visitors and residents to navigate transfers and estimate total trip costs. The DMV*Moves* Initiative aims to improve fare integration, traveler information, and the overall user experience across the region.

## Pedestrians

An interconnected network of sidewalks, shared-use paths, and trails allows residents to travel short distances without the need for a car, transit trip, or bicycle. In urban areas and many of the Regional Activity Centers (RACs), pedestrian facilities and low traffic speeds support walking. According to the 2017-2018 Regional Travel Survey, the District of Columbia, Arlington County, and City of Alexandria boast walk shares ranging from 17 to 33 percent. In the region's inner suburban jurisdictions, where most of the region's travel originates, 6 to 9 percent of all trips are made by foot, primarily concentrated in

10 National Capital Region Transportation Planning Board (October 19, 2022). *Agenda Item 9: Bus Transit Service Equity Study.* **https://www.mwcog.org/events/2022/10/19/transportation-planning-board/**

11 DMV*Moves* Initiative (October 2024). DMV*Moves Survey*. **https://dmvmoves.org/wp-content/uploads/2024/12/DMVMoves_SurveyReport_FullDeck_Oct-16.pdf**

areas with well-integrated pedestrian infrastructure such as RACs and job centers.

**To improve access to transit throughout the region, the TPB adopted Resolution R4-2021 approving a list of 49 Transit Access Focus Areas (TAFAs). The TAFAs include transit stations that have the greatest potential for increasing ridership through improved pedestrian access.**

**(National Capital Region Transportation Planning Board (July 22, 2020). Agenda Item 10 – Action: Approval of Regional List of Transit Access Focus Areas. https://www.mwcog.org/events/2020/7/22/transportation-planning-board/)**

The National Capital Trail Network, discussed in Chapter 2, provides a regional off-street system that makes walking a safe and accessible option, particularly for residents who live within proximity to the network. Approximately 63 percent of residents and 72 percent of jobs are within a half mile from the existing portions of the network.[12] Additionally, 125 of the region's 145 RACs are located within this same distance of the existing trail network, further enhancing connectivity and access to key destinations.[13] Wide street crossings, long distances to destinations, unmet mobility accommodations, high-speed roadways, and aggressive or speeding drivers are some of the many barriers to walking for community members.

## Bicyclists & Micromobility

Throughout the region, there are dense networks of on-street bicycle facilities and shared micromobility fleets (bicycles and scooters) connecting housing and jobs. RACs are places more likely to have access to a variety of bicycle facility types including shared-use paths, buffered and protected bike lanes, cycle tracks, protected intersections, and exclusive bus/bicycle lanes. Shared micromobility fleets and facilities play a significant role in serving shorter trips within the core jurisdictions of DC, Arlington, and Alexandria including Capital Bikeshare (traditional and e-bikes), dockless scooters, and dockless e-bikes.

Shared micromobility ridership has been growing rapidly. Capital Bikeshare had a record 6,097,896 trips in 2024, while private dockless e-bike and e-scooter systems had over one million riders in the month of July.[14]

Neighborhoods around downtown DC within easy biking/micromobility distance to many employment opportunities have the highest bike mode share in the region, with bike commute rates ranging from 10 to 15 percent.[15] Census tracts adjacent to existing

BeyondDC/Flickr

12 Staff analysis of National Capital Region Transportation Planning Board (February 21, 2024). *Agenda Item 8: National Capital Trail Network Update Approval*. **https://www.mwcog.org/events/2024/2/21/transportation-planning-board/** (May 16, 2025). See here for mapping resource: **https://national-capital-trail-network-mwcog.hub.arcgis.com/**

13 Staff analysis of source in footnote 12 (National Capital Trail Network Update) and Metropolitan Washington Council of Governments (May 14, 2025). *RACs Maps*. **https://www.mwcog.org/documents/2025/05/14/regional-activity-centers-maps-activity-centers-land-use-region-forward/** (May 28, 2025).

14 National Capital Region Transportation Planning Board (June 30, 2025). *Dockless Micromobility Workshop Agenda Item 2: DDOT Dockless Micromobility and Capital Bikeshare*. **https://www.mwcog.org/events/2026/6/30/dockless-micromobility-workhsop/**

15 National Capital Region Transportation Planning Board (May 18, 2022). *Bicycle and Pedestrian Plan for the National Capital Region*. **https://www.mwcog.org/documents/2022/05/18/bicycle-and-pedestrian-plan-for-the-national-capital-region--bicycling-bike-to-work-day-bikesharing-walking/**

segments of the National Capital Trail Network, such as the C&O (Frederick County, Montgomery County, and DC), the W&OD (Arlington County, Fairfax County, and Loudoun County), and the Mt. Vernon Trails (Fairfax County, Arlington County, and Alexandria) tend to have higher levels of bicycling compared to surrounding suburban tracts.

However, bicycling is not a feasible mode of transportation for many community members due to safety concerns and connectivity challenges. Identified barriers include a lack of direct and complete routes, insufficient protected bike lanes, limited access to shared-use paths/trails, and the absence of showers at work or school.[16]

## Remote Access

During the pandemic, services and jobs had to adapt to stay-at-home policies. Today, the tools developed during the pandemic are still widely used and provide important options for many people. Time can be saved for certain tasks, trips taken can be reduced, and people now have opportunities to access services remotely without needing to travel.

### TELEWORK

Many workers in the region sometimes telework instead of physically traveling to their place of employment. In 2022, 66 percent of regional commuters said they teleworked at least occasionally compared to 35 percent of commuters in 2019.[17] As a result of pandemic telework patterns, employers have adopted a variety of policies: some continue to offer full teleworking, others provide hybrid schedules with both in-office and teleworking options, and some have returned entirely to the office.

The pandemic presented a unique opportunity to observe the effects of widespread teleworking on the region's transportation system. Looking ahead, the challenge lies in balancing the benefits of teleworking with the benefits of in-person collaboration in addition to the need to support and enhance public transit.

### TELEHEALTH

The use of telehealth also increased during the pandemic. Today, it continues to be an option with more prevalence than before the pandemic. Telehealth provides access to healthcare without having to travel, making it easier and saving time for people with barriers to transportation to get the care they need.

### VIRTUAL LEARNING

Similar to telehealth, students of all ages transitioned to online learning environments. The change in routine transportation of students across the region eliminated the need for the public bus services and reduced trips for parents. Although in-person schooling returned, virtual learning services continue to provide access to education without having to travel. This has expanded opportunities for people to earn college degrees while working, attend distant universities with online programs, and provide supplemental education for children.

### ONLINE SHOPPING

The rise in online shopping and smartphone app-based delivery services has replaced trips to stores and restaurants. This was especially true at the peak of the pandemic, when 70 percent of survey respondents said their online ordering increased, and 58 percent said they expected their online shopping habits to continue even one year after the pandemic was over.[18] Years after the pandemic peak, online shopping remains widespread with consumers increasingly demanding fast delivery.

16 National Capital Region Transportation Planning Board (March 16, 2021). *Voices of the Region Survey Report*. **https://www.mwcog.org/documents/2021/03/16/voices-of-the-region-survey-visualize-2045/**

17 Metropolitan Washington Council of Governments (August 14, 2023). *2022 State of the Commute Survey Report*. **https://www.mwcog.org/documents/2023/08/14/state-of-the-commute-survey-report--carsharing-state-of-the-commute-telework-travel-surveys/**

18 National Capital Region Transportation Planning Board (March 16, 2021). *Voices of the Region Survey Report*. **https://www.mwcog.org/documents/2021/03/16/voices-of-the-region-survey-visualize-2045/**


Rachel Beyerle/COG

As the trend of online shopping continues to increase, vehicle delivery types will change over time. More recently, there has been an increase in the number of delivery drivers using mopeds and scooters, especially in core urban areas of the region. Planning decisions may need to more thoughtfully consider class 1 vehicle types (all two or three-wheeled motorized vehicles) when redesigning streets. These smaller vehicles, delivery trucks, and vans are competing for limited roadway and curbside space and exacerbating curbside management challenges. In the long run, this trend could significantly impact regional planning, prompting shifts from conventional delivery vehicles to drones or smaller vehicles, reimagining street designs to meet evolving demands, and adopting land use policies that address changes in retail space needs.

Overall, the benefits of remote access have been realized and are being applied as needed to meet personal and business goals. Higher levels of remote access than pre-pandemic are anticipated to continue given the knowledge and tools now available.

## Reliability & Congestion

Every day, people and goods travel millions of miles along the region's roads and rails to reach their destinations. On roads alone in 2025, the region experiences 122 million daily vehicle miles traveled.[19] Traffic congestion in the nation's capital is common; it requires people to make choices about when, how, or even whether to travel. More time spent traveling means less time for other activities and can impact personal budgets, heighten stress, and raise business costs.

Travel times are often longer due to expected congestion or non-recurring events. When unexpected delays occur, the resulting unreliability can jeopardize timely arrivals. People or goods may arrive late having spent more time traveling than intended, potentially causing negative consequences.

### Roadways

Roadway congestion impacts the majority of the region's travelers and is frustrating even when it is expected and common. Even though only 10 percent of all roadway lane miles were congested daily when considering both A.M. and P.M. peaks in 2023, congestion was concentrated on interstates and experienced by many people.[20] Despite the long commutes, across all trip types and times of day, the average daily delay is estimated by the TPB's travel demand model to be 4.1 minutes in 2025, suggesting that shorter trips tend to be more time reliable and occur on non-interstate roads that are less prone to congestion.[21]

19 System performance analysis of Visualize 2050, 2025 simulation, which made use of the Gen2/Ver. 2.4.6 Travel Model and the Round 10 Cooperative Forecasts of land activity.

20 National Capital Region Transportation Planning Board (November 19, 2024). *2024 Congestion Management Process (CMP) Technical Report*. **https://www.mwcog.org/documents/2024/11/19/congestion-management-process-cmp-technical-report-congestion-congestion-management-process/**

21 System performance analysis of Visualize 2050, 2025 simulation, which made use of the Gen2/Ver. 2.4.6 Travel Model and the Round 10 Cooperative Forecasts of land activity.

PERFORMANCE IS MEETING TPB-APPROVED TARGETS.

PERFORMANCE IS NOT MEETING TPB-APPROVED TARGETS.

## **Highway Travel Time Reliability** in 2022

**66.2%**
of Interstates with Reliable Travel Times 59.6% target (2022)

**89.2%**
of Non-Interstates with Reliable Travel Times met 77.6% target (2022)

**2.31**
Truck Travel Time Reliability Index met 2.59 target (2022)

Even though congestion slows traffic, it can still provide predictable travel times, helping people plan their day. Travel time reliability (TTR) is primarily influenced by highway system demand and daily decisions made by millions of drivers, rather than by deficiencies in the highway infrastructure itself. Additionally, delays caused by weather, incidents, roadwork and major construction projects can affect reliability.

The overall trends indicate travelers typically need to budget twice as much time during peak travel periods (6:00 -10:00 A.M. and 3:00 -7:00 P.M.) compared to non-peak periods to ensure on-time arrivals.[22] Looking back, interstate TTR improved significantly from 58.2 percent in 2018 to 85.8 percent in 2020 due to people's reduced travel during the COVID-19 pandemic.[23] Since 2020, interstate travel and congestion have increased and interstate TTR has declined while still performing better than pre-pandemic levels. The 2022 predicted performance

**Travel time on the region's major roads is generally reliable. Travelers should plan for twice as much time when travelling during peak periods compared to nonpeak periods.**


Rachel Beyerle/COG

of at least 59.6 percent of interstate roadways with reliable travel time was met with an observed 66.2 percent of travel on interstates being reliable.

In addition to affecting TTR, congestion negatively impacts freight delivery. In 2016, the American Transportation Research Institute (ATRI) estimated that nationally, congestion added over $74.5 billion in operational costs and resulted in 1.2 billion hours of delay.[24] Additionally, delays can create challenges for truck drivers who are subject to federal driving time limits and mandated breaks but face a truck parking shortage. Both the 2015 Virginia Truck Parking Study and the 2020 Maryland Statewide Truck Parking Study note a lack of truck parking in the vicinity of the National Capital Region.

22 National Capital Region Transportation Planning Board (November 19, 2024). *2024 Congestion Management Process (CMP) Technical Report*. **https://www.mwcog.org/documents/2024/11/19/congestion-management-process-cmp-technical-report-congestion-congestion-management-process/**

23 National Capital Region Transportation Planning Board Technical Committee (June 7, 2024). *Item 6: PBPP Highway Asset and Travel Reliability 2022-2025*. **https://www.mwcog.org/events/2024/6/7/tpb-technical-committee/**

24 American Transportation Research Institute (October 2018). *Cost of Congestion to the Trucking Industry: 2018 Update*. **https://truckingresearch.org/2018/10/cost-of-congestion-to-the-trucking-industry-2018-update/**

Non-interstate National Highway System roads (e.g., major arterials) have experienced declining TTR since 2021 due to the rebound in automobile travelers and recurring post-pandemic congestion. As of 2022, non-interstate congestion was better than pre-pandemic levels when TTR of 89.2 percent met the target goal of 77.6 percent.[25]

Truck TTR and Peak Hour Excessive Delay also follow similar trends where performance for both measures remain better than pre-pandemic levels and has met set targets.[26] The percentage of non-single occupancy vehicle travel on the National Highway System increased from 37 percent in 2019 to 44.3 percent in 2022.[27]

## **Highway Delays** in 2022

**13.1**
Annual Hours per Capita of Peak Hour Excessive Delay met 22.4 hours target

**44.3%**
Non-SOV Travel on the National Highway System met 37.3% target

Targeted spot improvements and the gradual expansion of the highway system have resulted in a regional transportation network where travel demand is consistent with travel reliability. Targeted improvements include innovative intersection designs that have made a positive impact to relieve congestion along corridors and at spot locations. A recent example is the Diverging Diamond Interchange at Prince William Parkway and Balls Ford Road completed in 2023.

Prince William County Police Department

Through the Congestion Mitigation and Air Quality (CMAQ) program, the TPB estimates total emissions reduction (kg/day) for VOCs and $NO_X$ for projects funded through this program. The two-year target for FFY 2022-2023 of 0.610 kg/day for VOCs and 2.830 kg/day for $NO_X$ was met, with funded projects achieving emissions reductions of 2.866 kg/day for VOCs and 3.093 kg/day for $NO_X$.

## **Air Quality** in 2022-2023

CMAQ projects reduce VOCs by 2.866 kg/day met the emissions reduction target of 0.610 kg/day

CMAQ projects reduce $NO_X$ by 3.093 kg/day met the emissions reduction target of 2.830 kg/day

More information about air quality can be found in Chapter 4.

25 National Capital Region Transportation Planning Board Technical Committee (June 7, 2024). *Item 6: PBPP Highway Asset and Travel Reliability 2022-2025*. **https://www.mwcog.org/events/2024/6/7/tpb-technical-committee/**

26 Peak hour excessive delay (PHED) is typically defined as annual hours of person time per capita spent at a speed of 20 miles per hour or less on the National Highway System during peak morning and evening periods.

27 National Capital Region Transportation Planning Board Technical Committee (June 7, 2024). *Item 6: PBPP Highway Asset and Travel Reliability 2022-2025*. **https://www.mwcog.org/events/2024/6/7/tpb-technical-committee/**

## Bus Transit

Most buses in the region operate in mixed traffic with cars, making their reliability highly dependent on overall traffic conditions. Relieving roadway congestion not only improves general traffic flow but also benefits bus transit by maintaining trip predictability and reducing bus bunching at stops.

Recent infrastructure investments have successfully alleviated some of the impacts of roadway congestion. On I-66, the completion of express lanes to Gainesville, VA enabled the addition of new and enhanced bus operations by reducing traveler delays and operating costs, ultimately improving reliability and increasing ridership. Similarly, the growing Bus Rapid Transit (BRT)/Transitway network provides communities with more dependable travel times and an improved rider experience, as seen with Montgomery County's Flash BRT on Route 29. Additionally, technology-driven solutions such as transit signal priority and queue jumps at intersections in the District of Columbia have further improved bus operations in congested areas.

I-66 Express Mobility Partners

Congestion affects not only roadway conditions but also conditions onboard transit vehicles. Buses can become overcrowded during rush hours; however, higher frequency service and larger buses have helped mitigate overcrowding on some corridors.

In addition, expanded fleets and central bus storage/layover sites in core areas and Activity Centers are critical in providing efficient, on-time service. Examples include WMATA's Northern Bus Garage reconstruction project and the new Arlington Operations and Maintenance Facility.

## Railways

Rail transit users may experience congestion from on-board overcrowding or delays due to track capacity where different rail lines share space, such as the Metrorail Blue/Orange/Silver lines corridor between Virginia and the District of Columbia. Even though rail crowding has not been as prevalent in the post-pandemic environment, return to office mandates have increased the number of commuters on transit services during peak periods.

Overcrowding is especially present during rush hours on Metrorail lines in the regional core, where it can be difficult for passengers to board or ride comfortably. Multimodal transit centers historically encounter congestion due to high volumes of passengers including the Gallery Place-Chinatown and Metro Center Metrorail stations and at Union Station, the region's largest transportation center, where passengers may line the interior corridors waiting to board Amtrak trains.

BeyondDC/Flickr

MARC and VRE trains each share track space with Amtrak and freight cars, presenting timing and congestion challenges that come with sharing critical space. For example, the two-track Long Bridge over the Potomac River is the largest freight/passenger rail bottleneck on the east coast and carries both VRE and Amtrak traffic. Where and when demand is high, insufficient track capacity leads to delays.

Rail transit reliability is also often impacted by maintenance work or incidents that require trains to single track until resolved. Extreme weather conditions can further disrupt service, with excessive heat forcing speed restrictions and delays while flooding or fallen trees can halt or delay rail operations.

## Safety & Security

In 2023, vehicles in the region traveled over 44 billion miles, alongside countless unmeasured miles by pedestrians and cyclists. While the region has achieved some of its safety targets, persistent challenges continue to make the desired safety performance difficult to attain.[28] Addressing the complex issues of traveler behavior, such as distraction, impairment, speeding, and seat belt use requires ongoing efforts to enhance safety outcomes and reduce risks for all travelers and maintenance and operations personnel.

As emphasized at an October 2024 Regional Safety Summit, traveler safety and security are a priority for the TPB. Members have repeatedly expressed great concern over the number of traveler fatalities and serious injuries in the region. Aside from traffic-related fatalities and injuries, emergencies in transportation are also tied to major disasters and extreme weather, cybersecurity threats, political related emergencies, and crime.

### Drivers, Passengers, Pedestrians, and Bicyclists

The safety of all roadway users continues to be a significant concern regionally and nationally. Between 2018 and 2022, the number of fatalities increased by an average of 6.1 percent annually while the fatality rate [fatalities per vehicle miles traveled (VMT)] increased by 7.8 percent per year. Between 2019 and 2020 alone, the fatality rate increased by 30.2 percent despite a decrease in VMT due to COVID-19 restrictions.[29]

The increase in the number and rate of roadway fatalities in the region reflected national trends. During to COVID-19 mitigation efforts, more people stayed at home and fewer vehicle trips were made. It has been suggested that reduced congestion and other factors led more people to speed and drive aggressively; impaired driving was also a contributor to the fatality increases. While the implementation of safety countermeasures has improved safety at individual locations, addressing changes in driver behavior has been identified as essential to reducing fatalities, serious injuries, and rates per 100 million VMT, which as of 2022 did not meet the five-year rolling average targets.

**Fatalities and Serious Injuries** in 2018-2022

| |
|---|
| **335** roadway fatalities did not meet the maximum 253 target |
| **0.804** fatality rate did not meet the maximum 0.588 target |
| **2,214.6** roadway serious injuries did not meet the maximum 1,889.7 target |
| **5.305** serious injury rate did not meet the maximum 3.867 target (5-yr. rolling average, 2018-2022) |

28 National Capital Region Transportation Planning Board (2023). *2023 Vehicle Miles Traveled Data Analysis*. **https://rtdc-mwcog.opendata.arcgis.com/datasets/ae0be1d6d98b461faf2359cae8178214/about**

29 National Capital Region Transportation Planning Board (November 15, 2023). *Item 7: Draft Annual Regional Transit and Highway Safety Targets*. **https://www.mwcog.org/file.aspx?&A=3ZPRcfh6jIhFvvAXToy5UrvfrZE0D9T%2fmmyChS4IqXw%3d**

Pedestrians and bicyclists are the most vulnerable road users, as even minor contact with a higher-speed vehicle or traveler can lead to severe consequences. A new, concerning trend has been that pedestrian and bicyclist fatalities are becoming a larger portion of all roadway fatalities. From 2008 to 2017, the region had a near constant number of pedestrian fatalities. However, since 2018, pedestrian fatality numbers have increased and remain elevated compared to previous years.[30] In addition, over the five-year period from 2018 to 2022, non-motorist (pedestrian and bicyclist) fatalities and serious injuries initially declined by 20 percent from 2018 to 2020 but then surged by 44 percent from 2020 to 2022 during the COVID-19 pandemic.[31]

### **Non-Motorist Fatalities and Serious Injuries** in 2018-2022

| | |
|---|---|
| ! | **549.8** non-motorist fatalities and serious injuries did not meet the maximum 492.4 target (5-yr. rolling average, 2018-2022) |

Common infrastructure improvements such as sidewalks, pedestrian priority crossing signals, cycle tracks, and bike lanes have been effective at providing dedicated spaces for pedestrians and bicyclists within roadway right-of-way, making walking and biking safer. Street improvement projects have incorporated countermeasures such as narrow lanes, chicanes, and bus bulbs to help reduce vehicle speeds. Where destination proximity exists and off-road right-of-way has been attained, off-road shared-use trails have provided attractive transportation alternatives to reach destinations.

Despite these infrastructure improvements, the number of pedestrian and bicyclist fatalities and serious injuries do not meet target levels. While many TPB member agencies have adopted Vision Zero or similar "zero deaths" goals and policies, significant challenges persist.

## Rail and Bus Transit Riders

The safety and security of rail and transit riders is fundamental. Public transportation providers that are Federal Transit Administration (FTA) Section 5307 funding recipients and subrecipients, including WMATA, PRTC, VRE, and transit systems in the District of Columbia and suburban Maryland, collect and analyze data to establish and report transit safety targets and performance annually to improve safety and security on and around transit operations.

### **Fatalities** in 2022

| | |
|---|---|
| ✓ | **No fatalities** on Streetcar, Commuter Bus, Demand, Response and Vanpools |
| ! | **2 fatalities** on Heavy Rail did not meet target of 0 (0.004 fatalities per revenue vehicle mile did not meet 0 target rate) |
| | **4 fatalities** on Urban Bus did not meet target of 0 (0.01 fatalities per revenue vehicle mile did not meet 0 target rate) |

In 2022, the region met its safety targets of having no fatalities on Streetcar Rail, Commuter Bus, Demand Response, and Vanpools but did not meet its safety targets for Heavy Rail and Urban Bus.

30 National Capital Region Transportation Planning Board (November 20, 2024). *Item 7: Draft Annual Regional Transit and Highway Safety Targets*. **https://www.mwcog.org/file.aspx?&A=wZwn2fYVNUxTz7dVkRHBKhY9ryNN1yJzyQVO3wL6h9Q%3d**

31 National Capital Region Transportation Planning Board (November 15, 2023). *Item 7: Draft Annual Regional Transit and Highway Safety Targets*. **https://www.mwcog.org/file.aspx?&A=3ZPRcfh6jIhFvvAXToy5UrvfrZE0D9T%2fmmyChS4IqXw%3d**

## **Injuries** in 2022

| | |
|---|---|
| ✓ | **81** injuries met no more than 255 injuries target for Heavy Rail (0.15 met 0.29 target rate) |
| ✓ | **257** injuries met maximum 268 injuries target for Urban Bus (0.45 met 0.49 target rate) |
| ✓ | **0** injuries met no more than 4 injuries target on Commuter Bus (0 met 0.06 target rate) |
| ✓ | **35** injuries met maximum 46 injuries target on Demand Response (0.17 met 0.24 target rate) |
| ✓ | **0** injuries met no more than 4 injuries target on Vanpools (0 met 0.04 rate) |
| ! | **1** injury did not meet 0 injuries target on Streetcar Rail (0.82 did not meet 0 target rate) |

Additionally, in 2022, the region had no injuries or fewer than expected injuries on all transit modes except Streetcar Rail. Rates shown are per 100,000 revenue vehicle miles.

## **Major Safety Events** in 2022

| | |
|---|---|
| ✓ | **No major safety events** met the target for Vanpools |
| ✓ | **252** major safety events met 404 targets for Urban Bus (0.44 met 0.74 target rate) |
| ! | **3** major safety events did not meet target of 2 for Commuter Bus (0.04 did not meet 0.03 target rate) |
| ! | **7** major safety events did not meet target of 4 for Streetcar Rail (5.72 did not meet 0.27 target rate) |
| ! | **103** major safety events did not meet target of 23 for Heavy Rail (0.19 did not meet 0.04 target rate) |
| ! | **63** major safety events did not meet target of 39 for Demand Response (0.31 did not meet 0.20 target rate) |

For the number of safety events, the 2022 data showed that the region met its targets for vanpools and urban buses but did not meet the targets for the other transit modes.[32]

Transit staff and customers benefit from the same roadway countermeasures that improve safety for private drivers and passengers, as well as updated vehicle safety features, driver training, and routine maintenance of transit vehicles and tracks. Other ongoing transit safety enhancements include bus stop placement and improvements, along with curbside management. Increased demand for use of the curb requires coordination to maintain safe, easy, and accessible transit vehicle boarding and alighting for customers at bus stops, particularly for customers with mobility needs.

32 National Capital Region Transportation Planning Board (November 15, 2023). *Item 7: Draft Annual Regional Transit and Highway Safety Targets*. **https://www.mwcog.org/file.aspx?&A=3ZPRcfh6JlhFvvAXToy5UrvfrZE0D9T%2fmmyChS4IqXw%3d**

Due to the public nature and infrastructure footprint of public transportation, the personal security of transit staff and customers is a more unique challenge when compared to the risks posed in and around a private vehicle. Improvements to increase riders' personal safety, such as increased presence of security officers, have been correlated to a decrease in crime even while Metrorail and Metrobus ridership increased.[33]

BeyondDC/Flickr

# Maintenance

The National Capital Region's extensive transportation network demands consistent maintenance to uphold the high infrastructure standards travelers rely on. Proper upkeep of roads, transit vehicles, shared mobility devices, and public rights-of-way are essential for ensuring traveler safety and maintaining reliable travel times. Overall, the region is successfully meeting most of its maintenance performance targets.[34]

## Roadways

Many state and local employees work tirelessly to keep the region's roadways in good condition, performing tasks ranging from repaving and landscaping to major structural replacements. The TPB tracks the acceptability of roadway maintenance based on pavement conditions, which can be interactively viewed in the **Maintenance of Roadways and Bridges** map.[35] Federal regulations require State DOTs and MPOs to set targets every four years for pavement in good condition and in poor condition (not to exceed), for the Interstate system and for the rest of the National Highway System (NHS). In 2018, the TPB set targets for 2021—the most recent year for which actual performance data is now available.

Online Resource

In 2021, 55.2 percent of the region's pavement lane miles were in good condition, meeting the target of 44.8 percent. With only 0.1 percent of interstate pavement miles in poor condition, the region also met its target of no more than 1.6 percent.[36]

The target to not exceed 7.0 percent for non-interstate pavement miles in poor condition was met in 2021 with 4.7 percent. However, non-interstate pavement miles in good condition did not meet the minimum target of 31.1 percent as actual performance was 24.3 percent.[37]

33 Washington Metropolitan Area Transit Authority (Feb 21, 2024). *Metro enhances safety with increased police patrols on trains and buses, more than 30,000 cameras in use systemwide*. [News Release]. **https://wmata.com/about/news/Metro-enhances-safety-with-increased-police-patrols-on-trains-and-buses.cfm**

34 National Capital Region Transportation Planning Board (June 2024). *Highway Asset Performance Measures* [Interactive Map]. **https://trap-mwcog.hub.arcgis.com/apps/40ecfeb4cc604dd78583b7ecf12f18cc**

35 TPB (2025). Visualize 2050: Maintenance of Roadway and Bridges [Interactive Map]. **www.mwcog.org/V50RoadAndBridgeMaintenanceMap**

36 National Capital Region Transportation Planning Board Technical Committee (June 7, 2024). *Item 6: PBPP Highway Asset and Travel Reliability 2022-2025*. **https://www.mwcog.org/events/2024/6/7/tpb-technical-committee/**

37 National Capital Region Transportation Planning Board Technical Committee (June 7, 2024). *Item 6: PBPP Highway Asset and Travel Reliability 2022-2025*. **https://www.mwcog.org/events/2024/6/7/tpb-technical-committee/**

### **Highway Assets** in 2021

| | |
|---|---|
| **55.2%** of Interstate Pavement in Good Condition met minimum 44.8% target (2021) | **24.3%** of Non-Interstate Pavement in Good Condition did not meet the minimum 31.1% target (2021) |
| **0.1%** of Interstate Pavement in Poor Condition met maximum 1.6% target (2021) | **4.7%** of Non-Interstate Pavement in Poor Condition met maximum 7.0% target (2021) |

When major pavement replacement projects occur, they can impede traffic flows by causing temporary delays in lane reductions or roadway closures. Despite the inconvenience, maintaining roadway pavements and clear rights-of-way are crucial for user safety and predictable surface and sightline conditions.


Rachel Beyerle/COG

## Bridges

Bridges in the region provide critical links across physical obstacles to connect communities along roadways, railroads, and trails. Within the interstate system, bridges function as links across natural barriers, passages over railroads, and as connections to other freeways.

In 2023, there were 1,443 bridges on the National Highway System in the region. The current deck area conditions of the region's bridges can be explored in the **Maintenance of Roadways and Bridges** map.[38] Recent maintenance replacements and rehabilitations such as the 11th Street Bridge in DC, the Frederick Douglass Bridge, and the Arlington Memorial Bridge have been effective in keeping travelers moving efficiently.

Online Resource

While the region's bridge deck conditions declined between 2018 and 2021, improvements were observed in 2022 and 2023. By 2023, the region met its target of 26.1 percent for interstate bridge deck area in good condition, achieving 41.2. Similarly, the 2023 target of keeping poor bridge deck area below 3.7 percent was met, with only 1.8 percent of bridges classified as poor condition.[39] Recent maintenance work since 2019 and 2020 have contributed to these improvements in bridge conditions.

### **Bridge Assets** in 2023

| |
|---|
| **41.2%** Interstate Bridge Deck Area in Good Condition met minimum 26.1% target (2023) |
| **1.8%** Interstate Bridge Deck Area in Poor Condition met maximum 3.7% target (2023) |

38 TPB (2025). Visualize 2050: Maintenance of Roadway and Bridges [Interactive Map]. **www.mwcog.org/V50RoadAndBridgeMaintenanceMap**

39 National Capital Region Transportation Planning Board Technical Committee (June 7, 2024). *Item 6: PBPP Highway Asset and Travel Reliability 2022-2025*. **https://www.mwcog.org/events/2024/6/7/tpb-technical-committee/**

Balancing the need for bridge reconstruction with the demands of a heavily congested highway segment is a significant regional challenge. As aging infrastructure requires ongoing attention to maintain a reliable travel network, routine maintenance, rehabilitation, and eventual replacement are essential investments to ensure continued mobility over physical barriers.

**The American Legion Memorial Bridge, connecting Maryland and Virginia on I-495, is over 62 years old and is a regional priority for replacement. Extensive repairs—including rehabilitation of the deck and concrete replacement—are necessary to maintain this Potomac River crossing in a state of good repair.**

Virginia Department of Transportation/Flickr

## Rail and Bus Transit

Availability, reliability, and safety are hallmarks of efficient public transportation service and form the foundation for a positive transit passenger experience. The TPB transit asset management (TAM) performance analysis aims to ensure that regional buses and trains are well-maintained and run safely.

The age and conditions of fleets and rolling stock are contributors to state of good repair. Buses, vans, autos, locomotives, and other rail vehicles are examples of rolling stock, also known here as revenue vehicles. Non-revenue service vehicles include cranes, lifts, and tow trucks. Fixed-guideway infrastructure includes rail signals, tracks, and systems. Stations, parking garages, and terminals are types of stations and facilities. By setting these targets, the region creates benchmarks for how all its combined transit assets should be maintained in order to support a good state of repair and quality service.

BeyondDC/Flickr

Most revenue vehicles in the region are in good shape as they are being procured and delivered on a planned schedule. Several asset classes of rolling stock which have higher TAM targets are also types of vehicles that are more prominent in agency fleets across the region, such as buses, cutaway buses, vans, and over-the-road buses. Some of

these vehicles are also more challenging to procure quickly than in the past due to a smaller number of manufacturers available to provide them. As a result, some agencies may continue using revenue or service vehicles past their useful life benchmark (ULB) until replacements can be acquired.

### **Percent of revenue vehicles** in 2022 at or past their useful life benchmark

| | |
|---|---|
| ✓ | Articulated Bus (2.1% met maximum 2.5% target) |
| ✓ | Bus (6.1% met maximum 6.9% target) |
| ✓ | Over-the-road Bus (8.1% met maximum 12.4% target) |
| ✓ | Automobile, Commuter Rail Locomotive, Commuter Rail Passenger Coach, Heavy Rail Passenger Car, Light Rail Vehicle (0% met 0% target) |
| ✓ | Minivan and Sports Utility Vehicle had no 2022 targets. |
| ! | Cutaway (6.6% did not meet maximum 0.7% target) |
| ! | Van (41.6% did not meet 0% target) |

The region's specially designed steel wheel service vehicles for use on railways in 2022 met the 46.3 percent target with only 23.3 percent at or past their useful life benchmark. Service automobiles, trucks and other rubber tire vehicles did not meet their targets in 2022.

### **Percent of service vehicles** in 2022 at or past their useful life benchmark

| | |
|---|---|
| ✓ | Steel Wheel Vehicles (23.3% met maximum 46.7% target) |
| ! | Automobiles (44.1% did not meet maximum 41.8% target) |
| ! | Trucks and other Rubber Tire Vehicles (34.2% did not meet maximum 25.0% target) |

In 2022, no streetcar rail track miles were under performance restrictions. For heavy rail track segments, 4.3 percent were under performance restrictions, which was just over the regional target of 3.5 percent.

### **Percent of rail track miles under performance restriction** in 2022

| | |
|---|---|
| ✓ | Streetcar Rail (0% met maximum 5% target) |
| ! | Heavy Rail (4.3% did not meet maximum 3.5% target) |

Lastly, most of the region's rated transit facilities did meet their set targets in 2022 of having a condition assessment below three.[40] One reason for this is new construction. For example, many new facilities have opened since 2021 including:

- OmniRide's Western Bus Maintenance and Storage Facility (2021).
- Metrorail's Dulles Railyard (2021).
- Transit Services of Frederick County's administrative and maintenance facility (2021).

40 National Capital Region Transportation Planning Board (March 15, 2022). *Item 9: PBPP Transit Asset Management Targets*. **https://www.mwcog.org/events/2022/3/16/transportation-planning-board/**

- Ride On's Brookville Smart Energy Bus Depot for battery-electric buses (2022).
- MARC's Riverside Heavy Maintenance Facility (2022).
- VRE's Lifecycle Overhaul and Upgrade Facility (LOU) (2023).
- Fairfax County Monumental Drive Commuter Parking Garage and Transit Center (2024), and
- Arlington Transit Operations and Maintenance Facility (2024).

Though all these facilities serve transit vehicles operating in the region, two are located outside the area: MARC Riverside—Baltimore, MD, and VRE's Life Overhaul and Upgrade—Spotsylvania County, VA.

**Percent of facilities with a condition assessment below 3** in 2022 at or past their useful life

| | |
|---|---|
| ✓ | At-Grade Fixed Guideway Station (0% met maximum 4.1% target) |
| ✓ | Bus Transfer Center (0% met maximum 4.1% target) |
| ✓ | Elevated Fixed Guideway Station (0% met maximum 4.1% target) |
| ✓ | Other, Passenger or Parking (0% met maximum 4.3% target) |
| ✓ | Parking Structure (0% met maximum 4.3% target) |
| ✓ | Surface Parking Lot (0% met maximum 4.3% target) |
| ! | Underground Fixed Guideway Station (4.3% did not meet maximum 4.1% target) |

Since 2015, WMATA has been upgrading its rolling stock from the 6000 series, introduced in 2006, to the 7000 series and, by 2027, plans to introduce the 8000 series cars.[41] These regular car upgrades ensure that Metro's rolling stock consistently features rail cars well within their useful lifespan. This commitment to modernizing transit extends beyond rail, as Fairfax County's Connecter fleet is also embracing upgrades with the introduction of battery-powered buses to replace aging combustion engine models.

## System Management

Transportation system management offers an integrated approach to planning, engineering, and operating existing facilities. This approach maximizes a system's full-service potential and ultimately enhances the efficiency, safety, and reliability of the transportation network. Because system management makes use of existing infrastructure without increasing the physical footprint, it offers cost-effective and expedited implementation of solutions. The strategies are coordinated with others across multiple jurisdictions, agencies, and modes, making it an important regional tool.

Daily operations of the region's transportation network are monitored through the Metropolitan Area Transportation Operations Coordination (MATOC) Program, which was created following the September 11, 2001, attacks. For over two decades, the MATOC Program has enabled transportation agencies to share information, plan, and coordinate with each other to improve regional mobility and safety by responding to incidents and clearing the problem as quickly as possible.

### Roadways

System management is often applied to roadways where investments in operations technologies and

41 Washington Metropolitan Area Transit Authority (2024). *Metro's Fleet of the Future*. **https://www.wmata.com/initiatives/plans/Fleet-Of-The-Future/index.cfm**

**Upon being notified of the January 29, 2025 mid-air collision, Metropolitan Area Transportation Operations Coordination (MATOC) staff monitored traffic on Potomac River commuter corridors and tracked potential lane closures due to planned events/road work, unrelated incidents, or plane crash response efforts. MATOC staff notified the Operations Subcommittee and Transit Task Force to coordinate the anticipated operations and service plans.**

functional design help move and smooth traffic without adding roadway capacity. Many roadway operations technologies exist, including dynamic congestion or parking pricing, ramp metering, managed/reversible lanes, traveler information communication, traffic surveillance, and coordinated or smart traffic signals.

For example, operations technologies such as parking pricing in DC is helping to address the competing parking needs of various groups, reduce congestion, and promote the use of public transit during peak periods. District Department of Transportation introduced the Performance Parking Zone in the greater U Street area as a demand-based pricing approach that leverages historical parking data to adjust rates and manage parking availability, leading to price differences by time of day.[42] Similarly, congestion pricing along segments of I-495, I-395, and I-95 in Virginia have High-Occupancy Toll (HOT) lanes that use demand-based roadway pricing to maintain highway speeds and manage congestion.

Curb space management has become particularly valuable as the region has experienced an increase in delivery drivers and ride-hailing services on top of routine stock deliveries. In addition, outdoor restaurant seating, transit stops, and street parking are competing for the same space. Alexandria's Curb Data Specifications Pilot is an innovative approach to curbside management. By merging data from meters, garages, and other parking payment systems, a digital map for curb zones provides real-time occupancy data that displays parking availability and dynamically prices parking based on demand.


Cristina Finch/COG

Traveler information programs such as Maryland Department of Transportation's Coordinated Highways Action Response Team (CHART)[43] and Virginia 511[44] provide travelers with reliable, current traffic and road closure information, as well as weather related traffic events and conditions. Programs such as these allow drivers to choose the safest and most efficient routes to their destinations.

42 District Department of Transportation (December 3, 2024). DDOT Announces Implementation of New Greater U Street Performance Parking Zone. **https://ddot.dc.gov/release/ddot-announces-implementation-new-greater-u-street-performance-parking-zone**

43 Maryland Department of Transportation (n.d.). *CHART Web Maryland 511 Traveler Information Service*. **https://chart.maryland.gov/**

44 Virginia Department of Transportation (2025). *511 Virginia*. **https://www.511virginia.org/**

Functional design of roadways also greatly influences system management. Alternative intersection, interchange, and other street designs are implemented to retrofit roadways and provide more efficient vehicle movement. Street designs commonly found in the region's more densely populated areas, such as bike lanes and narrower intersections with tighter turning radii, pose challenges for trucks maneuvering turns and can obstruct access for pedestrians and cyclists during deliveries. As more trucks operate in the region's dense urban areas and deliver goods to homes on residential streets, the negative aspects of freight, such as unwanted noise, pollutants, and vibrations from the vehicles present challenges to communities.

## Rail and Bus Transit

For rail and bus transit, systems management aims to improve the flow of passengers and freight, improve operations management, and optimize service schedules to make the best use of existing resources. Service frequency, hours of service, and routes are examples of choices made by the region's transit agencies to best meet public needs. Many solutions take place in a transit agency's operations control center where common challenges such as peak hour overcrowding or disruptions from non-recurring traffic events are addressed through continuous network monitoring.

The WMATA Better Bus Network planning initiative, launched in 2022 and implemented in 2025, is a notable example of system management. Many other smaller system efficiencies at each of the region's transit agencies are gained by routinely evaluating system operations.

Emma K Alexandra/Flickr

Every day, approximately 30 freight trains move through the heart of the region, sharing tracks with passenger trains and bringing unique challenges that require ongoing coordination and planning.[45]

Critical system management actions for rail include ensuring preparedness for emergency responses in case of an incident, evaluating safe rerouting options for hazardous materials, maintaining the integrity of rail lines and bridges, and balancing freight rail operations with the quality of life for nearby communities.

In Maryland, key corridors are shared by MARC, Amtrak, CSX, and Norfolk Southern, making it essential to manage bottlenecks and ensure safety, especially as efforts continue to improve freight rail access to the Port of Baltimore. Likewise, in Virginia, freight trains share tracks with Amtrak and VRE, prompting recent agreements with CSX that will allow Virginia to acquire hundreds of miles of tracks and right-of-way. This acquisition will enable the expansion of passenger rail services while maintaining critical freight operations, supporting both regional mobility and economic growth.

45 District of Columbia Department of Transportation (March 17, 2023). *District Freight Plan Update*. **https://www.transportation.gov/sites/dot.gov/files/2023-12/DC_DDOTFrtPlan_2023.06.12.pdf**

# Chapter 4:
# Societal Topics

Visualize 2050 comes at a critical turning point in history. During the COVID-19 pandemic, the region saw drastic changes in economic activity and travel behavior. As the region enters a new chapter, post COVID-19, many societal topics related to transportation today and in the future are at the forefront of people's minds including the economy, environment, public health, and emerging technologies.

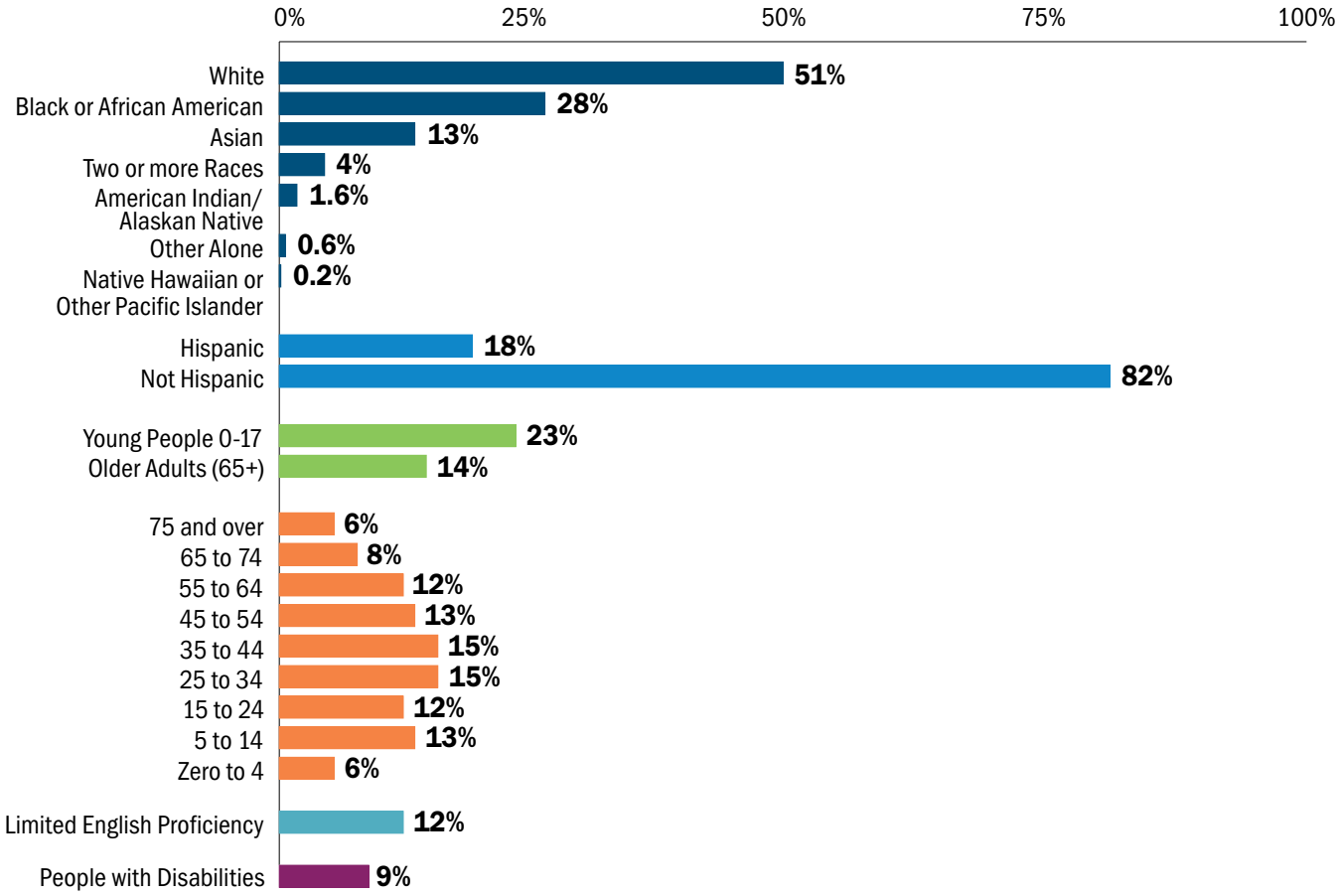
## Economy

The people who live and work in the National Capital Region (see Chapter 1 for planning area) power an economy whose influence extends far beyond the region's borders—across the country and around the world. A comprehensive understanding of the economy—including the population's characteristics, the region's housing market, and employment landscape—is essential for strategically planning the future transportation system.

## Population and Demographics

Today, approximately 5.95 million people of all backgrounds, ages, and abilities live in a region spanning approximately 3,500 square miles across 22 jurisdictions. Figure 4.1 provides a summary of population demographics.[1] Young people 17 and under comprise 23 percent of the population while older adults 65+ make up 14 percent. Residents with limited English proficiency comprise 12 percent, and nine percent of people live with a disability.

**Figure 4.1:** Regional Demographics, Current Percent of Population




1 U.S. Census Bureau (2023). American Community Survey (ACS) 5-Year Estimates Data Profiles – Selected Social Characteristics. **https://data.census.gov/table/ACSDP5Y2023.DP02?q=dp02&g=010XX00US** and Demographic Characteristics. **https://data.census.gov/table/ACSDP5Y2023.DP05?q=dp05&g=010XX00US**


Easterseals/NADTC

**Population Growth**
Today: 5.95M
2050: 7.18M
**+21%**

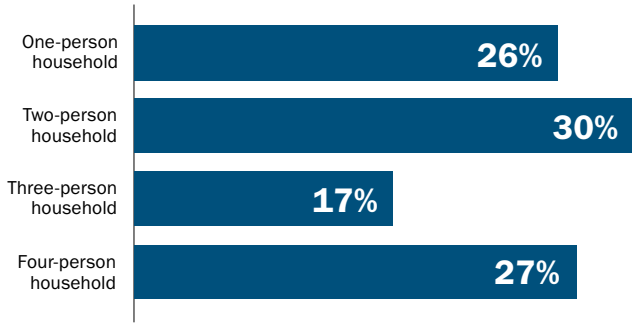
Although unforeseen disruptions, like COVID-19 or workforce reductions may occur, by 2050, the population is projected to reach over 7.18 million people, marking a 21 percent increase over 2025. Future growth will contribute to the region's quality of life and influence transportation options for both current and future residents. By 2050, Fairfax County (including City of Fairfax and City of Falls Church) and the District of Columbia are forecasted to gain the most community members, gaining 201 thousand and 147 thousand, respectively.[2]

## Households and Housing

**Household Growth**
Today: 2.25M
2050: 2.80M
**+24%**

More than 2.25 million households call the National Capital Region home. As shown in Figure 4.2, two-person households are the most prevalent (30 percent), followed by households with four or more people (27 percent), one-person households (26 percent), and three-person households (17 percent).[3] The number of households is expected to rise to 2.80 million by 2050, an increase of 24 percent.[4]

**Figure 4.2:** Regional Household Sizes




Seventy percent of households reside in single-family homes, with 51 percent in detached houses and 20 percent in attached homes like townhouses (Figure 4.3). The remaining 30 percent live in multifamily housing. As the region continues to add people, the resulting increase in housing demand will drive residential and household growth through 2050. Homeownership is prevalent as over two-thirds (71 percent) of households own their home, while just over a quarter (27 percent) are renters (Figure 4.4). The remaining 1.7 percent is categorized as other.[5]

2 National Capital Region Transportation Planning Board (November 3, 2023). Growth Trends: Cooperative Forecasting in Metropolitan Washington. **https://www.mwcog.org/documents/2023/11/03/growth-trends-cooperative-forecasting-in-metropolitan-washington-cooperative-forecast-featured-publications-growth--development/**

3 National Capital Region Transportation Planning Board (January 2021). *2017/2018 Regional Travel Survey*. **https://www.mwcog.org/documents/2021/02/11/regional-travel-survey-technical-documentation/**

4 National Capital Region Transportation Planning Board (November 3, 2023). Growth Trends: Cooperative Forecasting in Metropolitan Washington. **https://www.mwcog.org/documents/2023/11/03/growth-trends-cooperative-forecasting-in-metropolitan-washington-cooperative-forecast-featured-publications-growth--development/**

5 National Capital Region Transportation Planning Board (January 2021). *2017/2018 Regional Travel Survey*. **https://www.mwcog.org/documents/2021/02/11/regional-travel-survey-technical-documentation/**

**Figure 4.3:** Home Type

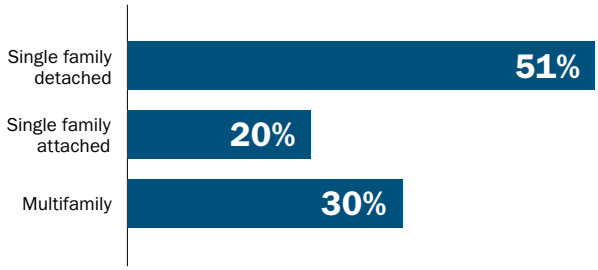
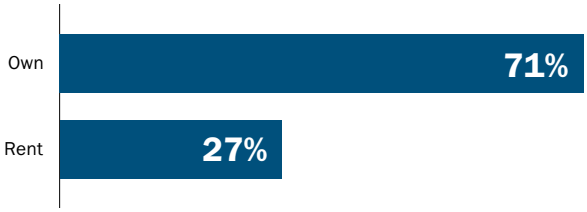



**Figure 4.4:** Housing Tenure




More nuanced trends in household characteristics are seen when examining the difference between the region's core, inner suburban, and outer-suburban geographies. In the core, one-person households make up the majority, over half of all households reside in multifamily housing, and approximately half are renters. Two-person households are most prevalent in the inner and outer suburbs. Since 2007-2008, the share of people living in single-family detached housing has decreased, and the share of people living in multifamily and rental housing has increased in the core and inner suburbs.[6]

## Housing Affordability

The region offers highly rated schools and access to jobs in a stable economy, making it an attractive place to call home. However, housing remains unaffordable for many people, as rents in the region are high compared to the median income of renters. At the end of 2022, median rents in multifamily buildings were between 27 and 39 percent of median renter income.[7] Moreover, the COG Fair Housing Plan survey found that 84 percent of respondents faced difficulties finding affordable housing that was also up to code.[8] This financial burden is particularly severe for people with low incomes and/or with disabilities.

High costs to acquire land, escalating costs of construction materials, and prohibitive land use controls that hinder affordability and higher-density development are some of the many challenges to achieving more affordable housing in the region. Beyond rental affordability, home ownership is also difficult to attain for many people because of high costs and low supply of housing, forcing many into long commutes in search of affordable housing. Homeownership and access to affordable housing are also difficult due to a history of exclusionary zoning. Most of the region's residential land is zoned exclusively for single family homes, which artificially limits supply, creates barriers to opportunity, and increases housing costs for all.[9] Without the additional construction of homes to purchase, many people lack the opportunity to build financial stability.

To improve access to code-compliant and affordable homes, many local governments in the region have increased funding for housing, pursued zoning changes to allow for more varied housing options, and added requirements for affordable housing in new developments. In 2017, the TPB determined that additional housing in Activity Centers and near

6 National Capital Region Transportation Planning Board (January 2021). *2017/2018 Regional Travel Survey*. **https://www.mwcog.org/documents/2021/02/11/regional-travel-survey-technical-documentation/**

7 Percentage of median rents of median renter income vary depending on the number of bedrooms in a unit. See Metropolitan Washington Council of Governments (March 26, 2024). *Multifamily Rental Housing Construction Indicators Report*: **https://www.mwcog.org/documents/2024/03/26/multifamily-rental-housing-construction-indicators-report-housing-multifamily-rental-housing-featured-publications/**

8 Metropolitan Washington Council of Governments (November, 2023). *Metropolitan Washington Regional Fair Housing Plan*. **https://www.mwcog.org/documents/2023/11/15/metropolitan-washington-regional-fair-housing-plan-equity-fair-housing-housing/**

9 Pew Charitable Trusts (January 22, 2024). *How Restrictive Zoning in Virginia Has Hurt Housing Affordability*. **https://www.pew.org/en/research-and-analysis/articles/2024/01/22/how-restrictive-zoning-in-virginia-has-hurt-housing-affordability**

HCT stations would improve transportation system performance.[10] In 2019, COG endorsed a set of regional housing targets for 2030: increase the amount of units constructed, ensure 75 percent of all new housing is in RACs or HCT stations, and ensure 75 percent of new housing is affordable to low- and middle-income households. Progress toward this is being made; in 2022 about 40 percent of all multifamily rental units were built within a half-mile walk from a Metrorail station, and about 78 percent of new units were located within one of the 141 Insert Regional before Activity Centers or near a HCT station.[11]

## Employment and Income

For the region's 3.4 million workers, commuting is a daily necessity that drives the economy forward. While the COVID-19 pandemic prompted unprecedented widespread remote work throughout the region, there has been an increasing trend of workers returning to their work location, which has brought about a return to significant commuting levels. The region has 3.4 million workers, many of whom commute on a regular basis. Although the region ranks among the most affluent in the nation—with a median household income nearing $125,000 and a gross regional product exceeding $679 billion annually—income disparities remain significant.[12] Nearly one-fifth (18 percent) of the region's households earn less than $50,000 a year.[13] Ensuring access to a variety of transportation options is critical to connecting residents with employment opportunities to sustain the economic prosperity of the region and its residents.


The region sustains a robust economy, which is expected to add nearly 800,000 jobs by 2050, totaling 4.2 million employees. Key industries are professional and business services, the government sector, and educational and health services. Most of this growth is projected to occur in Fairfax County (including City of Fairfax and City of Falls Church) and the District of Columbia, with anticipated increases of 159,000 and 176,000 jobs, respectively. In terms of fastest growth, Frederick County would grow at a rate of 41 percent and Prince William County (including Manassas and Manassas Park) at a rate of 34 percent.[14]

## Tourism

As the home to the nation's capital, tourism is one of the major sectors in the region's economy. The region's three major commercial airports, along with its intercity rail and bus networks, make it easily accessible for visitors traveling for business, tourism, or other purposes. Hundreds of national historic places, many world-class museums, and a variety of conferences attract millions of tourists to the region on an annual basis. In 2023, DC surpassed its pre-pandemic tourism record with nearly 26 million people visiting the city, a 17 percent increase from

10 Metropolitan Washington Council of Governments (December 20, 2017). *Long-Range Plan Task Force Reports*. **https://www.mwcog.org/documents/2017/12/20/long-range-plan-task-force-reports-projects-regional-transportation-priorities-plan-scenario-planning-tpb/**

11 Metropolitan Washington Council of Governments (March 2024). *Multifamily Rental Housing Construction Indicators Report*. **https://www.mwcog.org/documents/2024/03/26/multifamily-rental-housing-construction-indicators-report-housing-multifamily-rental-housing-featured-publications/**

12 Median household data comes from: U.S. Census Bureau (2023). *American Community Survey (ACS) 5-Year Estimates Data Profiles – Selected Economic Characteristics*. **https://data.census.gov/table/ACSDP5Y2023.DP03?q=dp03&g=010XX00US**. Gross regional product data comes from: MWCOG (2025). *Regional Economic Monitoring System (REMS) Dashboard*. **https://www.mwcog.org/community/data-and-tools/economic-dashboard/**

13 U.S. Census Bureau (2023). *American Community Survey (ACS) 5-Year Estimates Data Profiles – Selected Economic Characteristics.* **https://data.census.gov/table/ACSDP5Y2023.DP03?q=dp03&g=010XX00US**

14 National Capital Region Transportation Planning Board (November 3, 2023). Growth Trends: Cooperative Forecasting in Metropolitan Washington. **https://www.mwcog.org/documents/2023/11/03/growth-trends-cooperative-forecasting-in-metropolitan-washington-cooperative-forecast-featured-publications-growth--development/**

2022. Over 10 billion dollars were also spent in 2023, supporting DC's hotels, restaurants, venues, and other destinations.[15]

Industries such as hospitality, retail, service-related sectors, and transportation are primarily supported by low-wage workers. Overall, the community members employed by the region's travel and tourism economy are among the most reliant on the public transportation system.

BWI Airport

## Land Use and Development Patterns

As the region's population and employment grows, its transportation network will be challenged to meet the growing and changing needs that will come with future land-use developments. The region features a broad spectrum of development typologies, from natural areas that surround rural communities, to low-density, single-family subdivisions with adjacent commercial hubs, and dense, mixed-used urban centers.[16] Density, zoning, infrastructure, transportation networks, and the spatial relationship between different land uses together define land development patterns. Where and how land develops within the region's communities shapes the physical layout of communities and greatly influences people's practical mobility choices. When activities are far apart, travel options are limited, and reliance on vehicles to transport people becomes a necessity. This leads to more land dedicated to vehicle travel and undesired outcomes such as traffic congestion, crashes, and unfriendly environments for bicycles and pedestrians. Together, land use and transportation decisions impact travel distances, affect travel mode choice, and shape the accessibility of employment, goods, and services. Land use and transportation decisions have significant effects on the environment, public health, community character, and economic vitality.

Historically, the region has experienced significant job growth while housing supply has struggled to keep pace with demand. Recent forecasts of future employment and housing indicate this imbalance will continue, adversely affecting the area's affordability and undermining the region's appeal to new companies and talent. It also necessitates commuting to work from farther distances, which strains the transportation system, adds to the cost of living, and deteriorates the quality of life overall in the region.

To achieve a better balance between job growth and housing, a TPB task force determined that an optimal jobs-to-housing ratio of 1.54 would enhance competitiveness and improve future transportation system performance.[17] Using this ratio, COG projected that by 2030, the region will need at least 75,000 additional households beyond what was forecasted at the time. This gap has been identified as the region's "housing shortfall" in COG's *The Future of Housing in Greater Washington* (2019),[18]

15 Destination DC (May 29, 2024). *Destination DC announces record visitation, economic impact*. [News Release]. **https://washington.org/press/destination-dc-announces-record-visitation-economic-impact**

16 TPB staff analysis of regional activity density of COG's Round 10.0 Cooperative Forecasts

17 ICF et al. (December 20, 2017). *An Assessment of Regional Initiatives for the National Capital Region: Technical Report on Phase II of the TPB Long-Range Plan Task Force*. **https://www.mwcog.org/documents/2017/12/20/long-range-plan-task-force-reports-projects-regional-transportation-priorities-plan-scenario-planning-tpb/**

18 Metropolitan Washington Council of Governments (September 4, 2019). *The Future of Housing in Greater Washington: A Regional Initiative to Create Housing Opportunities, Improve Transportation, and Support Economic Growth*. **https://www.mwcog.org/documents/2019/09/10/the-future-of-housing-in-greater-washington/**

and it is expected to worsen without proactive intervention.

## Activity Density

Analyzing activity density, measured by the number of people and jobs per acre, simplifies and standardizes comparisons of current and future development intensity across the region. Activity density can be categorized into similar groups, known as transects, describing the spectrum of built environments from natural, open space to dense urban core areas, as shown throughout the region in Figure 4.5.

**Figure 4.5:** Transects in the Region


Top street level photos come from Google Maps; Bottom overview photos come from Google Earth Pro

Every jurisdiction in the region is home to transects that range from natural zones, likely dedicated to open space and environmental preservation, to denser urban development supporting job centers and higher-intensity residential development. Traveling to, from, and within these various transects occurs on a variety of highway, transit, bicycle, and pedestrian transportation options tailored to the use and needs of each density type.

Natural and rural zones tend to be more automobile-oriented, though they may also feature commuter rail stations or long-distance trails. As development intensifies and the region becomes more urbanized and denser, a broader range of transportation options emerge to support the growing activity. Roadways are designed to handle higher traffic volumes, and transit services expand to include Metrobus and other local providers. HCT options—such as Metrorail, bus-rapid transit (BRT), or commuter rail—become more prevalent, along with major interregional transit hubs like the Paul S. Sarbanes Transit Center in Silver Spring, Maryland, and the Springfield Community Business Center Commuter Parking Garage in Fairfax County, Virginia. Active transportation infrastructure also improves, with expanded bicycle and pedestrian networks, including Capital Bikeshare and various scooter-share programs throughout the region's urbanized centers.

The region's densest transects are home to the region's urban cores, with established street networks, various HCT options, and regional transportation hubs that support global economic activity. Downtown DC includes an abundance of transportation options to support one of the country's largest central business districts (CBDs). Tysons Corner in Fairfax County, Virginia, and Silver Spring in Montgomery County, Maryland, are also home to bustling CBDs supported by high-frequency, HCT, dense street networks, and bicycle and pedestrian infrastructure.

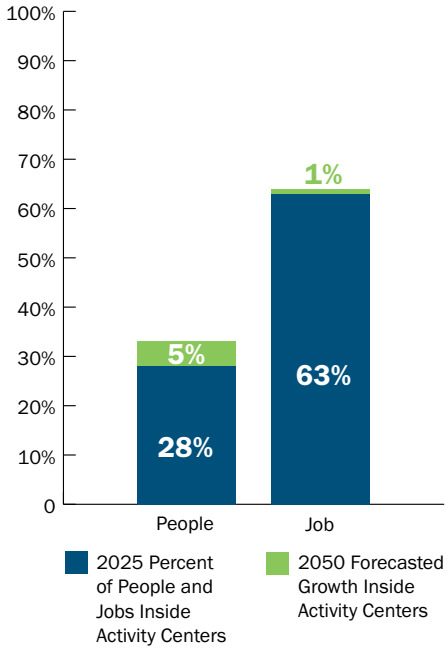

As shown in the **Forecast Population and Employment Growth, Activity Centers, and Activity Density** map, most of the region will stay the same transect in 2050; few places will increase by two or more transects, and those places with the greatest anticipated growth are located within or adjacent to currently active places.[19]

## Regional Activity Centers (RACs)

RACs are COG-designated places with concentrations of employment or mixed uses, often dense transects now or planned for greater activity density in the future, that can support concentrating, connecting, and circulating travel to reduce congestion, emissions, and improve safety. As of 2025, 145 RACs are found throughout the region. Figure 4.6, as well as the Forecast Population and Employment Growth, Activity Centers, and Activity Density map, shows existing and predicted growth outside and inside of RACs by 2050, where currently, 28 percent of the region's population resides, and 63 percent of jobs are located.[20] By 2050, 33 percent of the regional population and 64 percent of jobs are forecasted to be in RACs.

Daniel Kelly/Flickr

**Figure 4.6:** Growth of People and Jobs Inside RACs, 2025 to 2050




Of the 145 RACs, 88, or 61 percent, are close to a HCT station. Building more residential, commercial, and employment developments in activity centers allows more community members to easily access public transportation, walking, and biking options to meet their daily needs without relying on a car. Connecting activity centers with multimodal options enhances convenience and efficiency for travel between these hubs.

# Environment

Every aspect of transportation is deeply connected to the environment. Motor vehicle emissions contribute to air pollution, while natural hazards disrupt transportation systems and infrastructure. Additionally, certain activities associated with construction projects can negatively impact natural resources, disrupt ecosystem health, and affect nearby communities.

19 National Capital Region Transportation Planning Board (2025). *Forecast Job and Population Growth, Visualize 2050*. [Interactive Map]. **www.mwcog.org/V50PopAndJobForecastMap**

20 Metropolitan Washington Council of Governments (May 14, 2025). *RACs*. **https://www.mwcog.org/documents/2025/05/14/regional-activity-centers-maps-activity-centers-land-use-region-forward/**

COG stock

In turn, the environment influences transportation, shaping decisions that affect both people and infrastructure. Environmental considerations, along with regulations, shape decisions on transportation project locations and the measures needed to protect the region's environmental resources and mitigate adverse transportation impacts.

## Air Quality

The Clean Air Act Amendments (CAAA) of 1990 establish standards and procedures for reducing human and environmental exposure to a range of pollutants, referred to as "criteria pollutants," generated by industry and transportation. The National Capital Region monitors the air quality in the region, specifically for criteria pollutants as defined in the CAAA. Monitoring helps to ensure that regional air quality achieves the National Ambient Air Quality Standards (NAAQS), resulting in pollutant levels that are considered acceptable for individuals and the natural environment. Historically, three criteria pollutants have been of concern in the region: carbon monoxide (CO), fine particulate matter ($PM_{2.5}$),[21] and ground-level ozone. Ground-level ozone is created when volatile organic compounds (VOC) combine with nitrogen oxide ($NO_X$) and sunlight. The region has achieved the CO and $PM_{2.5}$ NAAQS and has done so long enough that analysis requirements under the CAAA no longer apply.

In April 2025, the U.S. Environmental Protection Agency (EPA) acknowledged that the region had also met the current NAAQS for ozone. This continues a decades-long trend of lower pollution levels in the region, mainly attributable to federal emissions control programs, although state and local emissions control programs and local transportation and land use planning have all played a role in emissions reductions. The Commuter Connections program, for example, which has existed in the region for more than 50 years, is estimated to have reduced daily $NO_X$ by 0.4 tons and VOC by 0.3 tons in 2022, just as the region was emerging from the COVID-19 pandemic.[22]

21 Fine particles, 2.5 micrometers in diameter and smaller.

22 Metropolitan Washington Council of Governments (November 21, 2023). *Commuter Connections Transportation Demand Management (TDM) Analysis Report FY 2021-2023*. **https://www.mwcog.org/documents/2023/11/21/commuter-connections-transportation-demand-management-tdm-analysis-report-carsharing-commuter-connections-commuting/**

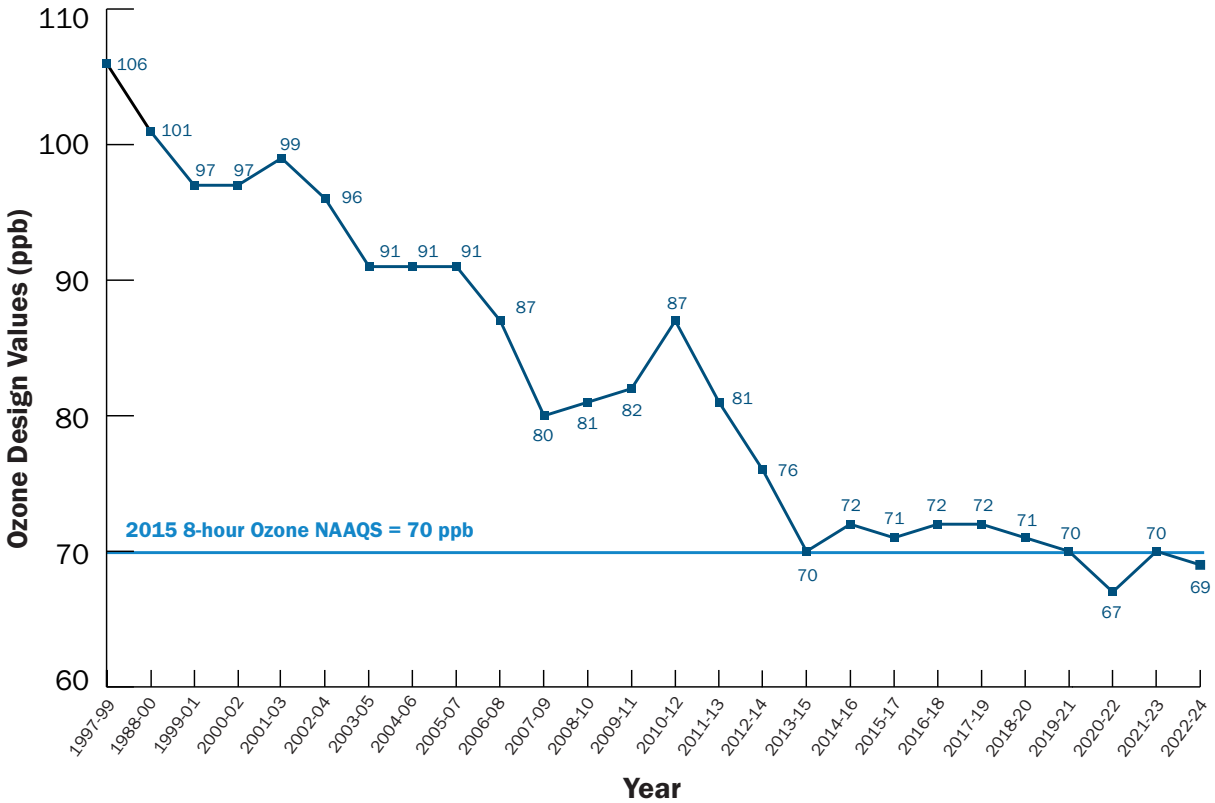
Historical ozone levels are shown in Figures 4.7, highlighting the progress made. However, with the projected increases in people and jobs by 2050, strategic regional planning must remain focused on reducing vehicle emissions to preserve healthy air quality.

## Natural Hazards Resiliency

The region has been adversely affected by natural hazards and weather events like extreme heat waves, severe wind, and flooding from coastal storms or heavy precipitation. Planning for and adapting to the impacts of these events is critical to ensuring the region's transportation system can operate efficiently and safely.

Elvert Barnes/Flickr

**Figure 4.7:** Trends in Ozone Pollutant Levels – DC-MD-VA Air Quality Region




**Design value = 3-year average of 4th highest daily maximum 8-hour average ozone concentrations.*

Projections suggest that by 2050, DC could experience between 29 and 38 days per year with temperatures exceeding 95°F—up sharply from the observed historical average (1961-1990) of just 4.4 days per year.[23] Precipitation is expected to become more variable each year, with heavy rainfall events expected to become more frequent and intense, leading to urban flooding. Sea levels are projected to rise by approximately 1.3-1.5 ft. by 2050 and 2.5-5.2 ft. by 2100, leading to nuisance flooding.[24] While the number of storms is expected to remain the same, storm intensity is projected to increase. Though projections are uncertain, the frequency of winter conditions (i.e., snow, ice) across the mid-Atlantic could decrease; however, winter storms that do occur may be more severe, with freeze-thaw cycles causing potholes and roadway cracking. Though average and high wind speeds are difficult to project, wind intensity during storms could increase, leading to downed trees on roads and rail lines. The **Vulnerability of the Transportation System to Natural Hazards** map shows where the current transportation system is likely to be most impacted by these expected changes in extreme weather.[25]

The NCR Transportation Resilience Improvement Plan (TRIP) (2024) and the associated risk-based vulnerability assessment found that many assets across the region—including roads and highways, public transit, and active transportation—are at high risk for impacts of these types of natural hazards. The assessment found 11.3 percent of rail lines and 4.8 percent of road and highway miles are at high risk of coastal and riverine flooding, while nearly 200 bus stops are at high risk of the impacts of extreme heat.[26] As the frequency and severity of weather events are expected to increase, the region must make resilience investments to minimize potential future impacts on transportation infrastructure and disruptions to services and operations.

Ted Eytan/Flickr

A transportation system resilient to natural hazards is one that offers a range of mobility options and has infrastructure that can withstand, respond to, and recover rapidly from weather-related impacts while continuing to serve the needs of people traveling in and through the region.

## Parks and Open Spaces

Throughout the region, there are many outstanding state and local parks, National Park Service and other federal public lands, and green spaces. These assets provide environmental benefits such as pollution mitigation, stormwater management, and temperature regulation. When a planned transportation project is found to have a negative impact on these assets, expanding or enhancing nearby green infrastructure can help to mitigate impacts. Within urban areas, incorporating bioswales

23 U.S. Federal Government (2025). *U.S. Climate Resilience Toolkit Climate Explorer*. **https://crt-climate-explorer.nemac.org/climate_graphs/?city=Washington%2C+DC&county=District%2Bof%2BColumbia&area-id=11001&fips=11001&zoom=7&lat=38.9071923&lon=-77.0368707&id=days_tmax_gt_95f**

24 National Capital Region Transportation Planning Board (June 20, 2024). *National Capital Region Transportation Resilience Improvement Plan*. **https://www.mwcog.org/documents/2024/06/20/national-capital-region-transportation-resilience-improvement-plan/**

25 National Capital Region Transportation Planning Board (2023). *TPB Transportation Resilience Study*. **www.mwcog.org/V50NaturalHazardsVulnerabilityMap**

26 National Capital Region Transportation Planning Board (April 10, 2024). *National Capital Region Transportation System Climate Vulnerability Assessment*. **https://www.mwcog.org/documents/2024/04/10/national-capital-region-transportation-system-climate-vulnerability-assessment/**

Virginia State Parks/Flickr

into street redesign projects contributes to stormwater management and water filtration. Less developed communities might benefit from restoring forested areas and erosion control. Table 4.1 outlines potential mitigation activities identified in environmental studies that can be used during the transportation planning process.

Community members also experience health and well-being benefits from the region's green infrastructure, which promotes active transportation along the National Capital Trail Network and within hundreds of parks. These active transportation facilities provide mental as well as physical health benefits. Making planning decisions that improve connectivity and access to parks is essential for enhancing the quality of life.

There are also cases where green infrastructure can help buffer noise from roadways, making nearby communities more pleasant. When transportation projects negatively impact green infrastructure, actions such as selective cutting and clearing, building sound barriers, and replacing or restoring forested areas can help mitigate environmental damage (Table 4.1).

## Protected Lands

Protected lands include federal lands, agriculturally protected lands, easements and nature preserves, and lands protected at state and local levels. These lands provide the region with ecosystem services such as air and water purification, flood control, soil stabilization, and climate regulation. They also act as wildlife corridors that prevent habitat fragmentation, which can otherwise be disrupted by transportation infrastructure. Like green infrastructure, these lands offer recreational and mental health benefits for NCR communities and improving connectivity and access to them contributes to improved quality of life. Transportation projects can incorporate conservation easements, wildlife bridges, or buffer zones to reduce environmental impact (Table 4.1).

## Wetlands

The region's wetlands are critical for many plants and animals and are valuable for flood protection, water quality improvement, erosion control, and recreation. As noted in the natural hazards resiliency section of this chapter, there are communities and transportation assets that face temporary and long-term flooding challenges. Wetlands absorb and store large amounts of water that help to protect transportation infrastructure from flood damage. At the same time, wetlands help to filter pollutants and sediments before reaching the region's rivers and lakes. Transportation planning efforts should avoid damage to wetlands to maintain these benefits for the community. In cases where damage does occur, mitigation efforts such as creating or restoring wetlands, submerging culverts, bridging roads over sensitive areas, and improving storm water management should be done.

The Visualize 2050 **Environmental Inventory** map highlights the region's environmental resources.[27]


27 National Capital Region Transportation Planning Board (2025). *Visualize 2050 Environmental Consultation Environmental Inventory Mapping*. [Interactive Map]. **www.mwcog.org/V50EnviroInvMap**

**Table 4.1:** Potential Mitigation Activities Identified in Environmental Studies

| RESOURCE | POTENTIAL MITIGATION STRATEGY |
|---|---|
| **Neighborhoods and Communities, Homes, and Businesses** | ■ Minimize noise impact with sound barriers<br>■ Prevent the spread of hazardous materials, fuels, and other contaminants with soil testing and treatment<br>■ New landscaping and revegetation to restore slopes<br>■ Design rail transit vehicles to reduce noise caused by the vehicles on the track<br>■ Adjust volume controls of transit public announcement system at specific sound levels in consideration of the surrounding community |
| **Wetlands, Water Resources, and Floodplains** | ■ Replace or restore wetlands<br>■ Submerge or utilize bottomless culverts<br>■ Bridge sensitive areas instead of laying pavement directly onto the ground<br>■ Improve storm water management with continuous planting strips or rain gardens<br>■ Purchase wetland and stream restoration credits to compensate for potential impacts<br>■ Design drain structures to minimize potential increases in flood levels |
| **Forested and Other Natural Areas** | ■ Use selective cutting and clearing<br>■ Replace or restore forested areas<br>■ Preserve existing vegetation<br>■ Provide invasive plant management for impacted areas<br>■ Forest mitigation banking<br>■ Implement soil stabilization techniques and erosion and sediment controls |
| **Endangered and Threatened Species** | ■ Use selective cutting and clearing<br>■ Bridge sensitive areas instead of laying pavement directly onto the ground<br>■ Replace or restore forested areas<br>■ Design drainage structures to minimize obstructions to aquatic wildlife movements |
| **Air Quality** | ■ Control loose exposed soils with watering or canvas sheets<br>■ Minimize idling of heavy construction vehicles<br>■ Implement dust control measures |

# Public Health

Transportation directly impacts public health. Air pollution from mobile sources weakens the immune system and fuels inflammation in the lungs and respiratory tract, adding to the risk of respiratory and cardiovascular diseases. With the region expecting an increase of over 20 percent more residents and jobs by 2050, air quality and emissions challenges will persist. Safety is also a significant public health challenge, with pedestrian deaths rising more rapidly than other traffic fatalities, and both the number and rate of motorist fatalities also increasing (See Safety in Chapter 3).

John Brighenti/Flickr

## Physical Health

Transportation and physical health are closely connected in several ways:

- Death or serious injury possibilities due to safety or security issues while traveling
- Respiratory health concerns from automobile and truck impacts on air quality
- Active mobility options reducing obesity and other health issues
- Access to physical fitness destinations and healthy food options

Neighborhoods closer to congested or high-traffic roadways are more likely to experience negative impacts from vehicle emissions. In the National Capital Region, communities closer to the region's core, interstates, or major highways experience greater exposure than those in outer suburban or rural areas. The proximity to major roadways contributes to this disparity, leading to higher rates of asthma, cancer, heart disease, and overall lower life expectancies. Because property values are often lower in these vulnerable areas, lower-income individuals and families disproportionately bear the burden of transportation-related public health impacts.

Walking and biking are often not viable transportation options when distances to destinations are long. When personal automobiles are the primary or most efficient means of getting around, there is an increased risk of obesity and other health issues.[28] Accessing healthy foods, green spaces, healthcare, and recreational areas is more challenging where multimodal options are limited, and vehicle ownership is essential.

## Mental Health

The region's transportation systems influence mental health through factors like commute times, access to social services, and opportunities for social interaction. People with limited incomes may struggle to afford a car, public transit fares, or highway tolls. They may also lack easy access to bus stops or Metrorail stations, often facing long, stressful commutes with multiple transfers. The resulting stress and sedentary time can harm people's mental health, regardless of socioeconomic status.

# Emerging Technologies

Every day, many people and businesses depend on transportation-related information technology. With ongoing advancements, new technologies are increasingly integrated, enabling phones, infrastructure, and all types of vehicles to connect,

28 Frank, L. D., Andresen, M. A., & Schmid, T. L. (2004). Obesity relationships with community design, physical activity, and time spent in cars. *American journal of preventive medicine, 27*(2), 87–96. **https://doi.org/10.1016/j.amepre.2004.04.011**

monitor, and communicate about the transportation system. Understanding these trends is crucial for future planning, ensuring that regional infrastructure and operations can adapt and leverage new opportunities for improved safety, efficiency, and user experience.

## Regional Intelligent Transportation System Architecture

The Regional Intelligent Transportation System Architecture (RITSA) serves as a vital framework for the integration of emerging technologies within the transportation sector. By establishing standards for communication and data exchange, RITSA facilitates enhanced coordination among transportation and public safety agencies, particularly in addressing incidents that have multi-jurisdictional or regional impacts. This collaboration is essential for improving data-sharing systems, streamlining operational procedures, and developing effective incident response strategies.

Key components such as transit signal priority (TSP), connected and automated vehicles (CAVs), autonomous vehicles, and on-demand transportation services rely on RITSA for vehicle-to-everything (V2X) communication, data exchange, security protocols, and infrastructure integration. RITSA provides the necessary structure for data warehousing and access, which are foundational for advanced analytics. It acts as the essential blueprint that ensures emerging technologies can communicate and function cohesively across the region, thereby supporting initiatives such as congestion management, emergency response, and the preparation for new mobility options.

## Autonomous Driving, Connected and Automated Vehicles (CAVs)

Autonomous driving and connected and automated vehicles (CAVs) are rapidly transforming the landscape of urban mobility and reshaping the ways regions approach transportation planning. The six levels of vehicle automation, defined by SAE International's J3016 standard[29] and adopted by the U.S. Department of Transportation[30] range from Level 0 (no automation) to Level 5 (full automation with no human intervention). Intermediate levels, such as Level 3, still require some degree of driver engagement, while Levels 4 and 5 represent high to full autonomy. Since 2020, Level 5 autonomous ride-hailing services have been operating in Phoenix, Arizona, and have expended to major cities including Austin, Los Angeles, and San Francisco. As these services continue to scale, they have the potential to improve safety, reduce congestion, and increase transportation accessibility which align with TPB's goals.

As autonomous driving becomes more prevalent, it will be important to consider their effects on driver and vehicle behavior, safety, traffic flow, infrastructure requirements, and regulatory policies to ensure their smooth integration into the existing system. Additionally, the deployment of autonomous

Richard Vaillancourt/Flickr

29 SAE International (July 1, 2019). *J3016 Levels of Driving Automation*. **https://www.sae.org/news/2019/01/sae-updates-j3016-automated-driving-graphic**

30 National Highway Traffic Safety Administration (March 2022). *Levels of Automation*. **https://www.nhtsa.gov/sites/nhtsa.gov/files/2022-03/Levels_of_Automation_Static_022822-v4-tag.pdf**

ride-hailing services may influence public transit connectivity, curbside management, and access to transportation, requiring proactive strategies to maximize benefits while addressing potential challenges. As the region prepares for this transition, transportation agencies and policymakers will continue to play a crucial role in shaping the future of autonomous mobility.

Alongside autonomous driving services are CAVs, which are transforming transportation through advanced technologies that enable seamless vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication. The transition to CAVs may have significant impacts for mobility, traffic safety, emergency preparedness, vehicle ownership, public transit, and/or regional development. Preparing for ongoing deployment of CAVs into society will be crucial for achieving regional goals related to safety, congestion management, and system efficiency.

To support these vehicles and driving advancements, agencies in the region are investing in smart infrastructure technology. The City of Alexandria, in collaboration with Virginia Tech, is studying smart intersections to enhance road safety through data collection.[31] In Arlington County, the Intelligent Transportation System (ITS) program is improving traffic operations and paving the way for future CAV integration.[32] Streetlights in Washington, DC, are being upgraded with functionality for the streetlight system to provide public Wi-Fi access.[33] As these innovations and others unfold, anticipating their impact and ongoing technological advancements will be important to maximize their benefits.

Intelligent Transportation Systems, U.S. Department of Transportation

## Electric Vehicles/Zero-Emission Vehicles

Transitioning from internal combustion engine vehicles to EVs and zero-emission vehicles (ZEVs) is essential to substantially reduce emissions and become a more resilient region. There are challenges to adopting light-duty EVs, including vehicle cost, limited number of models available, long charging times, and a lack of reliable, publicly available charging infrastructure.


The Regional Electric Vehicle Infrastructure Implementation (REVII) Strategy **Electric Vehicle Charger Siting** map is a regional tool that guides decision-makers in prioritizing where to place charging stations to overcome these challenges.[34] Electrification of medium- and heavy-duty vehicles, aside from buses, remains in early phases of technological advancements. As of December 2023, the 110,000 registered light-duty EVs in the region are supported by 4,276 EV plugs across 1,586 publicly available charging stations.[35]

31 City of Alexandria (2024). *Virginia Tech Smart Intersections Pilot: Potomac Yard Metro Station*. **https://www.alexandriava.gov/mobility/virginia-tech-smart-intersections-pilot-potomac-yard-metro-station**

32 Arlington County (2024). *Intelligent Transportation Systems*. **https://www.arlingtonva.us/Government/Projects/Project-Types/Uncategorised/Intelligent-Transportation-Systems**

33 District Department of Transportation (2022). *Project Profile: D.C. Smart Street Lighting*. **https://ddot.dc.gov/page/streetlights**

34 National Capital Region Transportation Planning Board (Sep 4, 2024). *REVII Strategy EV Siting Parcel Review*. **www.mwcog.org/V50EVSitingMap**

35 National Capital Region Transportation Planning Board (Sep 4, 2024). *Regional Electric Vehicle Infrastructure Implementation (REVII) Strategy*. **https://www.mwcog.org/documents/2024/09/04/regional-electric-vehicle-infrastructure-implementation-revii-strategy-climate--energy-climate-change-electric-vehicles/**

As the number of EVs in the region increases, there are potential factors for planners and policy makers to address. For example, roadway maintenance needs may increase because of the increase in average vehicle weight. As fewer drivers fill up tanks at the gas stations, there will be a reduction in gas tax revenue, which is currently a primary source of roadway maintenance funds. Strategically locating charging stations in a convenient manner for drivers throughout the region, especially for people living in multifamily buildings or who do not have parking available at their homes, will also be an important consideration.

Maryland, Virgina, and DC are all taking actions to encourage EV adoption and develop a publicly available network of EV charging infrastructure. DC and Maryland have adopted ambitious EV registration goals. All three jurisdictions joined Mid-Atlantic Electrification Partnership (MAEP), along with West Virginia, to support the deployment of EVs and a regional network of EV chargers that will make it possible to seamlessly drive and charge light-, medium-, and heavy-duty EVs across transportation corridors and underserved communities.[36]

Earth and Main/Flickr

At the regional level, COG published the region's first EV-readiness plan in 2012. Within COG's EV Deployment Clearinghouse[37] is the Regional Electric Vehicle Infrastructure Implementation (REVII) Strategy. This strategy was published in August 2024 as a joint effort by TPB and COG to support the implementation of the findings from the TPB's Climate Change Mitigation Study of 2021 (CCMS) by developing a blueprint for a robust regional network of EV chargers as a major element of the region's commitment to reducing emissions from motor vehicles.[38]

Electric vehicles/zero-emission vehicles are used by many people traveling throughout the region and more widespread adoption is anticipated. Continued planning for supportive infrastructure as well as consideration of other societal implications will be important.

## Artificial Intelligence

Artificial Intelligence (AI) is making its way into the landscape of transportation planning as computers are used for more tasks traditionally done by people. By integrating AI into processes, planners can explore innovative approaches to budget and cost estimation, enhance asset management, optimize transit routes and schedules, gain deeper insights into traffic mobility, and pinpoint areas requiring safety improvements.

The Virginia Department of Transportation is launching a pilot project that will leverage AI to address the growing financial strain of roadway maintenance. By providing deeper insights into pavement lifecycles, this initiative aims to enhance decision-making and optimize long-term maintenance strategies. Outside the region, the Texas Department of Transportation has released its AI Strategic Plan,

36 Virginia Clean Cities (2024). *Mid-Atlantic Electrification Partnership*. **https://vacleancities.org/projects-and-accomplishments/mid-atlantic-electrification-partnership/**

37 Metropolitan Council of Governments (2025). *Electric Vehicle (EV) Deployment Clearinghouse*. **https://www.mwcog.org/about-us/cog-board-and-priorities/ev-clearinghouse/**

38 National Capital Region Transportation Planning Board (Sep 4, 2024). *Regional Electric Vehicle Infrastructure Implementation (REVII) Strategy*. **https://www.mwcog.org/documents/2024/09/04/regional-electric-vehicle-infrastructure-implementation-revii-strategy-climate--energy-climate-change-electric-vehicles/**

serving as a roadmap for rolling out AI over the next three years. The plan foreshadows activities that AI may assist with in the NCR, including infrastructure and traffic analysis, strategic project prioritization and optimization, dynamic traffic signal adjustments, and the review of bid documents, among other advancements.

## Drone/Automated Vehicle Deliveries

E-commerce has expanded the level of access consumers have to retailers and products, and the increased demand for goods means that new modes of freight delivery may be required. Goods delivery by drone and automated vehicles, such as the Starship robots on George Mason University's Fairfax campus, are two potential methods that may be deployed to meet delivery needs. The use of these technologies could have policy implications in various areas such as public safety. Also, the federal airspace in certain parts of the region is currently restricted, which affects drone operations. As the timeline for the deployment of these technologies is unknown, continued monitoring of the development of these and similar freight delivery technologies is important.

The concept of using drones and similar aircraft technologies is part of a larger emerging air transportation system known as Advanced Air Mobility (AAM), which is focused on moving people and cargo from point to point using innovative aircraft, technology, and air operations. AAM can generally refer to local, regional, and intraregional operations, and Urban Air Mobility (UAM) is a subset of AAM focused primarily on flight operations within urban areas. AAM/UAM rely on aircraft, predominantly drones, with electric vertical takeoff and landing (eVTOL) capabilities. As this new system matures, consideration will be needed for supporting infrastructure on the ground including siting vertiport facilities, ground access, transportation planning, and community engagement.[39]


Rob Pegoraro/Flickr

## Automated Traffic Enforcement

Automated Traffic Enforcement (ATE) generally involves use of an electronic camera to enforce traffic laws by assisting with the detection of infractions and providing photo documentation of the vehicle or driver violating the traffic law. The two most common types of automated enforcement systems are red-light cameras and automated speed enforcement cameras.

ATE systems that cite red light runners and speeders are deployed across the region, although their use varies because of differences in state laws.

The TPB has attempted to shape ATE policy to improve regional roadways. In 2021, the TPB submitted a letter to the governors of Maryland and Virginia and the mayor of DC urging that they work to establish interjurisdictional reciprocity for citations issued by ATE. The letter stated that the existing Driver License Compact between all three jurisdictions allows for reciprocity across state boundaries for citations issued by law enforcement personnel but not for citations issued by automated traffic enforcement. It called on the three states to

39 U.S. Department of Transportation Federal Aviation Administration (April 26, 2023). *Urban Air Mobility (UAM) Concept of Operations v2.0: Foundational Principles, Roles and Responsibilities, Scenarios and Operational Threads*. **https://www.faa.gov/sites/faa.gov/files/Urban%20Air%20Mobility%20%28UAM%29%20Concept%20of%20Operations%202.0_1.pdf**


User Vmzp85/Wikipedia

**The AeroTrain automated train system at Washington Dulles International Airport has been moving passengers between the Terminal station and gates since 2010.**

"...work collaboratively to create a multijurisdictional safety taskforce to work toward an agreement on reciprocity for automated traffic enforcement citations..."[40]

The TPB renewed its interest in establishing automated traffic reciprocity at its October 2024 Regional Roadway Safety Summit, where attendees recommended that the TPB partner with COG to explore a multijurisdictional arrangement for reciprocity of automated enforcement. This recommendation was affirmed by the TPB in November 2024, and the TPB continues to pursue this action.

## Automatic Train Operation

Automatic Train Operation (ATO) is recognized globally as an industry standard and best practice for transit operations worldwide due to its energy-saving benefits, optimized acceleration and braking, and enhanced operator efficiency. The WMATA Metrorail system was designed in the 1970s with then state-of-the-art automatic operation, but technological capabilities and the aging of the system limited effectiveness. In recent years, WMATA has pursued the phased reintroduction of semi-automated ATO, including Automatic Door Operation, which reduces dwell time by 10-15 seconds at each stop. As a semi-automatic system, ATO assists train operators by managing key functions, allowing them to focus more on monitoring safety concerns and their surroundings, including track conditions, train status, and door operations. A system with ATO is more efficient and better equipped to handle higher passenger capacities.

The current ATO system still relies on obsolescent technology and its modernization is a priority for WMATA. The DMV*Moves* transit initiative is facilitating regional discussions to identify funding for advanced,

40 National Capital Region Transportation Planning Board (Dec 15, 2021). *Letter in Support of Establishing Interjurisdictional Reciprocity of automated Enforcement Citations*. **https://www.mwcog.org/documents/2021/12/15/letter-in-support-of-establishing-interjurisdictional-reciprocity-of-automated-enforcement-citations-traffic-safety/**

fully automated ATO in use elsewhere globally, which could lead to driverless trains in the future. An upgraded ATO system would feature improved train operation technology and platform screen doors in all stations, which would improve the safety, speed, and reliability of the Metrorail system, improving the traveler experience as well as providing operational and cost efficiencies.

## On-Demand Transit/Microtransit

A modern form of demand response transit, microtransit offers customers the opportunity to book a shared ride between dynamic pickup and drop-off points that are set based on the needs of multiple riders on a route. Typically, microtransit operates within designated service zones, uses small vehicles, and primarily uses a mobile app to schedule and manage rides. What makes these services unique is the technological convenience of booking trips through an app, with options available within minutes, hours, or even days. This contrasts to how many Dial-A-Ride services have operated traditionally where customers would perhaps need to schedule the trip at least 24 hours in advance.

Microtransit has become increasingly popular because customers have more control over the routes and lengths of their trips. For transit agencies, microtransit offers a cost-effective way to provide service in areas with low fixed-route ridership, requiring less capital investment, and potentially lower operating costs than traditional fixed-route services. However, microtransit is generally not the most efficient way of moving people due to the limited seating capacity per vehicle. This also means that the operating costs per vehicle revenue mile or hour will likely be higher than that of a fixed-route bus service. As a result, microtransit may be more effective as a strategic coverage solution or in specific contexts, rather than as a replacement for traditional transit in densely populated areas with high ridership potential.

The region features three microtransit services across Virginia and Maryland: Montgomery County's Ride On Flex, OmniRide Connect in Prince William County, and Prince George's County's Link. As of spring 2025, Arlington and Loudoun counties also have microtransit services planned.


User Rainclaw7/Wikimedia Commons

# Chapter 5:
# Financial Plan for Future Investments

The Visualize 2050 financial plan focuses on reporting government expenditures to maintain and expand the public road and transit system. In keeping with federal regulations, all the projects and programs included in Visualize 2050 must demonstrate that the funds needed to build, maintain and operate them are reasonably expected to be available. As such, this plan is fiscally constrained and reflects transportation investment decisions made at this time.

Funding for transportation projects and programs and for ongoing operation of the region's system—from highways and local roads, rail and bus transit, to sidewalks and trails—comes from a variety of federal, state, and local sources. Federal aid makes up a small share but funds a large part of new and major projects. States are the primary funding agencies, raising revenues from motor fuel taxes, vehicle registration fees and vehicle taxes, and other sources. Local governments, authorities, and agencies collect property taxes and user fees—such as tolls and fares—to fund operations and local projects. Five local jurisdictions in Virginia also pay the Northern Virginia Transportation Commission's (NVTC) regional gas tax to support funding for Washington Metropolitan Area Transit Authority (WMATA) and Viriginia Railway Express (VRE).

Elvert Barnes/Flickr

Rachel Beyerle/COG

As projects and programs were identified for inclusion in Visualize 2050, sponsor agencies provided estimates of capital and operating costs and identified the source of funding. In making these projections, agencies had to consider various factors affecting the estimation of funding sources and costs. Agencies considered the rising costs of project construction, especially since the COVID-19 pandemic, and the financial sustainability of maintenance and operations, especially transit system operations.

Additional challenges that could impact funding availability include changes in the economy, the price of motor fuel, motor vehicle fuel efficiencies, and the shift towards remote work and electric vehicles affecting fuel usage. Governments at all levels have been exploring alternative means of raising transportation revenues considering the above variables and reviewing best practices to achieve greater cost efficiencies in capital and operational programs through various commissions and initiatives.

Government transportation funding is limited and must be strategically allocated to meet current demands and future needs. The TPB places a strong emphasis on maintaining and preserving the existing transportation system, prioritizing system upkeep over expansion, and dedicating a significant share of funding to its maintenance.

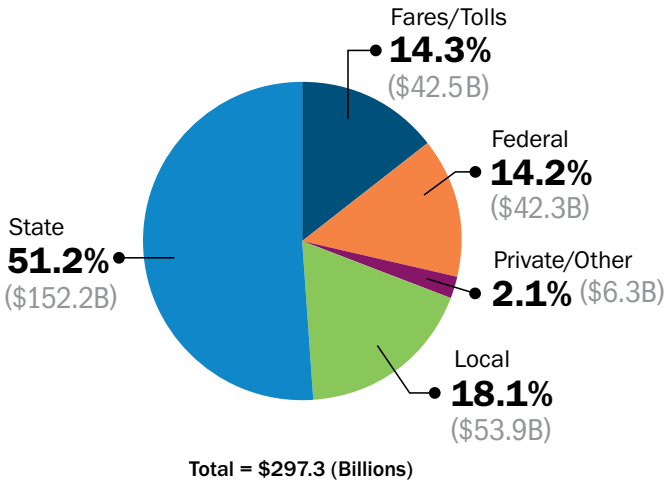
Financial analysis confirms that the Visualize 2050 plan, covering 2026 to 2050, is financially constrained by finding that forecasted revenues are reasonably expected to be available to cover the estimated costs of operating, maintaining, and moderately expanding the region's multimodal transportation system. More details of this process are available in the financial planning process documentation of Visualize 2050, including a discussion on the TPB's zero-based budgeting (ZBB) activity which required member agencies to re-evaluate and resubmit their planned projects and programs to align with the TPB's goals and other policy priorities.

## Expected Revenues 2026-2050

State departments of transportation, public transportation providers, transportation agencies, jurisdictions, and the TPB cooperatively developed reasonable estimates of funds that will be available over the next 25 years to support the implementation of the region's planned projects, programs, and services.

As illustrated in Figure 5.1 and detailed in Table 5.1, the financial plan consists of five key revenue sources: federal, state, regional/local, private/other, and fares/tolls. Federal funds account for 14 percent of total revenue, and the share generated from user fees such as fares and tolls account for 14 percent. State funding, including the District of Columbia, constitutes the largest share at 51 percent. Local funding, primarily in Northern Virginia due to the transportation funding responsibilities of regional agencies and local jurisdictions in the Commonwealth, constitutes 18 percent, coming from such sources as regional sales taxes, property transfer taxes, and transient occupancy (i.e., hotel) taxes; while bonds, private investments, and other sources collectively make up the remaining two percent.

**Figure 5.1** Revenues by Funding Source in Year of Expenditure Dollars (Billions), 2026-2050




Passage of the Infrastructure Investment and Jobs Act (IIJA) in November 2021 reauthorized federal surface transportation funding for five years, significantly increasing federal financial support. The federal transportation legislation also carried forward the Passenger Rail Investment and Improvement Act (PRIIA) through 2030 which provides $150 million for WMATA rehabilitation and is matched by $150 million in state funds ($50 million each from DC, MD, and VA) annually. With the IIJA expiring in 2026, Congress and interested parties are already at work on a new five-year surface transportation bill.

The Visualize 2050 financial plan reflects the current sources and levels of these various funds and assumes their availability through 2050 with moderate growth. Although future changes in funding sources, levels, and priorities are possible, especially with each new federal surface transportation authorization, the financial plan considers it reasonable to assume current revenue arrangements, given the absence of a definitive basis for predicting such changes.

**Table 5.1:** Revenues by Funding Source and Mode in Year of Expenditure Dollars (Millions), 2026-2050

| | Federal | State/DC | Local | Private/Other | Fares/Tolls | TOTAL |
|---|---|---|---|---|---|---|
| ***District of Columbia*** | | | | | | |
| Highway, Bicycle, & Pedestrian | $7,261 | $4,322 | $0 | $0 | $0 | $11,583 |
| Local Transit | $0 | $127 | $0 | $0 | $4 | $130 |
| Commuter Rail | $0 | $0 | $0 | $0 | $0 | $0 |
| WMATA Support | $0 | $37,513 | $0 | $0 | $0 | $37,513 |
| **Sub-Total** | **$7,261** | **$41,961** | **$0** | **$0** | **$4** | **$49,226** |
| ***Suburban Maryland*** | | | | | | |
| Highway, Bicycle, & Pedestrian | $5,124 | $17,816 | $0 | $0 | $7,200 | $30,140 |
| Local Transit | $1,481 | $5,854 | $9,905 | $0 | $1,529 | $18,769 |
| Commuter Rail | $1,807 | $8,343 | $0 | $0 | $479 | $10,629 |
| WMATA Support | $0 | $34,563 | $0 | $0 | $0 | $34,563 |
| **Sub-Total** | **$8,412** | **$66,576** | **$9,905** | **$0** | **$9,208** | **$94,101** |
| ***Northern Virginia*** | | | | | | |
| Highway, Bicycle, & Pedestrian | $2,739 | $20,929 | $13,051 | $626 | $1,067 | $38,413 |
| Local Transit | $1,967 | $3,507 | $15,138 | $954 | $1,512 | $23,077 |
| Commuter Rail | $1,458 | $6,656 | $3,512 | $37 | $3,267 | $14,930 |
| WMATA Support | $0 | $12,585 | $12,332 | $1,993 | $0 | $26,910 |
| **Sub-Total** | **$6,164** | **$43,676** | **$44,034** | **$3,610** | **$5,846** | **$103,330** |
| ***Other WMATA Support*** | | | | | | |
| Fares, Grants, & Regional | $20,493 | $0 | $0 | $2,653 | $27,475 | $50,621 |
| **Sub-Total** | **$20,493** | **$0** | **$0** | **$2,653** | **$27,475** | **$50,621** |
| **GRAND TOTAL** | **$42,330** | **$152,213** | **$53,939** | **$6,263** | **$42,533** | **$297,277** |

***Revenues - WMATA Summary***

| | Federal | State/DC | Local | Private/Other | Fares/Tolls | TOTAL |
|---|---|---|---|---|---|---|
| Capital | $20,493 | $23,146 | $3,406 | $3,749 | $0 | $50,794 |
| Operating | $0 | $61,515 | $8,926 | $897 | $27,475 | $98,813 |
| **Sub-Total WMATA** | **$20,493** | **$84,661** | **$12,332** | **$4,646** | **$27,475** | **$149,607** |

***Revenues - Modal Summary***

| | Federal | State/DC | Local | Private/Other | Fares/Tolls | TOTAL |
|---|---|---|---|---|---|---|
| Highway, Bicycle, & Pedestrian | $15,124 | $43,066 | $13,051 | $626 | $8,267 | **$80,135** |
| Local Transit | $3,448 | $9,487 | $25,044 | $954 | $3,044 | **$41,977** |
| Commuter Rail | $3,265 | $14,999 | $3,512 | $37 | $3,746 | **$25,559** |
| WMATA Support | $20,493 | $84,661 | $12,332 | $4,646 | $27,475 | **$149,607** |

## Planned Expenditures Through 2050

Planned expenditures are the infrastructure improvements to the region's multimodal transportation system as well as programs and services that transportation agencies expect to be able to afford and implement through 2050. The financial analysis forecasts the costs of operating, maintaining, and expanding the transportation system; thus, the financial plan includes three main funding categories:

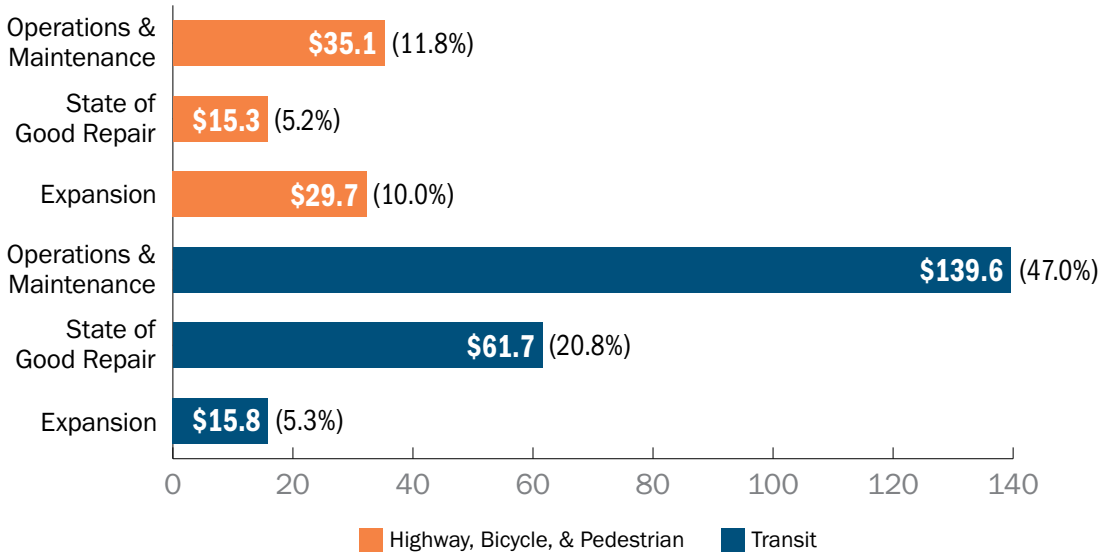
1. **Operations and Maintenance (O&M)**: Day-to-day activities like repaving roadways, upgrading bicycle and pedestrian facilities, inspecting and maintaining bridges, clearing snow and debris, servicing transit vehicles, maintaining and operating traffic signals, and paying train and bus operators.
2. **State of Good Repair (SGR)**: Major rehabilitation or complete replacement of aging infrastructure, including bridges, transit vehicles, and technology and communications systems, as they near the end of their useful lifespan.
3. **System Expansion**: Infrastructure improvements that add new capacity by increasing the number of lane miles of vehicle, bicycle, or pedestrian accommodations or by building new transit lines or adding service to existing lines.

These categories reflect the nature of matching available revenue, often referred to as "funding silos," to different expenditure streams allocated for specific types of investments. The region's planned expenditures are summarized for highway and transit modes including related bicycle and pedestrian improvements. Figure 5.2 and Table 5.2 show where anticipated funding will be devoted to improving regional transportation through 2050.

### WHAT ARE FUNDING SILOS?

**Transportation funding is not one "pot" of money that can be spent on any transportation project, program, or service. Federal and state laws and policies dictate where and how transportation funds can be applied, which separates the funding available into "silos."**

**Figure 5.2:** Expenditures by Type and Mode in Year of Expenditure Dollars (Billions), 2026-2050



A total of $297.3 billion in transportation expenditures is projected for the region between 2026 and 2050. More than three quarters (85 percent) of this—$251.8 billion—will be allocated to O&M and SGR expenses to upkeep the current system's bridges, pavements, transit vehicles, rail tracks, and other assets. Less than a quarter (15 percent) of this—$45.5 billion—will be dedicated to expanding the transportation network.

When the total forecast expenditures are broken down by mode, public transportation is projected to have the majority share—73 percent of total funding. This includes 50 percent for WMATA and 23 percent for other public transit services. Of the total investment in public transportation, 64 percent is expected to support O&M, 28 percent for SGR, and seven percent to expand the transit network.

The limited funding available for system expansion, as described above, necessitates strategic investments that meet the demands to create an efficient and resilient transportation system that aligns with shared regional goals. Additionally, the federal regulations calling for the plan to be financially constrained requires balancing revenues and expenditures between O&M, SGR, and expansion and modernization.

WMATA's forecast financial needs through 2050 for both O&M and SGR, as identified in WMATA's Capital Needs Inventory, face constraints. While current services can be provided into the future, funding for critical modernization and safety improvements and for capacity increases to meet the region's growth has not been identified. The Metropolitan Washington Council of Governments (COG) and WMATA convened the DMV*Moves* regional transit initiative in early 2024 to bring together elected and appointed officials to develop regional goals for transit, specify actions for improved regional integration, identify funding needs, and agree on new funding proposals.

The COG and WMATA Boards of Directors endorsed the DMV*Moves* Plan on November 17, 2025 which calls for an additional $460 million a year of capital funding for WMATA to modernize the region's transit system. If legislatively enacted, this would provide an additional $24.3 billion through 2050, an increase of 48 percent above the $50.8 billion of WMATA's capital expenditures in Visualize 2050. Following local and state action, new funding would be reflected in future Visualize plans.

The plan identifies funding for the construction of significant capital transit projects, including the completion of the *Purple Line Light Rail Transitway: Bethesda Metro Station to New Carrollton Metro Station* in Maryland. Highways account for 27 percent of total expenditures in the plan. Of this amount, 37 percent is allocated to highway expansion, including funding for bicycle and pedestrian improvements which are typically either built with roadway projects or as off-road trails. Another 44 percent of highway expenditure will go towards system O&M and the remaining 19 percent for SGR.

Funding investment decisions are not made by the TPB itself; instead, they are made by state, local, and sub-regional bodies within the TPB's member jurisdictions, guided by the regional transportation goals and values adopted by the TPB, along with other considerations. These funding decisions are then approved by the TPB where federal funds for all projects and state, local, and other funds for projects that change the transportation systems' capacity are otherwise required to be included in the TPB's metropolitan transportation plan, such as Visualize 2050.

The intent to expend funds in the near-term from the long-term Visualize 2050 financial plan are reflected in the TPB's Transportation Improvement Program (TIP) for fiscal years 2026-2029 which can be found online at visualize2050.org/plan-resource. The TIP includes the planned obligations for expenditures which have secured funding through federal and other sources and are actively being implemented in the short-term. Beyond the FY 2026-2029 TIP, reasonably anticipated funding in FY 2030-2050 is identified for planned expenditures in the longer-term based on projected revenue sources and the priorities identified by each sponsor agency in alignment with the TPB's regional goals.

**Table 5.2:** Expenditures by Type and Mode in Year of Expenditure Dollars (Millions), 2026-2050

| | Operations / Maintenance | State of Good Repair | Expansion | TOTAL |
|---|---|---|---|---|
| ***District of Columbia*** | | | | |
| Highway, Bicycle, & Pedestrian | $5,518 | $5,424 | $641 | $11,583 |
| Local Transit | $12 | $16 | $102 | $130 |
| Commuter Rail | $0 | $0 | $0 | $0 |
| WMATA Support | $27,587 | $9,528 | $397 | $37,513 |
| **Sub-Total** | **$33,117** | **$14,969** | **$1,140** | **$49,226** |
| ***Suburban Maryland*** | | | | |
| Highway, Bicycle, & Pedestrian | $14,449 | $3,131 | $12,560 | $30,140 |
| Local Transit | $14,339 | $1,706 | $2,723 | $18,769 |
| Commuter Rail | $3,805 | $1,467 | $5,358 | $10,629 |
| WMATA Support | $25,346 | $8,849 | $369 | $34,563 |
| **Sub-Total** | **$57,938** | **$15,152** | **$21,010** | **$94,101** |
| ***Northern Virginia*** | | | | |
| Highway, Bicycle, & Pedestrian | $15,110 | $6,790 | $16,513 | $38,413 |
| Local Transit | $14,107 | $7,178 | $1,791 | $23,077 |
| Commuter Rail | $8,555 | $2,713 | $3,662 | $14,930 |
| WMATA Support | $18,405 | $8,165 | $340 | $26,910 |
| **Sub-Total** | **$56,177** | **$24,847** | **$22,306** | **$103,330** |
| ***Other WMATA Support*** | | | | |
| **Sub-Total** | **$27,475** | **$22,088** | **$1,058** | **$50,621** |
| **GRAND TOTAL** | **$174,707** | **$77,055** | **$45,515** | **$297,277** |

***Expenditures - WMATA Summary***

| | Operations / Maintenance | State of Good Repair | Expansion | TOTAL |
|---|---|---|---|---|
| DC | $27,587 | $9,528 | $397 | $37,513 |
| Maryland | $25,346 | $8,849 | $369 | $34,563 |
| Virginia | $18,405 | $8,165 | $340 | $26,910 |
| Other WMATA | $27,475 | $22,088 | $1,058 | $50,621 |
| **Sub-Total WMATA** | ***$98,813*** | ***$48,630*** | ***$2,164*** | ***$149,607*** |

***Expenditures - Modal Summary***

| | Operations / Maintenance | State of Good Repair | Expansion | TOTAL |
|---|---|---|---|---|
| **Highway, Bicycle, & Pedestrian** | **$35,076** | **$15,344** | **$29,714** | ***$80,135*** |
| **All Transit** | **$139,631** | **$61,711** | **$15,801** | ***$217,142*** |
| *Local Transit* | $28,459 | $8,901 | $4,617 | ***$41,976*** |
| *Commuter Rail* | $12,359 | $4,180 | $9,020 | ***$25,559*** |
| *WMATA Support* | $98,813 | $48,630 | $2,164 | ***$149,607*** |

## Project and Program Expenditure Details

TPB member agencies will construct projects and implement a variety of programs, including the operation of transit services, to better serve residents, employees, and visitors' need to access places throughout the region. The financial plan and the ***Future Transportation Investments in Projects and Programs*** list includes three different types of records:


1. **Discrete projects (one)**: An activity with a scope of work, specific location, to/from limits, a total project cost, and finite completion year. Discrete projects will typically program funds for planning & engineering, right-of-way acquisition, and construction phases.
2. **Project groupings (more than one)**: Multiple discrete projects, or component projects, from two to 300+, typically non-regionally significant (NRS) and captured together under one record listing due to similar project scopes or types of funding.
3. **Ongoing programs**: Operational or capital activities that are NRS for air quality analysis and are anticipated to continue indefinitely with annual expenses. These programs are often funded at or near the same level from year to year, typically adjusted to account for inflation.

**NOTE**: For a complete list of all expenditures included in the Visualize 2050 financial plan along with total costs, completion dates, and other information visit visualize2050.org. Expenditure details are subject to change over time as projects are refined.

A full accounting of the Visualize 2050 financial plan expenditures on discrete projects, project groupings, and ongoing programs can be found in the **Future Transportation Investments in Projects and Programs** list on the Visualize 2050 website along with a link to more expenditure details available via the **TPB's Project InfoTrak database**[1]. Regionally significant projects that may affect future air quality (RSAQ) by adding or removing highway or transit capacity are identified in the expenditures list and used in the air quality conformity analysis.

**Table 5.3:** Project/Program Alignment with TPB Goals per Sponsor Responses

| | SAFETY | WELL-MAINTAINED INFRASTRUCTURE | TRAVEL TIME RELIABILITY | EFFICIENT SYSTEM OPERATIONS | AFFORDABLE AND CONVENIENT MOBILITY OPTIONS | ENVIRONMENTAL PROTECTION | RESILIENT REGION | LIVABLE AND PROSPEROUS COMMUNITIES |
|---|---|---|---|---|---|---|---|---|
| Discrete Projects | 241 | 184 | 274 | 166 | 274 | 129 | 125 | 206 |
| Project Groupings | 31 | 27 | 27 | 17 | 27 | 24 | 12 | 24 |
| Ongoing Programs | 66 | 56 | 66 | 55 | 66 | 54 | 24 | 58 |
| Total | 338 | 267 | 367 | 238 | 367 | 207 | 161 | 288 |

1 TPB's Project InfoTrak Database listing all the plan expenditures may be found at **https://www.mwcog.org/ProjectInfoTrak**

A main consideration during the Visualize 2050 development process and ZBB exercise was to ensure projects/programs align with TPB goals. In many cases, a project or program supports achievement of multiple TPB goals. Per TPB staff analysis on the sponsor agency responses, all projects/programs included in Visualize 2050 align with TPB's goals. Table 5.3 shows the alignment expenditures by type with TPB goals while Table 5.4 summarizes the number of projects/programs by jurisdiction.

**Table 5.4:** Number of Projects/Programs by Type and Jurisdiction

| | Discrete Projects | Project Groupings | Ongoing Programs |
|---|---|---|---|
| **DC** | 53 | 5 | 38 |
| **MD** | 107 | 15 | 59 |
| **VA** | 195 | 20 | 44 |
| **Regional** | 0 | 6 | 1 |
| **Total** | 355 | 46 | 142 |

## Applying TPB's Priority Strategies via the Planned Expenditures

Through the Visualize 2050 ZBB activity, member agencies applied the TPB's priority strategies to select projects and program expenditures in their local context to achieve shared regional goals. Highlights of member agencies' application of TPB priority strategies are shared in the remainder of this chapter and continue into the next. Through 2050, various individual projects and programs will ensure continuous resources are available for routine pavement, bridge, and transit asset maintenance. Through these efforts, member agencies are implementing the TPB priority strategy to apply best practices to maintain the transportation system, such as bridge and pavement management and transit asset management.

**PRIORITY STRATEGY:**
**Apply best practices to maintain the transportation system such as bridge and pavement management and transit asset management.**

Rehabilitation is important for extending a bridge's lifespan before more extensive reconstruction is needed. In Washington, DC, the *14th Street/U.S. 1 Bridge Rehabilitations over Maine Avenue, the Outlet Channel, and Haines Point Park* (T5342) is making structural repairs on multiple segments to support the critical link between DC and Virginia. This effort will extend the corridor's useful lifespan and ensure it can continue connecting the region for years to come. Built in 1977, the H Street NE bridge in DC will undergo essential reconstruction (T6039) that will also provide increased capacity for rail operations below. Best maintenance practices also involve preventative measures like those included in Prince George's County *Major Drainage and Flood Control Improvements* (T11593). To get ahead of flooding incidents that further erode infrastructure and disrupt travel, this ongoing program will fund the redesign, reconstruction, and rehabilitation of major drainage and flood control projects throughout the county.

Transit assets, like buses, rail cars, tracks, locomotives, and facilities, require continuous investments and upgrades to ensure they can keep operating. As buses and trains near the end of their

Pierre Gaunaurd/COG

useful lives, agencies are making the necessary investments to update or replace fleets. The Potomac and Rappahannock Transportation Commission (PRTC) is doing just that through the *OmniRide Bus Replacement* (CE2714) and *PRTC Transit Center Upgrades* (CE3023) programs. With these funds, the OmniRide bus service will overhaul its vintage fleet by rebuilding several bus engines to lengthen their useful lives. The facility to house and maintain these buses is 16 years old and will undergo several projects to keep the facility in a state of good repair. As investments like these are implemented, the TPB will continue to monitor the performance of bridges, pavements, and transit assets to assess the extent to which the region is meeting its performance targets and highway and transit maintenance goals.

**PRIORITY STRATEGY:**
**Apply the endorsed safety strategies to design and operate safer infrastructure and encourage safer behavior.**


BeyondDC/Flickr

The safety of travelers is among the top and most pressing concerns shared across the region. Many investments in Visualize 2050 apply the endorsed safety strategies to design and operate safer infrastructure and encourage safer behavior.

Efforts to improve safety will be seen at individual project sites with intersection reconfigurations, optimized traffic flow patterns, and new traffic calming features. Safety improvements are often folded into roadway projects to accommodate the multimodal nature of the region by including protected or off-road bicycle facilities or by making improvements for pedestrian visibility. Such is the case with the *Centreville Road (VA 28) Intersection Improvements: Manassas Drive to Fairfax County Line* (CE3815) project in Fairfax County where the goal is to improve safety, operations, and pedestrian accessibility and mobility through improvements at multiple intersections along a 2.2-mile stretch. The vision includes new medians for access management, pedestrian and bicycle facilities, improved ADA accessibility, traffic signal modifications, and restricted turns.

Other funds will be put into programs that are dedicated to prioritizing resources to on-going needs, strategic spot improvements, emerging issues, or education. In Washington, DC, for instance, the *Safety Improvements Program* (CE1148-T3212) will make strategic, data-driven investments in locations with the highest number of reported bicycle and pedestrian accidents across the city. Similarly, *Prince George's County's Pedestrian Safety Improvements* (CE3410-T6370-T3642) will fund multiple projects focused on enhancing pedestrian safety, particularly along high-crash corridors and near schools. Identified improvements include, but are not limited to, new crosswalks, pedestrian hybrid beacons, pedestrian refuge islands, sidewalks, bus pull-off areas, reconfiguring bus stop placements, and ADA upgrades.

**PRIORITY STRATEGY:**
**Provide more telecommuting and other options for commuting such as vanpool or carpool and alternative work schedules.**

The priority strategy to provide more telecommuting and other options for commuting, such as vanpool or carpool and alternative work schedules, aims to reduce single occupancy vehicle (SOV) commuting. This is done by encouraging employers to offer transit

incentives, allow for telework and flexible schedules, and disincentivize driving alone to work.

At the same time, through commuter marketing and program operations, commuters are directly encouraged to change their travel behaviors with commuter assistance and incentive programs. The regionwide Commuter Connections Program effectively reduces vehicle trips and vehicle miles traveled (VMT), and its continued funding supports congestion relief by promoting an alternative to driving alone.

Elvert Barnes/Flickr

In Maryland, the *Ridesharing Statewide Program* (CE1265-T3760) will continue to promote and encourage the establishment of carpools and vanpools by funding the activities of the ridesharing unit of the Statewide Transportation Program, including ridematching coordination. Many projects promote alternatives to SOV travel; however, no single project can be expected to reduce vehicle miles traveled (VMT) in a significant manner at the regional level. It is instead the collection of projects together that make other options for commuting more feasible.

**PRIORITY STRATEGY:**
**Implement Transportation Systems Management and Operations (TSMO) measures at all eligible locations.**

Transportation Systems Management and Operations (TSMO) measures are applied to improve traffic flow and safety by optimizing the performance of existing facilities, rather than relying solely on new construction or expansion. As a priority strategy to implement TSMO measures at all eligible locations, member agencies are applying a wide variety of solutions to fit their local contexts.


Automated Safety Camera Program/DDOT

An important element of managing traffic flow is the programming of traffic signals. Old traffic signal control technology needs to be updated like any other transportation asset. In Alexandria, Virginia, the *Traffic Adaptive Signal Control* program (CE3526-CE3611) will fund the replacement of their 30-year-old system with a new one that utilizes vehicle sensing technology and that has transit priority capabilities.

In Washington, DC, a similar program, *Traffic Operations Improvements* (CE1151-T32160), will upgrade vehicle and pedestrian traffic control systems, add new pavement markings, and enhance traffic management center operations to improve the efficiency of the city's existing street network. Alongside this, the *Traffic Camera Upgrades* program (CE3869) will modernize DC's traffic camera network to better support traffic management, safety monitoring, and the enforcement of speed limits and red-light laws.

To meet Montgomery County's transportation management needs, the ongoing *Advanced Transportation Management System* program (T3065) will integrate Intelligent Transportation Systems (ITS) to improve traffic control through

adaptive signals and GPS, monitor real-time traffic conditions, and actively inform travelers about incidents using Travelers Advisory Radio (TARS) and live broadcasts.

**PRIORITY STRATEGY:**
**Apply effective technologies that advance the TPB's goals.**

Agencies across the region are actively adopting new and updated technologies to improve transportation system performance and advance the TPB's goals. These efforts span a broad spectrum of applications, from enhancing safety and mobility to supporting sustainability and freight efficiency.

To reduce overweight freight violations and roadway infrastructure, Washington, DC, is launching the *Freight Size and Weight Enforcement Program* (CE3265-T2633). The program will expand the use of portable scales, helping to prevent pavement damage caused by overweight vehicles.

Funding for *VRE Information Technology Improvements* (T4802) will give riders of VRE real-time multimodal traveler information and an upgraded variable message system. Other technologies are being incorporated into larger projects, such as the *Crystal City Transitway Expansion from Crystal City Metro Station to Pentagon City Metro Station* (CE3521) where an expanded BRT route in Arlington will include solar-powered bus shelters to enhance the transit experience while reducing energy use.

Other transportation systems improvements like new LED signage, flashing pedestrian warnings, driver feedback displays, and upgraded traffic signal management systems will improve travelers' experiences throughout the region. For example, Alexandria's current traffic signal control system is 30 years old and unable to respond to evolving roadway conditions and travel demands. The *Traffic Adaptive Signal Control* project (CE3529-CE3611) will modernize the system with upgraded central control hardware and software, advanced vehicle detection, mobile device tracking for real-time and historical traffic data, and adaptive signal controls to enhance overall traffic flow and improve transit operations.

Arlington DES/Flickr

As demonstrated through the implementation of the TPB priority strategies highlighted, the Visualize 2050 financial plan is more than just a collection of costs and expenditures—it serves as a strategic blueprint for shaping the region's future transportation system. It reflects how the region is addressing current challenges and sets the course for meeting the needs of both current and future populations. The investment in hundreds of additional projects and programs will influence the mobility, accessibility, reliability, safety, and sustainability of the entire system across all modes of travel. The next chapter continues with highlighting how TPB member agencies are implementing TPB priority strategies, exploring how these planned investments will enhance the region's multimodal transportation system, and examining how the 2050 network will perform according to regional metrics, including travel time reliability, congestion, mode share, and emissions.

# Chapter 6:
# 2050 System & Performance

The substantial investments planned for the region's multimodal transportation system through 2050 will feature new elements—many of which will help address current transportation performance challenges highlighted in Chapter 3. This chapter will explore each mode of the 2050 transportation system, the system's anticipated performance, as measured through extensive travel demand model analysis from 2025 (Today) to 2050, and how transportation agencies are applying TPB's priority strategies.

As in Chapter 5, some of the region's planned projects are highlighted in this chapter to showcase the implementation of strategies, and the full listing can be found on the visualize2050.org website. As shown in the future system performance analysis, the characteristics of the region's existing transportation system, including the level of service experienced, the increased demand on the system due to the forecast increase in people and jobs, and the impact of regionally significant transportation projects planned to be implemented drive what is expected from the region's transportation system in 2050.

## Future Transportation Network

The region's future transportation network in 2050 will feature new elements for all modes and travelers, such as 530 miles of new roadway and 100 miles and 99 stations of High-Capacity Transit (HCT). The **Future Transportation System** map displays all mappable, programmed investments scheduled for construction in the short term (through FY 2029) and those reasonably anticipated in the long term (through FY 2050).[1]


Based on the 2020 Census, the National Capital Region is the 6th largest metropolitan area in the U.S.[2] Between 2025 and 2050, it is predicted that 1.2 million more people and 800,000 more jobs will be added to the region, a 21 and 24 percent increase, respectively, indicating that most of the anticipated number of people and jobs in 2050 are already present in 2025.


robpegoraro/Flickr

1 National Capital Region Transportation Planning Board (2025). Visualize 2050: Future Transportation System. [Interactive Map]. **https://www.mwcog.org/V50FutureTransportationMap**

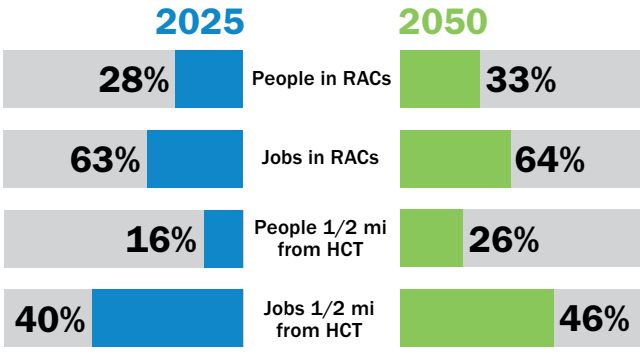
2 Rosenberg, Matt (June 7, 2024). *Which Metropolitan Areas in the United States Have the Largest Populations?* **https://www.thoughtco.com/largest-metropolitan-areas-1435135**

**PRIORITY STRATEGY:**
**Bring jobs and housing closer together by focusing growth and adding housing units in Regional Activity Centers and near High-Capacity Transit stations.**

The priority strategy to bring jobs and housing closer together is aimed at providing options for people to travel and reducing the need for automobile travel, particularly in single-occupant vehicles (SOV). This is a proven strategy to improve mobility, accessibility, and conserve natural resources.

As housing and jobs are projected to grow, they will be located closer together. This is a result of local zoning and development policies that emphasize Regional Activity Centers (RACs) and areas close to HCT stations. Transportation investments further reinforce these priorities by focusing on existing RACs, transit, and non-motorized travel, aligning with the TPB priority strategy to promote land use patterns that make the best use of the network.

**Figure 6.1:** Percent of People and Jobs in Regional Activity Centers and near High-Capacity Transit, Today and 2050




Visualize 2050 advances this strategy in several ways, including by designing streets that accommodate multiple travel modes and support more intensive land uses, filling in gaps in pedestrian/bicycle facilities, and investing in safety and access improvements near HCT stations. Figure 6.1 shows the anticipated impacts of targeted development and growth in RACs and HCT stations.

## Roadways

By 2050, capacity changes to the region's transportation system will result in 530 new lane miles of roadway. These capacity projects will take the form of newly constructed roads, extended roads, or added general-purpose, electronic toll, or High-Occupancy Toll (HOT) lanes along existing routes.


The number of additional roadway lane miles, by type, is summarized in Table 6.1 and visualized regionwide in the **Future Roadway Network** map.[3] The changes to roadway capacity fulfill local comprehensive or state transportation plans, and improve motor vehicle access to daily needs. Although automobiles make the most use of roadways, the multimodal nature of the region is evident in new roadway projects, which increasingly include infrastructure for buses, cyclists, and pedestrians.

In the region's core, particularly Washington, DC, and other dense RACs, safety and mobility challenges are sometimes addressed by repurposing existing roadway space to accommodate a wider range of transportation modes. In contrast, the outer suburbs of Maryland and Virginia have more flexibility to expand the roadway network through widening, extensions, or new construction. However, these areas are also increasingly pursuing alternatives to roadway expansion, including multimodal and demand management strategies.

3 National Capital Region Transportation Planning Board (2025). *Future Roadway Map*. **http://www.mwcog.org/V50FutureRoadwayMap**

**Table 6.1:** Roadway Facilities added to the Transportation System

| Roadway Type | Today Lane Miles | 2050 Lane Miles | Change in Lane Miles (~% Change) |
|---|---|---|---|
| **Freeways/ Expressways** | 3,824 | 4,115 | 291 (+8%) |
| *General Purpose Electronic Toll Roads* | *190* | *195* | *5 (+3%)* |
| *HOV Only* | *39* | *29* | *-10 (-26%)* |
| *HOT3+* | *255* | *336* | *81 (+32%)* |
| **Arterials** | 13,300 | 13,539 | 239 (+2%) |
| **Total** | **17,124** | **17,654** | **530 (+3%)** |

Many planned roadway projects will incorporate multimodal elements supporting alternative travel modes while also improving conditions for drivers. For example, in Tysons, VA, the *Boone Boulevard Extension: Chain Bridge Road (VA 123) to Ashgrove Lane* (CE3150), will add 1.1 miles of new roadway through existing commercial areas. This extension will provide more direct and convenient access between multiple commercial destinations, reducing the need to travel along Leesburg Pike (VA 7), which experiences congestion. The project will also enhance connectivity for non-motorized travelers by incorporating bicycle and pedestrian facilities. As part of the Tysons Grid of Streets, the extension will contribute to a finer street network with shorter block lengths, supporting a more walkable and accessible urban environment.[4]

At intersections and interchanges, many reconfigurations and traffic light system upgrades will be made to optimize traffic flow and add safety features. In Prince George's County the *I-95/I-495 Interchange at Medical Center Drive Interchange Improvements* (CE3854-T11578) will manage traffic through a diverging diamond to reduce conflict points between vehicles, improve traffic operations, support

Kenneth Candelaria/Flickr

future development, and improve pedestrian and bicycle connectivity with new shared-use paths.

Washington, DC, is rolling out a comprehensive traffic operations program (CE1151-T3216) aimed at improving vehicle and pedestrian mobility through strategic modifications to traffic signals, channelization, signage, and pavement markings. Emergency responders will also benefit from the region's evolving traffic signal system, which will increasingly incorporate smart signals capable of communicating directly with their vehicles to improve response times and safety. All these efforts will calibrate intersections and traffic management systems with the changing travel patterns from roadway improvements.

**PRIORITY STRATEGY: Expand the express highway network, with rapid transit, and allow carpool/vanpool to ride free.**

This strategy to expand the express highway network aims to advance several goals, including providing more options for travel, reducing congestion, incentivizing ride sharing, and expanding opportunities for rapid and reliable bus travel. The region's HOT lanes, or express lanes, are designed to provide an average minimum travel speed of 45 miles per hour, offering travelers a

4 Fairfax County (2022). *Transportation – Transforming the Existing System*. **https://www.fairfaxcounty.gov/tysons/transportation-transforming-existing-system**

faster and more reliable option for a fee. By diverting vehicles from the general purposes lanes, HOT lanes help facilitate less congested travel on those lanes. They also encourage carpooling and transit use, as buses and vehicles with three or more people can use them free of charge.

On the region's interstates, drivers will be able to make use of over 85 new lane-miles of HOT lanes. The use of high-occupancy vehicle (HOV) and HOT lanes in 2050 includes the following policies:

- In Maryland, the HOV facility on U.S. 50 will remain HOV 2+ through 2050
- In Maryland, the HOV facility on I-270 will convert from HOV 2+ to HOT 3+ when the express lanes project is implemented
- In Virginia, I-66, I-95, I-395, and I-495 are all HOT 3+
- In Virginia, all HOV-only facilities will be HOV 2+

The new HOT facilities will continue to support buses by allowing them to travel for free. In Virginia and Maryland, the *I-495 Express Lanes Northern Extension Transit Operation Services: Tysons to Bethesda* (T13640) will provide funds to support the operation of the express bus service between Tysons, VA, and Bethesda, MD. The Fairfax Connector and Omniride/PRTC will continue to travel for free on the express lanes to provide faster and more reliable travel.

Freight truck drivers will be able to bypass peak hour traffic delays by using the express lanes along I-495 in Fairfax County and I-95 from Fredericksburg to Prince William County. The *I-495 Express Lanes Truck Access* project (CE3812-CE3813), spanning from the American Legion Bridge to the I-95/I-395 Interchange, will provide the necessary infrastructure upgrades to enable this access.

The remaining HOV facilities that will be HOV 2+ will continue to promote carpooling by providing dedicated lanes for vehicles with two or more people. Efforts such as these help the region achieve reliability and affordable and convenient multimodal options by implementing its priority strategy to expand the express highway network where carpools and vanpools ride for free and transit use is encouraged in express lanes.

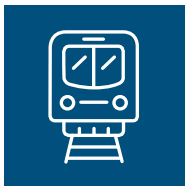
Numerous bridges tie the roadway network together and connect DC, MD, and VA. By 2050, many aging bridges will undergo a range of reconstruction and maintenance efforts to restore structural integrity. New bridges and underpasses will be built to improve multimodal connectivity such as the two planned overpasses in Reston, VA, across Dulles Toll Road (VA 267) which will create new and improved connections for drivers, cyclists, and pedestrians *Soapstone Drive New Overpass over Dulles Toll Road (VA 267): Sunrise Valley Drive to Sunset Hills Drive*, T6583, and *South Lakes Drive New Overpass over Dulles Toll Road (VA26): Sunrise Valley Drive to Sunset Hills Road*, (CE3451).


Cristina Finch/COG

**PRIORITY STRATEGY: Develop and implement an electric vehicle charging network to support the expansion of EVs.**

Driving will remain the dominant mode of travel in the region, with the number of registered light–duty vehicles projected to grow from 3.9 million to over 4.9 million by 2045, according to the TPB's Regional Electric Vehicle Infrastructure Implementation (REVII) Strategy.[5] As vehicle ownership grows, the fleet of vehicles may also become less gasoline dependent as alternative fuel, hybrid, and electric vehicles gain in popularity and account for a larger share within the region's vehicle fleet.

The number of registered electric vehicles increased by over 250 percent in the region between 2020 and 2023, making it the fastest growing vehicle category.[6] Based on these EV-adoption trends, the REVII Strategy projected that over 74,000 more publicly available chargers may be needed by 2045 beyond the 1,586 publicly available chargers in place in late-2023, with possibly over 100,000 additional chargers needed under a high EV adoption scenario.[7] To support this shift to EVs, dedicated funding from programs like the *National Electric Vehicle Infrastructure Deployment Program (NEVI)* (T13601-T11622) will help expand the regional network of publicly available EV charging stations.



## Railways

By 2050, the region's passenger rail system will expand upon the existing 304 network miles with 18 new track miles. Beyond the physical expansion, the 2050 rail transit system will also feature operational enhancements designed to modernize and improve daily transit performance, helping to implement the priority strategy to move more people on Metrorail. Table 6.2, the **Future Railway and Bus Transit Network** map, and the ***List of New HCT Stations (2050)*** showcase the transit capacity changes that will serve the region by 2050.[8]



**Table 6.2:** Railway Transit added to the Transportation System

| High-Capacity Rail Transit | Today | 2050 | New |
|---|---|---|---|
| **Metrorail Stations** | 98 | 98 | 0 |
| **Commuter Rail Stations** | 38 | 39 | 1 |
| **Streetcar/Light Rail Stations** | 8 | 34 | 26 |
| ***Total Stations*** | **144** | **171** | **27** |
| **Metrorail Miles** | 129 | 129 | 0 |
| **Commuter Rail Miles** | 173 | 173 | 0 |
| **Streetcar/Light Rail Miles** | 2 | 20 | 18 |
| ***Total Miles*** | **304** | **322** | **18** |

**PRIORITY STRATEGY: Move more people on Metrorail with more frequent services, longer trains, and expanded stations that are accessible by nonmotorized modes.**

5 ICF. *Regional Electric Vehicle Infrastructure Implementation Strategy*. Prepared for the National Capital Region Transportation Planning Board and the Metropolitan Washington Council of Governments, August 2024. **https://www.mwcog.org/documents/2024/09/04/regional-electric-vehicle-infrastructure-implementation-revii-strategy-climate--energy-climate-change-electric-vehicles/**

6 National Capital Region Transportation Planning Board Technical Committee (October 4, 2024). *Agenda Item 9: 2023 Vehicle Registration Data*. **https://www.mwcog.org/events/2024/10/4/tpb-technical-committee/**

7 Increased levels of EV adoption are represented in the Visualize 2050 technical analysis by using the EPA's assumptions that over 40 percent of light-duty vehicles sold after 2030 will be electric. These assumptions are reflected in the EPA's MOVES4 model default inputs that are based on the federal regulations and recent trends.

8 National Capital Region Transportation Planning Board (2025). *Future Railway and Bus Transit Network Map*. **http://www.mwcog.org/V50FutureTransitMap**

BeyondDC/Flickr

The most significant rail expansion will come from the *Purple Line Light Rail Transitway: Bethesda Metro Station to New Carrollton Metro Station* (CE3645-T2795), which will span 16 miles. This transformative project will provide faster, more direct, and more reliable east-west transit service for RACs in Prince George's and Montgomery Counties. Featuring 21 stations along a semi-circular route, the fixed-guideway system plans to run every 7.5 minutes during peak periods, operating in both mixed traffic and dedicated lanes to serve parts of the region that have long been disconnected from the existing rail network.[9] Moving more people on Metrorail will also be easier as the Purple Line will provide new, seamless connections to Metro's Red, Green, and Orange lines, as well as MARC, Amtrak, and local and regional bus services, allowing residents in six RACs including Silver Spring, Takoma/Langley Crossroads, and the University of Maryland to access many destinations without a car.

Emma K Alexanrda/Flickr

Several planned upgrades to Metrorail station entrances will make access easier, safer, and more direct for riders. At Bethesda Station, a long-awaited second entrance at Elm Street will provide a smooth connection between the Purple Line and Metrorail (T5560). Ballston-MU Station will gain a new western mezzanine entrance with an underground passageway, fare gates, escalators, elevators, and an attendant kiosk (CE3633). In Crystal City, a new eastern mezzanine entrance will improve access from Crystal Drive, the VRE station, and the northbound Transitway (T6670). A new pedestrian and bicycle tunnel under Georgia Avenue will offer safer, more direct access to Forest Glen Station (T5649). At the Van Dorn Station, a new multimodal bridge over the freight railroad tracks and Eisenhower Avenue will connect buses, bicyclists, and pedestrians from South Pickett Street directly to the station entrance (CE3284).

Travelers on Virginia Railway Express (VRE) and MARC commuter trains will see improved and expanded service. On the VRE, a bottleneck in Alexandria will be addressed by adding new tracks that will separate freight and passenger trains, improving freight operations while also increasing capacity and efficiency for VRE and Amtrak northbound travel into Washington, DC. Further south on the Fredericksburg Line between Lorton and Springfield, an additional track will also remove conflicts with freight trains while also increasing train speeds through curves. To complement these upgrades, *VRE Fredericksburg and Manassas Lines Service Improvements* (CE2832) will increase weekday peak-period, peak-direction service frequency to 20-minute headways, introduce limited reverse-peak and midday weekday trains, and launch new weekend service.

9 Maryland Department of Transportation (2024). *Purple Line Project Overview*. **https://www.purplelinemd.com/overview/**

Jeff Morfit/Flickr

Similarly, MARC is advancing a series of capital projects including mainline track expansions to support the potential for future run-through service into Northern Virginia, increased weekday and weekend service, and strategic enhancements to storage and maintenance facilities—enabling the deployment of longer trains for expanded seating capacity. These commuter train service enhancements will improve access to Metro and make commuter trains a more appealing option for both daily commuting and weekend travel.

Complementing the additional rail capacity and service improvements are many planned upgrades inside and around rail stations. Lighting upgrades for better visibility, upgraded security and communication systems, accessibility improvements to the platforms, and enhanced wayfinding will all contribute to a better experience for rail transit users. *New Carrollton Station Improvements* (T13654) will go above and beyond with an upgraded train hall for the existing MARC, Metrorail, and Amtrak services, while also incorporating connections to local and intercity bus services and the Purple Line light rail. Outside of New Carrollton Station, new sidewalks, bike lanes, lights, signalization, and traffic calming improvements on Garden City Drive will create a more welcoming space for all riders.

Altogether, by 2050, residents and visitors in the region will have a more robust rail transit network that offers new travel options to key destinations, more frequent service, and enhanced station amenities.

## Bus Transit

The bus network that hundreds of thousands rely on will gain nearly 80 lane miles of bus rapid transit (BRT) and 90 BRT stations, as shown in Table 6.3, on the **Future Railway and Bus Transit Network** map, and in the ***List of New HCT Stations (2050)*** online. This BRT network expansion will be accomplished by repurposing space and adding transitways along existing roadways. The 2050 BRT system will allow more buses to operate outside of general traffic where possible, reducing their reliance on roadway conditions and improving reliability along key corridors.

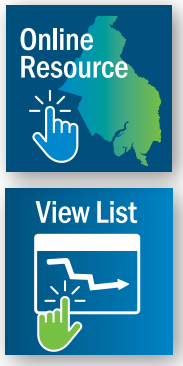



**Table 6.3:** Bus Rapid Transit added to the Transportation System

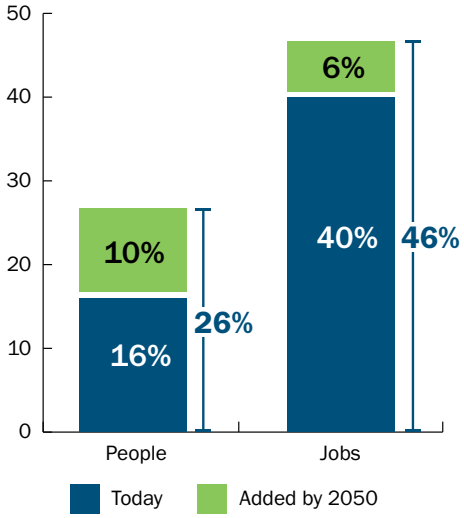
| | Today | 2050 | New |
|---|---|---|---|
| **Bus Rapid Transit Service Miles** | 14 | 93 | 79 |
| **Bus Rapid Transit Bus Stations** | 28 | 118 | 90 |

**PRIORITY STRATEGY: Increase frequency and capacity of transit by expanding bus rapid transit (BRT) and transitways across the region to provide more service to more people, especially in corridors with high demand.**

A range of other upgrades like transit signal priority for existing routes, queue jumps at targeted congested intersections, expansion of all-door boarding, optimization of bus routes and bus stop locations, and dedicated lanes or peak-hour bus lanes on existing routes are all on the docket and will help to make bus travel a more viable option for many people. With a larger BRT system and the growth in population and jobs, the share of people and jobs within 1/2 mile of HCT stations will increase by 10

percent and six percent respectively, between Today and 2050 (see Figure 6.2).

**Figure 6.2:** Share of People and Jobs 1/2 mile from High-Capacity Transit stations, Today and 2050




The region's priority strategy to increase the frequency and capacity of transit by expanding BRT and transitways across the region will be advanced with the new BRT lane miles. One such project is the *Richmond Highway (US 1) New BRT: Huntington Metrorail Station to Fort Belvoir* (T13563-T6680) in Fairfax County. About 90 percent of the 7.4-mile route will have dedicated bus lanes have dedicated bus lanes, helping Richmond Highway BRT - The One buses avoid traffic and stay on schedule as they transport riders between the Yellow Metro Line, residential communities, and Fort Belvoir. The BRT will also use long, 60-foot electric buses that are quiet, environmentally friendly, and can transport more people than a general lane of cars, expanding overall transportation capacity in the corridor. Pedestrian improvements will also be weaved into the project so that accessing transit will be easier and safer.

In Montgomery County, the Veirs Mill Road (MD 586) corridor will be transformed with *New BRT Expansion from Montgomery College, Rockville to Wheaton Metro Station* (CE3103). Running along one of the county's busiest bus transit corridors, this seven-mile BRT route will upgrade the existing bus corridor with pre-payment stations for faster boarding, real-time transit information, dedicated lanes, queue jumps, and transit signal priority at key intersections. Building further upon Montgomery County's BRT system, the *MD 355 New BRT Expansion from East-West Highway (MD 410) to Clarksburg Road* (CE3856) will feature median-running dedicated bus lanes where feasible, offering faster, more reliable service between downtown Bethesda, North Bethesda, Rockville, and Gaithersburg. Similar BRT projects, along with the continual refinement of service plans and routes by transit agencies, will significantly enhance bus travel times and overall reliability for the thousands of residents and visitors that depend on buses to get around.

**PRIORITY STRATEGY: Reduce travel times on all public transportation bus services with faster bus service for existing users, regardless of the type of bus or corridor.**

In addition to major BRT projects, the region will benefit from a spectrum of smaller-scale improvements, non-infrastructure upgrades, and fleet replacements. One example is along Georgia Avenue NW in Washington, DC, where bus speeds have steadily declined since 2020.[10] In response,


BeyondDC/Flickr

10 District Department of Transportation (2023). *Georgia Avenue NW Bus Priority.* **https://buspriority.ddot.dc.gov/pages/georgiaavenw**

the *Georgia Avenue NW Capacity Reduction for New Bus Lanes: Eastern Avenue to Barry Place NW* project (T13591) will introduce bus lanes, install bus bulbs to streamline boarding without leaving the travel lane, and relocate and rebalance bus stops, all designed to reduce delays and improve operational efficiency along the heavily used corridor. While waiting for the bus, riders will more frequently see modernized stops with real-time arrival information, more comfortable seating, and better lighting.

Commuter buses traveling to and from areas within and beyond the region will spend less time in interstate traffic due to the use of existing and future HOV and HOT lanes. These lanes, available to public buses free of charge, will offer faster, more reliable service with shorter travel times and fewer delays. Leveraging existing routes and tools available in this way will help the region implement its priority strategy to reduce travel times on all public transportation bus services with faster bus service for existing users, regardless of the type of bus or corridor. Having more bus services that are less dependent on private automobile traffic conditions will allow travelers to be more confident of bus arrival times and spend less time in traffic.

Transportation services designed to serve individuals with transportation disadvantages will continue to have support from the TPB and transportation agencies through the region's program for *Enhanced Mobility of Seniors and Individuals with Disabilities* (T6366). In some cases, technological advancements in mobility help address the needs of these community members. In other cases, providing more resources to existing mobility services will enable more reliable and widespread coverage.

**PRIORITY STRATEGY:**
**Convert vehicles to clean fuels: 50 percent of new light-duty vehicles, 30 percent of medium and heavy-duty trucks sold, and 50 percent of all buses on the road.**

Bus technology and power sources will continue to evolve. As aging diesel fleets are phased out, local transit agencies will replace them with electric buses, supported by new charging infrastructure. In Virginia, DASH will replace 13 end-of-life buses with battery electric models (T6331), powered by 13 depot chargers, three megawatts of electric utility service, and an on-route opportunity charger (T13618-T13569). Fairfax County will deploy 21 articulated electric buses to serve riders on the new Richmond Highway (US 1) "The One" BRT route (T13563-T6680). In Maryland, 14 of Montgomery County's Ride On diesel buses with be replaced with electric ones, along with 13 new hydrogen fuel cell electric buses (T6616) to add to its fleet to support the many planned BRT routes. Dedicated funding will also be invested into bringing EV chargers for buses across the region. Fleet and infrastructure upgrades such as these will advance the region's priority strategies to convert vehicles to clean vehicles and to develop and implement an electric vehicle charging network.

Between 2025 and 2050, the region's bus network will continue to advance into a modern, next-generation transit system that operates with greater independence from automobile traffic. Riders along the new BRT corridors can expect better reliability with shorter waiting times and more consistent arrival schedules. As investments in bus priority are focused along major corridors, where populations and employment are projected to increase, a positive feedback loop is expected to emerge; improved service will attract more riders, fueling continued demand for further investment in BRT.

## Pedestrians, Bicyclists, & Micromobility

Active transportation and micromobility daily trips are possible for people in the region because of the region's concerted investment to improve safety and accessibility for pedestrians, bicyclists, and micromobility users. By 2050, non-motorized travel will be better supported across the region through expanded, and more integrated, bicycle and pedestrian infrastructure.

Throughout the region's communities, all applicable investments in Visualize 2050 will include a range of bicycle and/or pedestrian accommodations. The region's ongoing commitment to building safe pedestrian and bicyclist accommodations will further strengthen the active and micromobility transportation networks. The **Future Pedestrian, Bicyclist, and Micromobility Network** map shows investments through 2050 that will include bicycle or pedestrian accommodations.[11]

Online Resource

Because the region is motivated to address non-motorized user safety and access concerns, agencies are implementing bicycle and pedestrian features such as shared-use paths, bike lanes, more visible crossings, or other amenities into all types of projects, including roadway redesign and widening projects. Many projects will incorporate access to new off-road trails or fill gaps between existing trails. With these changes, the ability for people to walk, bike, or use micromobility to reach daily destinations will become easier and safer while also providing public health benefits.

In Prince George's County, safety concerns for pedestrians along Marlboro Pike have inspired a new vision for 4.5 miles of the corridor to gain widened sidewalks, more visible crosswalks, new landscaping, and potential modifications to driveways (T13604). In Arlington, a segment of George Mason Drive surrounded by schools, homes, parks, and commercial areas will be rebuilt into a safer, multimodal corridor with enhanced bicycle and pedestrian crossings at intersections, a separated multiuse trail, and narrowed travel lanes designed to reduce traffic speeds (CE3884).

BeyondDC/Flickr

**PRIORITY STRATEGY: Improve walk and bike access to transit, especially within TPB identified High-Capacity Transit station areas, through the application of Complete Streets and Green Streets policies.**

Many projects will strategically make walking and bike access to transit easier. With an expected 26 percent of people and 46 percent of jobs to be within a half-mile of an HCT station, there is a substantial opportunity to make improvements to encourage even more people to choose Metrorail, commuter rail, BRT, or streetcar.

A critical gap between Bethesda, Chevy Chase, and Silver Spring in Montgomery County, for instance, will be filled with the *Capital Crescent Trail: Elm Street to Chevy Chase Lake Terrace and Silver Spring Transit Depot to Silver Spring Metro Station* (CE3122-T6015) to provide safer and more direct access to the Bethesda and Silver Spring Metro Stations, as well as to several future Purple Line Stations. The corridor connecting the Largo, Garrett Morgan Boulevard, Addison Road/Seat Pleasant, and Capitol Heights Metro stations in Prince George's County will be transformed from a car-centric throughfare into a more balanced, multimodal corridor, featuring a range of bicycle and pedestrian access improvements at, and between, each station (T13605). A *New Pedestrian Bridge over I-395: Quantrell Avenue to Landmark Mall* (CE3768) will overcome the highway barrier separating nearby neighborhoods from the future Landmark Transit Center (CE3071), a planned

11 National Capital Region Transportation Planning Board (2025). *Future Bicycle and Pedestrian Map*. **http://www.mwcog.org/V50FutureBikePedMap**

hub that will serve as a transfer point between two BRT routes. When walking or biking to transit is safe and convenient, the value of existing transit investments is maximized as transit becomes a more practical and appealing option for more people.

**PRIORITY STRATEGY: Complete the National Capital Trail Network to create an extensive web of trails that provide walk and bicycle access to jobs and other activities by connecting communities across the region to Activity Centers.**

New trails on the National Capital Trail Network (NCTN) will help create a more robust and connected off-road bicycle/pedestrian system. Most likely, other trail projects, both on and off the NCTN, will be identified as part of project groupings and ongoing programs, beyond the discrete projects submitted by agencies for this plan.

From 2020 to 2023, the region added mileage to the NCTN at a rate of 27 miles per year. If this rate continues, the trail network as currently envisioned will be almost complete by 2050.

The *Anacostia River Waterfront Reconstruction: Poplar Point to Kenilworth Park* (CE1589) will mend disconnections between neighborhoods that are separated by DC 295 and provide new, comfortable access to trails and parks for residents. A new one-mile trail, the Silver Spring Green Trail, will run from Fenton Street to the Sligo Creek Trail to provide direct connection to the Silver Spring Transit Center Purple Line Station by way of the Metropolitan Branch Trail and the future extension of the Capital Crescent Trail. As community members gain access to these safe and interconnected networks by 2050, the opportunity for improved physical and mental health increases as more people have access to active commuting and recreational options.

Even some rail and interstate projects, like *I-495/I-270Y (West Spur)/I-270 Express Toll Lanes Widening: I-370 to George Washington Memorial Parkway* (CE3863) and the *New Long Bridge over the Potomac River* (T6727) will create new trail connections strengthening multimodal links between DC, MD, and VA.

Between Today and 2050, the transportation network will become larger, more interconnected, and more multimodal than ever before with an expanded roadway and transit system and a strengthened pedestrian, bicycle, and micromobility network. These investments, guided by priority strategies, will not only change how people and goods move, but will also influence where growth occurs and how

Joe Flood/Flickr

communities function. As the transportation network grows and evolves, its ability to deliver safe, reliable, and sustainable travel will depend on how well it performs for everyone who relies on it. The following section examines this performance, looking closely at how the future system is expected to impact access, congestion, and the environment.

## 2050 System Performance

The future system performance analysis of Visualize 2050 considers how well the anticipated transportation system will accommodate 2025 and forecasted 2050 travel demand and address mobility and accessibility challenges. Future expectations for the region's transportation network will be shaped by the characteristics of the existing transportation system and the prevailing land use and development patterns, increased demand on the system associated with projected growth in population, employment, changes in land use and development patterns, combined with the influence of regionally significant transportation projects. Without the investments included in Visualize 2050, auto congestion and delays are expected to rise, and accessibility is expected to worsen which is further explained in the following sections.

As the size of the population and workforce continue to grow, travel demand across all modes of transportation is expected to rise. While Visualize 2050 includes some capacity expansion and more options on modes with more reliable travel times (such as rail, BRT, walk and bike, and HOV and HOT lanes), the existing highway and transit systems will need to absorb most of this increased demand. Despite advancements in technology and shifts in travel behavior to more non-single occupancy vehicle (non-SOV) travel and shorter trips, congestion and delay are still projected to worsen on highways, leading to declines in timely auto access to destinations. For transit, population and job growth near HCT stations, along with new transit services, leads to improved job access by transit in the year 2050.

### DID YOU KNOW?

**TPB's analysis of future system performance uses output from the TPB's Travel Demand Model (Gen2/Version 2.4), which forecasts where, when, and how people will travel around the region in the coming decades. To make its predictions, the model relies on the latest regional population and job growth forecasts from the COG Round 10.0 Cooperative Forecasts, information on existing travel patterns from the TPB's Regional Travel Survey, and the planned future transportation system.**

### Access

Investments in the roadway network, rail and bus transit system, and bicycle and pedestrian infrastructure will reshape how people can reach their destinations. The expansion of BRT routes is expected to enable more people to travel efficiently by bus, while enhancements to both on- and off-road bicycle and pedestrian facilities will expand opportunities for active transportation. However, the impact of these improvements will vary widely depending on local land use characteristics and where future housing and job growth is concentrated. As a result, the changes in access brought by Visualize 2050 investments will not be experienced uniformly across urban, suburban, and rural zones. This section presents findings from the accessibility analysis of the TPB's Travel Demand Model (see callout for more info).

#### MODE SHARE FOR ALL TRIP AND WORK TRIP ACCESS

The share of trips in this region—for accessing both work and non-work places—taken on non-SOV modes such as high occupancy auto of two passengers or more, bicycle and pedestrian travel, and transit trips increases at rates greater than single occupancy vehicle trips by 2050 (see Figure 6.3 and Figure 6.4). For all trip purposes, rates of growth in non-SOV trips lead to more than 62 percent of trips by 2050

compared to 59 percent Today (see Figure 6.3). This is a similar trend for work trips, where 43 percent of commute trips will be taken on non-SOV modes by 2050 compared to 40 percent Today. SOV travel, however, will continue to be the predominant way the region's commuters travel to work (see Figure 6.4).

**By 2050, more people will take auto trips together than by themselves.**

NADTC

While transit and walk/bicycle travel will increase, automobiles will continue to be the dominant travel mode into 2050. Seventy-eight percent of all trips will be in personal automobiles of which 38 percent will be made in SOV, and 40 percent will be taken using high-occupancy vehicles of two passengers or more. This 78 percent of automobile trips in 2050 is a decrease from 81 percent Today (see Figure 6.3). Over this period, the growth rate of HOV trips is slightly greater than that of SOV trips, indicating that more trips will be taken with multiple passengers per car (see Figure 6.3).

**Figure 6.3:** Mode Share for All Trips, Today to 2050

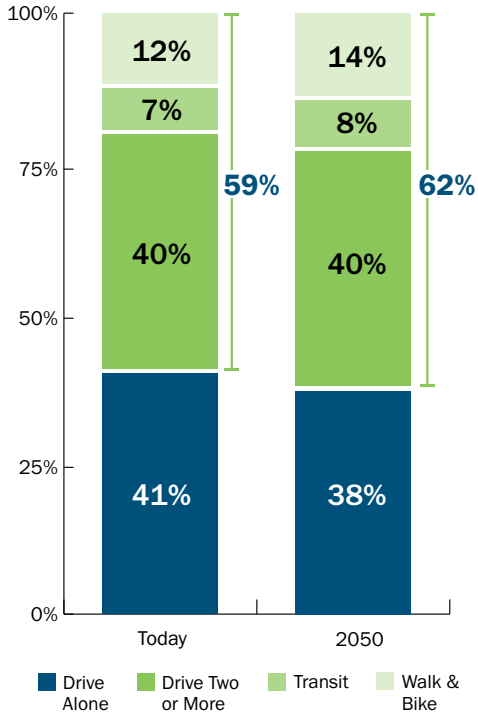
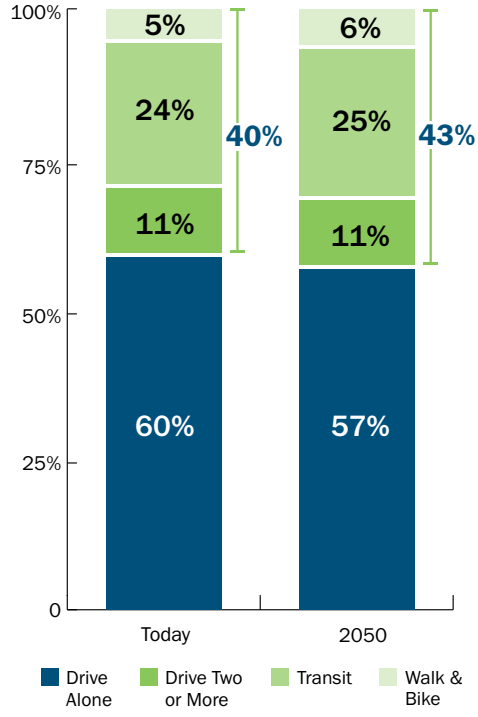



**Figure 6.4:** Mode Share for Work Trips, Today to 2050



## MODE ANALYSIS BY GEOGRAPHY FOR ALL TRIPS AND WORK TRIP ACCESS

While some general trends can be observed across the region, such as higher number of trips on transit for work access than other trip purposes and carpooling trips being more common for non-work trips, travel mode distribution and number of trips in 2050 vary across the region. These are influenced by differences in land use and access to transportation infrastructure. Geographic analysis areas help to understand how the different land use patterns relate to proximity and access to HCT stations and RACs. Table 6.4 lists the number of RACs and HCT stations in each geographic area, while Figure 6.5 illustrates the projected share of all trips in 2050 across the geographic analysis areas.

### TPB GEOGRAPHIC ANALYSIS AREAS

**Regional Core:** City of Alexandria, Arlington County, District of Columbia

**Inner Suburbs:** City of Bowie, City of College Park, Fairfax County, City of Fairfax, City of Falls Church, City of Gaithersburg, City of Greenbelt, City of Laurel, Montgomery County, Prince George's County, City of Rockville, City of Takoma Park

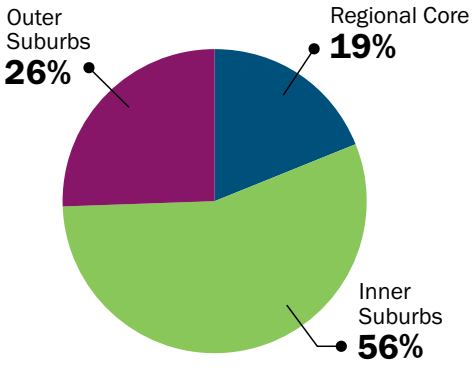
**Outer Suburbs:** Charles County, Frederick County, City of Frederick, Loudoun County, City of Manassas, City of Manassas Park, Prince William County

In the Regional Core, residents benefit from dense, mixed-use development, many HCT stations, and a broad range of travel options. Non-recreational walk and bicycle trips are typically over short distances, and the proximity and mixed-use nature of land use in the region's core is most supportive of such travel. In the Inner Suburbs, more dispersed land use patterns and scattered RACs create uneven, and often less convenient, access to non-driving modes. Farther out in the Outer Suburbs, low-density development, fewer RACs, and limited access to HCT stations further car dependency.

**Table 6.4:** Number of RACs and HCT stations by Geography

| TPB Geographic Analysis Area | #RACs | #HCT stations Today | #HCT stations 2050 |
|---|---|---|---|
| **Regional Core** | 45 | 83 | 103 |
| **Inner Suburbs** | 78 | 75 | 170 |
| **Outer Suburbs** | 22 | 13 | 15 |

**Figure 6.5:** Percent of All Trips in 2050 by Geography



### Regional Core

Transit, walking, and biking are highly accessible in the Regional Core, where dense, mixed land uses of the region's historic center—particularly in transects categorized as urban core, urban center, and general urban zones—make these modes easy and convenient (Figure 6.6, see Chapter 4, Land Use and Development Patterns for more information on transect categories). As a result, the Regional Core is projected to continue to have the highest share of transit, walking, and biking trips for all trip types as well as for only work trips among the geographic analysis areas (Figures 6.9 and 6.10).

For all trips in the Regional Core, travel is estimated to be evenly split—50 percent by driving (SOV and HOV) and 50 percent by alternative modes (transit/walking/biking). When looking specifically at work trips, transit use becomes even more prominent, as more than half of work trips are projected to be made by transit, one-third by driving, and the remaining 17 percent by walking or biking.

**Figure 6.6:** Regional Core Land Use Patterns

## Inner Suburbs

With an expected 47 percent of all jobs and 54 percent of all residents in 2050, most trips in 2050, 56 percent, are projected to originate from the Inner Suburbs (Figure 6.5). This area includes a mix of transects defined as urban center zones, general urban zones, and sub-urban zones (Figure 6.7). RACs and HCT in the Inner Suburbs are primarily located within the denser, mixed-use urban center and general urban zones. These denser nodes play an important role in supporting travel options to connect, concentrate, and circulate movement.

This variation in land use is reflected in differences in mode choice access (Figures 6.9 and 6.10). While only seven percent of all trip types in the Inner Suburbs are expected to be made by transit, work trips by transit make up 24 percent of travel. Conversely, community members are about three times more likely to walk or bike for all trip types than for commuting. Carpooling is also more common for work trips in the Inner Suburbs compared to the Regional Core, six times the share of mode choice in comparison, highlighting the unique travel patterns shaped by the area's land use and transit accessibility.

**Figure 6.7:** Inner Suburbs Land Use Patterns

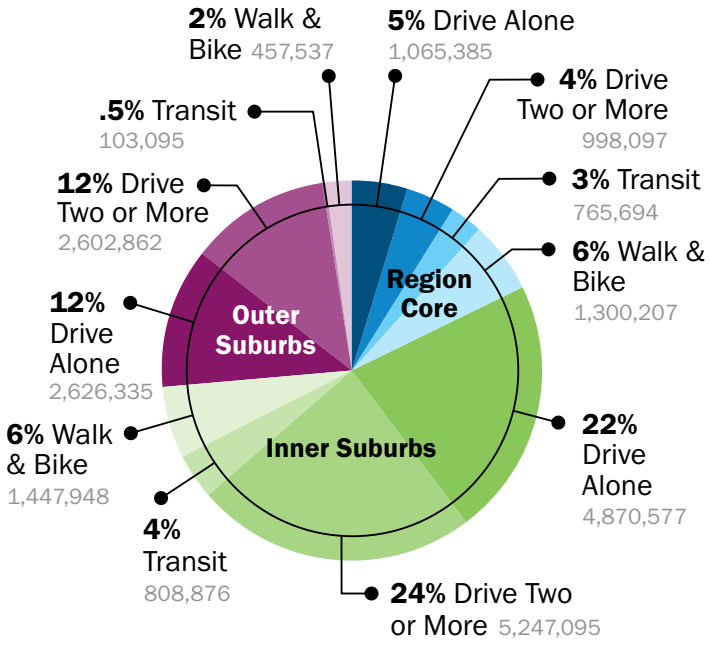
### Outer Suburbs

Transects defined as sub-urban, rural, and natural zones, with lower-density RACs and HCT stations largely characterize the fabric of the Outer Suburbs (Figure 6.8). Here, most of the travel will be dominated by single-occupant and carpool auto-based travel (Figures 6.9 and 6.10). Auto-based commute trips from here are greater than all commute trips combined from the Regional Core.

In the Outer Suburbs, only one half of one percent of all trips are projected to be made by transit, underscoring the limited availability and feasibility of transit services common in areas with lower density. Despite this, the share of work trips made by transit is projected to be four times higher than that of all trips, highlighting the relative importance for job-related travel. Walking and biking are expected to account for two percent of all trips, which is four times higher than their estimated share of work trips.

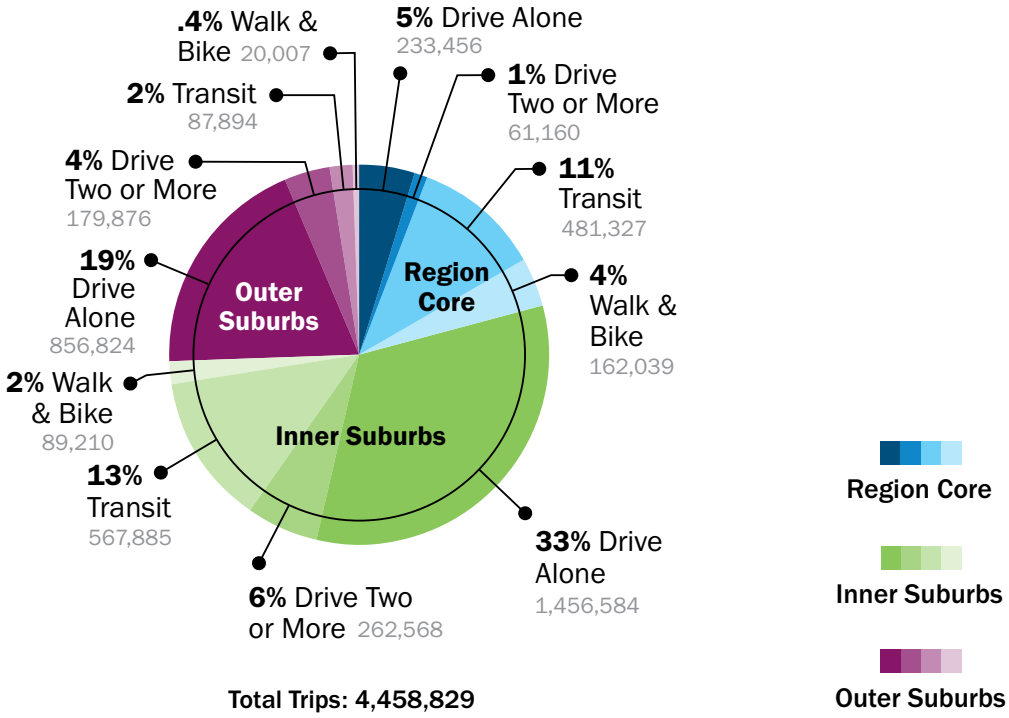
**Figure 6.8:** Outer Suburbs Land Use Patterns

**Figure 6.9:** All Trips by Mode and Geography, 2050




**Total Trips: 22,293,708**

**Figure 6.10**: Work Trips by Mode and Geography, 2050




**Total Trips: 4,458,829**

## ACCESS TO JOBS BY AUTO AND TRANSIT

Analyzing roadway performance through the number of jobs accessible by auto and transit during a 45-minute morning commute, the region as-a-whole will see a decline in access by auto and an increase by transit by 2050. This shift from Today to 2050 is shown on the **Current and Future Accessibility to Jobs** map.

Access to jobs by auto declines by five percent below the 2025 level of nearly 1.06 million jobs accessible (see Figure 6.11). Forecasted growth in people and jobs contributes to increased demand on the region's roadway network, thus increasing congestion and delay, resulting in some residents no longer being able to reach certain jobs within the 45-minute commute travel shed. However, without the investments proposed in Visualize 2050, average regional job accessibility by automobile would decline by 11 percent (or more than 110,000 jobs). This contrast highlights the critical role of Visualize 2050 in preserving timely job access by auto.

**Figure 6.11**: Change in Access to Jobs by Auto, Today to 2050

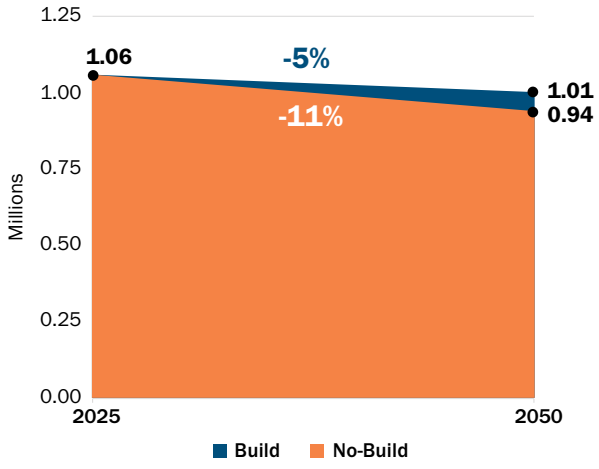
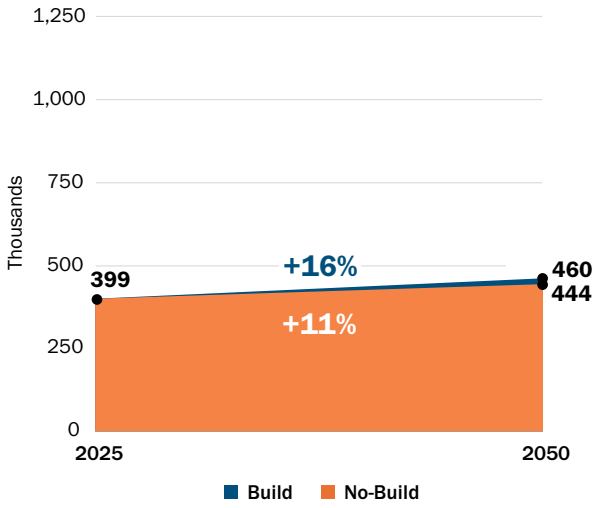



**Figure 6.12**: Change in Access to Jobs by Transit, Today to 2050




The change in job access by auto will not be felt evenly across the region as illustrated in the **Current and Future Accessibility to Jobs** map. Communities in the region's core, western suburbs, and northern suburbs are projected to experience moderate to significant improvements in job accessibility by auto. In contrast, areas in the eastern part of the region and within the Capital Beltway will likely face moderate to significant declines. These disparities are likely driven by worsening congestion and delays, which will increase the time it takes to access certain areas by car. Additionally, as seen in the online map, job growth is expected to be concentrated in the western part of the region, meaning residents there will have easier access to employment opportunities, while people living in the east will face longer distances and travel times to reach new job centers.

Access to jobs by transit is expected to grow between Today and 2050 (see Figure 6.12). With additional HCT services planned for the region and forecasts expecting more people and jobs close to those transit services, the analysis finds a 16 percent increase in jobs accessible by transit during a 45-minute morning commute, increasing

by almost 62,000 jobs by 2050. A closer look at the geographic distribution of these changes reveals that most areas already served by transit will experience increased job access. Additionally, parts of the region where new transit projects are planned are forecasted to gain even greater access to employment opportunities. These advancements highlight not only the region's commitment to transit investment, but also its evolving urban landscape, with population and employment centers becoming more concentrated around HCT stations.

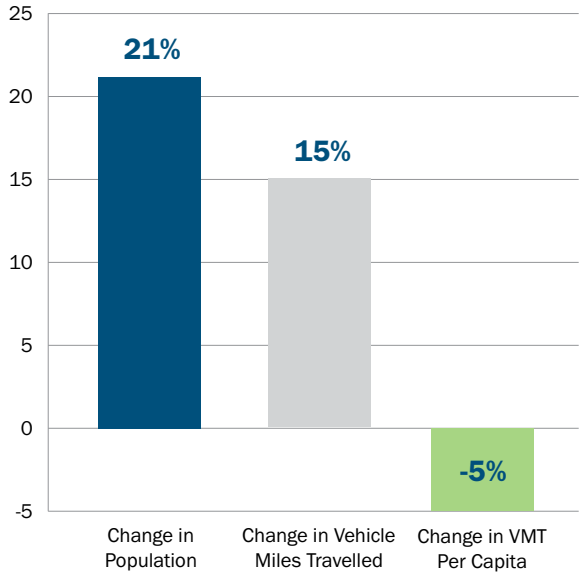
## Congestion

Congestion is and will continue to be a recurring experience for people traveling along the region's roadways. Transportation planners across the region consider congestion when developing projects and aim to include features and infrastructure that help reduce it. Still, factors such as the location of population and job centers, varying growth patterns, unplanned emergencies, and the feasibility of alternative transportation options will continue to influence congestion levels in 2050. This section presents findings from the congestion analysis of the TPB's Travel Demand Model.

### RESIDENT VEHICLE MILES TRAVELLED PER CAPITA BY AUTO

Even though congestion and delay are forecast to grow by 2050, residents of the region are expected to drive fewer miles per person, meeting a noted target in COG's Region Forward. The total vehicle miles traveled by all residents on a typical day in 2050 is forecast to grow less than the growth in population and vehicle miles traveled per person is expected to be five percent less than it is in 2025 (see Figure 6.13). These findings suggest that travel behavior in the region responds to changes to the land use and transportation infrastructure environment, particularly that of the region's residents. These can include people making shorter trips due to jobs and housing being closer, using non-auto-based modes more often as more transit/walk/bike infrastructure is built, and changing travel behavior due to the impact of congestion and delay.

**Figure 6.13**: Change in Resident Vehicle Miles Travelled Per Person, Today to 2050




### CONGESTION AND DELAY BY AUTO

While many projects in Visualize 2050 aim to reduce congestion on the region's highway network, growing roadway demand will continue to strain an already overburdened system. Despite efforts to mitigate congestion, forecasts indicate worsening highway conditions in the coming decades. Total daily vehicle hours of delay (VHD), which represents time spent in traffic in congested conditions, is predicted to increase 70 percent, and average minutes of delay per trip is predicted to increase 46 percent, or from four minutes to nearly six minutes by 2050 (see Figures 6.14 and 6.15). By contrast, without the transportation projects in the plan, VHD is predicted to increase 85 percent, between 2025 and 2050, and the average minutes of delay per trip are predicted to increase 59 percent.

Capacity-adding roadway projects in Visualize 2050 are expected to provide short-run reductions in congestion. Over the long run, average traffic congestion levels in the areas where road capacity is increased are expected to remain about the same due to changes in people's travel behavior (pattern, choice of mode, etc.) resulting from the larger influence of employment and population growth forecasted

to occur in the region over the next 25 years, the assumed distribution of future jobs, housing, and future transit service levels, which will fuel increased demand on the region's highway network.

**Figure 6.14**: Change in Total Daily Vehicle Hours of Delay, Today to 2050

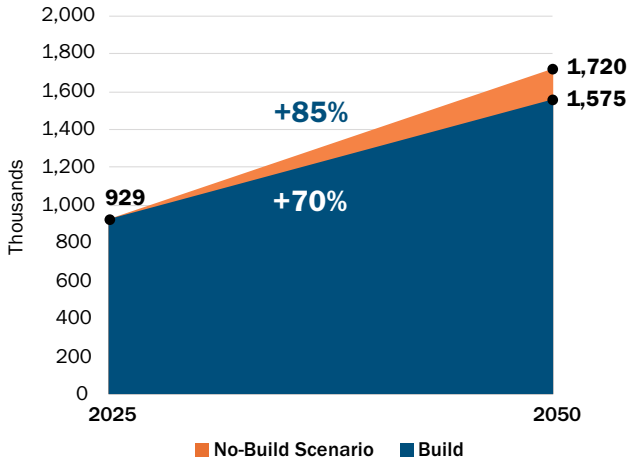
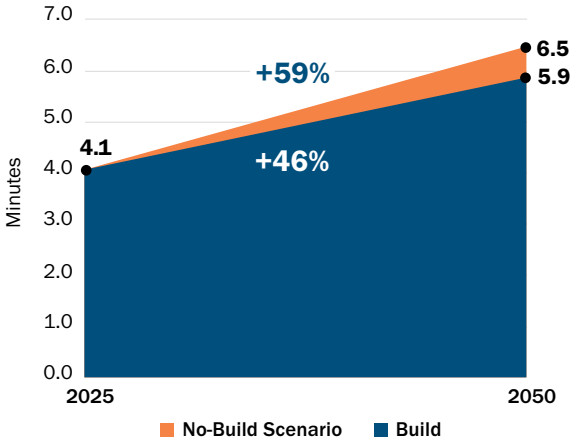



**Figure 6.15**: Change in Average Minutes of Delay Per Trip, Today to 2050




## Environmental Forecasts

As discussed in Chapter 4, transportation projects have both direct and indirect environmental impacts. While it is impossible to predict all outcomes, TPB analyzes how millions of motor vehicles, which are continually subject to new standards for fuel consumption, emissions and advanced technologies, may influence air pollution/vehicle emissions. At the same time, designing the built environment to mostly prioritize vehicle movement and direct car access to land uses has fostered automobile dependency, driving higher fuel consumption and related emissions. All of this must now be considered in the context of a time where more frequent and more severe weather events and natural hazards can be expected. Certain elements of transportation projects can improve infrastructure's ability to withstand extreme heat, flooding, and winter storms. This section provides an overview of how the investments in Visualize 2050 may affect air quality and the region's resilience to natural hazards.

### Vehicle Emissions and Air Quality Conformity

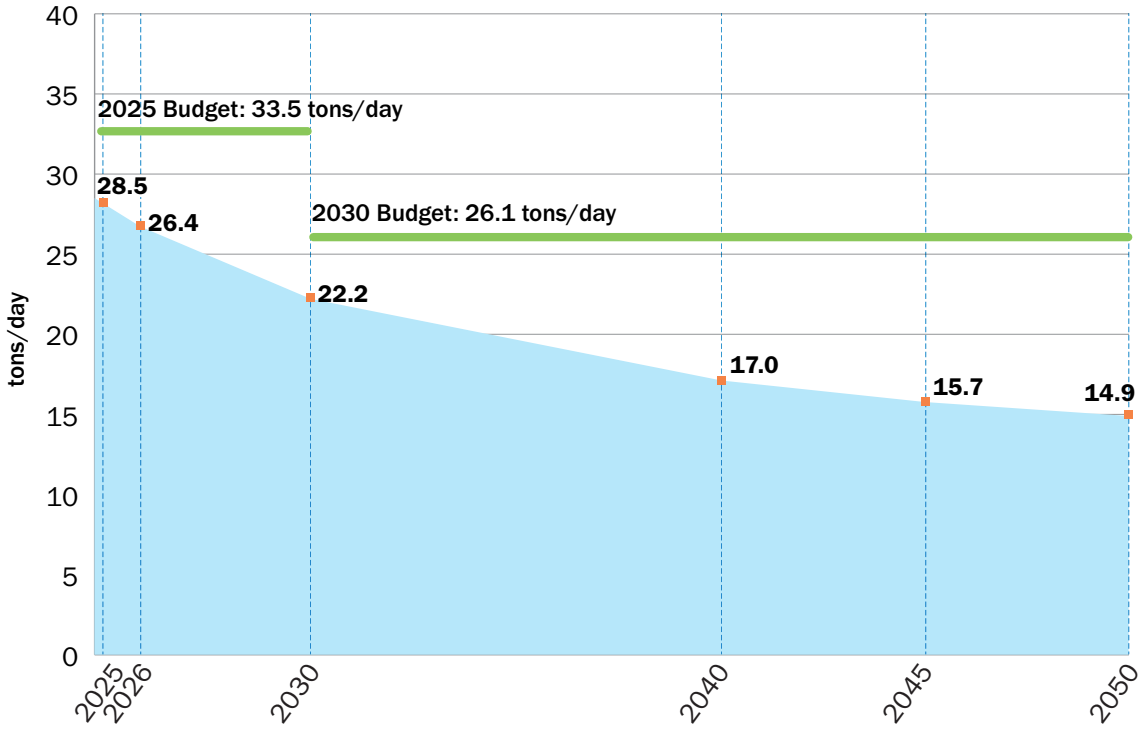
Visualize 2050 must comply with specific federal requirements to ensure it aligns with or "conforms" to the region's plan to achieve and maintain the national ambient air quality standards (NAAQS). This air quality plan is known as the State Implementation Plan (SIP). As part of the SIP, motor vehicle emission budgets (MVEBs) are established that limit the amount of mobile (on-road) vehicle emissions for specific pollutants. With ground-level ozone being the last remaining NAAQS of concern in the region, the pollutants that combine to form ozone, Volatile Organic Compounds (VOCs) and Nitrogen Oxides ($NO_X$), must fall below their MVEBs established in the SIP. This evaluation forms the basis for the air quality conformity analysis and report that must be completed and approved by the FHWA and FTA for Visualize 2050 itself to be approved.

## The TPB's analysis shows Visualize 2050 meets air quality conformity requirements for Ozone.

To perform the air quality conformity analysis, projects deemed regionally significant for air quality (RSAQ) are input into the TPB's Travel Demand Forecasting Model, along with land use, population, jobs, and household forecasts. The resulting travel forecasts, along with other local non-transportation data, are combined and analyzed using the EPA's Motor Vehicle Emissions Simulator (MOVES) model. After additional processing of the results, estimates of the total motor vehicle emissions of VOC and $NO_X$ for the entire region are developed. These total emissions are then compared to the MVEBs to verify that the Visualize 2050 plan conforms to the MVEB in the SIP. Full documentation of air quality conformity analysis can be found in the related report online at **visualize2050.org/plan-resources**.

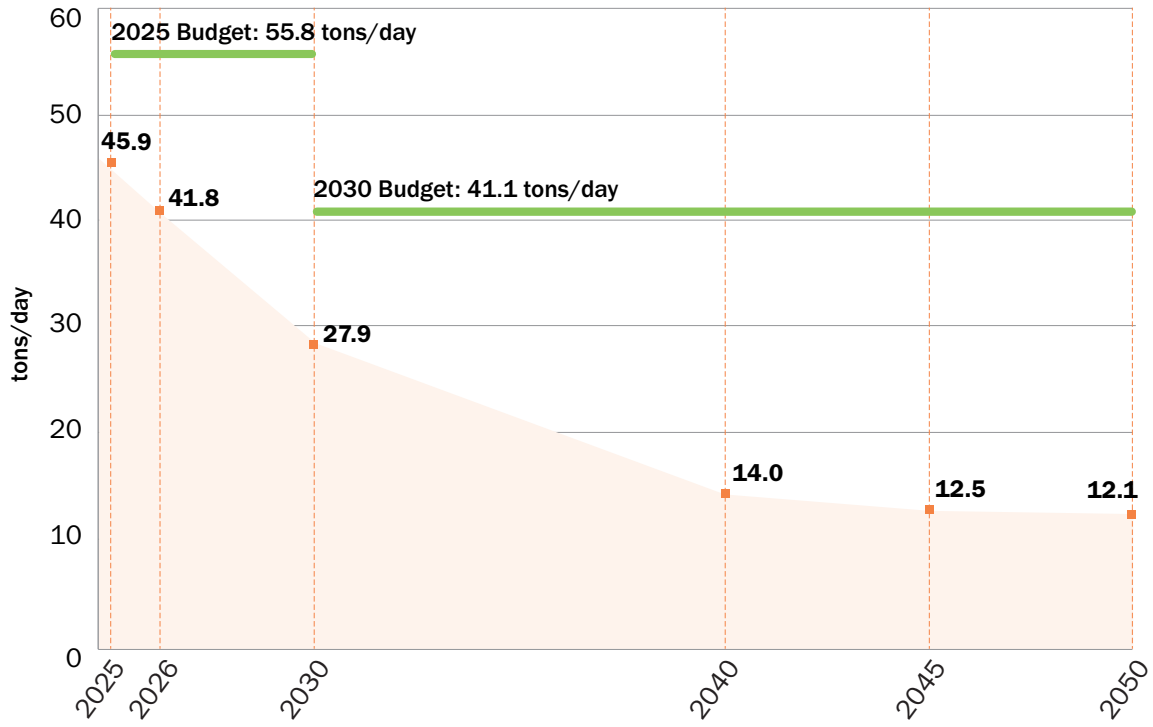
Despite rising travel demand, on-road vehicle emissions are expected to steadily decline through 2050 as electric and newer, cleaner, and more fuel-efficient cars and trucks replace older models in the region's vehicle fleet. Additionally, improvements in fuel formulations, shifts in development patterns, investments in transit and alternative travel options, and enhanced roadway operations will likely further contribute to emissions reductions. The TPB's analysis of air quality conformity confirmed that the total mobile emissions generated by the implementation of Visualize 2050 will fall below the MVEBs for VOCs and $NO_X$, demonstrating that the transportation plan conforms to the State Implementation Plan. This is illustrated in Figures 6.16 and 6.17, which also show the general downward trend in the total motor vehicle emissions from Today to 2050.

**Figure 6.16**: Visualize 2050 Air Quality Conformity Mobile Source Emissions and Mobile Emissions Budgets Ozone Season: Volatile Organic Compounds (VOC)




NOTE: The Mobile Emissions Budgets shown were developed as part of the Update to 2008 Ozone Standard Maintenance Plan. EPA found the budgets adequate for use in conformity with an effective date of October 4, 2024.

**Figure 6.17**: Visualize 2050 Air Quality Conformity Mobile Source Emissions and Mobile Emissions Budgets Ozone Season: Nitrogen Oxides ($NO_X$)




NOTE: The Mobile Emissions Budgets shown were developed as part of the Update to 2008 Ozone Standard Maintenance Plan. EPA found the budgets adequate for use in conformity with an effective date of October 4, 2024.

Pierre Gaunaurd/COG

Dan Reed/Greater Greater Washington

## 2050 System Resiliency

To understand how investments in Visualize 2050 might strengthen the region's resilience to extreme weather and natural hazards, TPB staff reviewed projects for resiliency components. The review found that many include features with the potential to improve the resilience of different transportation assets. Upgrades to bridges and roadways can potentially reduce negative impacts of flooding, while additions to transit and pedestrian infrastructure—such as pedestrian tunnels, covered walkways, bus shelters, and improved vegetated streetscapes—might offer protection from extreme heat. Ongoing restoration and maintenance of numerous bridges to ensure a state of good repair will enhance their structural integrity and resilience, enabling them to better withstand severe weather events.

The transition of buses and locomotives to zero-emission vehicles will help to reduce dependence on fossil fuels and help improve air quality. Additionally, targeted programs that fund the maintenance of critical drainage systems will make stormwater systems better prepared to handle water flow during heavy rainfall.

Piece by piece, these efforts have the potential to make the region's transportation system more resilient; however, significant challenges will remain—not only in the face of natural hazards, but across a range of issues.

When agencies develop projects, they often address more than one TPB goal. However, the challenges of limited funding, lengthy project development timelines, and the other hurdles of enhancing transportation in an already built-out region means implementation will continue to face many hurdles. The following chapter discusses key challenges that cannot be solved through Visualize 2050 alone and explains how the ongoing collaboration of TPB and its member agencies will continue to shape planning efforts to achieve regional goals.

# Chapter 7:
# Planning Together for Further Progress

The National Capital Region has a strong history of collaborating to meet mobility and accessibility challenges by improving the transportation network and services that are coordinated with land use changes. This approach has supported decades of population, job, and economic growth while keeping the National Capital Region vibrant and attractive.

In the past, the region had non-compliant levels of carbon monoxide, ozone, and fine particulate matter. Through regional collaboration, the area achieved compliance with all these air quality standards, most recently the 2025 ozone standard. Improvements in mobility, accessibility, and air quality were achieved alongside increasing demand for the region's transportation system from population and economic growth. Planning frameworks such as Regional Activity Centers (RACs) and Transit-Oriented Communities anchored around High-Capacity Transit (HCT), the building of a trail network within one-half mile of RACs and HCT stations, regular updates to the local and regional bus services, and a commitment to invest in the region's rail systems have proven to be effective and instrumental in the National Capital Region's progression towards its multi-sectoral goals and targets.

The planned $300 billion financial investment in the transportation system over the next 25 years will collectively enhance the region's quality of life, far beyond what would occur without action. The region aspires to be best in class in all aspects, with its multi-sectoral goals rooted in accessibility, prosperity, sustainability, affordability, and livability intended for all communities. Notwithstanding the continued, comprehensive, and cooperative work of the region, more needs to be done with a greater sense of urgency, especially for the transportation system which supports other parts of the region's growth.

## Future Challenges

The key challenges acknowledged in this section are not new, and they will continue to be major concerns for transportation. As demonstrated in the previous chapters, the region will continue to apply the TPB's priority transportation and land use strategies, but future challenges merit additional, more intensive strategies that demand broader and deeper regional collaboration to improve future outcomes.

SeanPavonePhoto/iStock

From continued roadway safety and congestion difficulties to insufficient funding for operations, maintenance, state of good repair, and expansion improvements, the region must redouble its commitment, efforts, creativity, and funding to address these challenges. The TPB's strong foundation of an ongoing, collaborative, data-driven approach to decision-making, guided by its shared regional goals and related federal performance measures and targets, positions the region to address challenges through a continuous and cooperative process.

### Continued Traveler Fatalities and Serious Injuries

As a major public health concern, any number of fatalities and serious injuries affecting community members and visitors is unacceptable. As noted in Chapter 3, roadway fatalities and serious injuries, which had been declining previously, have increased over the past seven years, with a concerning rise in the share of bicyclist and pedestrian fatalities among all roadway fatalities. Even with the investments outlined in this plan's projects and programs to improve safety, additional efforts will be needed to address traffic safety as quickly and effectively as possible.

Emma K Alexandra/Flickr

Some of the underlying contributing factors to fatalities and serious injuries—such as vehicle size and weight, high-speed roadway designs, enforcement, and unsafe driving behaviors—are complex and far-reaching yet addressing them is an essential task which extends beyond the TPB's work. Reducing traveler fatalities and serious injuries is vital—every saved life is a valuable and a meaningful achievement.

Implementing the TPB's endorsed safety strategies is an ongoing effort. Since 2002, the Street Smart Safety Campaign has worked to reduce bicyclist and pedestrian injuries and fatalities through partnership with local transportation and law enforcement agencies, using visible education, outreach, and enforcement activities. TPB also launched the Regional Roadway Safety Program (RRSP) in 2020 to provide funding for its agencies to implement one or more of the safety strategies within or across the engineering, education, and enforcement disciplines. These efforts are guided by the TPB's commitment to eliminating traffic fatalities and severe injuries.[1]

In October of 2024, the TPB convened the Regional Roadway Safety Summit, bringing together fifty professionals from diverse organizations and jurisdictions to address the region's most pressing safety challenges and explore potential solutions. A key outcome of this collaboration was a shared recognition of the need to understand the region's progress in achieving the safety priorities outlined in the TPB's 2020 Safety Resolution. Participants also agreed on the importance of establishing a multijurisdictional agreement to improve enforcement of automated ticketing systems and traffic laws, given the frequency with which residents and travelers cross state boundaries.

The TPB will measure progress using the following federally prescribed highway, non-motorized, and transit performance measures and adopted targets. Highway safety targets include non-motorized users on highways. While zero fatalities is the aspirational goal, these short-range targets serve as incremental benchmarks to assess progress towards achieving the aspirational goal. These performance measures and targets shown in Table 7.1 were adopted by the TPB on December 18, 2024.[2]

1 National Capital Region Transportation Planning Board (July 22, 2020). *R3-2021 - Resolution to Establish a Regional Roadway Safety Policy, and Associated Roadway Safety and Equity Policy Statements, to Reduce Fatalities and Serious Injuries on the National Capital Region's Roadways*. **https://www.mwcog.org/assets/1/28/Resolution_R3-2021_TPB_Safety_Resolution_Final.pdf**

2 National Capital Region Transportation Planning Board (December 18, 2024). R5-2025 – *Resolution to Adopt Annual Highway Safety Targets for the National Capital Region*. **https://www.mwcog.org/documents/2024/12/18/r5-2025---pbpp-highway-safety-targets-tpb-traffic-safety/**

**Table 7.1:** Highway and Non-Motorized User Safety Performance Measures and Targets

| Performance Measure (Five-Year Rolling Average) | TPB Adopted Targets for 2021-2025 on December 18, 2024 |
|---|---|
| # of Fatalities | 253 |
| Rate of Fatalities (per 100 million VMT) | 0.588 |
| # of Serious Injuries (SI) | 1661.9 |
| Rate of Serious Injuries (per 100 million VMT) | 3.222 |
| # of Nonmotorized Fatalities & SI | 473.5 |

The latest transit safety performance measures and targets, shown in Table 7.2, were adopted by the TPB on December 18, 2024, and will help the region track its progress on making transit users and workers safer.[3]

The TPB and its member jurisdictions have reaffirmed their strong commitment to maintain safety as a top priority and will strive to achieve the regional goal to **ensure the safety of all users, including travelers and maintenance and operations personnel alike, on all parts of the transportation system at all times**. Continued investment in the RRSP, along with member-led projects and programs dedicated to improving safety, will help close the gap and advance progress on this critical issue.

## Anticipated Risks to Infrastructure from Natural Hazards

Transportation infrastructure faces threats to its structural integrity from a variety of natural

Chesapeake Bay Program/Flickr

phenomenon such as earthquakes, wildfires, flooding, and extreme cold and heat. In the National Capital Region, flooding and extreme heat pose the greatest risks, and these threats, along with rising sea levels, are expected to become more frequent and severe, making the region's transportation infrastructure more vulnerable.[4] This puts roads, bridges, and public transit infrastructure at a growing risk of being temporarily or permanently unusable, requiring traffic to be rerouted in order to protect public safety under increasingly difficult conditions. The growing need to maintain aging transportation assets while addressing vulnerabilities, especially at high-risk locations adds another layer of priority consideration in transportation design and investment decision making.

In recognition of this emerging challenge and the urgency to act, the TPB has integrated resilience planning as part of its metropolitan planning activities. The TPB worked with its member agencies to develop the region's first Transportation Resilience Improvement Plan (TRIP) and the National Capital Region Inland Flood Analysis. This plan and analysis demonstrate the region's commitment to strengthening its ability to anticipate, prepare for, adapt to, and recover from the impacts of natural hazards. The TRIP's comprehensive risk assessment

3 National Capital Region Transportation Planning Board (December 18, 2024). R4-2025 – *Resolution to Adopt Annual Transit Safety Targets for the National Capital Region*. **https://www.mwcog.org/documents/2024/12/18/r4-2025---pbpp-transit-safety-targets/**

4 National Capital Region Transportation Planning Board (April 10, 2024). *National Capital Region Transportation System Climate Vulnerability Assessment*. **https://www.mwcog.org/documents/2024/04/10/national-capital-region-transportation-system-climate-vulnerability-assessment/**

**Table 7.2:** Transit Safety Performance Measures and Adopted Targets

| Performance Measure | TPB Adopted Target for 2024 on December 18, 2024 |
|---|---|
| Fatalities by Mode [Number/Rate/Transit Worker Rate (per Revenue Vehicle Mile)] | 0/0/0 (Heavy rail) |
| | 0/0/0 (Streetcar rail) |
| | 0/0/0 (Urban bus) |
| | 0/0/0 (Commuter bus) |
| | 0/0/0 (Demand response) |
| Reportable Injuries by Mode [Number/Rate/Transit Worker Rate (per Revenue Vehicle Mile)] | 256/24.2/9.5 (Heavy rail) |
| | 6/6.69/N/A (Streetcar rail) |
| | 403/0.69/0.19 (Urban bus) |
| | 6/0.07/0.10 (Commuter bus) |
| | 42/0.21/0.07 (Demand response) |
| Reportable Safety Events by Mode (Number/Rate per Revenue Vehicle Miles) | 127/12.8 (Heavy rail) |
| | 6/6.69 (Streetcar rail) |
| | 357/0.61 (Urban bus) |
| | 3/0.04 (Commuter bus) |
| | 54/0.27 (Demand response) |
| Assaults on Transit Workers (Number/Rate per Revenue Vehicle Miles) | 586/59.1 (Heavy rail) |
| | N/A (Streetcar rail) |
| | 207/0.37 (Urban bus) |
| | 0/0 (Commuter bus) |
| | 9/0.04 (Demand response) |
| Collisions Between Major Mechanical Failures by Mode (Rate/Pedestrian Collision Rate/Vehicular Collision Rate) | 2/0/2 (Heavy rail) |
| | N/A (Streetcar rail) |
| | 1.43/0.05/1.12 (Urban bus) |
| | 2/0/2 (Commuter bus) |
| | 0.25/0/0.25 (Demand response) |
| Reliability (Mean Distance Between Failures) | 29,000 (Heavy rail) |
| | 1,000 (Streetcar rail) |
| | 8,964 (Urban bus) |
| | 25,000 (Commuter bus) |
| | 24,913 (Demand response) |

equips TPB jurisdictions with the data and tools needed to make resilience-focused decisions, particularly by integrating cutting-edge flooding analysis. The TPB is better prepared than ever to inform transportation plans and decisions to ensure the region's transportation network can continue to operate safely and **facilitate mobility for people, even when faced with major disruptions**.

## Single-Occupant Vehicles Continue to be Most People's Choice for Commuting to Work

While the region has seen a decline in this trend, most residents will continue to choose to drive by themselves to work, particularly in the region's Inner and Outer Suburbs where long travel distances and travel times impact mode choice. Many residents in the Outer and Inner Suburbs will continue to face limited access to timely multimodal options to access work. Although access to HCT will improve greatly with new bus rapid transit (BRT) and rail services in 2050, the expanded network will still leave many people in these areas with limited HCT choices. Where HCT alone is an impractical transportation mode for commuting, other options including commuter bus, local transit services, express lanes for vanpools/carpools/buses, and park and ride lots with sufficient parking capacity will continue to support non-SOV choices.

TPB's Transportation Land-Use Connections and Transit Within Reach Programs have provided and will continue to provide funding for small projects that help improve bike and walk connections to existing and planned HCT stations. With these programs and the TPB's designation of RACs and HCT areas, jurisdictions have the tools to think regionally while acting locally and align land use policies with the transportation system to **provide affordable, realistic multimodal options**. The region currently has more HCT stations (171) than RACs (145), and by 2050 it is expected that 118 (about 70 percent) of the HCT stations will be inside RACs. This means that 39 RACs (about 26 percent) will not have a HCT station. Local zoning and land use policies will remain critical for encouraging multimodal travel in RACs, guiding development around HCT stations, and expanding attractive alternatives to SOV commuting.

Ben Schumin/Flickr

## Continued Increase in Traffic Congestion and Delays

Congestion and delays are expected to persist as population and employment levels continue to grow. While recurring delays at specific locations and times of day can be predicted and planned for, they still negatively influence driver behavior, increase the risk of certain roadway safety incidents, and waste energy. Increased recurring congestion also leads to non-recurring congestion that is hard to predict and thus has a greater negative impact on safety, energy consumption, and lost productivity. Analysis from the Regional Travel Demand Model, as described in Chapter 6, indicates that the number of congested lane miles and daily vehicle hours of delay will remain high in the future, requiring travelers to account for longer travel times.

Joe Flood/Flickr

The TPB's Congestion Management Process (CMP) uses a systemic approach to monitor and evaluate the transportation system performance and identify and evaluate potential benefits of congestion management strategies, including demand management, traffic operational improvements, public transportation improvements, ITS technologies, and additional system capacity (where necessary). Through this process, projects that increase capacity for single-occupant vehicles (SOVs) must show that congestion management strategies have been considered. The TPB's regional program to reduce single occupant travel and increase ridesharing, transit usage, and bicycling is a key congestion management strategy and has been in place since 1974. For over 50 years, the Commuter Connections Program has served a vital role in offering community members smarter ways to get to work, while reducing traffic congestion. Commuter Connections will continue to evolve with new incentives like CommuterCash and the Pool Rewards Program that reward for using transit and carpooling during peak hours.

To track progress on reducing the delays that roadway travelers experience, the TPB has adopted highway reliability, freight, and congestion short-range targets shown in Table 7.3.[5, 6] The TPB will stay committed to working towards its shared goal to **make all options of travel reliable to get the user to their destination on time every time**. As the TPB works to reduce roadway congestion and delays, vehicle-related emissions of volatile organic compounds (VOCs) and nitrogen oxides ($NO_X$) are also expected to decline. To monitor this progress in reducing harmful pollutants, the TPB has established new short-range air quality performance targets

5 National Capital Region Transportation Planning Board (June 15, 2022). R19-2022 – *Resolution to Adopt Regional Congestion Management Mitigation and Air Quality Program Performance Measure Targets for 2022-2025 for the National Capital Region*. **https://www.mwcog.org/documents/2022/06/16/r19--2022---resolution-to-adopt-regional-congestion-mitigation-and-air-quality-program-performance-measure-targets-for-2022-2025-for-the-national-capital-region/**

6 National Capital Region Transportation Planning Board (June 15, 2022). R3-2023 – *Resolution to Adopt Regional Highway Asset and Travel Time Reliability Performance Measure Targets for 2022-2025 for the National Capital Region*. **https://www.mwcog.org/file.aspx?&A=MY98NXpz%2BUFdP40XNnXu2UVDfduFIrpf2q6Lppi5pnY%3D**

**Table 7.3:** Highway Reliability, Freight, and Congestion Performance Measures and Adopted Targets

| Performance Measure | TPB Adopted 4-year Target for 2022-2025 on October 19, 2022 |
|---|---|
| Interstate Travel Time Reliability (% person miles traveled that are reliable) | 61.10% |
| Non-Interstate (NHS) Travel Time Reliability (% person miles traveled that are reliable) | 78.60% |
| Truck Travel Time Reliability Index (Interstates) | 2.56 |

(Table 7.4).[7] The TPB will **provide, facilitate, and incentivize methods that build, operate and maintain the transportation system in a manner that provides for healthy air, water, and other environmental factors**.

**Table 7.4:** Congestion Mitigation and Air Quality Performance Measures and Adopted Targets

| Performance Measure | TPB Adopted 4-year Target for 2022-2025 on June 15, 2022 |
|---|---|
| Annual Peak Hours of Excessive Delay per Capita | 22.7 hours |
| Non-SOV Mode Share (%) | 37.70% |
| Total VOCs Emissions Reduction (kg/day) | 9.408 (kg/day) |
| Total $NO_X$ Emissions Reduction (kg/day) | 21.117 (kg/day) |

## Insufficient Truck Parking along Major Routes

Truck drivers will continue to face major challenges finding safe and reliable parking as growth in and consumer demand for goods, especially via e-commerce, increases the volume of freight delivered by truck along major routes. Rising truck traffic volume not only worsens truck parking congestion near key freight corridors but also heightens pressure to expand strategically located warehouse space and distribution centers, projects that often must be balanced with other community needs.

Rachel Beyerle/COG

The National Capital Region Freight Plan regularly documents freight issues and offers recommendations to ensure the transportation system continues to support the regional economy. By incorporating Virginia and Maryland's truck parking studies and data from the District's Freight Plan, the TPB's Freight Plan pinpoints freight bottlenecks faced by truck drivers and monitors the

7 National Capital Region Transportation Planning Board (June 15, 2022). R19-2022 – *Resolution to Adopt Regional Congestion Management Mitigation and Air Quality Program Performance Measure Targets for 2022-2025 for the National Capital Region*. **https://www.mwcog.org/documents/2022/06/16/r19--2022---resolution-to-adopt-regional-congestion-mitigation-and-air-quality-program-performance-measure-targets-for-2022-2025-for-the-national-capital-region/**

supply of public truck parking locations and spaces. This information helps guide agencies in targeting investments where they will have the greatest impact. With work like this, the TPB will continue to strive to achieve the regional goal of **implementing transportation systems management and operations**.

## Insufficient Transit Revenue to Sustain, Let Alone Increase Services

There continues to be challenges with adequately funding Washington Metropolitan Area Transit Authority (WMATA), the two commuter rail systems (VRE and MARC) and the 15 local and three commuter bus transit systems' needs with sustainable, predictable, long-term sources. With exceptions, WMATA cannot spend capital funds on operating costs, and the federal government does not fund operations in urbanized areas with populations over 200,000. Many funding sources available to WMATA are not indexed to inflation, so their value has been reduced over time. Federal competitive grants require localities to match funds and for larger projects, this funding is often not available.

Montgomery County Council/Flickr

Facing WMATA's and local transit agency's financial shortfalls, regional leaders established DMV*Moves*, a joint task force of the COG and the WMATA Board of Directors, to craft a sustainable funding model for the region's transportation system. Since its inception in 2024, DMV*Moves* has reported several measures taken by WMATA to improve its financial situation, including the elimination of a $140 million annual operating budget deficit previously predicted. Increased ridership, revenue gains, stricter fare evasion enforcement, and cost saving measures informed by DMV*Moves* have all contributed to resolving this operating budget shortfall.

Although WMATA came to a solution for its operating budget, the agency still faces a fiscal cliff for its capital budget, which maintains the system, beginning in Fiscal Year 2028. WMATA predicts that its dedicated capital funding will be inadequate to support previous capital debt service costs while continuing to invest in the system's maintenance starting in 2028.

As of 2025, the DMV*Moves* task force continues to regularly meet and is developing a framework to generate additional dedicated, predictable, and sustainable funding that will allow Metro to reasonably sustain a reliable, high-performing system. The TPB will remain a key partner in this effort, providing regional leaders with the analysis and guidance needed to optimize the region's public transportation system. Without a stable funding solution, the region's ability to elevate the regional transit system to a world-class standard remains difficult.

Improving the region's public transportation financial situation also requires ensuring that transit assets, such as vehicles, tracks, and facilities, are well maintained and remain within their useful lifespans. As fleets age, the risk of failures and expensive repairs increases. To strengthen accountability, TPB periodically adopts targets (Table 7.5) to monitor asset management and ensure that transit systems across the region are consistently safe, reliable, and well maintained.[8]

8 National Capital Region Transportation Planning Board (June 15, 2022). R3-2023 – *Resolution to Adopt Regional Highway Asset and Travel Time Reliability Performance Measure Targets for 2022-2025 for the National Capital Region*. **https://www.mwcog.org/file.aspx?&A=MY98NXpz%2BUFdP40XNnXu2UVDfduFIrpf2q6Lppi5pnY%3D**

**Table 7.5:** Transit Asset Management Performance Measures and Adopted Targets

| Performance Measure | TPB Adopted Target for FY2025 on February 19, 2025 |
|---|---|
| Service Vehicles exceeding Useful Life (%) | 54.2% (Auto) |
| | 31.4% (Trucks and other Rubber Tire Vehicles) |
| | 42.7% (Steel Wheel Vehicles) |
| Reportable Injuries by Mode [Number/Rate/Transit Worker Rate (per Revenue Vehicle Mile)] | 0.2% (Articulated bus) |
| | 0.0% (Auto) |
| | 6.8% (Over-the-road bus) |
| | 10.3% (Bus) |
| | 25.7% (Cutaway bus) |
| | 6.0% (Heavy rail passenger car) |
| | 0% (Light rail vehicle) |
| | 1.7% (Minivan) |
| | 0.0% (Commuter rail locomotive) |
| | 9.6% (Commuter rail passenger coach) |
| | 0.0% (Sport utility vehicle) |
| | 31.2% (Van) |
| Track Segments with Performance Restrictions (%) | 54.2% (Auto) 0.0% (Commuter rail) |
| | 3.5% (Heavy Rail) |
| | 5.0% (Streetcar rail) |
| Facilities rated Marginal or Poor (%) | 2.3% (Parking Facilities) |
| | 2.8% (Passenger Parking Facilities) |
| | 1.6% (Maintenance Facilities) |
| | 1.3% (Administrative Facilities) |

## Funds for Ongoing Maintenance are Often Constrained, Limiting What Can Be Kept in Good Condition

Even though most funds are designated for maintenance and operations, and maintaining the existing system is a priority over expansion, there are still challenges with the prioritization of those funds. Federal funding can be uncertain over the long term, can often only be used for specific purposes, and makes up a small percentage of overall transportation funding. As other sources of funding, such as the motor fuel or gas tax, are gradually declining, DC, MD, VA, and the many jurisdictions in the region will have to increase current or find new funding sources to ensure that funding levels can support the transportation systems in the future.

The COG-WMATA DMV*Moves* Initiative and state-led groups continue to be formed to tackle well-known funding challenges. Despite these hurdles, the TPB aspires for **all aspects of the transportation**

Preservation Maryland/Flickr

**system's infrastructure to be maintained in a state of good repair to provide reliable, safe, and comfortable mobility to all users**. Because reaching this aspiration is a long-term process, the TPB's highway asset condition short-range targets (Table 7.6) serve as a yardstick to track the region's progress.[9]

## Antiquated Infrastructure at Union Station Limiting Service Quality and Capacity

Union Station, the region's primary multimodal gateway, is more than a century old and demands substantial investment to anchor the region as a world-class transit center for 100+ years to come. As the region's busiest transit station within a vibrant Regional Activity Center, Union Station must be poised to support future plans for intercity rail and bus, Metrorail, VRE, MARC, and ground transportation infrastructure in step with projected growth in ridership fueled by rising population and employment in the region and along the Northeast Corridor. Along with nearby improvements such as the new Long Bridge over the Potomac River and the new Frederick Douglass Tunnel in Baltimore, and increasing services planned on commuter and passenger rail, Union Station will continue to be a critical link in regional and inter-regional mobility and an indicator of regional prosperity.

**Table 7.6:** Highway Asset Condition Performance Measures and Adopted Targets

| Performance Measure | TPB Adopted 4-year Target for 2022-2025 on October 19, 2022 |
|---|---|
| Interstate/NHS Pavement Lane Miles in Good Condition (%) | 44.8% |
| Interstate/NHS Pavement Lane Miles in Poor Condition (%) | 1.6% |
| Non-Interstate/NHS Pavement Lane Miles in Good Condition (%) | 26.3% |
| Non-Interstate/NHS Pavement Lane Miles in Poor Condition (%) | 7.3% |
| Bridge Deck Area in Good Condition (%) | 25.7% |
| Bridge Deck Area in Poor Condition (%) | 4.2% |

9 National Capital Region Transportation Planning Board (October 19, 2022). R3-2023 – *Resolution to Adopt Regional Highway Asset and Travel Time Reliability Performance Measure Targets for 2022-2025 for the National Capital Region*. **https://www.mwcog.org/file.aspx?&A=ZX8XqmTT8tJaLAg8Vjkr2v6NYh6IDPfLY0QhQrLRo3U%3d**


Sergio Ritacco/COG

The Union Station Redevelopment Corporation (USRDC) oversees the station and leads the redevelopment efforts. In March of 2024, the Federal Railroad Administration (FRA) approved the environmental review of the Union Station Expansion Project. The project, based on the FRA's preferred alternative, foresees replacing existing tracks, adding ten platforms and new concourses with better access to intercity buses and train gates, expanding retail, and modernizing the train hall branching from the historic station to improve passenger circulation. USRDC envisions attaining the station's air rights for mixed-use development to generate revenue for maintenance and upgrades.[10] With the preferred alternative set, USRDC is advancing design work though more collaboration, and financial commitment must occur before this iconic station can be renewed and ready to serve the desired ridership envisioned in 2050 and beyond. Although USRDC is not affiliated with the TPB, the TPB's members have a vested interest in the future success of Union Station including the quality of services enabled by a well-functioning multimodal transfer hub and the ripple of economic prosperity generated throughout the region.

**Intercity travel at Union Station is strengthened by the TPB's Intercity Travel Survey, which provides a comprehensive assessment of travel services and patterns to inform ongoing transit and rail service plans.**

## A Continuously Evolving National Capital Region

Although major challenges will exist beyond what this plan and its many projects, programs, and funding can fully address, the TPB's continuing, comprehensive, and cooperative metropolitan transportation planning has a proven record of uniting the region to meet its needs and respond to challenges. The TPB's unofficial credo of *Think*

10 Federal Railroad Administration (March 12, 2024). Final Environmental Impact Statement (FEIS) and Record of Decision (ROD). **https://railroads.dot.gov/rail-network-development/environment/environmental-reviews/washington-union-station-expansion-8**

## FEDERAL PLANNING FACTORS GUIDING TPB'S COLLABORATIVE WORK

- **Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.**
- **Increase the safety of the transportation system for motorized and non-motorized users.**
- **Increase the ability of the transportation system to support homeland security and to safeguard the personal security of all motorized and nonmotorized users.**
- **Increase accessibility and mobility of people and freight.**
- **Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and state and local planned growth and economic development patterns.**
- **Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight.**
- **Promote efficient system management and operation.**
- **Emphasize the preservation of the existing transportation system.**
- **Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation.**
- **Enhance travel and tourism.**

*Regionally, Act Locally*, has provided a balanced and practical approach to the 20 local jurisdictions, three state departments and one regional transit agency to coordinate and cooperate in both setting regional goals and developing their agency specific transportation plans and investment decisions.

The TPB's process, especially data analysis, research, and establishment of best practices has been and continues to be an independent, impartial, and trusted means for collective action to ensure that the National Capital Region's aspiration to be the best in class in all aspects is realized. As the region evolves, the TPB's collaborative framework with its member jurisdictions ensures that progress remains steady, forward-looking, and aligned with the shared vision that values a more accessible, prosperous, sustainable, affordable, and livable community. The Federal Planning Factors (FPFs), which have guided the work to produce this plan, will continue to guide planning efforts to address challenges and attain regional goals.

The TPB is committed to its continuous application of the FPFs in its work. The FPFs naturally align with the TPB's own goals of safety, maintenance, reliability, affordable and convenient mobility options, efficient system operations, environmental protection, resilient region, and livable and prosperous communities. To achieve these goals, the TPB will continue to implement its priority strategies. This plan demonstrates only some of the many ways that member agencies are applying these priority strategies locally in a cooperative fashion that crosses jurisdictional borders to create a unified region.

## Commitment to Achieving Our Goals

Visualize 2050 marks a point in time of an elaborate regional transportation planning and programming process. As demonstrated in this plan, that process covers many transportation modes and societal topics that will continue to evolve as new leaders, technologies, and priorities emerge to shape people's lifestyles and preferences.

Regional goals, developed within the coordinated and collaborative framework of the TPB and COG, help to paint a shared vision for the future. The eight TPB goals outline what the region aims to accomplish together to enhance different aspects of the transportation system. Related land use and housing goals, such as those in the *Region Forward Vision* and the *Region United Planning Framework*, help guide future decisions with intention and encourage leaders to consider the regional impact of local action.[11, 12]

In harmony with these principles, the TPB will continue to **support regional economic competitiveness, opportunity, and a high quality of life for all people**. Together, the TPB and COG goals will guide the region to be one that is more livable, sustainable, and accessible for all. With shared values, goals, strategies, performance measures, and targets, the region has a solid foundation for working towards its transportation vision.

Moving forward, the region will continue to plan together **for better travel tomorrow!**

Rachel Beyerle/COG

11 Metropolitan Washington Council of Governments (January 28, 2010). *Region Forward Vision*. **https://www.mwcog.org/documents/2010/01/28/region-forward-vision/**

12 Metropolitan Washington Council of Governments (March 9, 2022). *Region United Framework*. **https://www.mwcog.org/documents/2022/03/09/region-united-framework-document-2030-framework-climate--energy-equity-featured-publications-regional-housing-targets-transit/**

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