

TRAFFIC IMPACTS OF THE METRORAIL SHUTDOWN AND OTHER EVENTS

Preliminary Analysis

Wenjing Pu, PhD, PE
TPB Senior Transportation Engineer

TPB Technical Committee
April 1, 2016



Work In Progress

- Staff still collecting more data, conducting analysis, and writing memorandums...
- Soliciting comments from the TPB Technical Committee
- Analysis results will be finalized by mid-April

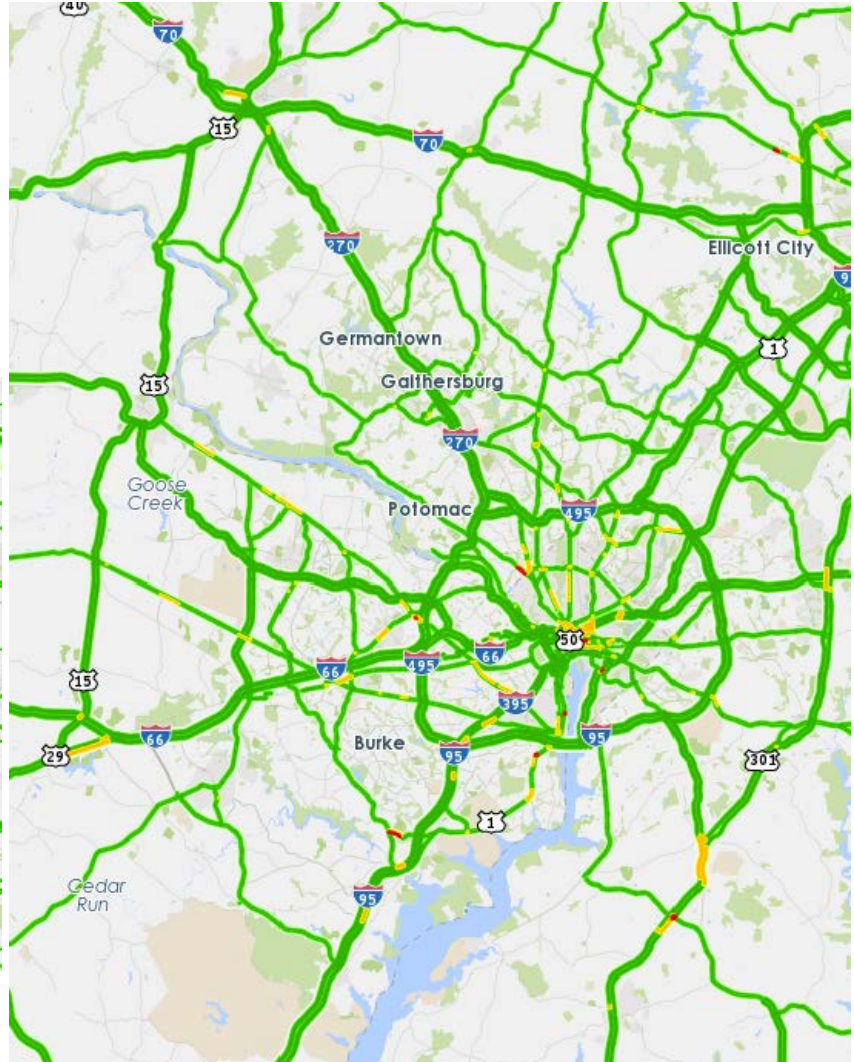
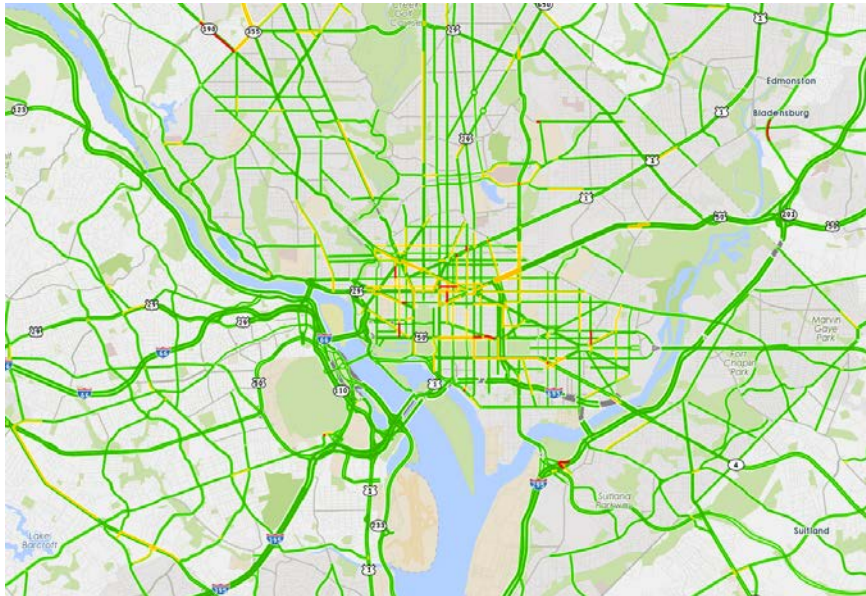


Outline

- Data and Tools (2 slides)
- March 16, 2016 Metrorail Shutdown (14 slides)
- January 20, 2016 Snow/Ice Event and January 22-23, 2016 Blizzard (11 slides)



Data and Tools (1/2)



Data and Tools (2/2)

Vehicle Probe Project Suite

Welcome, Wenjing | Help | Screencasts | Logout

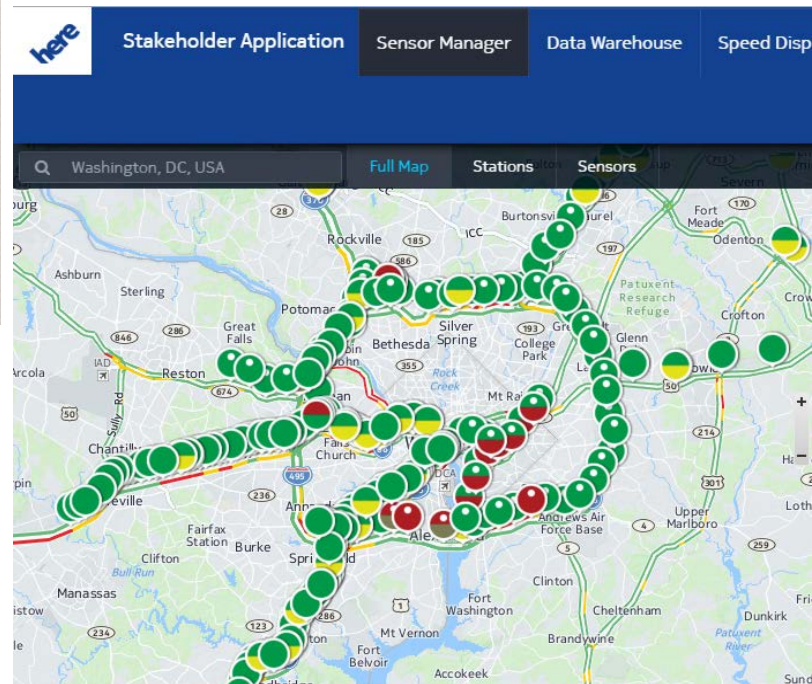
What's New 3/3/16

Region Explorer Explore the relationships between bottlenecks and traffic events in real-time and in the past.	Massive Data Downloader Download raw probe data from our archive for offline analysis.
Congestion Scan Analyze the rise and fall of congested conditions on a stretch of road.	Trend Map Create animated maps of roadway conditions.
Performance Charts Chart performance metrics over time.	Performance Summaries Report on Buffer Time Index, Planning Time Index, and other performance metrics.
Bottleneck Ranking Rank bottlenecks and discover which ones have the greatest impact.	User Delay Cost Analysis My reports Put a dollar amount on how much a road's performance impacts its users.
Dashboard Create your own personal dashboards to monitor corridor performance in regions of interest.	Tutorials Learn how to use each of the tools in the suite.

Sponsored by

Vehicle Probe Project (VPP) Suite

FHWA Transportation Technology Innovation and Demonstration (TTID) Program/HERE



March 16 Metrorail Shutdown



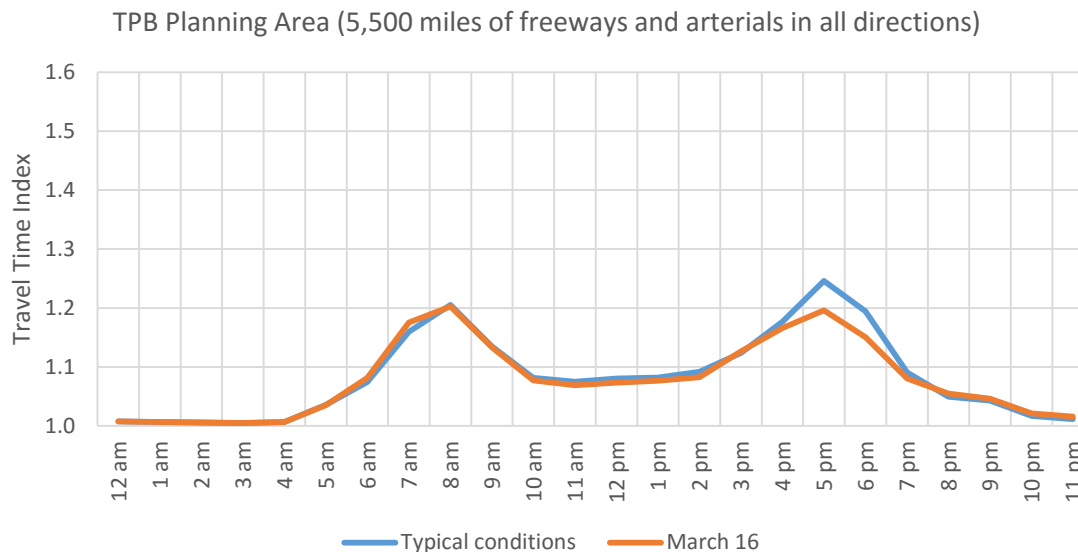
Actions Taken Affecting Travel on March 16

- Federal employee Unscheduled Leave/Unscheduled Telework, announced the prior evening
- Key additional Metrobus connections
- Limited service enhancements on DC Circulator, other regional bus systems
- Limited enhanced capacity on MARC
- Capital Bikeshare free daily memberships, special event corrals
- Shared rides on D.C Taxi cabs, Uber; Surge pricing capped on Uber
- Commuter Connections outreach
- VDOT afternoon HOV restrictions lifted early (but kept for the first part of the peak period to aid bus movement); MDOT HOV restrictions lifted for PM
- Travel adjustments made by the traveling public: staying home, leaving early or late, rescheduling appointments, etc.



Congestion – Regional Average

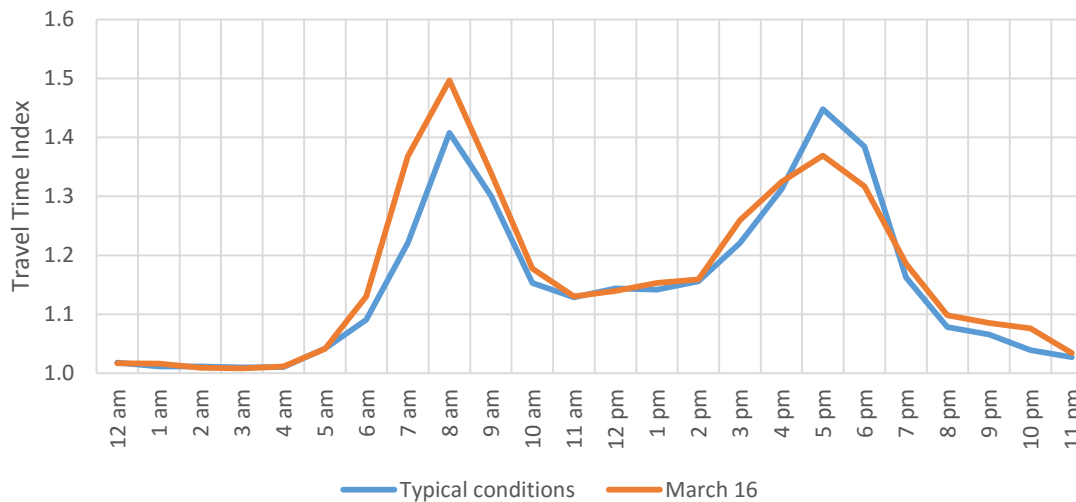
- Similar to or slightly better than typical conditions most times of the day
- Slightly more congested, 1%, early morning peak hours 6-8 A.M.
- Notably less congested, 4%, afternoon peak hours 5-7 P.M.



Congestion – Regional Core

- More traffic most times of the day, except afternoon peak 5 - 7 P.M.
- Much more congested, 8%, during morning peak period 6 - 8 A.M. (Regional average 1% higher)
- Notably less congested, 5%, during afternoon peak period 5 - 7 P.M. (Regional average 4% lower)

Regional Core (800 miles of freeways and arterials in all directions)

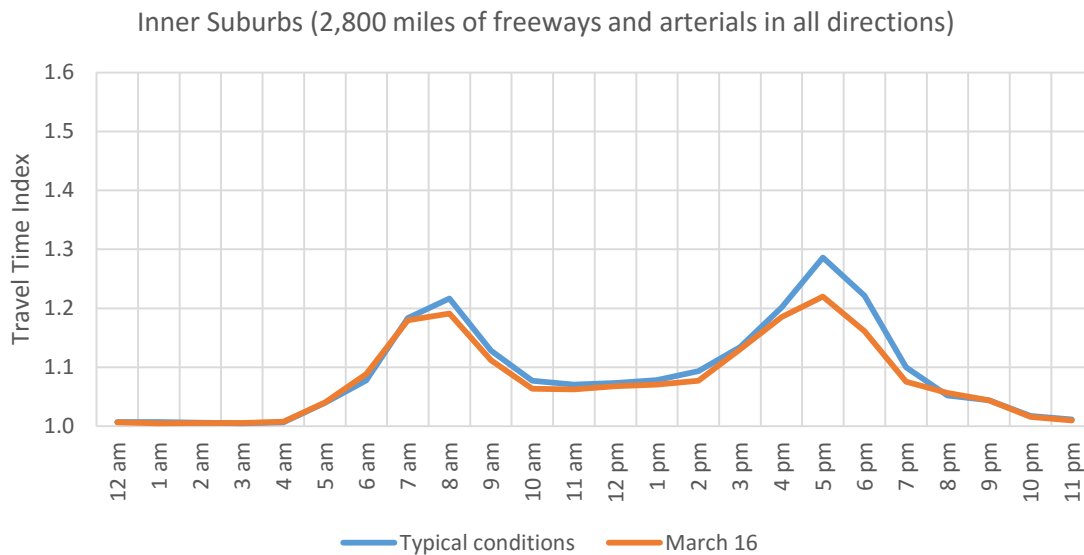


Regional Core: District of Columbia, Alexandria and Arlington



Congestion – Inner Suburbs

- Marginally less congested throughout the day, except 6 – 7 A.M. with slightly more congestion (1%)
- Notably less congested, 5%, during afternoon peak period 5 - 7 P.M.

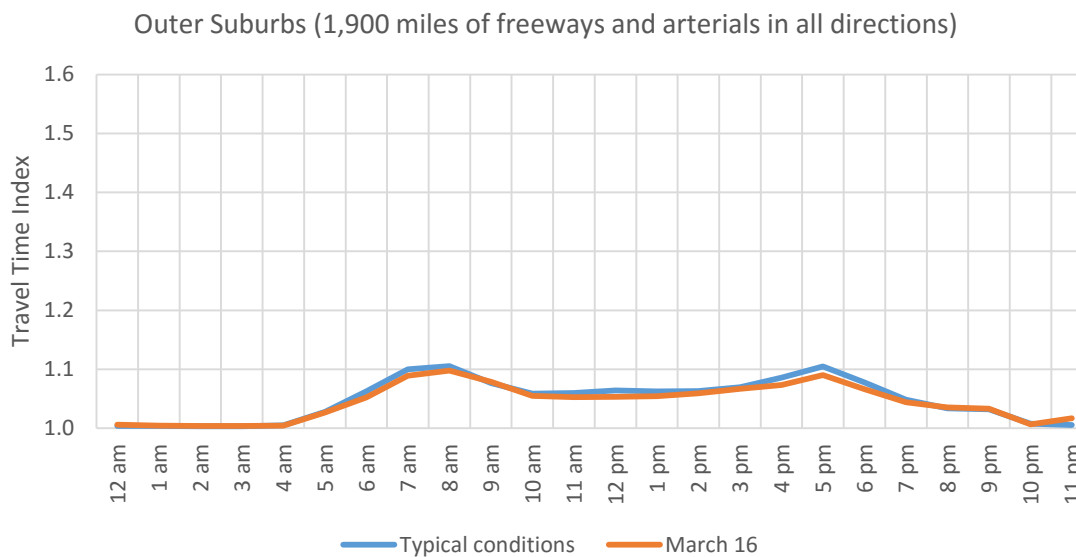


Inner Suburbs: Montgomery, Prince George's, Falls Church, Fairfax Co. and Fairfax City



Congestion – Outer Suburbs

- Marginally lower congestion, 1%, most hours of the day
- Least congested among the three areas in the region

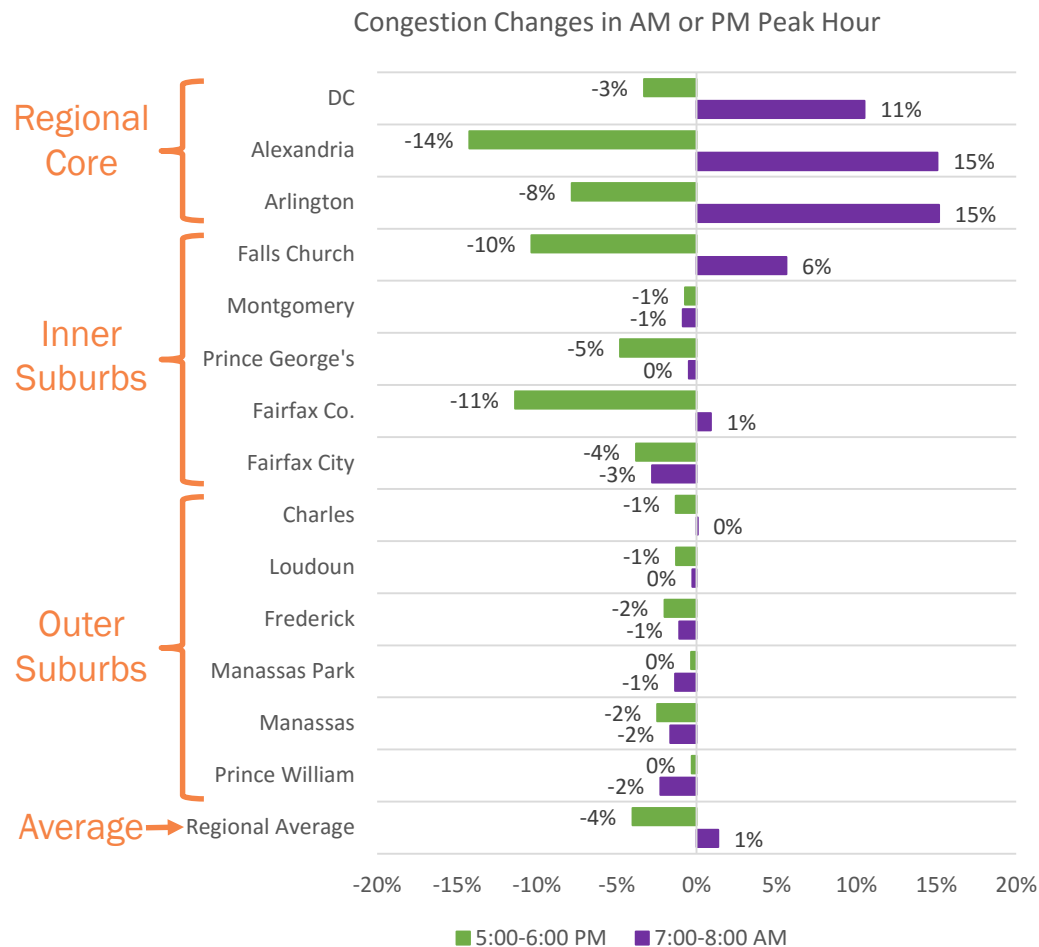


Outer Suburbs: Frederick, Charles, Loudoun, Prince William, Manassas and Manassas Park



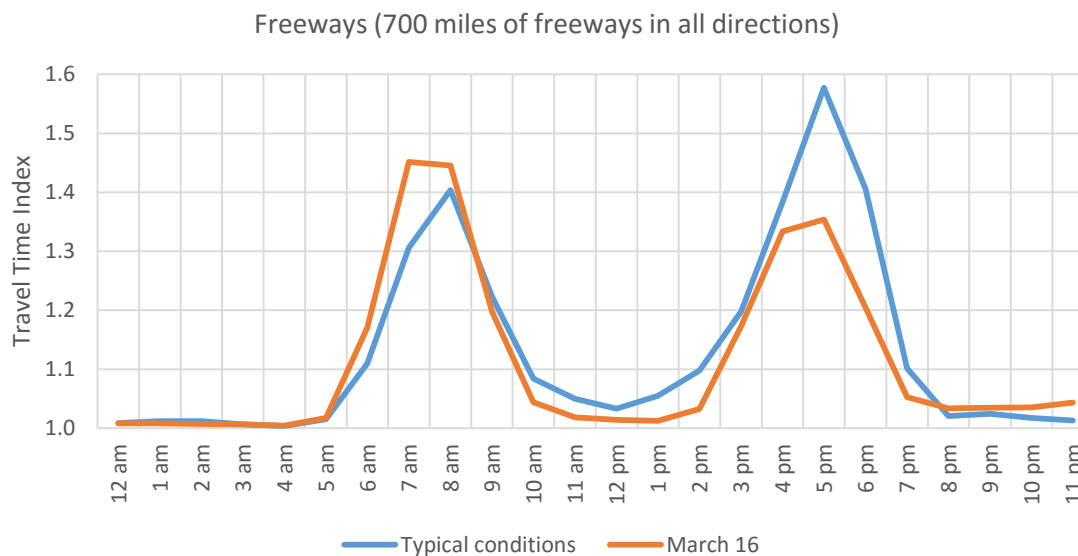
Congestion – % Change in Peak Hour

- The Regional Core:
A.M. – significantly higher congestion, 14%.
P.M. – considerably less congestion, 8%.
- The Inner Suburbs:
A.M.- no increase
P.M. – considerably less congestion, 6%.
- The Outer Suburbs:
A.M. and P.M. slightly less congestion, 1%.



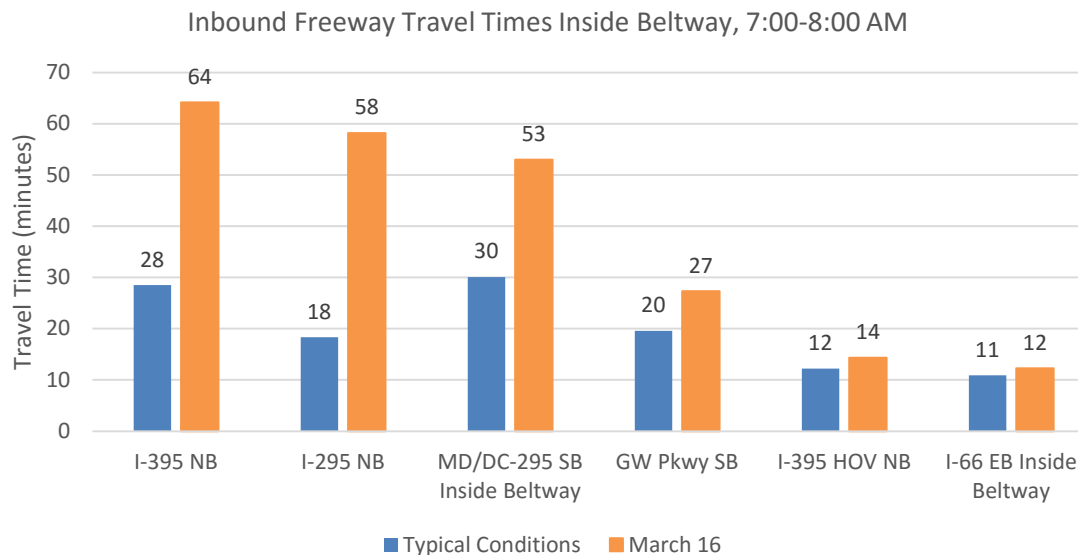
Congestion – Freeways

- AM peak hour congestion was higher, started one hour earlier than normal, and lasted two hours (2-hour avg. 8% higher)
- P.M. peak hour congestion was significantly lower and remained lower the next hour (2-hour avg. 14% lower)
- Less congestion for most of the rest of the day



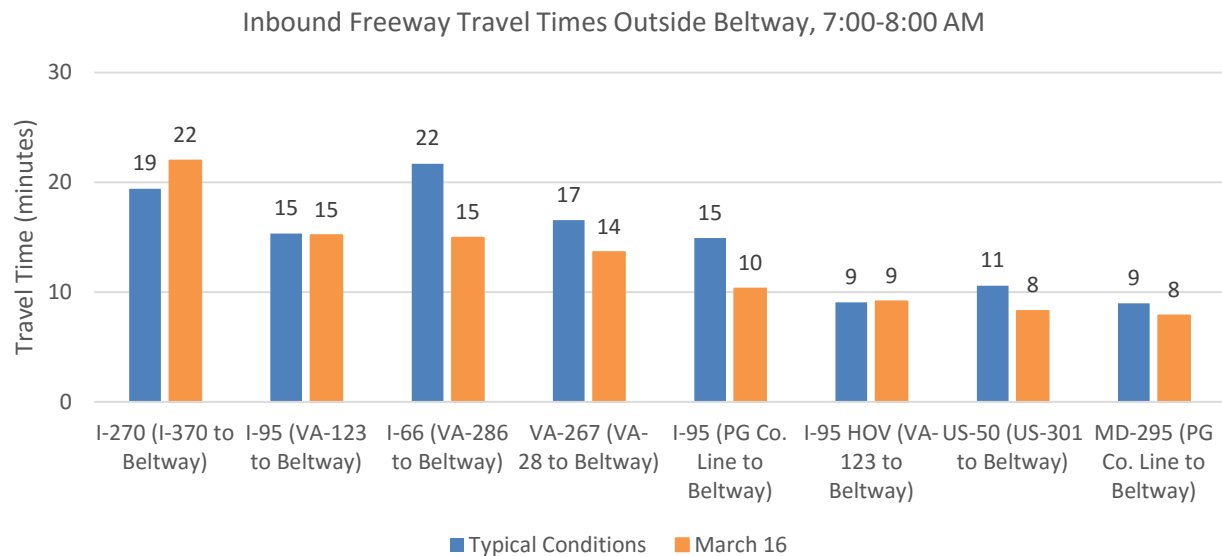
Travel Times – Inbound, Inside Beltway

- A.M. Inbound travel times increased on all freeways inside the Beltway, Most significant increases on I-395 NB, I-295 NB, MD/DC-295 SB
- A.M. Inbound HOV (I-66 EB and I-395 NB) travel times also increased slightly



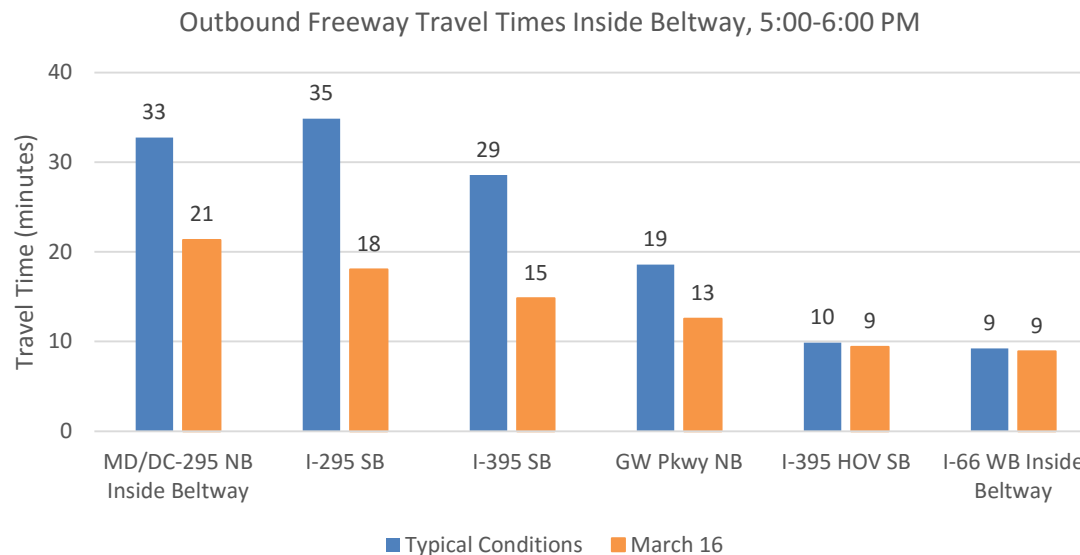
Travel Times – Inbound, Outside Beltway

- A.M. Inbound travel times decreased moderately on most facilities – except I-270 SB (3 minutes increase)
- Most significant reductions on : I-66 EB, I-95 SB in MD, VA-267 EB
- No change along I-95 NB in VA



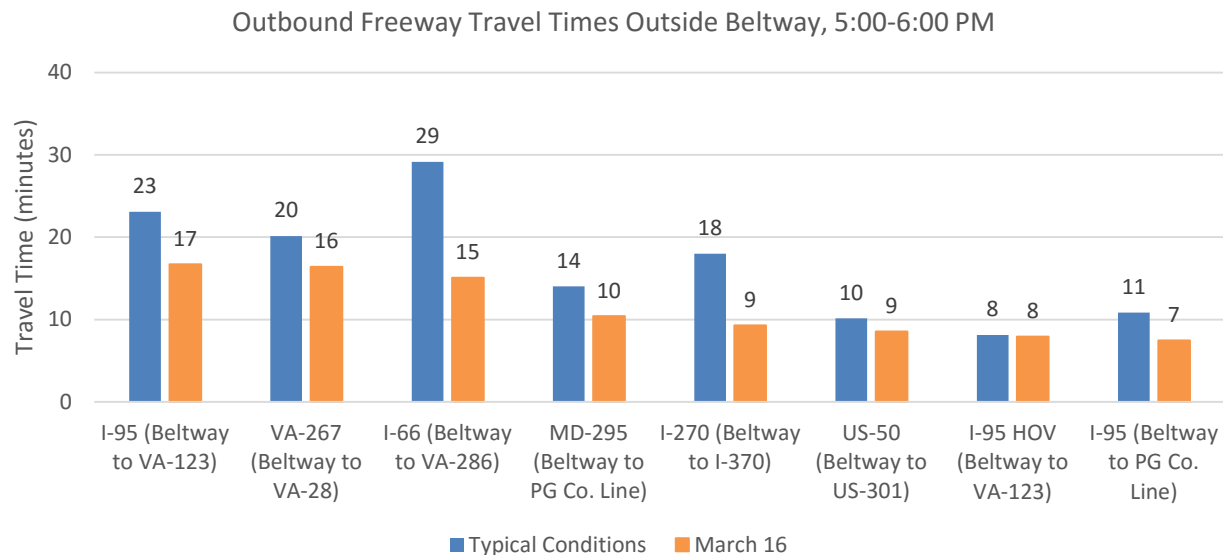
Travel Times – Outbound, Inside Beltway

- P.M. Outbound travel times decreased on all freeways
- Most significant decreases on MD/DC-295 NB, I-295 SB, I-395 SB



Travel Times – Outbound, Outside Beltway

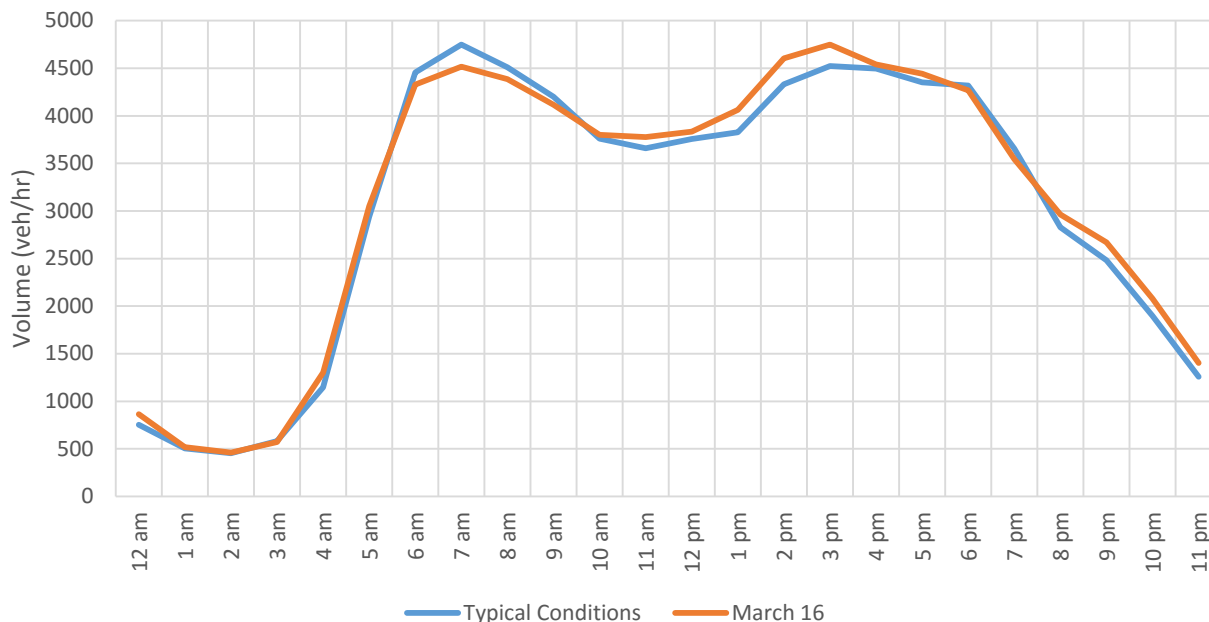
- P.M. Outbound travel times decreased on all freeways
- Most significant decreases on I-66 WB and I-270 NB



Freeway Volumes – Limited Observations

- Average volume of the 120+ observed locations deviated only slightly from normal conditions. All variations were below 300 vehicles per hour
- There were fewer vehicles in the morning peak period and seemingly unchanged volumes during the afternoon peak period, but slightly higher volumes in midday, suggesting travelers' peak-avoiding behavior

Average Volumes at Observed Freeway Locations



Metrorail shutdown: Traffic Congestion Preliminary Conclusions

- **Regionally average congestion was similar to or slightly less than a normal weekday**
 - Regionally avg. AM Peak was marginally more congested while PM Peak was less congested
 - The regional Core had more congestion during the A.M. period while Inner and Outer suburbs had **less**
 - The region's Core, Inner and Outer suburbs all had less P.M. congestion with highest reduction in the Core
- **Individual traveler experiences varied - the impacts varied considerably in different areas and time of day**
 - A.M. Peak hour congestion: significant increase in the region's Core
 - P.M. Peak hour congestion: significant **decrease** in the region's Core
 - Freeways: increased congestion in A.M.; decreased congestion rest of the day
 - Inbound A.M. travel times: increased inside the Beltway; decreased **outside** the Beltway
 - Outbound P.M. travel times: decreased inside **and** outside the Beltway



January 2016 Snow Events



Looking Back

- January 20, 2016 (Wed.) snow/ice event
 - Unexpected, over-performing snow hit cold (24° F) road surfaces around 6:00 pm
 - Only about 1 inch accumulation, but icy surfaces created hazardous driving conditions
- January 22-23, 2016 (Fri.-Sat.) blizzard
 - NOAA category 4 – crippling winter storm
 - Hit the region around 1:00 pm on Fri., Jan 22
 - 36-hour non-stop snowfall
 - 2-3 feet accumulation
 - Many transportation services suspended



Courtesy: WTOP and Lori Montenegro

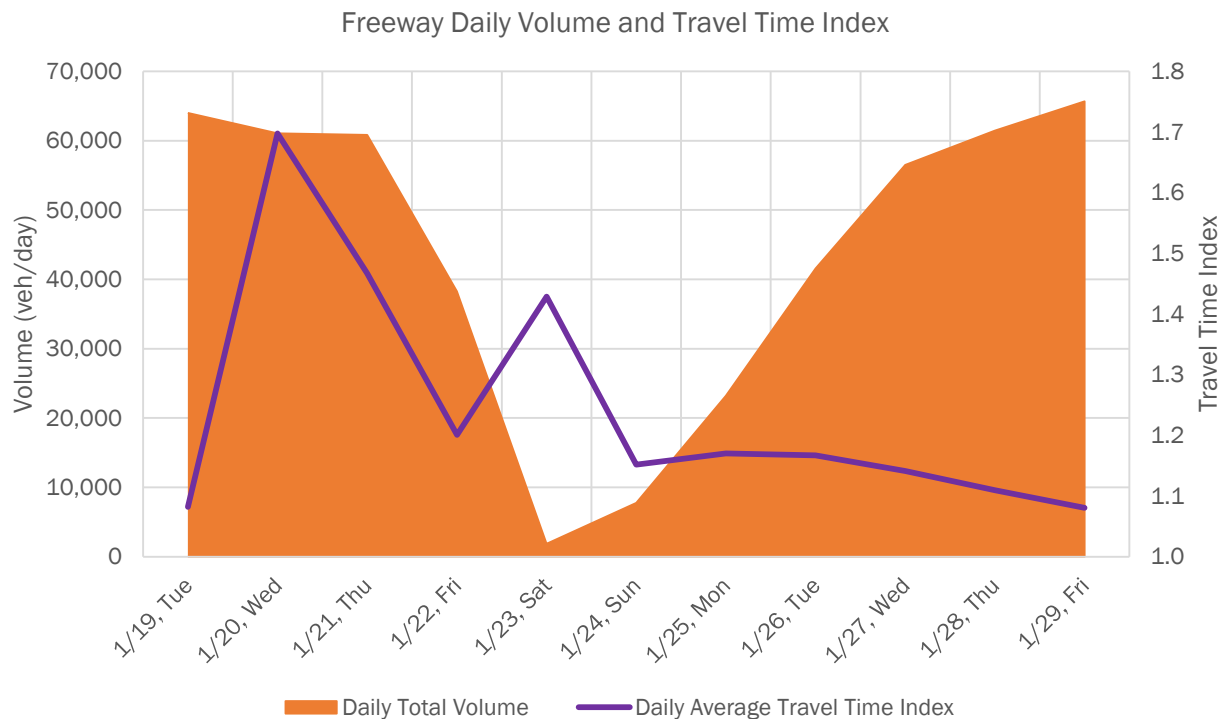


Courtesy: Alex Wong, 2016 Getty Images



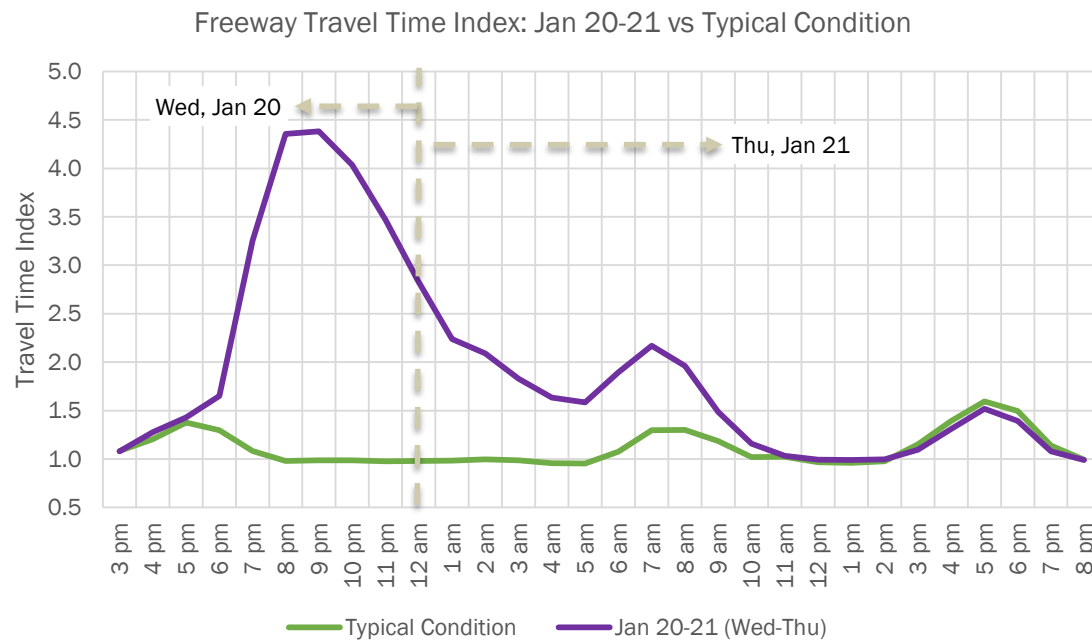
Major Impacts

- Jan 20 snow/ice major impact: delay
- Jan 22-23 blizzard major impact: vehicle volume



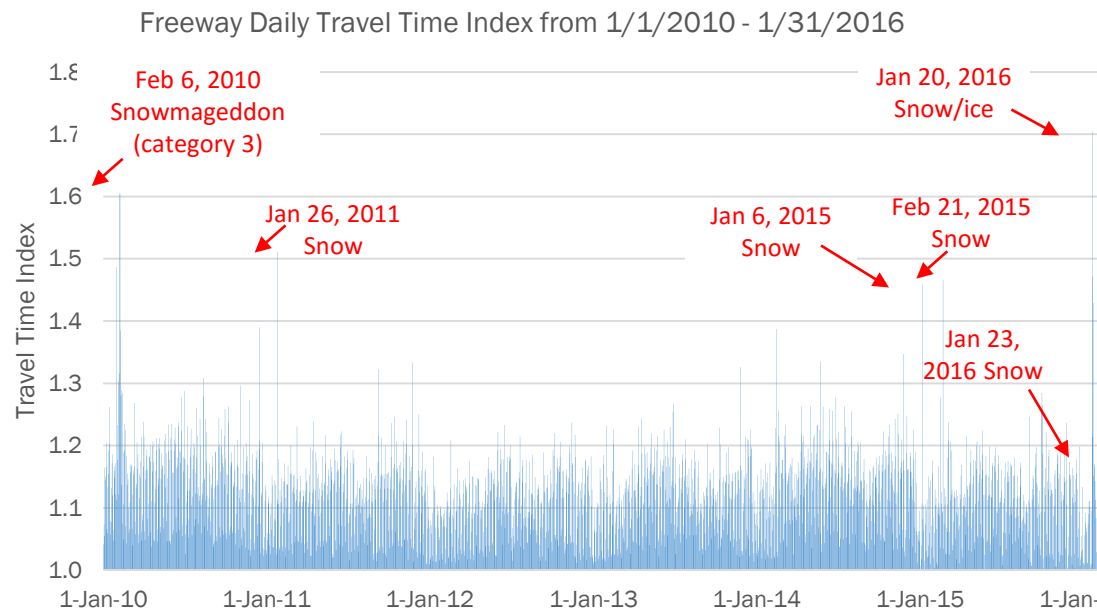
Jan 20 Snow/Ice: Skyrocketing Delays

- Delay picked up rapidly after 6 pm; reached to the highest 9-10 pm
- Avg. freeway travel time was 4.4 times longer than free flow 8-10 pm
- Back to normal around 11 am the next day, a 17-hour impact



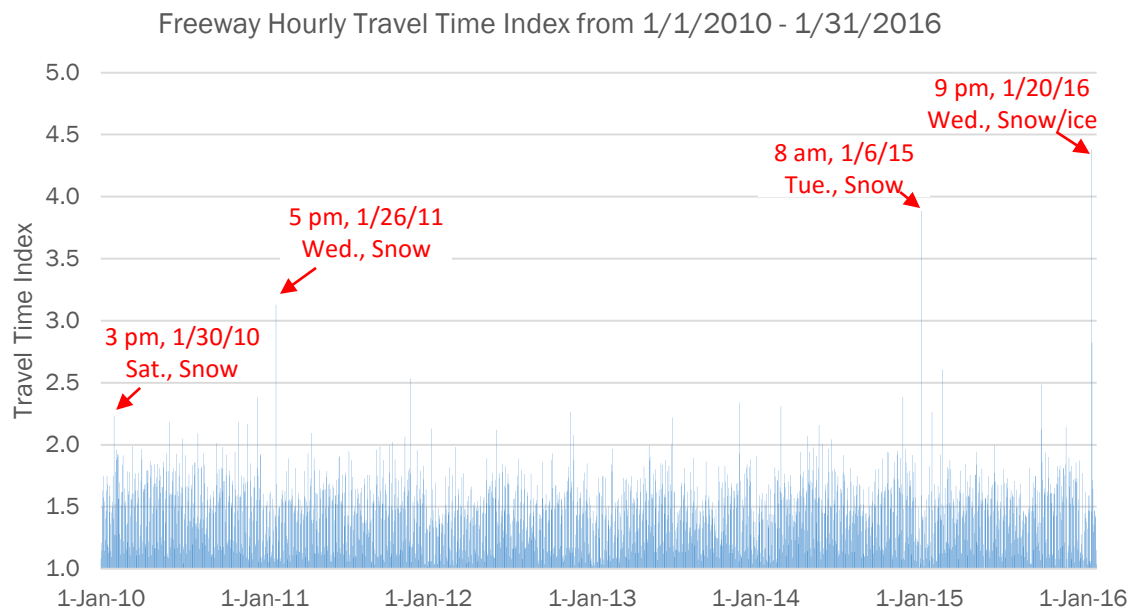
Jan 20: Worst Day of Travel Since 2010

- Daily Travel Time Index: 1.70
 - Higher than Feb 5-6, 2010 Snowmageddon's 1.60 and all other days
 - Higher than Jan 22-23, 2016 blizzard

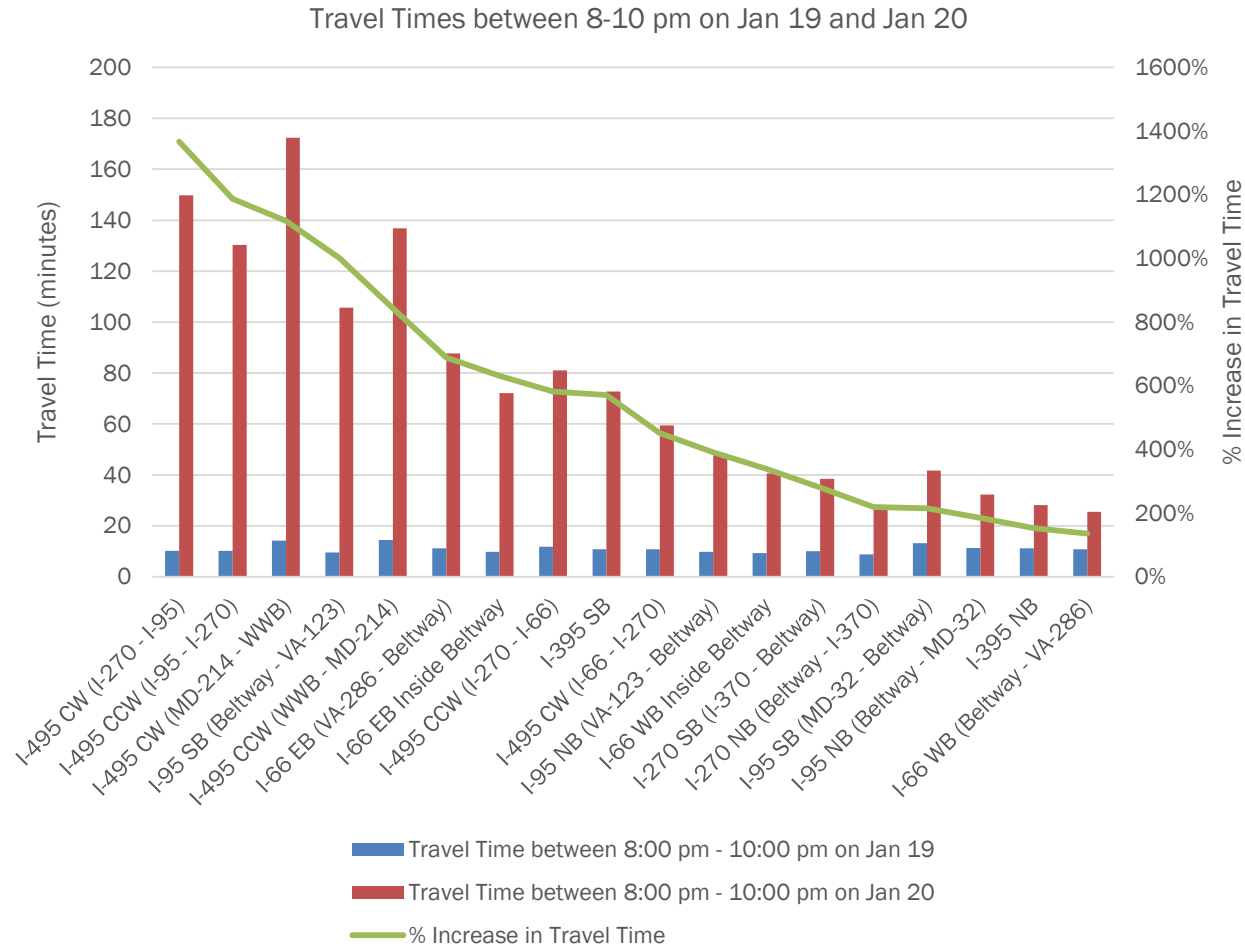


9 pm, Jan 20: Worst Hour of Travel Since 2010

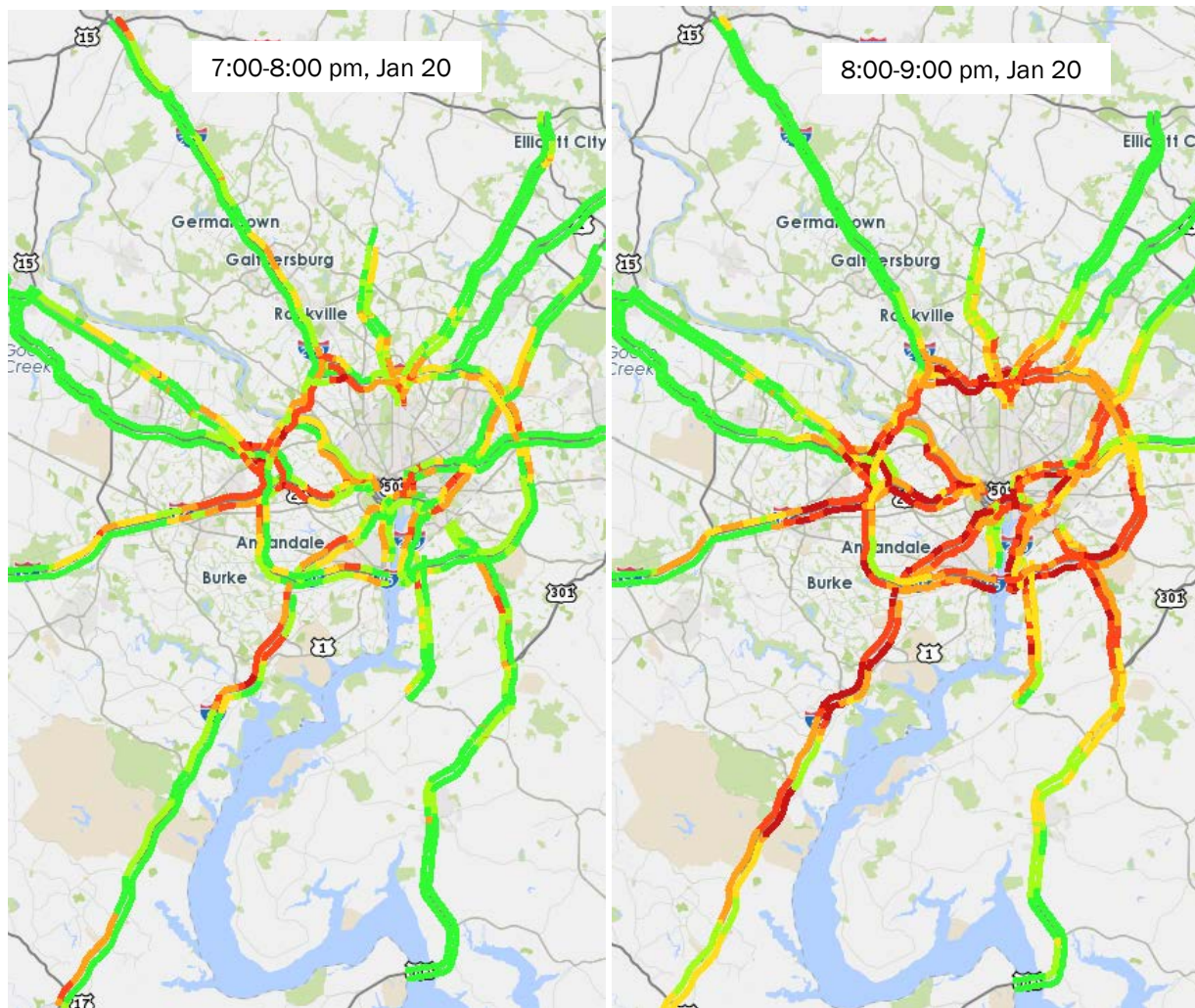
- 9:00-10:00 pm Travel Time Index: 4.40



8-10 pm, Jan 20: Fwy Travel Time Up 10+ Times



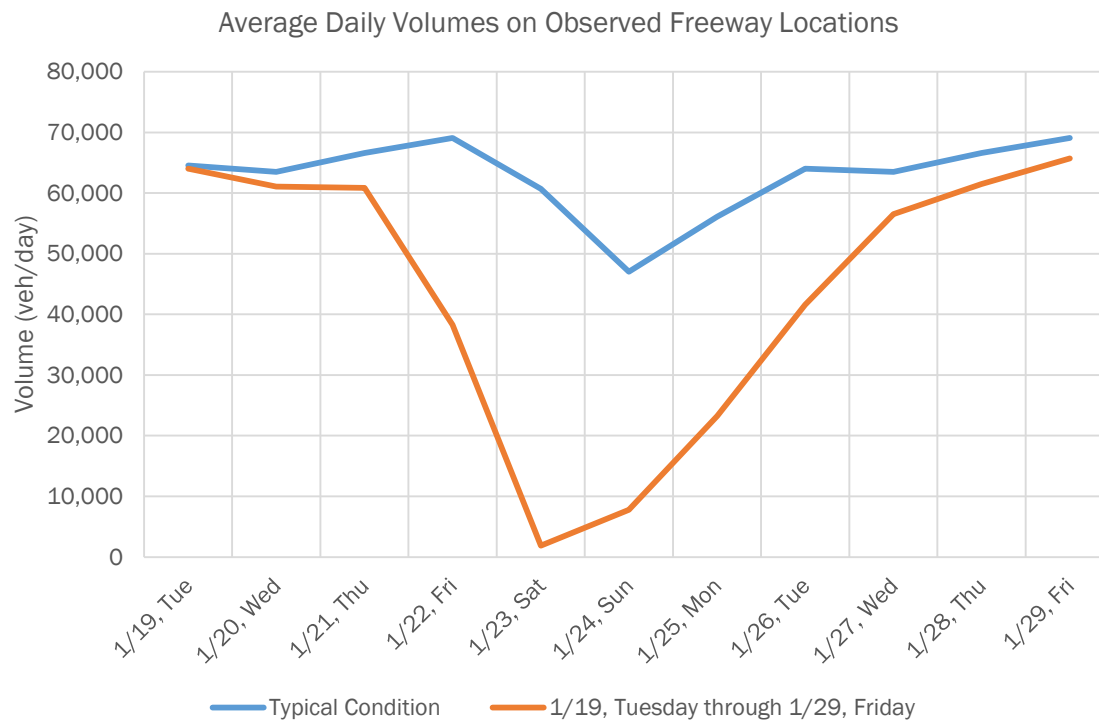
Speed Dropped Rapidly within One Hour



Source: Generated by Taran L. Hutchinson using the Trend Maps tool of the Vehicle Probe Project Suite developed by the CATT Lab of the University of Maryland.

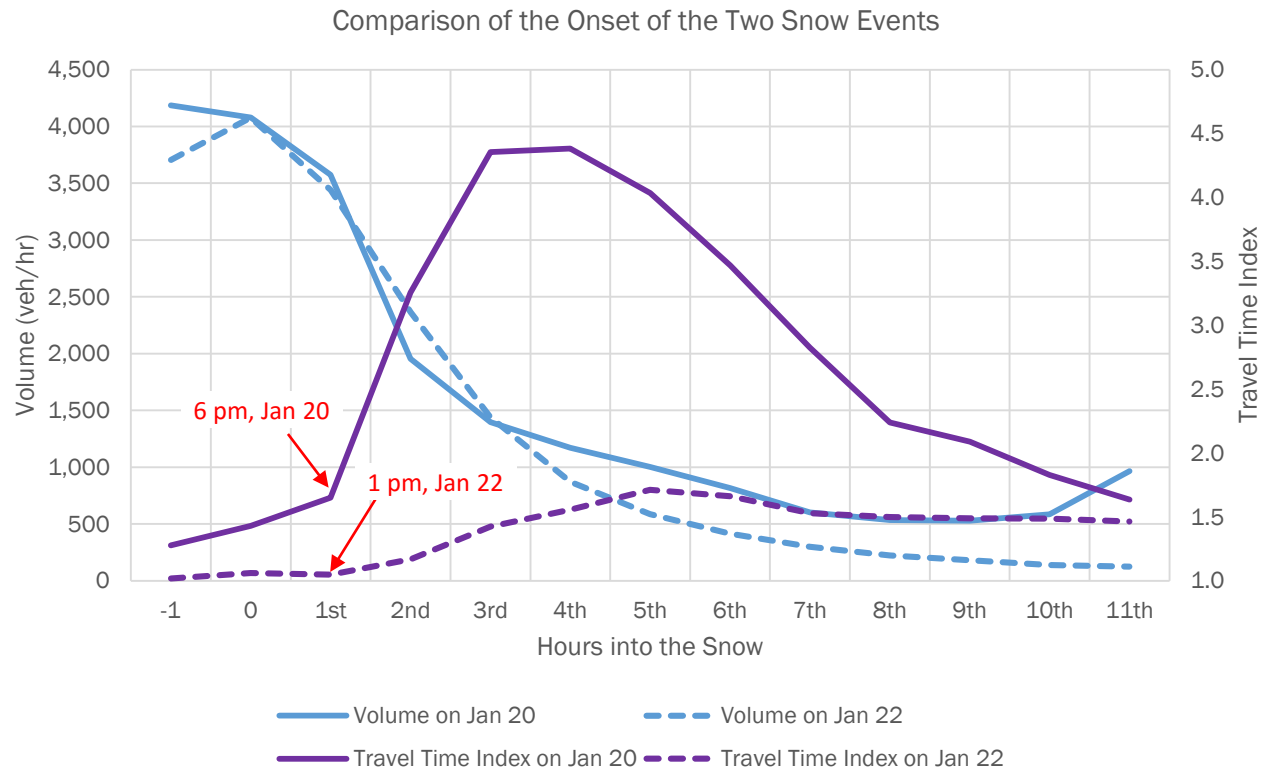
Jan 22-23 Blizzard: People Stayed Home

- Volume drop on Jan 22: 45%; Jan 23: 97%
- Recovery took 4 days from Jan 24-27



Onset of Jan 20 and Jan 22 Snow Events

- Volume drop: constrained vs. smooth
- Delay increase: sharp vs. gradual



Preliminary Conclusions of the Snow Events

- Adequate advance warning and preparation is key



Acknowledgements

Kanti Srikanth
TPB Staff Director

Andrew J. Meese
TPB Systems Performance Planning Director

Robert Griffiths
TPB Planning and Programming Director

Ronald Milone
TPB Travel Forecasting Program Director

Benjamin Hampton
TPB Transportation Planner



Wenjing Pu

Senior Transportation Engineer

(202) 962-3761

wpu@mwkog.org

mwkog.org/TPB

Metropolitan Washington Council of Governments

777 North Capitol Street NE, Suite 300

Washington, DC 20002



National Capital Region
Transportation Planning Board