2024 CONGESTION MANAGEMENT PROCESS (CMP) TECHNICAL REPORT

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Commuter Connections Subcommittee
November 19, 2024

National Capital Region
Transportation Planning Board

Agenda Item #4

Introduction

- A Congestion Management Process (CMP) is a mandated element of metropolitan transportation planning
  - Many generations of federal regulations for metropolitan planning have addressed CMP requirement; no changes in law under IIJA/BIL
  - The CMP Technical Report is a supporting document for the National Capital Region Transportation Plan (Visualize 2050)
    - Developed biennially since 2008
- The TPB Technical Committee (the CMP's official oversight committee) accepted the 2024 CMP Technical Report as final at their November 1, 2024 meeting

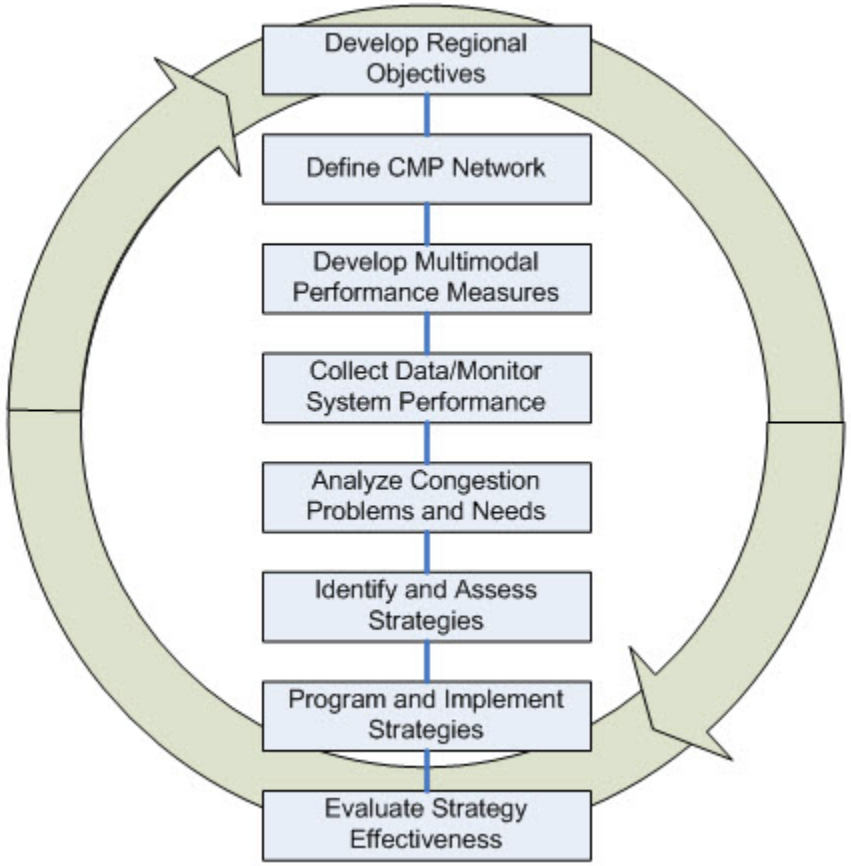
CMP and Commuter Connections

- The Commuter Connections Subcommittee has been briefed regularly on the regional Congestion Management Process (CMP), most recently in March 2023 regarding the 2022 CMP Technical Report and follow-up bottlenecks analysis
  - Thanks again for committee members' input for travel demand management information included in the 2024 report
- The Commuter Connections program is the centerpiece of the region's TDM efforts that are essential to satisfy federal CMP requirements
  - Appreciation for Commuter Connections' ongoing evaluation efforts that also help satisfy these requirements
  - In turn, information developed in the CMP has been used to advise ongoing Commuter Connections programs

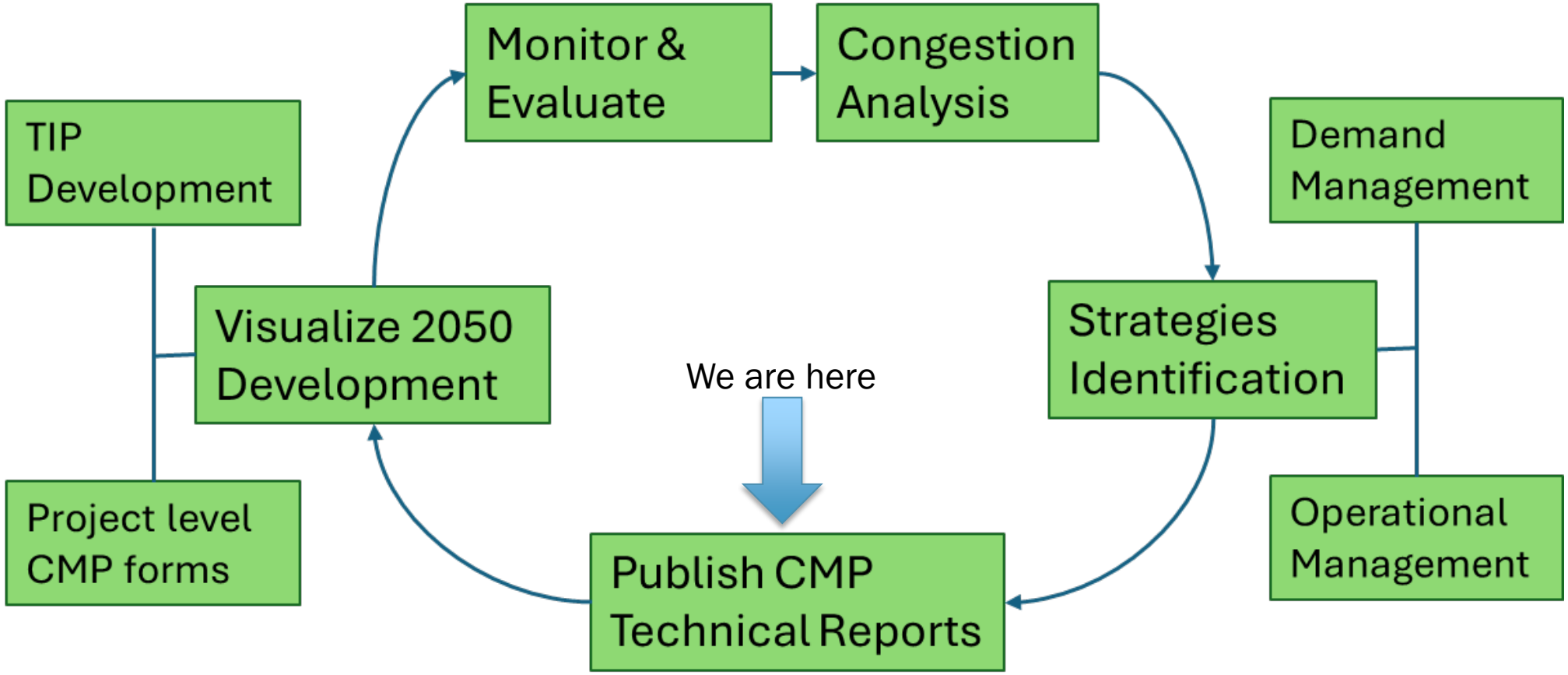
What Is A CMP?

The transportation planning process in a TMA shall **address congestion management through a process** that provides for safe and effective integrated management and operation of the multimodal transportation system…**through the use of travel demand reduction…job access projects, and operational management strategies**.

- Federal Register Vol. 81, No.103, pp.34152, May 27, 2016.
- TAM: Transportation Management Areas



National Capital Region Transportation Plan & CMP



Components of the Region's CMP

- Visualize 2045 comprises the official regional CMP
  - TPB ensures that the plan includes alternatives to SOVs
  - The CMP informs the project selection process for the plan and TIP
- Project-specific CMP addressed in Technical Inputs Solicitation
- National Capital Region Congestion Reports (quarterly dashboard)
- Biennial CMP Technical Reports
  - The 2024 CMP Technical Report will inform Visualize 2050 development

The 2024 CMP Technical Report

The **Report** serves as a background document to the National Capital Region Transportation Plan's CMP, providing detailed information on data, strategies, and regional programs involved in congestion management:

- Compiles information from a wide range of metropolitan transportation planning activities
- Provides some additional CMP-specific analyses, particularly Vehicle Probe Project data-based analyses

Contents – Congestion Summaries

- Executive Summary
- Chapter 1 – Introduction
- Chapter 2 – State of Congestion
  - Regional Travel Trends
  - Congestion on Highways; Transit Systems
  - National Comparison of the Washington Region's Congestion
  - Performance Analysis of Visualize 2045

Contents – Strategies and Outcomes

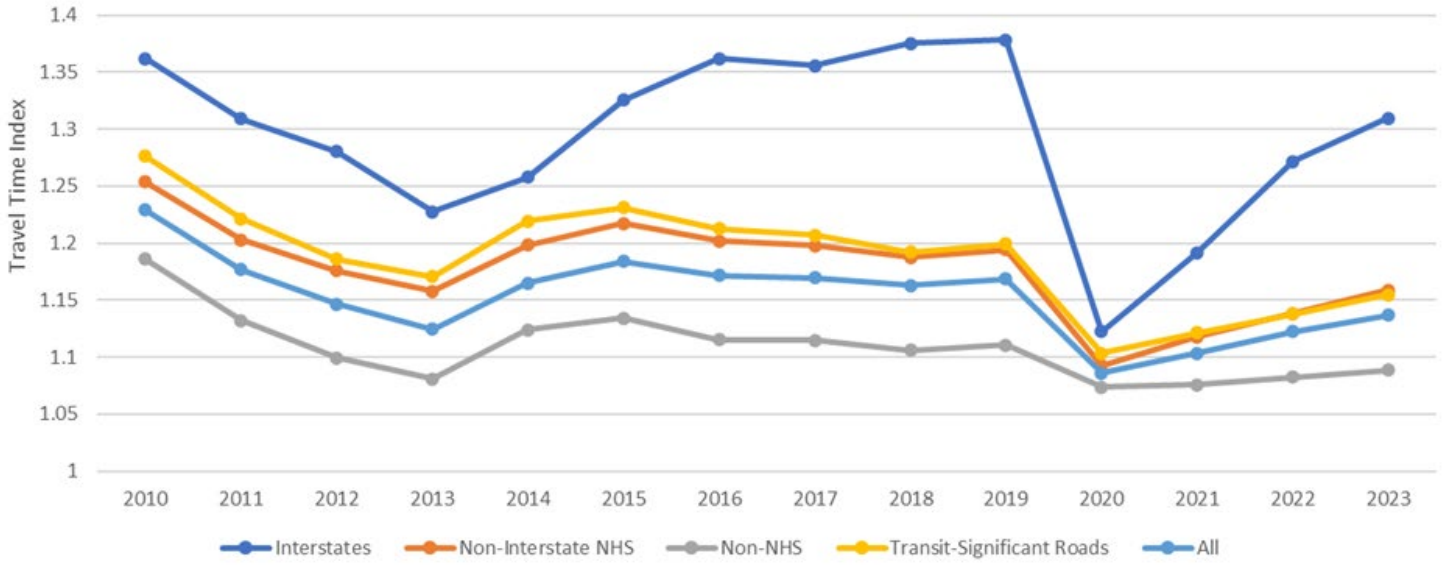
- Chapter 3 – Consideration/Implementation of Strategies
  - Demand Management Strategies (esp. Commuter Connections)
  - Operational Management and Integrative/Multi-Modal Strategies
- Chapter 4 – Studies of Congestion Management Strategies
- Chapter 5 – How Results of the CMP Are Integrated into the National Capital Region Transportation Plan
- Chapter 6 – Conclusions
  - Key Findings of the 2024 CMP Technical Report
  - Recommendations
- Appendices

Highlights of The Report

- § 2.2.1 The Eastern Transportation Coalition Vehicle Probe Project Traffic Monitoring
- § 2.2.1.6 Top Bottlenecks
- § 2.5 National Comparison of the Washington Region's Congestion
- Appendix A – 2023 Peak Hour TTI for the Region and Sub-regions
- Appendix B – 2023 Peak Hour PTI for the Region and Sub-regions
- Appendix C – 2010 and 2021-2023 Travel Times along Major Freeway Commute Corridors
- Appendix D – Peak Hours Travel Time over Years on Major Freeway Commute Corridors

Peak Period Congestion

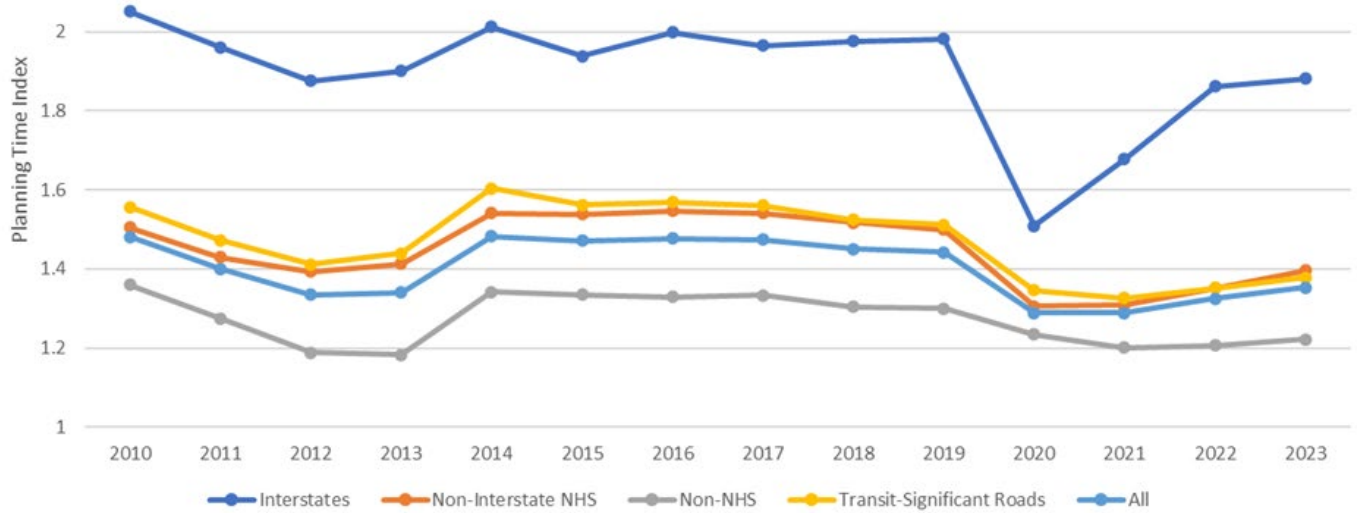
- Measured by Travel Time Index (TTI)*
- TTI has been steadily climbing since 2020, indicating a return to pre-pandemic traffic levels. While this trend highlights the recovery of travel demand, it also presents a challenge in terms of congestion. Strategies to manage traffic flow and improve travel efficiency remain important.



*Travel Time Index = Actual travel time / Free flow travel time.

Peak Period Travel Time Reliability

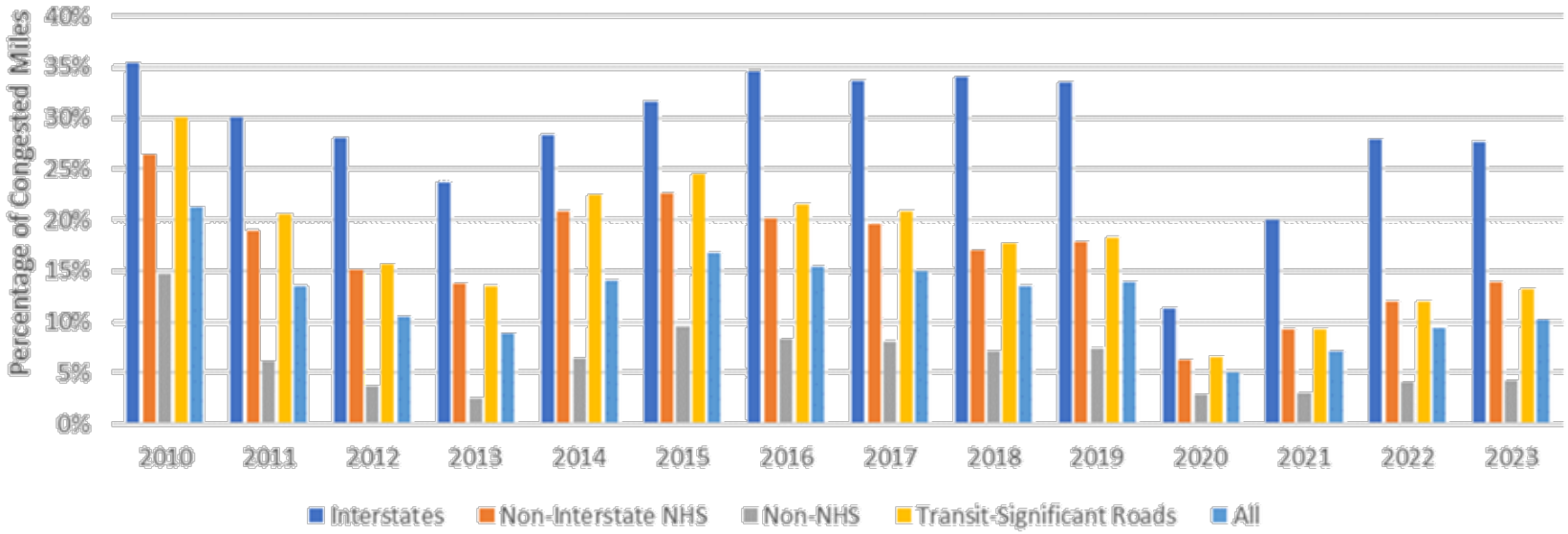
- Measured by Planning Time Index (PTI)*
- The PTI for Interstates has been increasing more rapidly than for other categories of roadways in the three years following the pandemic in 2020. This trend is observed for both AM and PM peak periods. The PTI for Interstates increased by approximately 23% from 2020 to 2023 during AM peak periods, and by approximately 27% during PM peak periods.



*Planning Time Index = 95th percentile travel time / Free flow travel time

Percent of Congested Miles by Highway Category

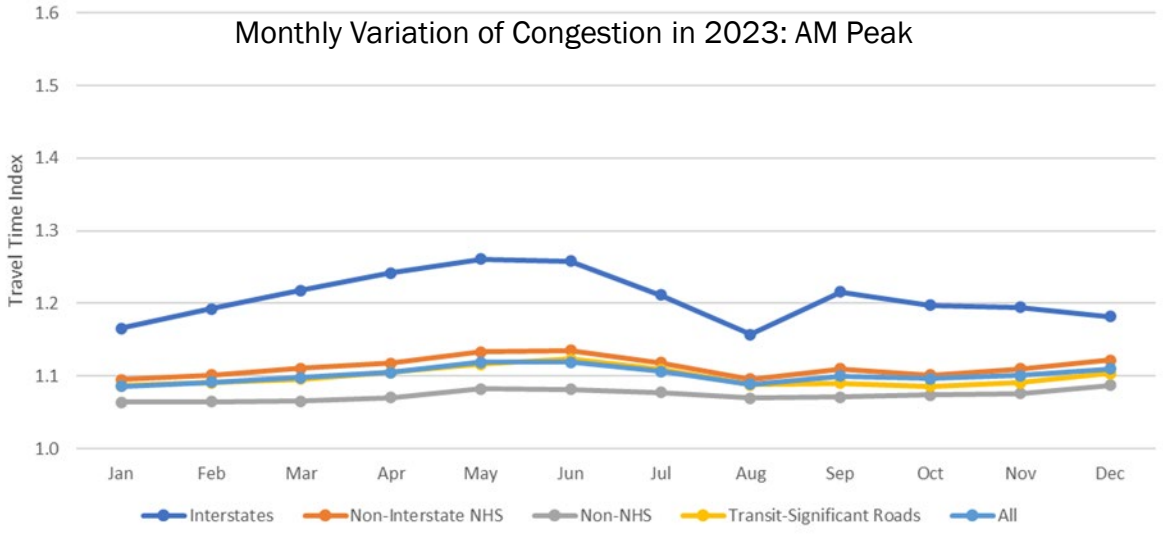
- To capture the spatial extent of congestion*
- Despite the temporary drop in 2020 due to the pandemic, the long-term trend shows a general increase in the percentage of congested miles, particularly on Interstates
- In 2023 regionally, approximately 27% of Interstate mileage was congested, versus about 10% of roadway mileage overall

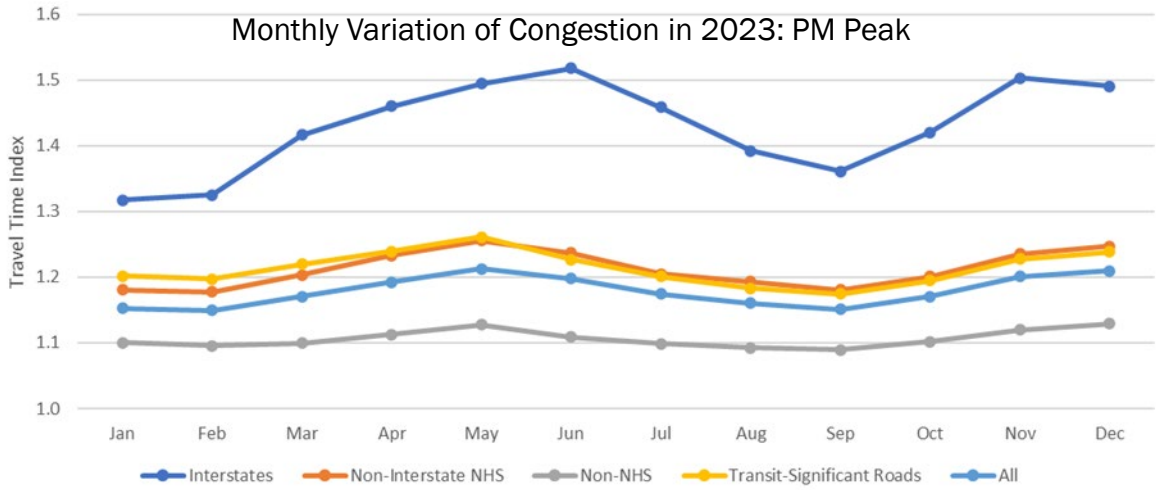


*Conditions are considered to be congested when Travel Time Index > 1.30.

Congestion Monthly Variation in 2023

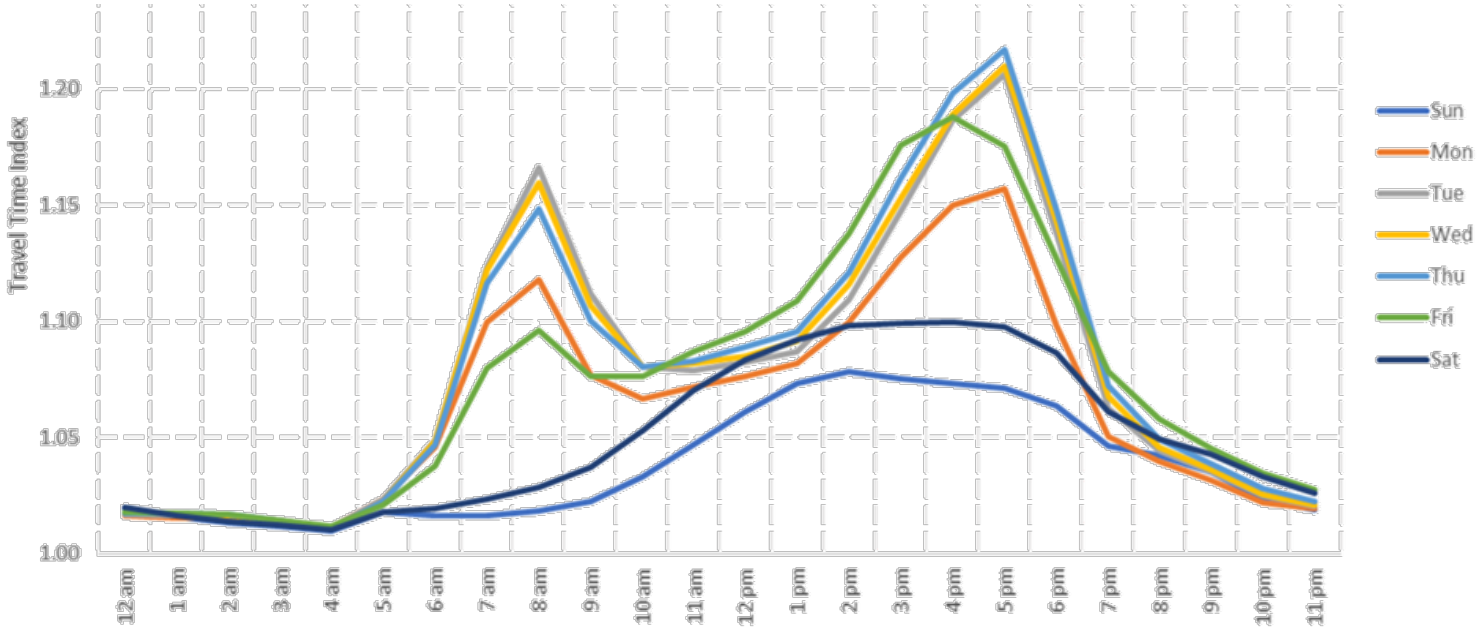
- The TTI for Interstates fluctuates more throughout the year compared to other categories
- The TTI values in the PM peak are consistently higher than those in the AM peak
    - This observation aligns with the general trend of heavier traffic during afternoon or evening hours





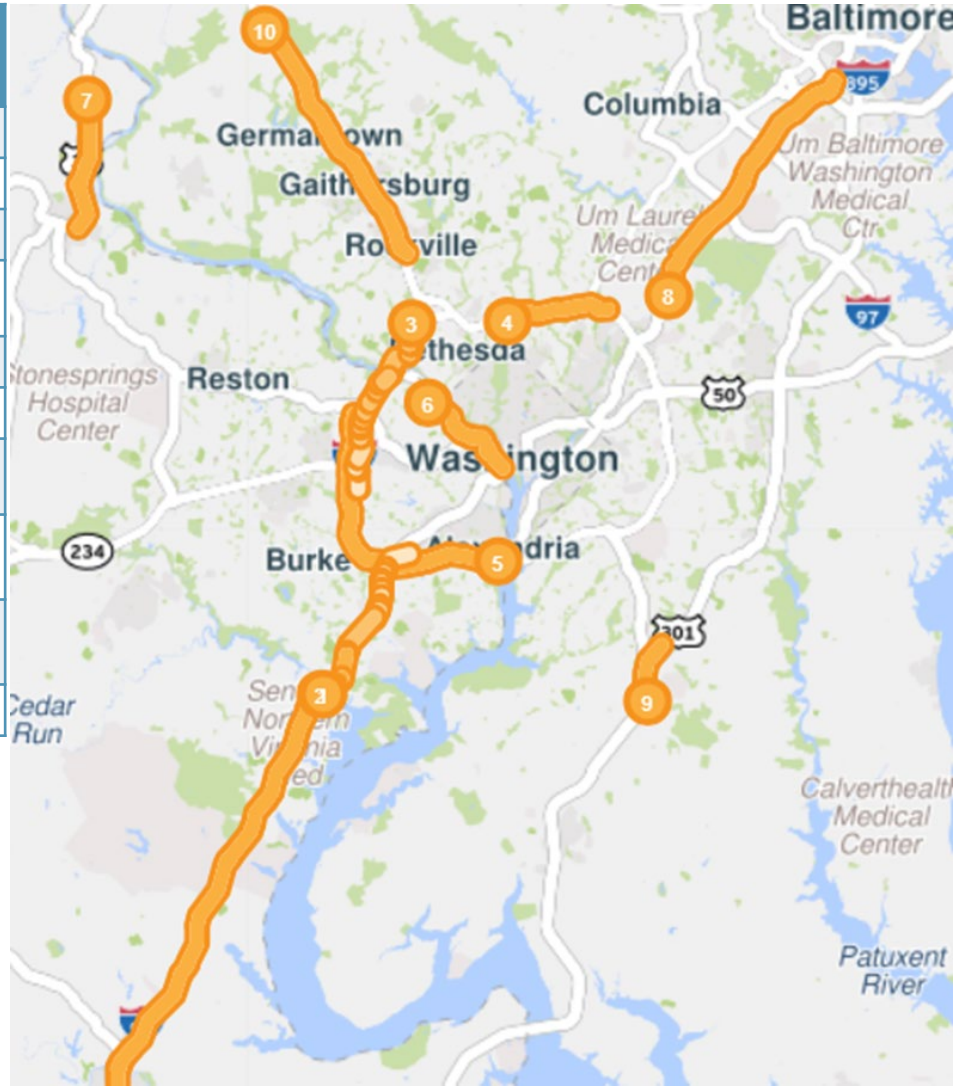
Congestion Time of Day, Day of Week Variation

- Weekday AM and PM peaks on Tuesday, Wednesday, and Thursday show significant increases. These levels are comparable to those observed before the COVID-19 pandemic.
- The most congested PM peak hour shifted from Friday to Thursday in 2023. Additionally, Tuesday and Wednesday PM commutes had higher TTI than Friday. This is a new pattern compared to previous years, where Friday evenings typically had the worst congestion.



Location of Top 10 Bottlenecks in 2023

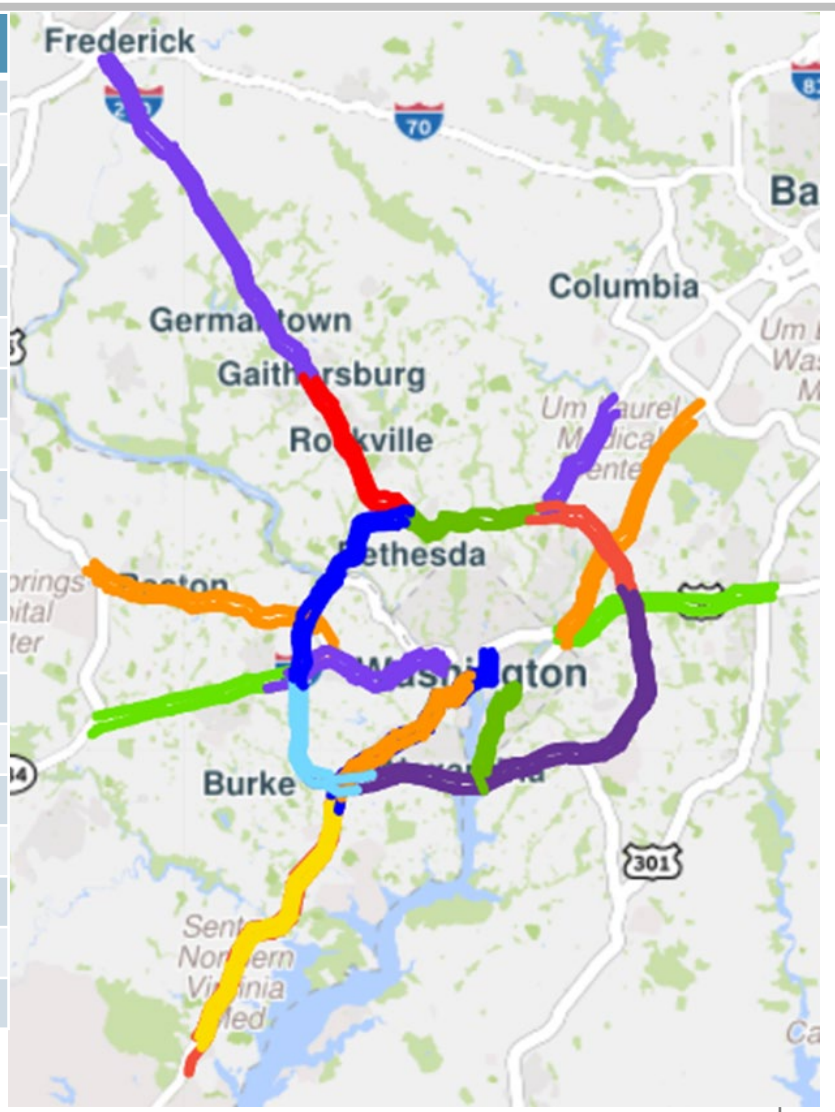
Rank	Location	Impact factor*
1	I-95 S @ VA-123/EXIT 160	358,921
2	I-95 N @ VA-123/EXIT 160	348,300
3	I-495 CW @ I-270 SPUR	311,793
4	I-495 CCW @ MD-97/GEORGIA AVE/EXIT 31	265,032
5	I-495 CCW @ US-1/EXIT 1	251,152
6	GW PKY N @ VA-123/CHAIN BRIDGE RD	239,625
7	US-15 N @ STUMPTOWN RD/LUCKETTS RD	220,696
8	B/W Parkway S @ POWDER MILL RD	217,495
9	US-301 S @ MCKENDREE RD/CEDARVILLE RD	217,102
10	I-270 N @ MD-109/EXIT 22	214,980



*Base impact - the sum of queue lengths over the duration

Major Freeway Commute Routes

Route Code	Description	Peak Period Travel Time: 2023 vs. 2021	
		AM	PM
C1	I-270 between I-370/Sam Eig Hwy/Exit 9 and I-70/US-40	↑	↑
C2	I-270 between I-370/Sam Eig Hwy/Exit 9 and I-495/MD-355	↑	↑
C3	VA-267 between VA-28/Exit 9a and VA-123/Exit 19	↑	–
C4	I-66 between VA-28/Exit 53 and I-495/Exit 64	↓	↓
C5	I-66 between I-495/Exit 64 and Theodore Roosevelt Memorial Bridge	↑	↑
C6	I-95 between VA-234/Exit 152 and Franconia Rd/Exit 169	↑	–
C7	I-95 HOV between VA-234/Exit 152 and Franconia Rd/Exit 169	↑	–
C8	I-395 between I-95 and H St	↑	↑
C9	I-395 HOV between I-95 and US-1	↑	–
C10	US-50 between MD-295/Kenilworth Ave and US-301/Exit 13	↑	↑
C11	Balt-Wash Pkwy between US-50/MD-201/Kenilworth Ave and MD-198	↑	↑
C12	I-95 between I-495/Exit 27-25 and MD-198/Exit 33	↑	↑
C13	I-495 between I-270/Exit 35 and I-95/Exit 27	↑	↑
C14	I-495 between I-95/Exit 27 and US-50/Exit 19	↑	↑
C15	I-495 between US-50/Exit 19 and I-95/I-395/Exit 57	↑	↑
C16	I-495 between I-95/I-395/Exit 57 and I-66/Exit 9	↑	–
C17	I-495 between I-66/Exit 9 and I-270/Exit 35	↑	↑
C18	I-295 between I-495 and 11th St. Bridge	↑	–



TTI Information Now Added to National Comparison

INRIX Traffic Scorecard (2022 Data)			Texas Transportation Institute (TTI) Urban Mobility Report (2022 Data)			TomTom Traffic Index (2023 Data)		
Hours Lost in Congestion			Annual Person-Hours of Delay per Commuter			Average Travel Time per 6 Miles (Metro Area)		
Metro Area	Hours	Rank	Urban Area	Hours	Rank	Metro Area	Minutes	Rank
Chicago	155	1	Los Angeles	122	1	New York	21	1
Boston	134	2	San Francisco	109	2	Honolulu	21	2
New York	117	3	New York	92	3	McAllen	20	3
Philadelphia	114	4	Washington	85	4	San Francisco	20	4
Miami	105	5	Atlanta	82	5	Los Angeles	20	5
San Francisco	97	6	Seattle	82	5	Philadelphia	19	6
Los Angeles	95	7	Miami	79	7	Seattle	19	7
Washington	83	8	Boston	73	8	Miami	19	8
Houston	74	9	Chicago	72	9	Chicago	19	9
Atlanta	74	10	Houston	69	10	Washington	18	14

National Comparison over Time

Report Year*	INRIX	TTI	TomTom
2016	2[1]	1[2]	8[3]
2018	6[1]	1[2]	9[3]
2020	5[4]	3[5]	7[3]
2022	13[4]	5[6]	8[3]
2024	8[4]	4[6]	14[7]

1. Average Hours Wasted in Traffic (hours)
2. Annual Hours of Delay per Auto Commuter (hours)
3. Extra Travel Time compared to Free Flow Conditions (%)
4. Hours Lost in Congestion (hours)
5. Yearly Delay per Auto Commuter (hours)
6. Annual Person-Hours of Delay per Auto Commuter (hours)
7. Average travel time per 6 miles (Metro Area) (minutes)

*Years that reports were published. Actual data years that were analyzed varied.

Latest Additions to The Report

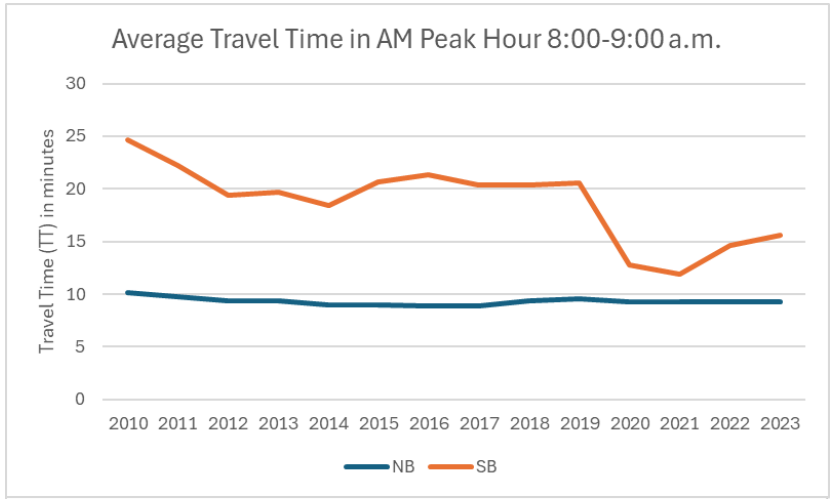
- 2.1.1 Key External Influences on NCR's Congestion
  - An interpretative analysis of the external factors influencing weekday Interstate traffic congestion, as gauged by the travel time index (TTI)
  - Preliminary data from 2010-2022 suggests that employment, population, and gasoline prices have a moderate to minor impact on TTI
- 2.1.2 Long-term Travel Time Trends on NCR Corridors
  - Traffic congestion has worsened on average during both morning and evening peak hours compared to 2013.
  - The impact varies significantly across corridors, with some experiencing improvements and others significant slowdowns.
- Appendix D is added to provide more details of the peak hours' travel time trend

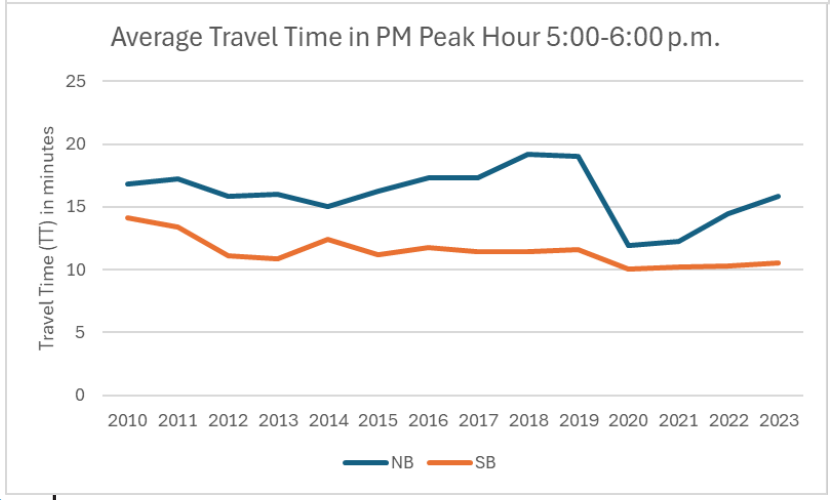
Long-term Travel Time Trends on NCR Corridors

- Increased congestion during both peak hours
  - Traffic congestion has worsened on average during both morning and evening peak hours compared to 2013
  - Year-to-year variations may reflect temporary issues such as construction zones
- Varying impacts across corridors
  - The impact varies significantly across corridors, with some experiencing improvements and others significant slowdowns
- Potential shift in commuter behavior
  - Commuter behavior may have shifted, with a larger increase in congestion observed during the evening peak hour potentially reflecting a change in work schedules or trip patterns

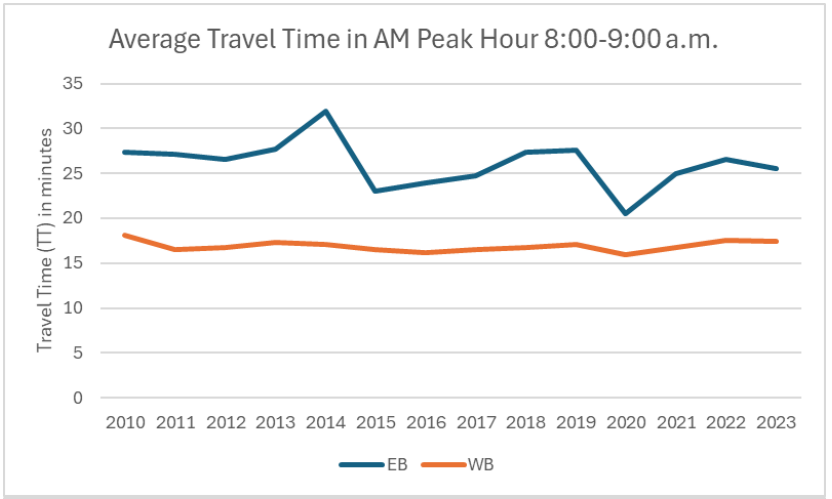
Examples of Commute Direction on NCR Corridors

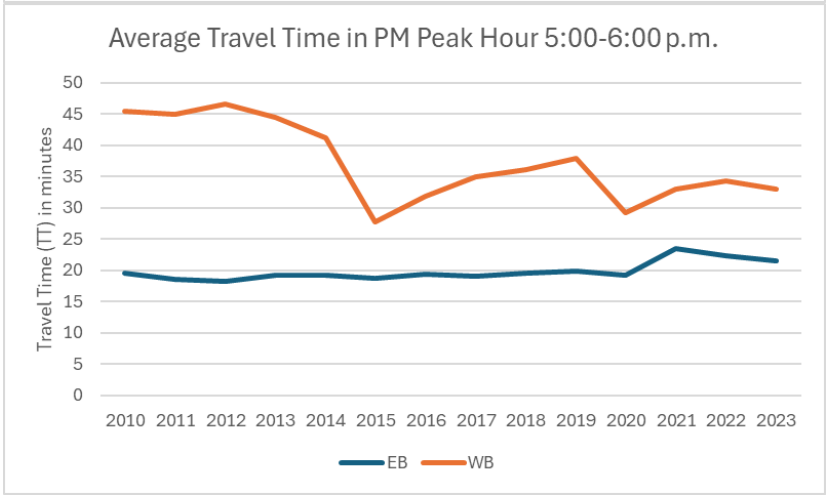
I-270 between I-370/Sam Eig Hwy/Exit 9 and I-495/MD-355



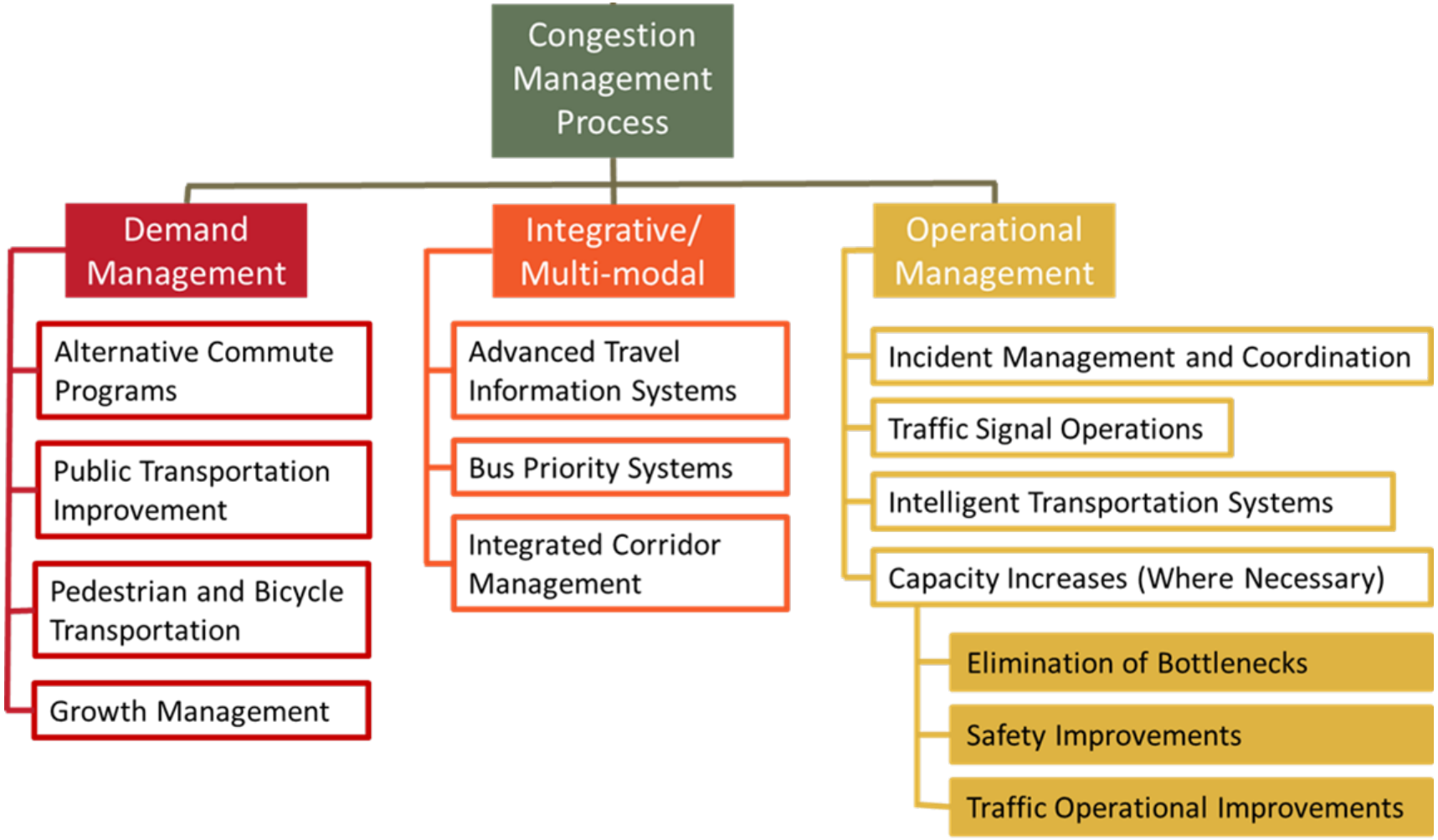


I-95 between VA-234/Exit 152 and VA-644/Franconia Rd/Exit 169





Congestion Management Strategies in The Report



Selected Congestion Management Strategies

Key Findings (1 of 2)

1. Congestion rebounded in 2023, but to levels still below pre-pandemic norms
2. Travel time reliability improved during the pandemic due to reduced congestion but has since reverted to pre-pandemic levels
3. Bottleneck locations have shifted somewhat since 2019, though many persistent hotspots remain
4. Travel demand management strategies remain crucial for congestion mitigation
5. Walking and bicycling continue to grow in the region in part due to increasing connectivity in the bicycle and pedestrian network

Key Findings (2 of 2)

6. Variably priced lanes provide additional options to travelers in the region
7. 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
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
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

Report Recommendations (1 of 3)

1. Continue the Commuter Connections program
2. Continue and enhance the MATOC program and support agency/jurisdictional transportation management activities
3. Continue to coordinate PBPP with the CMP
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
5. Pursue sufficient investment in the existing transportation system, which is important for addressing congestion
6. Continue variable pricing and other management strategies in conjunction with capacity increasing projects

Report Recommendations (2 of 3)

7. Continue to encourage transit in the Washington region and explore transit priority strategies
8. Encourage implementation of congestion management for major construction projects
9. Continue to encourage access to non-auto travel modes
10. Continue and enhance providing real-time, historical, and multimodal traveler information
11. Encourage implementation of projects, programs, and processes that support the TPB Priority Strategies
12. Encourage connectivity within and between Regional Activity Centers

Report Recommendations (3 of 3)

13. Continue and enhance the regional congestion monitoring program with multiple data sources
14. Undertake enhanced analysis of available data to understand congestion trends and impacts
15. Monitor trends in freight, specifically truck travel
16. Participate in collaborative planning connected and automated vehicle readiness
17. Monitor impacts of and interactions with shared mobility services
18. Encourage Traffic Incident Management (TIM)

Next Steps

- The report has been posted on the TPB website (link to be provided)
- Highlights of the report to be presented to the TPB at a future meeting (when agenda time permits)
- Ongoing consideration of methodological improvements toward the next anticipated CMP Technical Report in 2026

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