2024 CONGESTION MANAGEMENT PROCESS (CMP) TECHNICAL REPORT – EXECUTIVE SUMMARY

November 2024

National Capital Region
Transportation Planning Board

CONGESTION MANAGEMENT PROCESS (CMP) TECHNICAL REPORT
Prepared on behalf of the Transportation Planning Board Technical Committee
November 2024

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ABBREVIATIONS AND ACRONYMS

AADT	Annual Average Daily Traffic
ACS	American Communities Survey
ART	Arlington Transit
ATIS	Advanced Traveler Information Systems
ATM	Active Traffic Management
ATRI	American Transportation Research Institute
AVL	Automatic Vehicle Location
BRAC	Base Closure and Realignment Commission
BWI	Baltimore/Washington International Thurgood Marshall Airport
CAFE	Corporate Average Fuel Economy
CAV	Connected and Autonomous Vehicle(s)
CATT	Center For Advanced Transportation Technology
CCTV	Closed-Circuit Television
CHART	Coordinated Highway Action Response Team
CLRP	Constrained Long-Range Plan
CLV	Critical Lane Volume
CMP	Congestion Management Process
CMS	Congestion Management System
CNG	Compressed Natural Gas
CO	Carbon Monoxide
COC	Commuter Operations Center
CUE	City-University-Energysaver
DASH	Driving Alexandrians Safely Home
DCA	Ronald Reagan Washington National Airport
DMS	Dynamic Message Signs
DOT	Department of Transportation
MPSTOC	McConnell Public Safety and Transportation Operations Center
MTA	Maryland Transit Administration
MWAA	Metropolitan Washington Airports Authority
MWCOG	Metropolitan Washington Council of Governments
MWRITSA	Metropolitan Washington Regional Intelligent Transportation Systems Architecture
NCHRP	National Cooperative Highway Research Program
NCR	National Capital Region
NEPA	National Environmental Policy Act
NGA	National Geospatial Agency
NHS	National Highway System
NOx	Nitrogen Oxides
NPMRDS	National Performance Management Research Data Set
NPRM	Notice of Proposed Rulemaking
NTOC	National Transportation Operations Coalition
NVRC	Northern Virginia Regional Commission
NVTC	Northern Virginia Transportation Commission
PBPP	Performance-Based Planning and Programming
PM	Particulate Matter
PRTC	Potomac and Rappahannock Transportation Commission
PSTOC	Public Safety Transportation Operations Center
PTI	Planning Time Index
RITIS	Regional Integrated Transportation Information System
RFC	Region Forward Coalition
RTPP	Regional Transportation Priorities Plan
SAFETEA-LU	Safe Accountable Flexible Efficient Transportation Equity Act - A Legacy for the Users
SIP	State Implementation Plans

EPC	Emergency Planning Council
FAF	Freight Analysis Framework
FHWA	Federal Highway Administration
FSCPPE	Federal State Cooperative Program for Population Estimates
GHG	Greenhouse Gas Emissions
GPS	Geographic Positioning System
GRH	Guaranteed Ride Home
HOT	High Occupancy/Toll
HOV	High Occupancy Vehicle
HPMS	Highway Performance Monitoring System
IAD	Washington Dulles International Airport
ICC	Inter-County Connector
ICM	Integrated Corridor Management
IMR	Incident Management and Response
IS	Interstate System
ITS	Intelligent Transportation Systems
IVR	Interactive Voice Response
LATR	Local Area Transportation Review
LAUS	Local Area Unemployment Statistics
LOS	Level of Service
MAP-21	Moving Ahead for Progress in the 21st Century Act
MARC	Maryland Area Rail Commuter
MAROps	Mid-Atlantic Rail Operations
MATOC	Metropolitan Area Transportation Operations Coordination
MATOps	Mid-Atlantic Truck Operations
MDSHA	Maryland State Highway Administration
MNCPPC	Maryland – National Capital Park and Planning Commission
MOITS	Management, Operations, and Intelligent Transportation Systems
MPO	Metropolitan Planning Organization
SOC	State of the Commute Survey
SOV	Single Occupancy Vehicle
SRTS	Safe Routes to Schools
TARS	Travelers Advisory Radio System
TAZ	Traffic Analysis Zone
TCSP	Transportation, Community and System Preservation
TDM	Transportation Demand Management
TE	Transportation Enhancements
TERM	Transportation Emission Reduction Measure
TIGER	Transportation Investment Generating Economic Recovery
TIP	Transportation Improvement Program
TLC	Transportation/Land Use Connections
TMA	Transportation Management Area
TMC	Traffic Management Center; Traffic Message Channel
TOC	Transportation Operations Center
TOD	Transit-Oriented Development
TPB	Transportation Planning Board
TTI	Travel Time Index
TTID	Transportation Technology Innovation and Demonstration
UPT	Unlinked Passenger Trip
VDRPT	Virginia Department of Rail and Public Transportation
VHD	Vehicle Hours of Delay
VHT	Vehicle Hours of Travel
VMT	Vehicle Miles of Travel
VOC	Volatile Organic Compound
VPL	Variably Priced Lane
VPP	Vehicle Probe Project
VRE	Virginia Railway Express
WMATA	Washington Metropolitan Area Transit Authority

EXECUTIVE SUMMARY

Background

A Congestion Management Process (CMP) has been a requirement since the 2005 Safe Accountable Flexible Efficient Transportation Equity Act - A Legacy for Users (SAFETEA-LU) federal legislation. The requirement for a CMP continued under subsequent federal transportation laws including the Moving Ahead for Progress in the 21st Century Act (MAP-21, 2012) and the Fixing America's Surface Transportation (FAST) Act (2015).

The Infrastructure Investment and Jobs Act, also known as the Bipartisan Infrastructure Law (IIJA/BIL), was signed into law by President Biden on November 15, 2021. The IIJA/BIL itself and subsequent rulemaking were silent on the topic of the CMP. This report proceeds with the understanding that previous federal requirements as updated under the FAST Act remain in place.

This CMP Technical Report serves as a background document to the official CMP within Visualize 2050, providing detailed information on data, strategies, and regional programs involved in congestion management. This 2024 CMP Technical Report is an updated version of the previously published CMP Technical Reports (2008-2022).

Components of the CMP

The National Capital Region's Congestion Management Process has four components as described in Visualize 2050:

- Monitor and evaluate transportation system performance
- Define and analyze strategies
- Compile project-specific congestion management information
- Implement strategies and assess

This report documents and provides technical details of the four components of the CMP. It compiles information from a wide range of metropolitan transportation planning activities, as well as providing some additional CMP specific analyses, particularly travel time reliability and non-recurring congestion analyses.

Congestion on Highways

REGIONAL CONGESTION TRENDS, 2010-2023

The analysis of regional congestion trends from 2010 to 2023 highlights significant fluctuations in traffic congestion, notably influenced by the COVID-19 pandemic. The congestion intensity, measured by the Travel Time Index (TTI)[1] from a traveler's perspective, decreased during the pandemic, reaching a historic low TTI of 1.17 in 2020. Although the TTI rebounded in 2023, it remained below pre-pandemic levels. As shown in Figure E-1, Interstates exhibit higher TTI values

[1] Travel Time Index (TTI) is an indicator of the intensity of congestion, calculated as the ratio of actual experienced travel time to free flow travel time. A travel time index of 1.00 implies free flow travel without any delays, while a travel time index of 1.30 means one has to spend 30% more time to finish a trip compared to free flow travel.

than other road types, emphasizing the need for effective traffic management. Further details on the Travel Time Index are available in Section 2.2.1.1.

The spatial extent of congestion, measured by Percent of Congested Miles[2] from a system perspective, varied (Figure E-2) similar to the TTI. All highway categories experienced a significant decrease in congestion in 2020, likely due to the impacts of COVID-19, with reductions ranging from 84% to 95% compared to 2019. However, congestion levels rebounded swiftly, particularly on Interstates. By 2023, the percentage of congested miles on Interstates during AM peak periods reached 20%, a 400% increase from the pandemic low of 4% in 2020. Despite the temporary pandemic-related decline, the long-term trend indicates a general increase in the percentage of congested miles, especially on Interstates. Additional details on the Percent of Congested Miles can be found in Section 2.2.1.3.

Figure E-1: Annual Average Travel Time Index by Highway Category: Total AM and PM Peaks

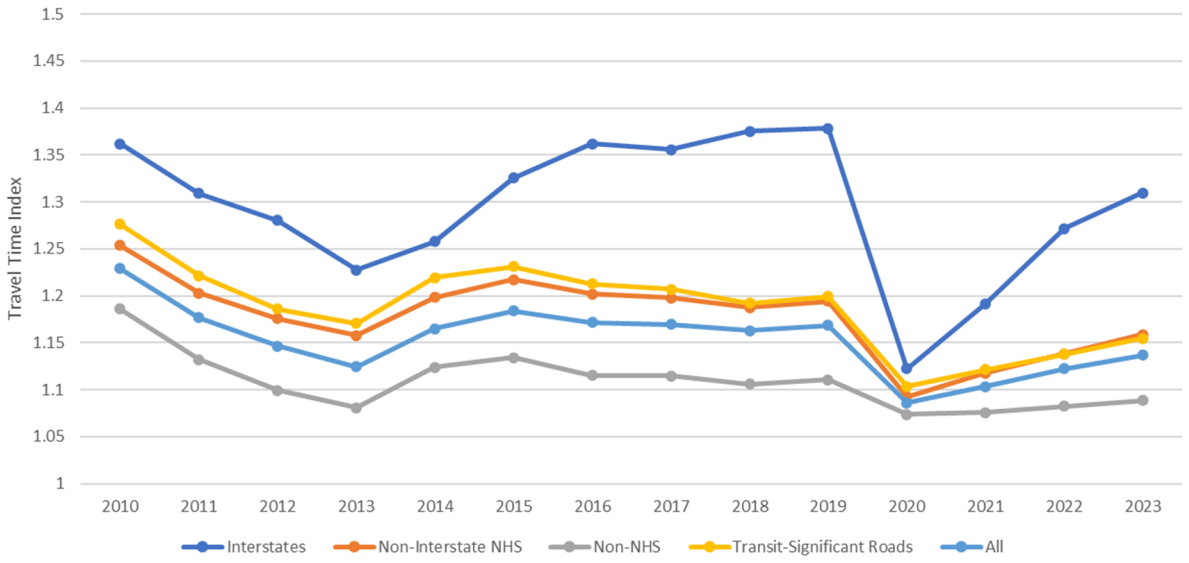
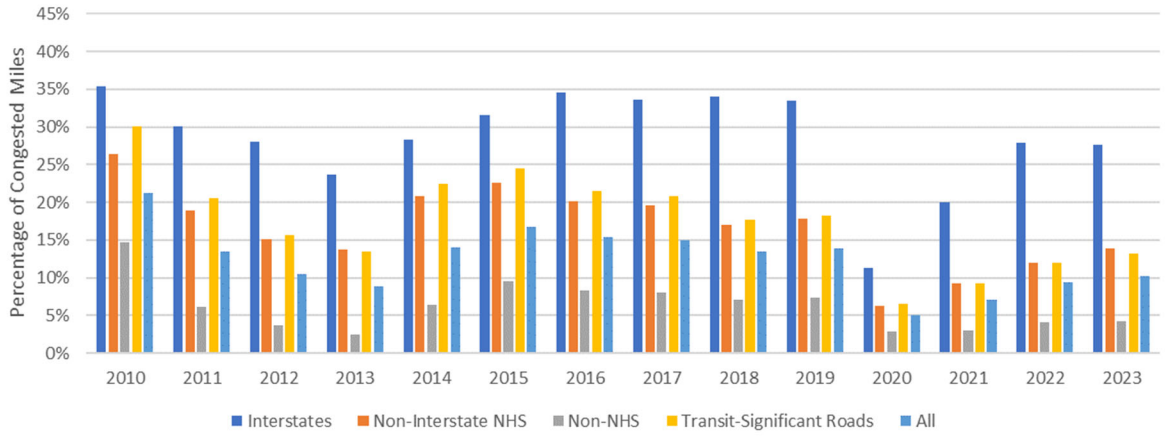


Figure E-2: Annual Average Percent of Congested Miles by Highway Category: Total AM and PM Peaks



[2] Percent of Congested (Directional) Miles is a system-wide measure that captures the spatial extent of congestion. Congestion is defined if actual travel time is 30% longer than the free-flow travel time[2], i.e., Travel Time Index > 1.3, based on recommendations made by the National Transportation Operations Coalition in 2005.

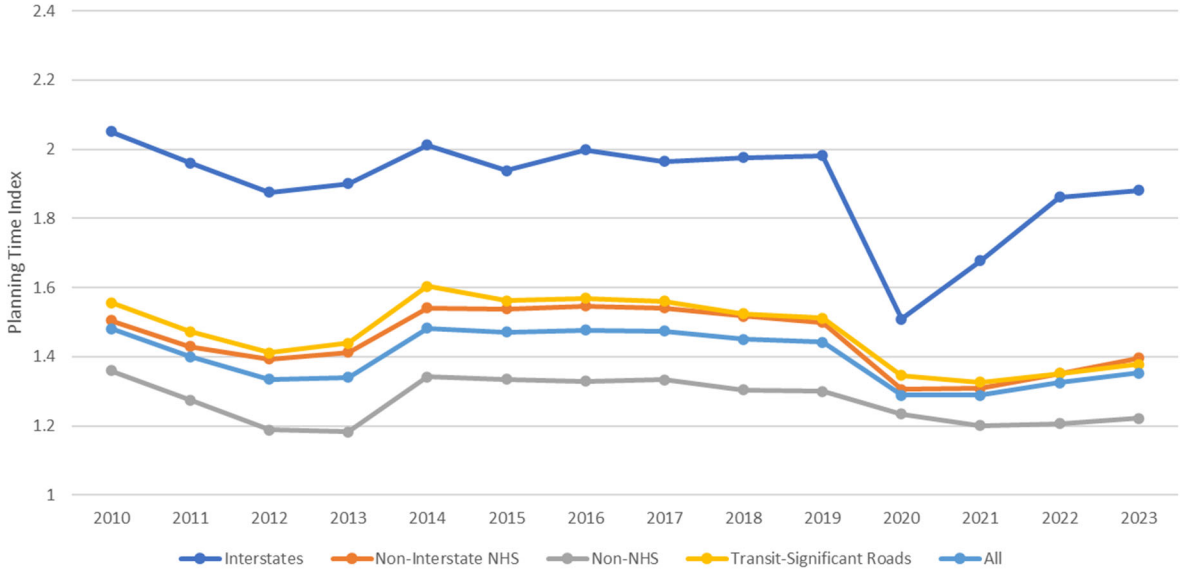
REGIONAL TRAVEL TIME RELIABILITY TRENDS, 2010-2023

Travelers in the Washington region should expect significantly longer journey times during peak periods. To ensure on-time arrivals, it is advisable to double the estimated free-flow travel time, especially on the regional Interstates. This estimate accounts for all directions of travel, but those traveling in the direction of heaviest traffic may need to allocate even more time.

In line with broader traffic congestion trends, Interstates have consistently demonstrated lower travel time reliability compared to other road types. As measured by the Planning Time Index (PTI), Interstates have consistently had a higher PTI than other highway categories, both during AM and PM peak periods. On average, the PTI for Interstates is approximately 23% higher than the overall average (Figure E-3).

Since the pandemic in 2020, the reliability of Interstate travel has worsened at a faster pace than other road types. This trend is evident in both AM and PM peak periods. The PTI for Interstates has increased by approximately 23% during AM peak periods and by 27% during PM peak periods between 2020 and 2023. Further details on the Travel Time Index are available in Section 2.2.1.2.

Figure E-3: Annual Average Planning Time Index by Highway Category: Total AM and PM Peaks

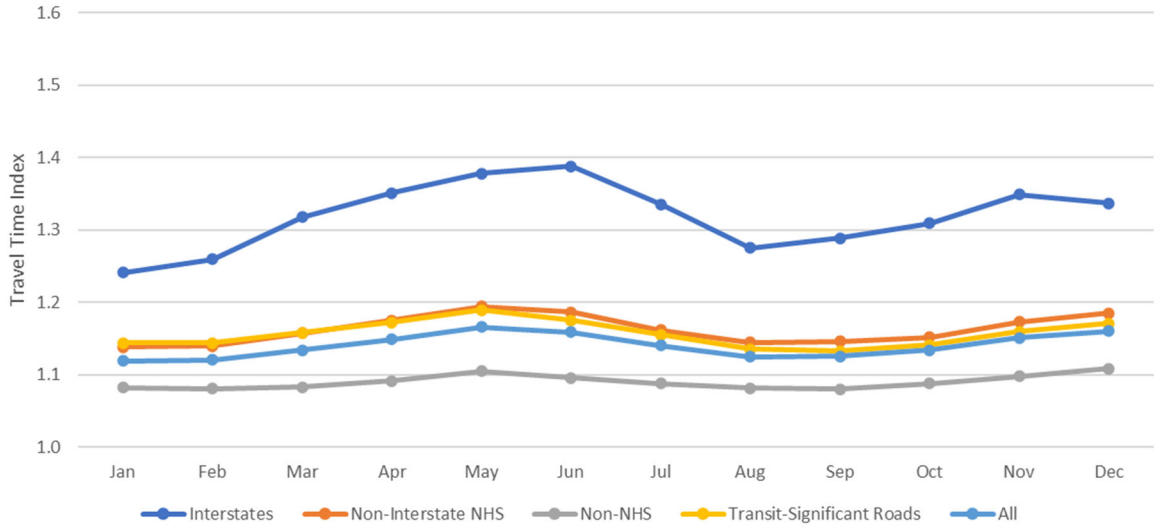


CONGESTION MONTHLY VARIATION

As depicted in Figure E-4 for 2023, traffic congestion fluctuates seasonally, with the Interstates experiencing the most significant monthly variations. Transit-Significant Roads, Non-Interstate NHS, and Non-NHS roads follow in terms of congestion variability.

During PM peak hours in 2023, Interstate TTI (Travel Time Index) exhibited a 22.1% difference between its highest (May - 1.49) and lowest (August - 1.16) values. In contrast, Non-NHS roads saw a 13.5% difference (May - 1.26 vs. August - 1.09). This indicates that Interstate travel times are more subject to seasonal fluctuations than those on other road types. The monthly variation of congestion is discussed in greater detail in Section 2.2.1.4.

Figure E-4: 2023 Monthly Variation of Congestion: Total AM and PM Peaks

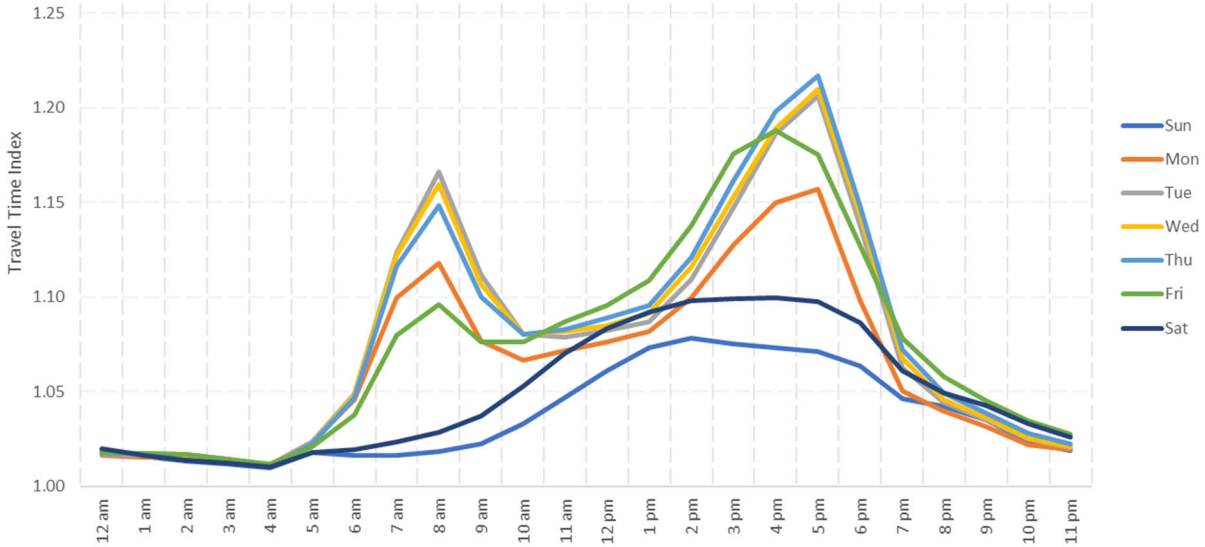


CONGESTION DAY OF WEEK VARIATION

Congestion also fluctuates throughout the week (Figure E-5). Weekends exhibited the least traffic, with Sunday recording even less congestion than Saturday and lacking distinct morning and afternoon peaks. Saturday displayed a distinctive pattern with slightly elevated midday traffic compared to Monday and Tuesday.

Weekday morning and afternoon rush hours on Tuesday, Wednesday, and Thursday witnessed substantial increases in TTI. For example, the TTI on Tuesday at 8 AM reached 1.17 compared to near free-flow conditions of 1.02 overnight, and at 5 PM, it reached 1.21. These levels are comparable to those seen before the COVID-19 pandemic, indicating a robust return to pre-pandemic traffic patterns during peak hours. For more information on the congestion variation in a typical week of 2023, see Section 2.2.1.5.

Figure E-5: Time of Day and Day of Week Variation of Congestion in 2023



TOP BOTTLENECKS

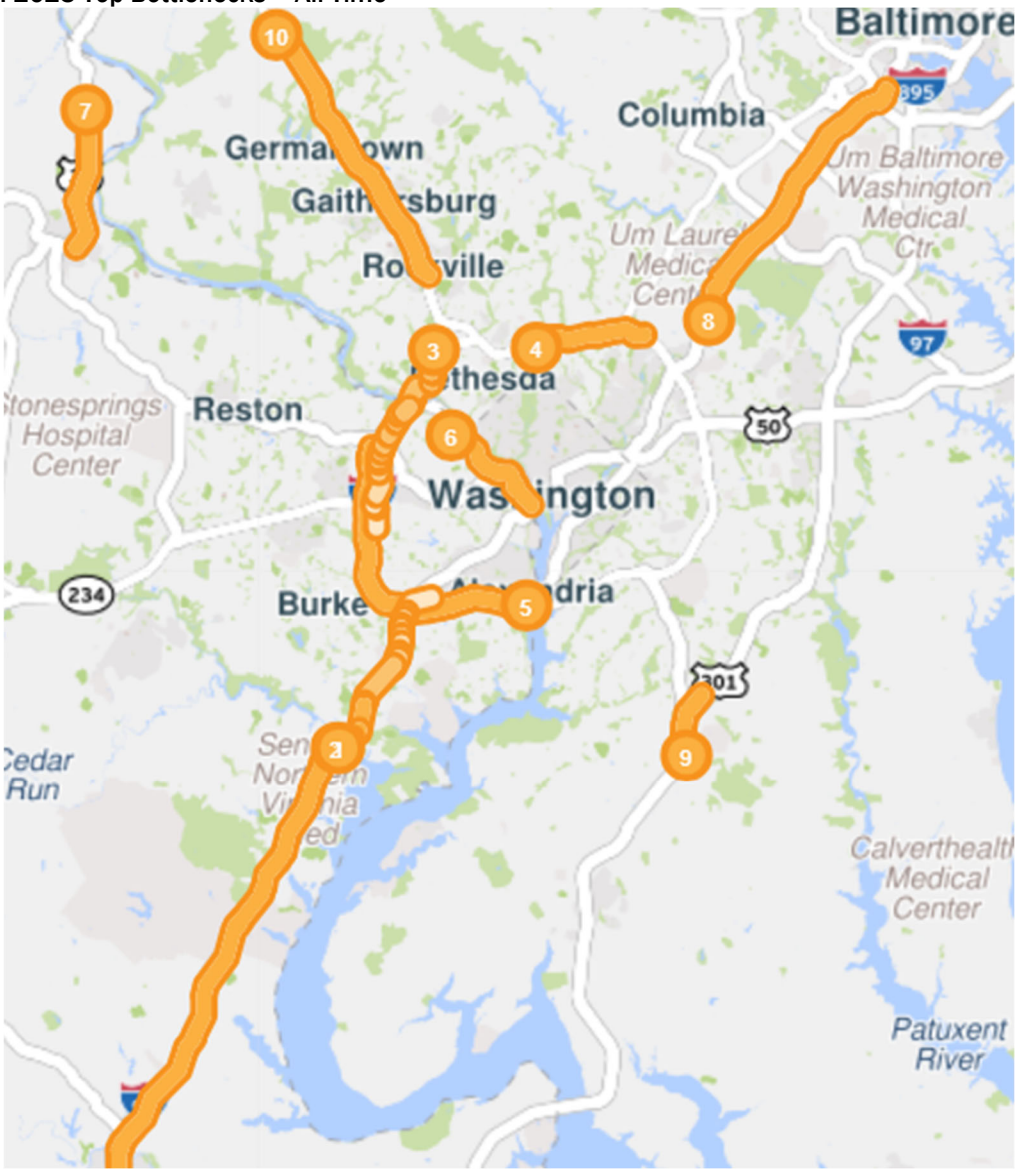
This report presents "all-time", i.e. 24/7/365, top bottlenecks by taking advantage of the Bottleneck Ranking tool in the University of Maryland's Regional Integrated Transportation Information System (RITIS) Probe Data Analytics (PDA) Suite. A measure of "Base Impact", defined within the PDA Suite as the sum of queue lengths over the duration, was used to rank the bottlenecks for this report. The "all-time" top bottlenecks in 2023 are summarized in Table E-1 and mapped in Figure E-6.

For 2023, I-95 South at VA-123/Exit 160 remained the region's most severe bottleneck (as it was in 2021 and in prior years), but the severity of congestion at this location decreased substantially compared to 2021. The average duration in 2023 (6 hours and 32 minutes) was almost 2 hours less compared to 2021 (8 hours and 9 minutes), representing a reduction of nearly 27%. The average maximum length for the bottleneck has decreased from 4.01 miles in 2021 to 3.19 miles in 2023, a decrease of approximately 20.4%. These measures suggest successful improvement efforts in this corridor. A more comprehensive discussion of the 2023 top ten bottlenecks is provided in Section 2.2.1.6.

Table E-1: 2023 Top Bottlenecks – All Time

Rank	Location	Average duration	Average max length (miles)	Total duration	Impact factor
1	I-95 S @ VA-123/EXIT 160	6 h 32 m	3.19	99 d 12 h 37 m	358,921
2	I-95 N @ VA-123/EXIT 160	4 h 17 m	3.89	65 d 7 h 21 m	348,300
3	I-495 CW @ I-270 SPUR	2 h	6.97	30 d 11 h 11 m	311,793
4	I-495 CCW @ MD-97/GEORGIA AVE/EXIT 31	3 h 45 m	3.13	57 d 1 h 35 m	265,032
5	I-495 CCW @ US-1/EXIT 1	3 h 8 m	3.52	47 d 16 h 53 m	251,152
6	GW PKY N @ VA-123/CHAIN BRIDGE RD	2 h 39 m	4.11	40 d 11 h 7 m	239,625
7	US-15 N @ STUMPTOWN RD/LUCKETTS RD	1 h 26 m	7.23	21 d 23 h 26 m	220,696
8	Baltimore–Washington Parkway S @ POWDER MILL RD	2 h 26 m	4.62	37 d 42 m	217,495
9	US-301 S @ MCKENDREE RD/CEDARVILLE RD	4 h 30 m	2.23	68 d 15 h 49 m	217,102
10	I-270 N @ MD-109/EXIT 22	2 h 8 m	5.09	32 d 14 h 5 m	214,980

Figure E-6: 2023 Top Bottlenecks – All Time



MAJOR FREEWAY COMMUTE ROUTES

Beyond the regional performance metrics outlined above, this report delves into corridor-specific analyses, focusing on 18 major freeway commute routes identified between key interchanges and points of interest. Utilizing the PDA Suite's 'Performance Charts' tool, we analyzed travel times along these routes during peak periods (Tuesdays, Wednesdays, and Thursdays) for 2010 and 2021-2023 (detailed in Section 2.2.1.7 and Appendix C).

Upon comparing travel times between 2013 and 2023, corridors were identified that have experienced improvements, deterioration, or remained relatively unchanged. The analysis conducted reveals a general trend of increased travel times across most routes during both morning and evening peak hours. However, several corridors have shown signs of improvement, with reduced travel times in 2023 compared to 2013. These insights provide valuable information for traffic management and planning efforts. For a more comprehensive exploration of traffic trends, please refer to Section 2.1.2 and Appendix D.

Congestion on Transit and Other Systems

The CMP Technical Report provides a detailed analysis of congestion's interrelationship with various issues and transportation modes, drawing from a diverse range of contemporary and historical sources. Chapter 2 provides in-depth coverage of these topics. Key findings, particularly those derived from recent research, are summarized below.

TRANSIT

The National Capital Region's transit system is a complex network comprising multiple modes, including Metrorail, commuter rail, and various bus operations. A primary concern is the persistent congestion that occurs within this system.

Roadway congestion often adversely impacts bus transit operations. Key chokepoints, particularly those situated on the Washington Metropolitan Area Transit Authority's (WMATA) Priority Corridor Network and Transit-Significant Roads (as identified by the TPB's Regional Public Transportation Subcommittee, see Section 2.3.1.1 for more information), frequently bottleneck bus transit. Addressing roadway congestion directly benefits bus operations by reducing passenger delays, lowering operational costs, enhancing reliability, and increasing ridership.

Congestion can also arise within the transit system itself. When demand for bus, rail, and train services exceeds capacity, overcrowding becomes a concern. Metrorail stations often experience peak-hour congestion, and certain transit centers, such as Union Station, are prone to crowding. Station congestion is typically attributed to design limitations, circulation constraints, and increasing ridership. As indicated in Metro's strategic plan, Momentum[3], crowded conditions during peak periods are likely to intensify without expanding the rail fleet.

MANAGED LANES FACILITIES

Several High-Occupancy Vehicle (HOV) facilities in the region have been reconstructed to High-Occupancy Toll (HOT) lanes. These lanes allow eligible vehicles, such as carpools or buses, to continue using the facility at no cost. However, single-occupant vehicles can also utilize these lanes by paying a variable toll that adjusts based on traffic congestion levels.

[3] WMATA, Strategic Plan 2013-2025, https://www.wmata.com/initiatives/strategic-plans/upload/momentum-full.pdf

PARK-AND-RIDE FACILITIES

There are over 160,000 parking spaces at nearly 400 Park & Ride lots throughout the Washington/Baltimore Metropolitan areas where commuters can conveniently bike, walk or drive to and join up with carpools/vanpools or gain access to public transit. According to the region's Commuter Connections program: two thirds of Park & Ride Lots have bus or rail service available; parking is free at 89% of the Park & Ride Lots; and more than 25% of Park & Ride Lots have bicycle parking facilities.

AIRPORT ACCESS

The transportation linkage between airports and local activities is a critical component of the transportation system. The Washington region has two major airports – Ronald Reagan Washington National Airport (DCA) in Arlington, VA, and Washington Dulles International Airport (IAD) in Loudoun County, VA. The region is also served by the nearby Baltimore/Washington International Thurgood Marshall Airport (BWI). According to the most recent TPB Air Passenger Survey the majority (over 90%) of those traveling to the region's airports does so via the highway network (i.e. personal cars, rental cars, taxis, buses). Therefore, understanding ground airport access is important to congestion management.

FREIGHT

The National Capital Region has a responsive freight system to support the vitality of economy and quality of life. This region features a consumer and service-based economy and approximately 73% of freight by weight moving into, out of and within the region is transported by truck[4]. In addition, the TPB calculates a Truck Travel Time Reliability Index (TTTRI) as part of federal Performance-Based Planning and Programming reporting requirements (see Section 4.1.2).

Future Congestion

The constrained element of Visualize 2045, the Metropolitan Washington region's long-range transportation plan, included all regionally significant transportation projects and programs planned in the Metropolitan Washington region over the next 25-30 years. The TPB produces a performance analysis of every long-range plan, which examines trends and assesses future levels of congestion as well as other performance measures. The performance analysis of the constrained element of Visualize 2045 provided an overall assessment of the anticipated impacts and an indication of future levels of congestion relevant to the CMP.[5]

Based upon the outlook of growth in the region, the plan performance analysis examined travel demand model data to identify where congestion is expected to occur now and in the future. It looked at criteria that may affect congestion, such as changes in population, employment, transit trips, auto trips, number of lane miles, and congested lane miles. The analysis broke down lane miles of congestion by examining the total share of congested lane miles, a comparison with no-build alternative scenario, additional indicators of delay, and, generally, where the most lane miles of congestion may be found in 2045.

The region was forecast to be home to 23% more residents and 26% more jobs in 2045. Towards accommodating that growth, 42% more lane miles of roadway and 27% more high-capacity transit miles were planned to be constructed. The total number of trips per day taken was expected to

[4] National Capital Region Freight Plan Update – 2023, https://www.mwcog.org/documents/2023/07/19/national-capital-region-freight-plan-freight/

[5] TPB, Visualize 2045 Long-Range Transportation Plan (2022 Update). https://visualize2045.org/plan-update/approved-2022-plan/

increase by 17%, and transit, walk, and bike trips were expected to increase at a faster rate than single driver trips. The overall amount of driving (Vehicle Miles Traveled or VMT) was expected to increase by 15%. This was slightly less than forecast population growth, which means that VMT per capita was expected to decline by 3%. The increase in demand on the roadways was forecast to outpace the increase in supply, leading to a significant increase in congestion.

National Comparison of the Washington Region's Congestion

The Washington metropolitan area is consistently ranked among the most congested regions in the United States. According to independent congestion analyses conducted by INRIX[6], Texas A&M Transportation Institute[7], and TomTom[8], the region's traffic patterns significantly contribute to travel time delays. According to INRIX, Washington was ranked 8th nationally in 2023 for annual average hours wasted in traffic. The Texas A&M Transportation Institute reported that Washington had the 4th highest Annual Person-Hours of Delay per Commuter among 15 very large urban areas. Meanwhile, TomTom ranked the region 14th based on average travel time per 6 miles. For additional details of the Washington region's congestion relative to other major cities, please refer to Section 2.5.

Congestion Management Strategies

The CMP has been playing an important role in developing strategies, including strategies in association with capacity-expanding projects, to combat congestion or mitigate the impact of congestion. Visualize 2045 and TPB member agencies have pursued many alternatives to capacity increases, with considerations of these strategies informed by the CMP. In accordance with R18-2021[9], the TPB and Fredericksburg Area MPO (FAMPO) maintain coordinated, cooperative, and continuing planning processes, particularly regarding the CMP that FAMPO oversees[10] for the northern portion of Stafford County, which is part of the Washington, DC-MD-VA Urbanized Area (UZA), in compliance with applicable federal laws and regulations. Implemented or continuing strategies include demand management strategies and operational management strategies, as shown in Figure E-7. It should be noted that although strategies are divided into two categories for reporting purposes in this document, demand management and operational management strategies should be designed and implemented to work in cooperation.

[6] INRIX, Inc., Traffic Scorecard, http://inrix.com/scorecard/

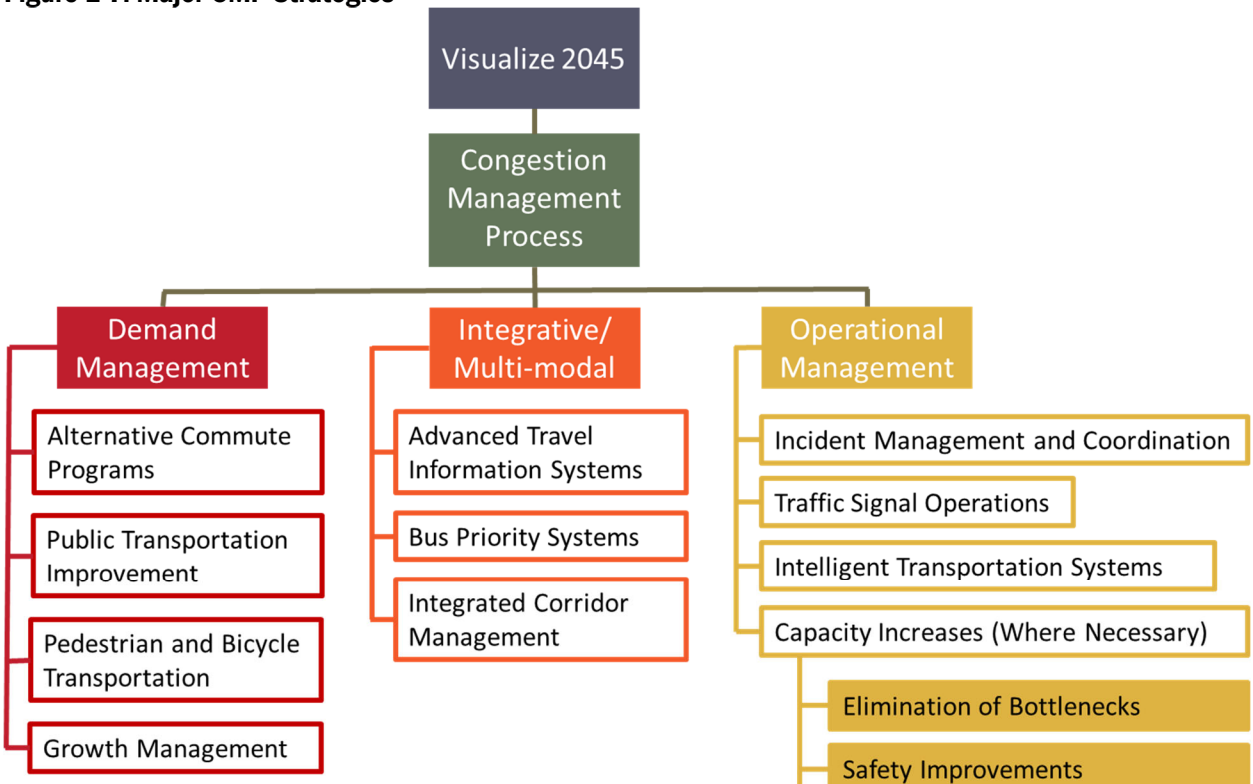
[7] Texas A&M Transportation Institute, 2023 Urban Mobility Report, https://mobility.tamu.edu/umr/

[8] TomTom, Traffic Index, https://www.tomtom.com/en_gb/trafficindex/list

[9] R18-2021 - Resolution to approve the 2021 TPB-Fredericksburg Area MPO Memorandum of Understanding, https://www.mwcog.org/documents/2021/05/21/r18-2021---resolution-to-approve-the-2021-tpb-fredericksburg-area-mpo-memorandum-of-understanding-/

[10] FAMPO, Congestion Management Process, https://fampo.gwregion.org/congestion-management-process/

Figure E-7: Major CMP Strategies



Note: There are synergies between demand management and operational management strategies, such real-time traveler information on ridesharing opportunities responsive to a real-time traffic incident or situation.

DEMAND MANAGEMENT STRATEGIES

Demand Management aims at influencing travelers' behavior for the purpose of redistributing or reducing travel demand. Examples of TPB's demand management strategies include:

- Commuter Connections Program – Including strategies such as Telework, Employer Outreach, Guaranteed Ride Home, Live Near Your Work, Carpooling, Vanpooling, Ridematching Services, Car Free Day, and Bike To Work Day.

- Promotion of local travel demand management – Local demand management strategies are documented in the main body of the CMP Technical Report.

- Public transportation improvements – The Washington region continues to support a robust transit system as a major alternative to driving alone.

- Pedestrian and bicycle transportation enhancements as promoted and tracked through the Bicycle and Pedestrian Planning program – The number of bicycle and pedestrian facilities in the region has increased in recent years; the regional bikesharing program, Capital Bikeshare has more than 5,000 bikes available at 600 stations across six jurisdictions: Washington, DC; Arlington, VA; Alexandria, VA; Montgomery County, MD; Prince George's County, MD; Fairfax County, VA; and the City of Falls Church, VA.

- Car sharing - Local governments work with private companies to make the region's car sharing market viable.
- Land use strategies – Including those promoted by the Transportation-Land Use Connections (TLC) Program.

OPERATIONAL MANAGEMENT STRATEGIES

Operational management focuses on improvements made to the existing transportation system to keep it functioning effectively. Examples of TPB's operational management strategies include:

- Managed Lanes Facilities, which can include high-occupancy vehicle facilities (such as on US-50 and the Dulles Toll Road) and variably-priced facilities (such as on I-66 and I-495).

- Incident Management – The region's state DOTs all pursue strategies for managing their transportation systems, including operation of 24/7 traffic management centers, roadway monitoring, service patrols, and communications interconnections among personnel, centers and systems.

- Regional Transportation Operations Coordination – Notably, the Metropolitan Transportation Operations Coordination (MATOC) program, whose development the TPB helped shepherd, uses real-time transportation systems monitoring and information sharing to help mitigate the impacts of non-recurring congestion.

- Intelligent Transportation Systems are considered, particularly through the TPB's Systems Performance, Operations, and Technology Subcommittee. Examples include traffic signal optimization, adaptive traffic signal systems, safety service patrols, drone technology for accident reconstruction and traveler information.

INTEGRATED/MULTI-MODAL STRATEGIES

While there is often overlap in demand management and operational management strategies, for example, real-time traveler information on ridesharing opportunities responsive to a real-time traffic incident or situation, there are projects in the region that fully integrate demand and operational management strategies.

- Advanced Traveler Information Systems – Travelers have more ways than ever for obtaining trip planning information such as traffic, incidents, real-time transit arrivals, and emergency information. The prevalence of internet capable mobile devices and social media provide new means of communication between travelers and operators.

- Bus priority systems are sensors used to detect approaching transit vehicles and alter signal timings to improve transit performance. This is important because improved transit performance, including more reliable arrival times for buses, makes public transit a more appealing option for travelers. Bus priority systems have been installed on key bus corridors across the region, helping to offset the impact of traffic congestion on bus speeds.

- Integrated Corridor Management - MDOT and VDOT have instituted ICM efforts in major corridors.

- Both the VDOT and the MDOT utilize performance-data-driven project programming prioritization processes that consider, in part, congestion management impacts of proposed projects.

- DOTs, transit agencies, private transportation providers, and other third parties have developed mobile versions of websites and mobile applications (apps) to make it easier for travelers to receive information on their devices.

- Transportation agencies in the region have adopted social media as a means of sharing information with a large segment of the public. Instead of providing information only on a central website that the user has to visit, social media provides a way to deliver that information to users through a forum to which they already subscribe, such as Twitter which was one of the most popular social media sites for the transportation sector.

ADDITIONAL SYSTEM CAPACITY

Federal law and regulations list capacity increases as another possible component of operational management strategies, for consideration in cases of elimination of bottlenecks, safety improvements and/or traffic operational improvements. These capacity increase projects were documented in Visualize 2045.

The region has an emphasis on demand and operational management strategies, such as transit improvements, the Commuter Connections program, instead of or in conjunction with system capacity increases.

Assessment of Congestion Management Strategies

ASSESSMENT OF IMPLEMENTED STRATEGIES

The TPB assesses the implemented congestion management strategies in a variety of ways. Many strategies have specific assessments and the overall effectiveness of all strategies is repeatedly evaluated by congestion monitoring and analysis.

Specific assessments (of individual or several strategies):

- A variety of surveys within the Commuter Connections Program are regularly conducted to provide firsthand data inputs for the assessments, including the Guaranteed Ride Home Customer Satisfaction Survey, Commuter Connections Applicant Placement Rate Survey, State of the Commute Survey, Employee Commute Surveys, Carshare Survey, Vanpool Driver Survey, Employer Telework Assistance Follow-up Survey, and the Bike-to-Work Day Participant Survey.

- Public transportation improvements, pedestrian and bicycle transportation improvements, and land use strategies are assessed in Regional Household Travel Surveys, and Regional Travel Trends Reports.

Overall assessments (of all implemented strategies):

a) The Eastern Transportation Coalition probe-vehicle-based traffic monitoring data.

b) National Performance Management Research Data Set (NPMRDS).

c) Maryland, Virginia and the District of Columbia's Highway Performance Monitoring Systems (HPMS).

ASSESSMENT OF POTENTIAL STRATEGIES THROUGH SCENARIO PLANNING

The TPB has conducted scenario planning studies over the years. The three most recent scenario studies are the Long Range Plan Task Force Report which identified seven initiatives for inclusion in Visualize 2045; the Multi-sector Working Group (2015) identified projects in the transportation and land use sector with the aim of reducing greenhouse gases; and the TPB Climate Change Mitigation Study of 2021 which included three "top-down" scenarios and 10 "bottom-up" scenarios exploring single and combination pathways to reduce on-road, transportation-sector greenhouse gas emissions.

The TPB has also undertaken the Transportation/Land Use Connections (TLC) Program. The TLC Program addresses the "how to" challenges related to improving transportation/land-use coordination and realizing an alternative future for the region, through providing both direct technical assistance and information about best practices and model projects.

Compiling Project-Specific Congestion Management Information

Pursuant to Federal regulations, the TPB encourages consideration and inclusion of congestion management strategies in all Single Occupancy Vehicle (SOV) capacity-increasing projects. To ensure that individual transportation projects contribute positively to regional congestion management efforts, the TPB utilizes a CMP Documentation Form11 (see Appendix F) to assess that the planning of federally funded single-occupancy vehicle (SOV) projects has included considerations of CMP strategy alternatives and integrate such components where feasible. In the Technical Inputs Solicitation for the update to Visualize 2050 and the TIP, for any project to undergo construction activities within the first four years (by 2029) and is providing a significant increase to SOV capacity, it must be documented that the implementing agency considered all appropriate systems and demand management alternatives to the SOV capacity. This ensures that project planning considered strategies that reduce overall traffic demand, alongside potential capacity enhancements.

The dedicated CMP Documentation Form includes a specific set of questions related to SOV congestion management. Any project with construction activities planned by 2029 aiming to significantly increase a highway's single-occupancy vehicle capacity must answer these questions to be considered for inclusion within the Visualize 2050 plan and the FY26-29 TIP. By requiring this documentation, the CMP ensures that high-capacity SOV projects are carefully evaluated and, whenever possible, integrated with strategies that manage overall traffic demand.

Key Findings of the 2024 CMP Technical Report

1. Congestion – While the COVID-19 pandemic significantly reduced congestion, with the Travel Time Index (TTI) reaching a historic low of 1.17 in 2020, congestion rebounded in 2023, but to levels still below pre-pandemic norms (e.g., Interstates TTI of 1.41 in 2023 versus 1.48 in 2019).

2. Reliability – Travel time reliability improved during the pandemic due to reduced congestion but has since reverted to pre-pandemic levels (Section 2.2.1.2).

[11] *The CMP Documentation Form is currently a portion of the online system member agencies use to enter project information into TPB's Technical Inputs Solicitation.*

3. Bottlenecks – Bottleneck locations have shifted somewhat since 2019, though many persistent hotspots remain, with I-95 southbound between US-1 and VA-123 continuing to be the region's most congested segment. (Section 2.2.1.6).

4. Travel Demand Management – Travel demand management strategies, including the Commuter Connections program, remain crucial for congestion mitigation. The region's robust transit system is a key alternative to single-occupancy vehicles (Section 3.2.1).

5. Walking and Bicycling – Walking and bicycling continue to grow in the region in part due to increasing connectivity in the bicycle and pedestrian network (Sections 3.2.4 and 3.2.5).

6. Variably Priced Lanes (VPLs) - VPLs provide additional options to travelers in the region. Facilities include 95Express, 395Express, 495Express, I-66, and Maryland Route 200 (Intercounty Connector (ICC)) (Section 3.3.2).

7. Regional Transportation Operations Coordination – The Metropolitan Washington Area Transportation Operations Coordination (MATOC) continues to play an important role in coordination and communicating incident information during both typical travel days and special events such as severe weather and construction work (Section 3.3.3.4).

8. Real-time travel information – The increasing availability of technology to monitor, detect, and evaluate travel conditions allows operators to make changes to the transportation network through active travel demand management, traffic signal optimization, and integrative corridor management. For travelers, real-time traffic and transit information are available from a number of sources though mobile applications and mobile versions of websites. Social media provides a mutually beneficial direct connection between transportation providers and users. Mobile applications related to non-auto modes, such as transit and bikesharing, allow travelers to be flexible with their mode choices (Section 3.4.6).

9. COVID-19 Pandemic Impacts – 2023 saw a mix of travel trends coming out of the pandemic, with A.M. peak congestion remaining lower but P.M. peak congestion matching pre-pandemic conditions. (Sections 2.2.1.1 and 2.2.1.2; Section 2.2.3; Section 2.3).

Recommendations for the Congestion Management Process

The 2024 CMP Technical Report delineates the evolution of the Congestion Management Process in the Washington region. The report underscores several pivotal recommendations for prospective enhancements.

1. **Continue the Commuter Connections program.** The Commuter Connections program is a fundamental strategy for demand management in the National Capital Region, offering benefits from a regional perspective. It contributes to the reduction of trips, vehicle miles of travel, transportation emissions, and enhances air quality.

2. **Continue and enhance the MATOC program and support agency/jurisdictional transportation management activities.** The MATOC program/activities are key strategies of operational management in the National Capital Region. Recent enhancements have including efforts on severe weather mobilization and incident coordination. Future enhancements of the MATOC program should be considered when appropriate to expand the function and participation of the program.

3. **Continue to coordinate PBPP with the CMP.** Performance measurement and analysis are integral components of both requirements and can be achieved synergistically.

4. **Continue to encourage integration of operations management and travel demand management components of congestion management for more efficient use of the existing transportation network.** State DOTs should persist in exploring ATM strategies along congested freeways and actively manage arterials along freeways. Collaboration among transportation agencies and stakeholders is encouraged along congested corridors.

5. **Pursue sufficient investment in the existing transportation system, which is important for addressing congestion.** Prioritizing maintenance for the existing transportation system, as advocated in TPB's Regional Transportation Priorities Plan, is crucial to congestion management.

6. **Continue variable pricing and other management strategies in conjunction with capacity increasing projects.** Variably priced lanes (VPLs) offer an option for travelers to circumvent congestion and provide an effective congestion management strategy for agencies.

7. **Continue to encourage transit in the Washington region and explore transit priority strategies.** The transit system serves as a significant alternative to solo driving, maximizing the utility of existing infrastructure. Local jurisdictions should collaborate with transit agencies to explore transit priority strategies.

8. **Encourage implementation of congestion management for major construction projects.** Past successes, such as the 495 NEXT and Transform 66 projects, underscore the effectiveness of construction project-related congestion management.

9. **Continue to encourage access to non-auto travel modes.** The success of the Capital Bikeshare program and the decrease in automobile registrations in the District of Columbia indicate a shift towards non-automobile transportation in urban areas.

10. **Continue and enhance providing real-time, historical, and multimodal traveler information.** Sharing travel/incident information and partnering with private sector providers of travel and navigation information can help travelers avoid congestion and delays.

11. **Encourage implementation of projects, programs, and processes that support the TPB Priority Strategies.** In February 2023, the TPB approved Priority Strategies to guide the development of Visualize 2050. As a continuation of the seven Aspirational Initiatives endorsed in 2018, the TPB noted that these fourteen total Priority Strategies, if funded, enacted, and supported, would have the potential to significantly improve the region's transportation system performance compared to current plans and programs.

12. **Encourage connectivity within and between Regional Activity Centers.** The recent refinement of the Regional Activity Centers map, adopted in 2013, helps coordinate transportation and land use planning for future growth.

13. **Continue and enhance the regional congestion monitoring program with multiple data sources.** There is a wealth of sources, both public and private sector, for data related to congestion which have their individual strengths and shortcomings. Private sector probe-based monitoring provides unprecedented spatial and temporal coverage on roadways, but still needs to be supplemented with data from other sources including data on traffic

volumes and traffic engineering considerations. There should be continual review of the quality and availability of data provided by different sources and the structuring of a monitoring program in a way that is adaptable for potential future changes in data reporting and/or data sources.

14. **Undertake enhanced analysis of available data to understand congestion trends and impacts.** Regional understanding of the equity impacts of congestion as well as long-term trends would be improved with new and additional analyses.

15. **Monitor trends in freight, specifically truck travel.** Interrelationships between freight movement and congestion differ from interrelationships between passenger travel and congestion.

16. **Participate in collaborative planning connected and automated vehicle readiness.** These emerging technologies will dramatically alter future transportation planning. Standards and interoperability are critical issues and should be addressed through extensive collaboration with a variety of stakeholders.

17. **Monitor impacts of and interactions with shared mobility services.** Transportation Network Companies (TNCs) continue to have an evolving impact on a variety of aspects of congestion management, mode share, and transportation overall, but data for regional analysis remain scarce. Regulating agencies are encouraged to arrange for TNC data to be collected and shared with the TPB and other official transportation planning and operating entities, to enable analysis of impacts.

18. **Encourage Traffic Incident Management (TIM).** COG's 2018 creation of its Traffic Incident Management Enhancement (TIME) initiative highlighted the importance of TIM within congestion management.

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