National Capital Region Transportation Planning Board
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Item 10
TPB Tech, October 7, 2011

MEMORANDUM

TO: TPB Technical Committee
FROM: Wenjing Pu, Transportation Planner
SUBJECT: Introducing the National Capital Region Congestion Report (Draft).
DATE: October 7, 2011

Background

After the finalization of the 2010 Congestion Management Process (CMP) Technical Report (TPB Technical Committee September 3, 2010 meeting), staff tried to go beyond the previously biennially updated CMP Technical Report and to study and develop a quarterly updated, dashboard-style National Capital Region Congestion Report that would briefly summarize the congestions on the region's transportation systems. The prototype draft report was completed in May 2011, and has recently been reviewed by the Management, Operations and Intelligent Transportation Systems (MOITS) Technical Subcommittee and the Travel Forecasting Subcommittee. The revised draft report attached to this memorandum (attachment 1) is the latest version that accommodates all the comments received from the reviews. A summary of the Frequently Asked Questions (FAQs) is also developed (attachment 2) and to be released alongside the main report. The end goal of this effort is to make the Congestion Management Process "alive" on the TPB website that timely summarizes the region's congestion and the programs of the TPB and its member jurisdictions that would have an impact on congestion.

Scope

The draft National Capital Region Congestion Report primarily focuses on traffic congestions on the region's freeway system, with limited information from arterials due to the data coverage limitation imposed by the I-95 Corridor Coalition Vehicle Probe Project (as an affiliated member of the Coalition, the TPB has gratis access to the data covered by this project). Incidents and events information from the Regional Integrated Transportation Information System (RITIS) and the Metropolitan Area Transportation Operations Coordination (MATOC) Program are also included in this draft report in view of that congestion and operations are closely related to each other.

This draft report does not include transit congestion information in view of that the Washington Metropolitan Area Transit Authority (WMATA) already publishes the "Metro Scorecard" on its web site.

Performance Measures

The draft report keeps tracking the following highway performance measures from the 3rd quarter of 2008 (when the I-95 Corridor Coalition Vehicle Probe Project started) to the 4th quarter of 2010:

1) Percentages of Freeway Lane-Miles by Congestion Level (a system overview)
2) Freeway Delay and Cost per Freeway Traveler (an individual experience)
3) Vehicle Miles of Travel (VMT)
4) Travel Time Burden (the percentage of additional travel time over and above free flow travel time)
5) Top 10 Most Severe Freeway Bottlenecks
6) Top 10 Most Unreliable Freeway Segments
7) Travel Time of the Last 5 Miles to the Beltway (Freeways Only) in AM Peak Hour (8-9 AM)

8) Travel Time of the First 5 Miles from the Beltway (Freeways Only) in PM Peak Hour (5-6 PM)

The highway performance measures can be revised as needed. If a revised measure is introduced in a future report, it will be recalculated for all previous quarters to ensure an appropriate trend-tracking.

The draft report presents the following statistical summaries of incidents/events for the 4th quarter of 2010:

1) Number of MATOC Notifications by Incident Severity (severity is determined by incident duration)
2) Percentages of Different Types of RITIS-Recorded Events
3) Number and Average Duration of RITIS-Recorded Events
4) Distribution of Duration of RITIS-Recorded Events
5) Time of Day Distribution of RITIS-Recorded Events

These incidents/events summaries can be revised or replaced as needed in the future. For example, the "INCIDENTS/EVENTS" portion on page 1 of the report could be replaced by a quarterly spotlight that would feature a congestion management strategy (e.g. the Car-Free-Day), a planned event (e.g. inauguration), or an unplanned event (e.g. earthquake).

Requested Action

The TPB Technical Committee is asked to review this draft report, in preparation for future publication of such a dashboard report on the TPB web site.

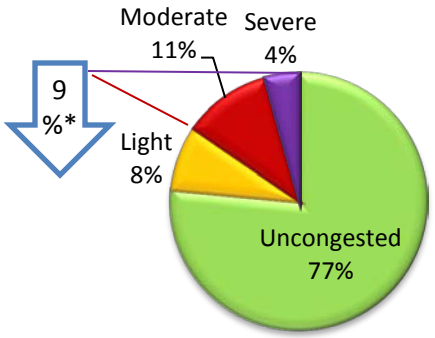
Attachments:
1. National Capital Region Congestion Report (DRAFT) 4th Quarter 2010.
2. Frequently Asked Questions of the National Capital Region Congestion Report (DRAFT) 4th Quarter 2010.

National Capital Region Congestion Report (DRAFT) 4th Quarter 2010 *Snapshot*

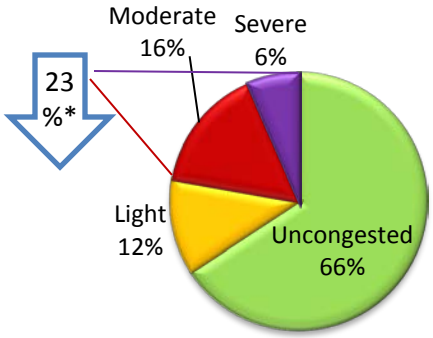
FREEWAY CONGESTION

Percentages of Freeway Lane-Miles by Congestion Level in 4th Quarter 2010

AM Peak (6 - 10 AM)



PM Peak (3 - 7 PM)



Congestion level	Ratio of experienced travel time to free flow travel time
Uncongested	< 1.15
Light	1.15 - 1.30
Moderate	1.30 - 2.00
Severe	> 2.00

* Q4/2010 vs. Q4/2009, see p. 2 & 11 for more information.

Freeway Delay per Freeway Traveler

7.6 Hours → $141*

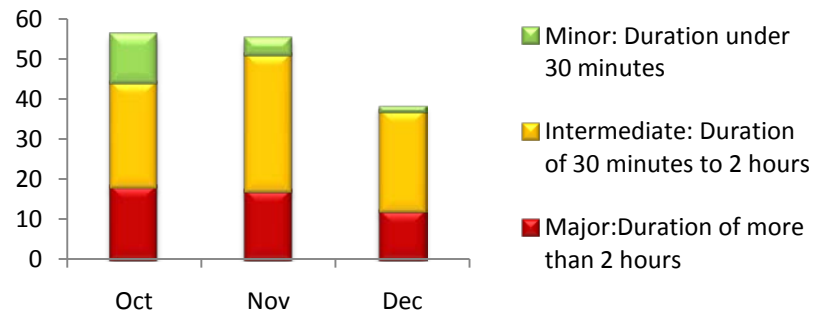
Per month during Q4/2010
*Cost of time $18.49/ hour
(Derived from TPB model & Household Travel Survey)

-45 %

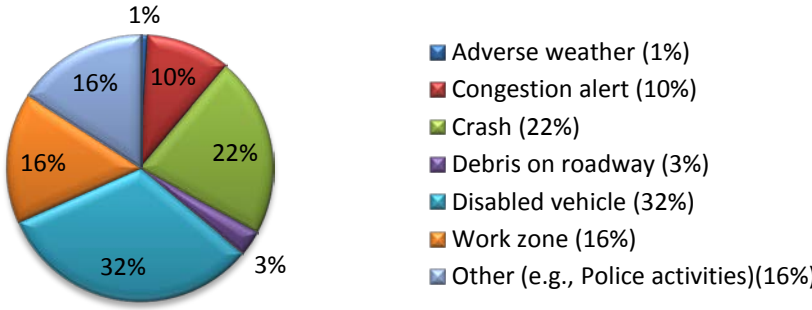
Q4/2010 vs. Q4/2009
Major factors: weather, fuel prices, economy
(see p. 3 & 11)

INCIDENTS/EVENTS

MATOC: Number of Notifications by Incident Severity in 4th Quarter 2010



RITIS: Percentages of Different Types of Recorded* Events in 4th Quarter 2010 (total 11,610 incidents)

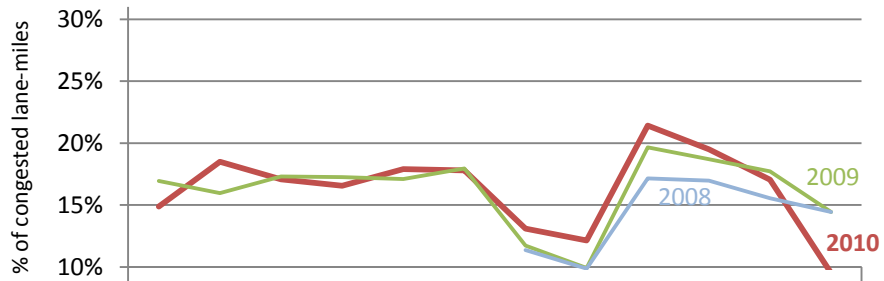


*Only RITIS-recorded events included . Data were not available for the District of Columbia.

Powered by the I-95 Corridor Coalition Vehicle Probe Project and expansions made available by MDOT and VDOT, the Transportation Technology Innovation and Demonstration (TTID) Program of FHWA, the Regional Integrated Transportation Information System (RITIS), and the Metropolitan Area Transportation Operations Coordination (MATOC) Program.

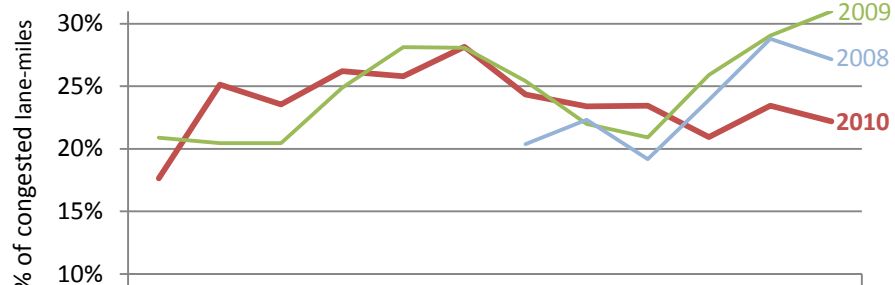
National Capital Region Congestion Report (DRAFT) 4th Quarter 2010 *Congested* Freeway Lane-Miles*

Percentages of Congested Freeway Lane-Miles: AM Peak (6 – 10 AM)



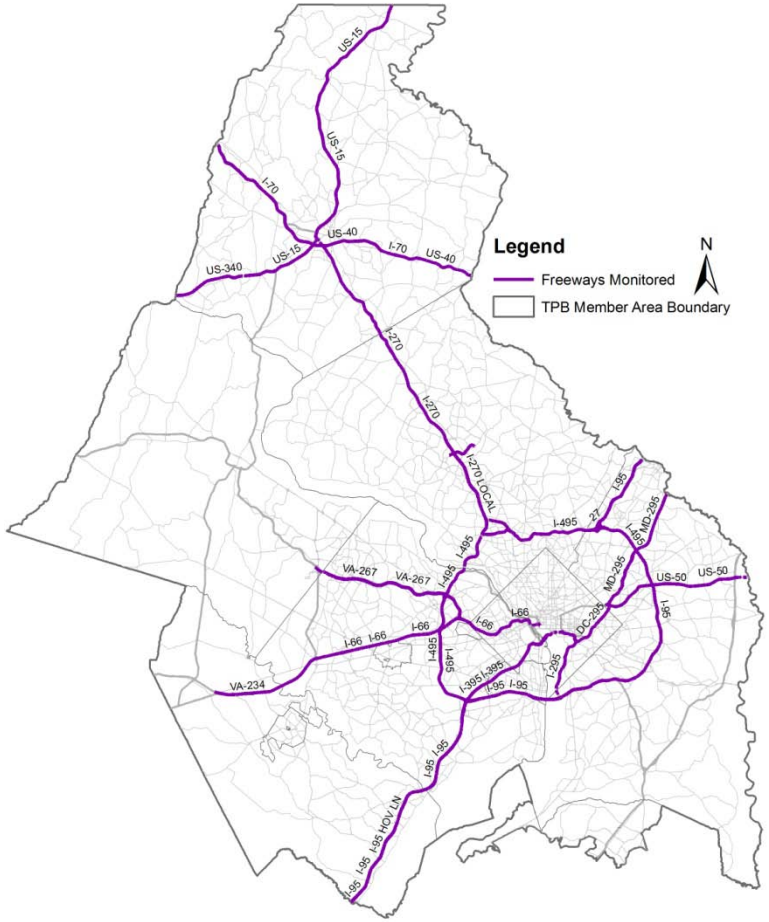
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	15%	18%	17%	17%	18%	18%	13%	12%	21%	20%	17%	10%
2009	17%	16%	17%	17%	17%	18%	12%	10%	20%	19%	18%	14%
2008							11%	10%	17%	17%	16%	14%

Percentages of Congested Freeway Lane-Miles : PM Peak (3 – 7 PM)



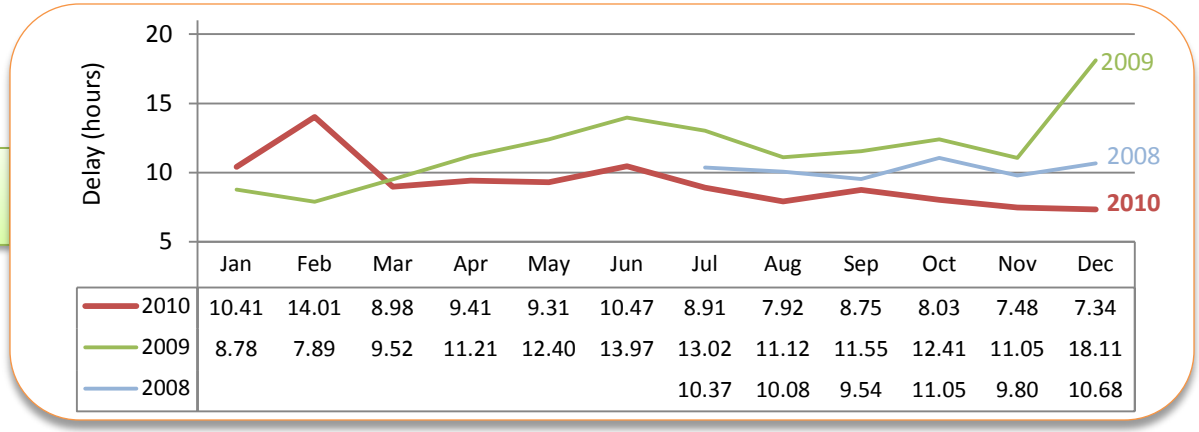
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	18%	25%	24%	26%	26%	28%	24%	23%	23%	21%	23%	22%
2009	21%	20%	20%	25%	28%	28%	25%	22%	21%	26%	29%	31%
2008							20%	22%	19%	24%	29%	27%

Data Coverage on Freeways



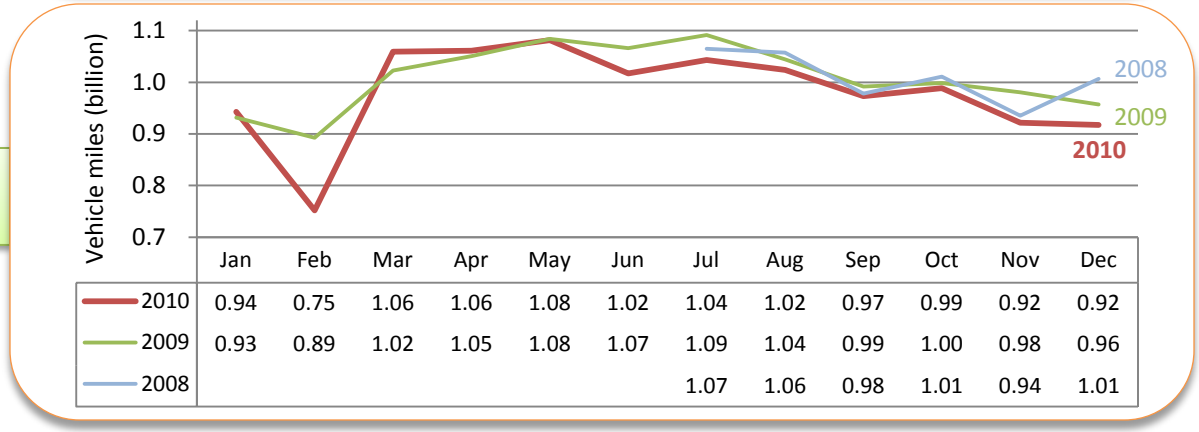
*Congestion is defined if travel time is longer than 1.3 times of free flow travel time (National Transportation Operations Coalition, 2005).

Monthly Freeway Delay per Freeway Traveler (hours)



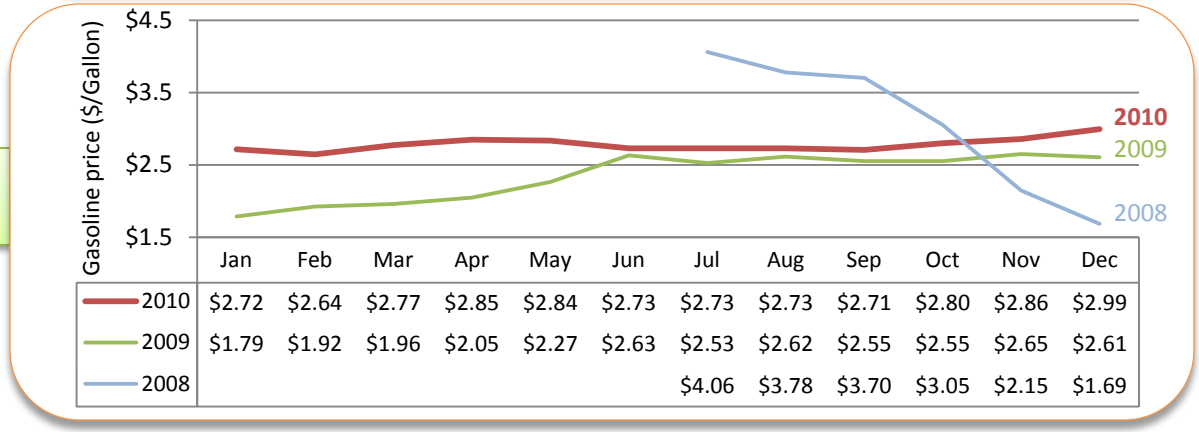
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	10.41	14.01	8.98	9.41	9.31	10.47	8.91	7.92	8.75	8.03	7.48	7.34
2009	8.78	7.89	9.52	11.21	12.40	13.97	13.02	11.12	11.55	12.41	11.05	18.11
2008							10.37	10.08	9.54	11.05	9.80	10.68

Monthly Freeway Vehicle Miles of Travel (billion vehicle miles)



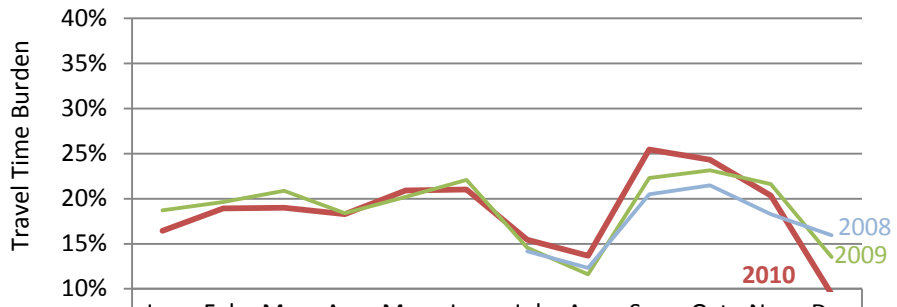
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	0.94	0.75	1.06	1.06	1.08	1.02	1.04	1.02	0.97	0.99	0.92	0.92
2009	0.93	0.89	1.02	1.05	1.08	1.07	1.09	1.04	0.99	1.00	0.98	0.96
2008							1.07	1.06	0.98	1.01	0.94	1.01

Monthly Average of U.S. Retail Gasoline Prices ($/Gallon, Regular)



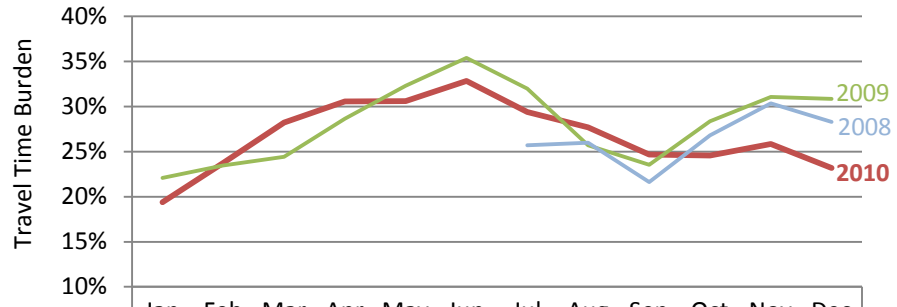
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	$2.72	$2.64	$2.77	$2.85	$2.84	$2.73	$2.73	$2.73	$2.71	$2.80	$2.86	$2.99
2009	$1.79	$1.92	$1.96	$2.05	$2.27	$2.63	$2.53	$2.62	$2.55	$2.55	$2.65	$2.61
2008							$4.06	$3.78	$3.70	$3.05	$2.15	$1.69

Freeway Travel Time Burden: AM Peak (6 – 10 AM)



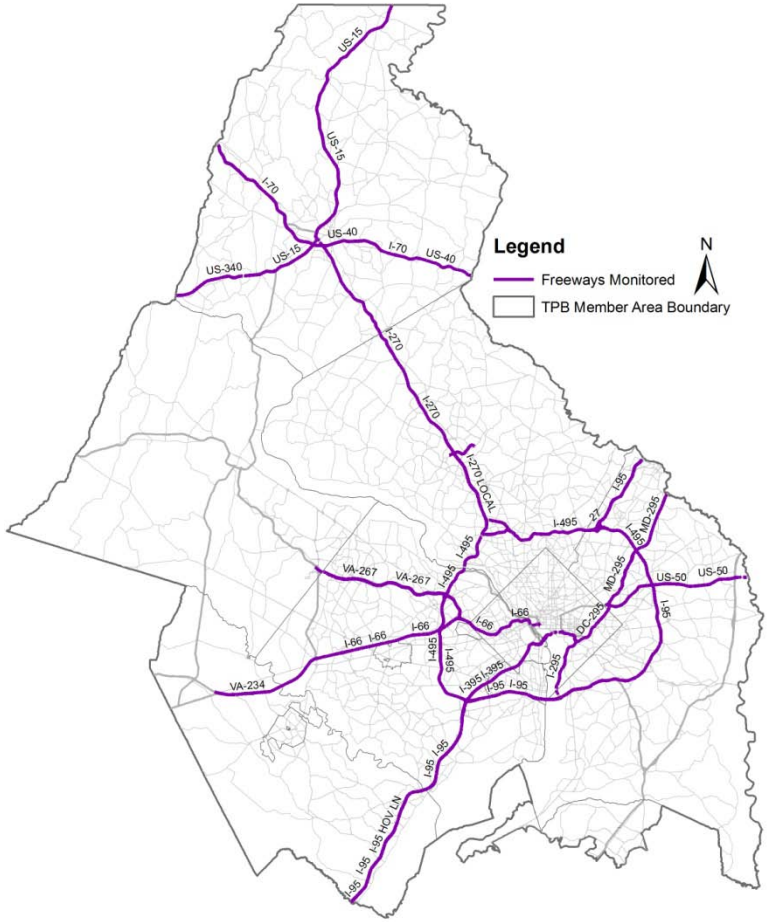
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	16%	19%	19%	18%	21%	21%	15%	14%	25%	24%	20%	9%
2009	19%	20%	21%	18%	20%	22%	15%	12%	22%	23%	22%	14%
2008							14%	12%	20%	21%	18%	16%

Freeway Travel Time Burden: PM Peak (3 – 7 PM)



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	19%	24%	28%	31%	31%	33%	29%	28%	25%	25%	26%	23%
2009	22%	23%	24%	29%	32%	35%	32%	26%	24%	28%	31%	31%
2008							26%	26%	22%	27%	30%	28%

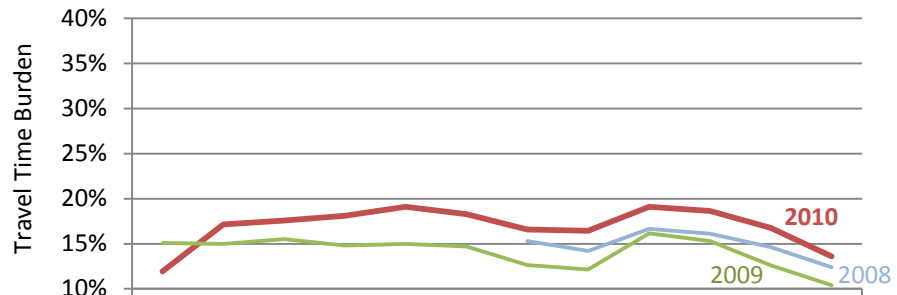
Data Coverage on Freeways



*Travel time burden is the percentage of additional travel time over and above free flow travel time, i.e., travel time burden = (actual travel time – free flow travel time)/free flow travel time * 100%.

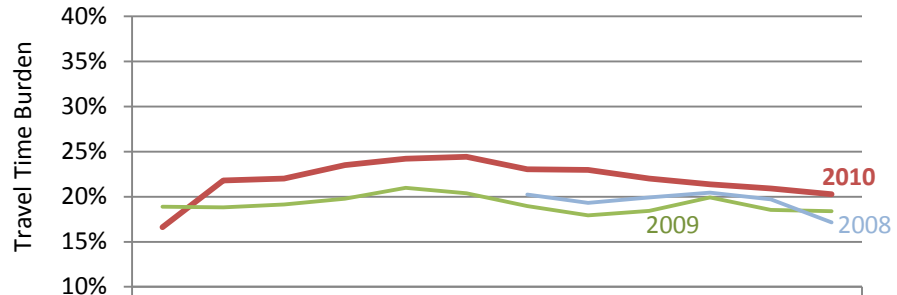
National Capital Region Congestion Report (DRAFT) 4th Quarter 2010 *Arterial Travel Time Burden**

Arterial Travel Time Burden: AM Peak (6 – 10 AM)



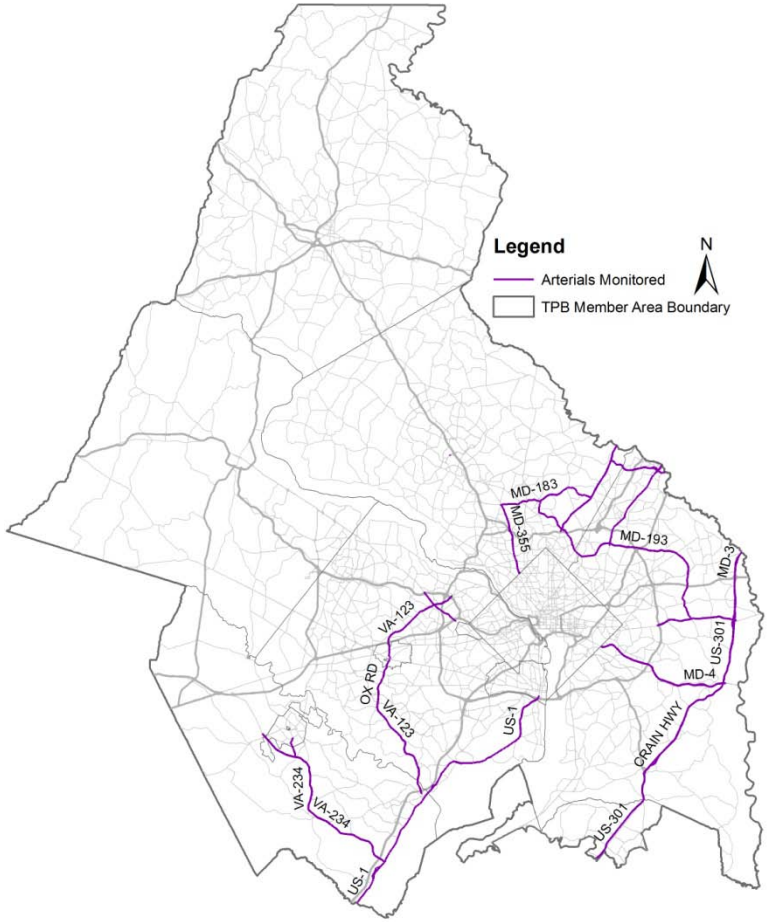
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	12%	17%	18%	18%	19%	18%	17%	16%	19%	19%	17%	14%
2009	15%	15%	16%	15%	15%	15%	13%	12%	16%	15%	13%	10%
2008							15%	14%	17%	16%	15%	12%

Arterial Travel Time Burden: PM Peak (3 – 7 PM)



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2010	17%	22%	22%	24%	24%	24%	23%	23%	22%	21%	21%	20%
2009	19%	19%	19%	20%	21%	20%	19%	18%	18%	20%	19%	18%
2008							20%	19%	20%	20%	20%	17%

Data Coverage on Arterials

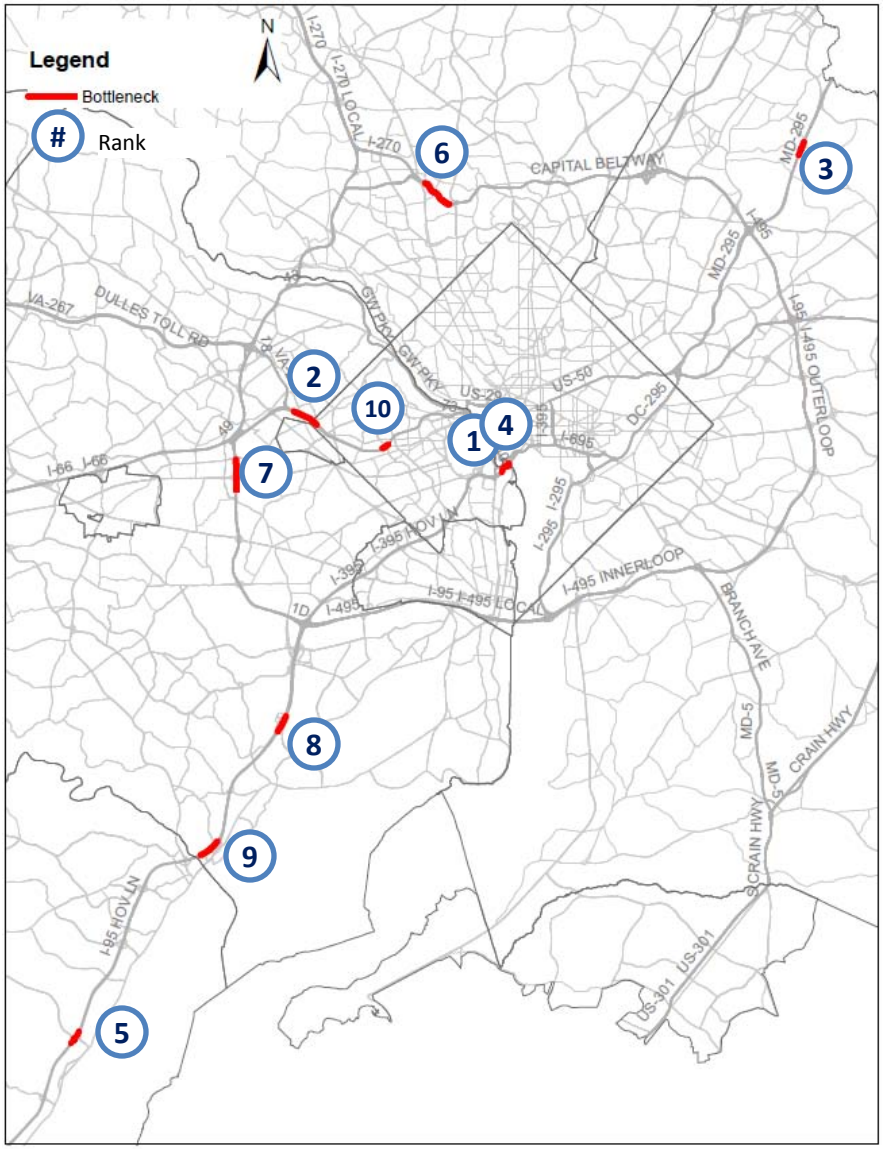


*Travel time burden is the percentage of additional travel time over and above free flow travel time, i.e., travel time burden = (actual travel time – free flow travel time)/free flow travel time * 100%.

Most Severe Freeway Bottlenecks

Road/ Direction	Location	Daily Hours of Congestion*	Average Speed when Congested (mph)	Rank		
				2010Q4	2010Q3	2009Q4
I-395 HOV NB	10TH ST/EXIT 10	2.05	40	1	4	>10
I-66 EB	VA-267/EXIT 67	1.43	29	2	>10	>10
MD-295 NB	POWDER MILL RD	1.47	32	3	6	10
I-395 NB	11TH ST/EXIT 11	1.64	27	4	1	>10
I-95 HOV SB	End of HOV	1.37	34	5	5	>10
I-495 IL	MD-185/EXIT 33	1.49	32	6	9	8
I-495 IL	US-50/EXIT 50	1.47	34	7	>10	>10
I-95 HOV NB	VA-7900/EXIT 169	1.53	37	8	10	>10
I-95 SB	US-1/EXIT 161	1.16	29	9	>10	2
I-66 WB	FAIRFAX DR/EXIT 71	1.55	36	10	3	>10

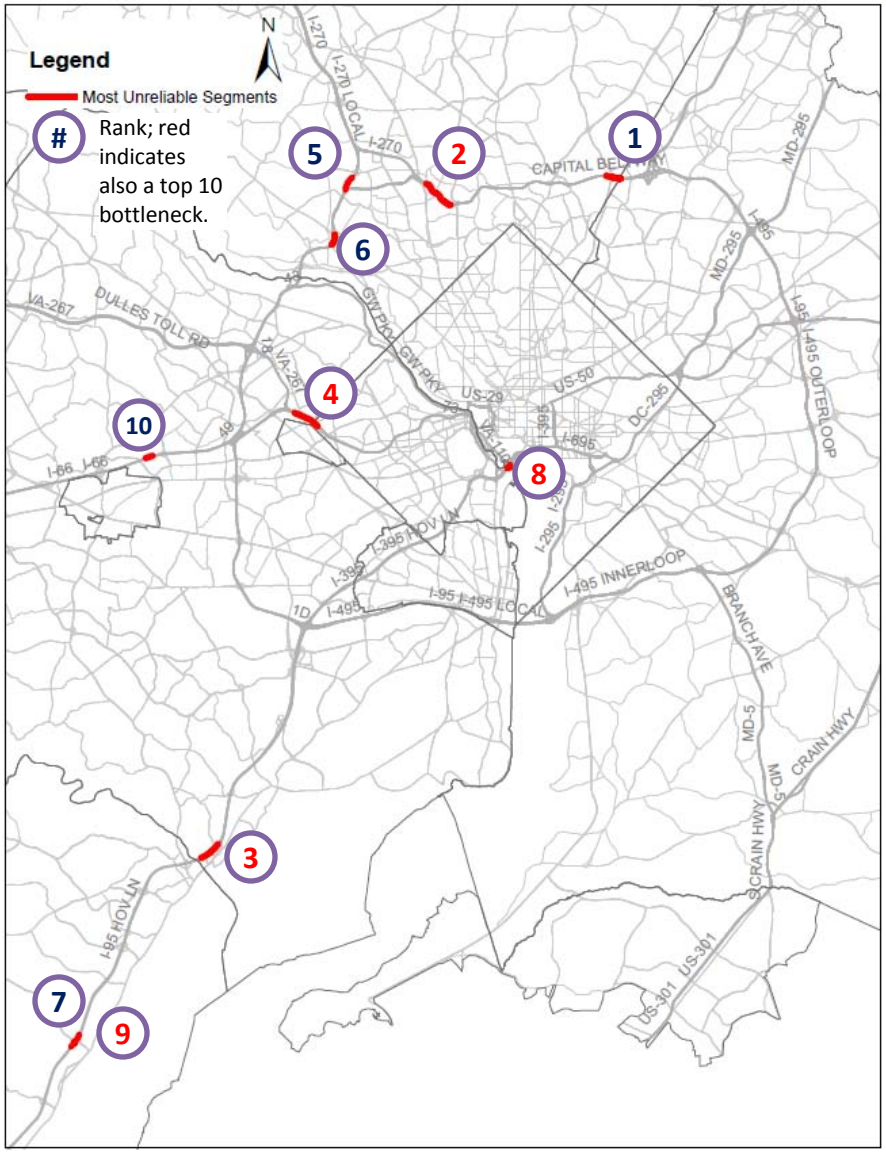
* Daily Hours of Congestion is calculated by the total number of congested hours in the quarter, divided by the number of days (including weekends and holidays) in the quarter. Congestion is defined if travel time is longer than 1.3 times of free flow travel time (National Transportation Operations Coalition, 2005).



Most Unreliable Freeway Segments

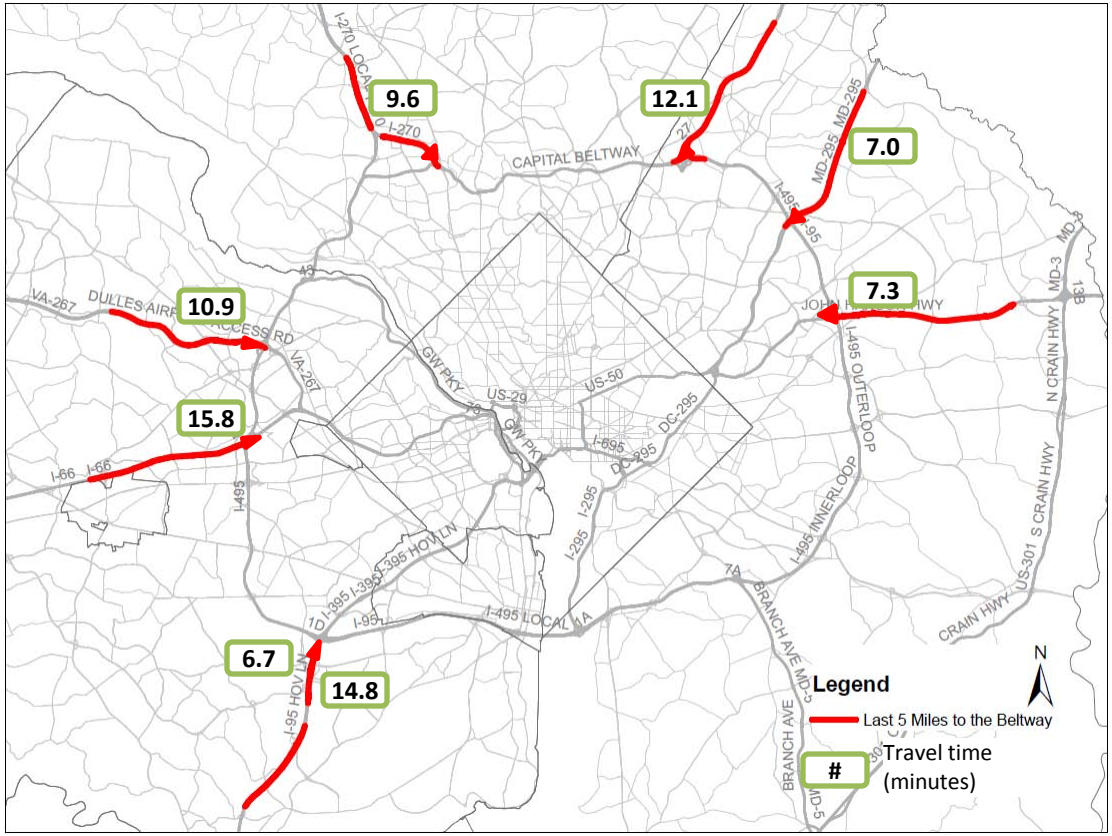
Road/ Direction	Location	Buffer Time Index*	Also A Top 10 Bottleneck?	Rank		
				2010Q4	2010Q3	2009Q4
I-495 OL	MD-650/EXIT 28	3.43	No	1	4	>10
I-495 IL	MD-185/EXIT 33	3.20	Yes	2	2	1
I-95 SB	US-1/EXIT 161	3.17	Yes	3	>10	>10
I-66 EB	VA-267/EXIT 67	3.01	Yes	4	9	>10
I-270 Spur SB	I-495	2.98	No	5	8	3
I-495 IL	C.J.PKWY/EXIT 40	2.95	No	6	>10	10
I-95 SB	VA-234/EXIT 152	2.85	No	7	1	>10
I-395 NB	11TH ST/EXIT 11	2.75	Yes	8	5	7
I-95 HOV SB	End of HOV	2.58	Yes	9	6	>10
I-66 WB	VADEN DR/EXIT 62	2.54	No	10	>10	>10

* Buffer time index = (95th travel time – 50th travel time)/50th travel time. Buffer Time Index measures the ratio of the extra time a traveler has to budget for on-time arrival to median travel time.



Travel Time of the Last 5 Miles to the Beltway (Freeways Only) in AM Peak Hour (8 – 9 AM)

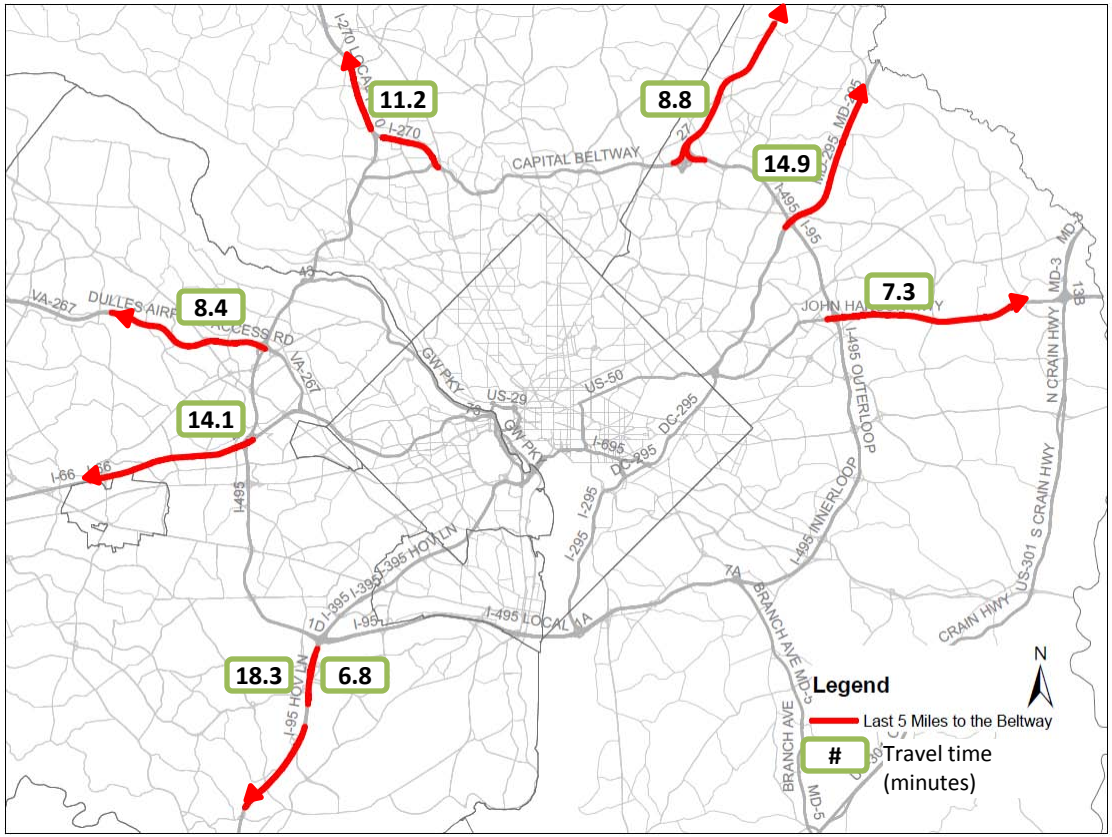
Route	From	To	Travel Time (min)	Buffer Time Index*	Rank		
					2010Q4	2010Q3	2009Q4
I-66 EB	VA-123/EXIT 60	Beltway	15.8	0.53	1	1	1
I-95 NB	LORTON RD/EXIT 163	Beltway	14.8	1.08	2	2	2
I-95 SB	MD-198/EXIT 33	Beltway	12.1	0.87	3	3	3
VA-267 EB	HUNTER MILL RD/EXIT 14	Beltway	10.9	0.29	4	4	4
I-270 SB	FALLS RD/EXIT 5	Beltway	9.6	0.67	5	5	5
US-50 WB	MD-197/EXIT 11	Beltway	7.3	0.81	6	6	8
MD-295 SB	MD-197/EXIT 11	Beltway	7.0	0.78	7	8	7
I-95 HOV NB	LORTON RD/EXIT 163	Beltway	6.7	0.36	8	7	6



* Buffer time index = (95th travel time – 50th travel time)/50th travel time. Buffer Time Index measures the ratio of the extra time a traveler has to budget for on-time arrival to median travel time.

Travel Time of the First 5 Miles from the Beltway (Freeways Only) in PM Peak Hour (5 – 6 PM)

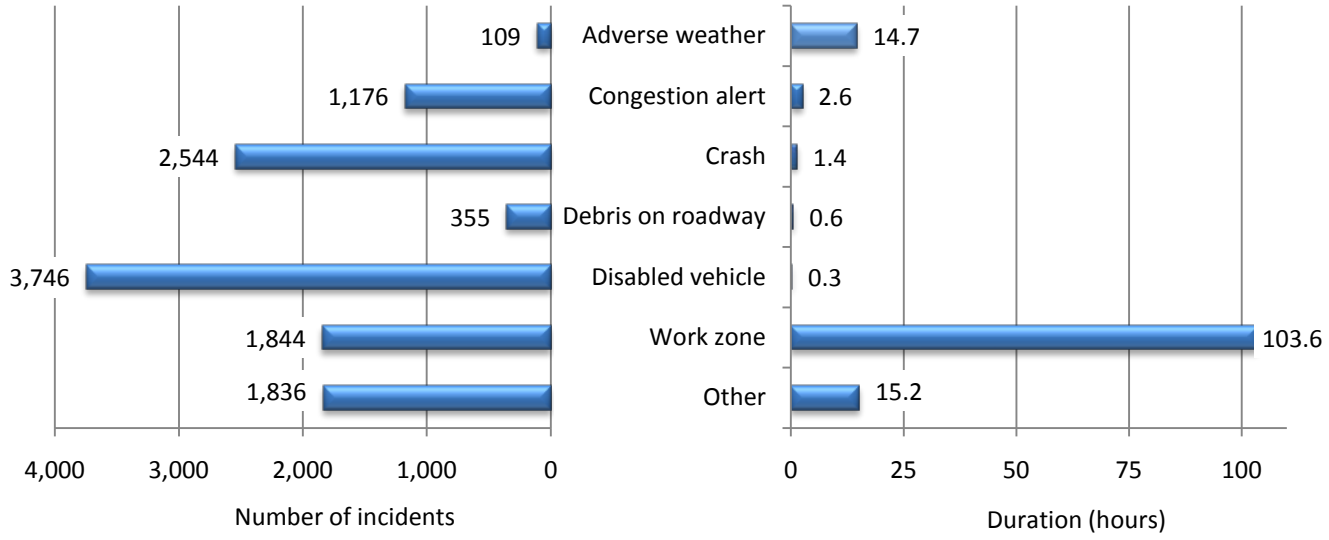
Route	From	To	Travel Time (min)	Buffer Time Index*	Rank		
					2010Q4	2010Q3	2009Q4
I-95 SB	Beltway	LORTON RD/EXIT 163	18.3	0.56	1	1	1
MD-295 NB	Beltway	MD-197/EXIT 11	14.9	0.20	2	2	2
I-66 WB	Beltway	VA-123/EXIT 60	14.1	0.37	3	3	4
I-270 NB	Beltway	FALLS RD/EXIT 5	11.2	0.21	4	4	3
I-95 NB	Beltway	MD-198/EXIT 33	8.8	0.57	5	5	5
VA-267 WB	Beltway	HUNTER MILL RD/EXIT 14	8.4	0.45	6	7	6
US-50 EB	Beltway	MD-197/EXIT 11	7.3	0.42	7	6	8
I-95 HOV SB	Beltway	LORTON RD/EXIT 163	6.8	0.07	8	8	7



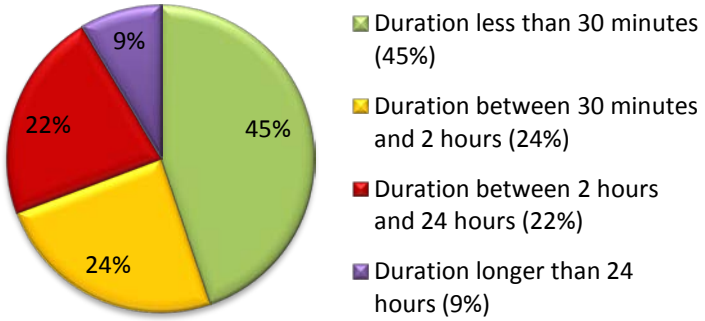
* Buffer time index = (95th travel time – 50th travel time)/50th travel time. Buffer Time Index measures the ratio of the extra time a traveler has to budget for on-time arrival to median travel time.

National Capital Region Congestion Report (DRAFT) 4th Quarter 2010 *Incidents/Events**

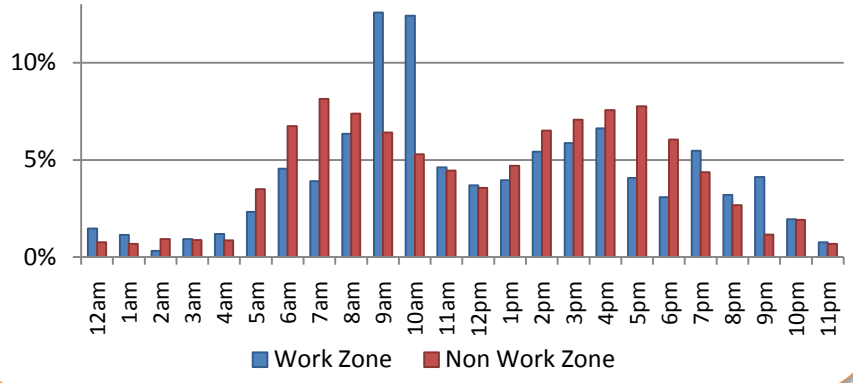
Number and Average Duration of RITIS-Recorded Events
in 4th Quarter 2010



Distribution of Duration of RITIS-Recorded Events
in 4th Quarter 2010 (total 11,610 events)



Time of Day Distribution of RITIS-Recorded Events
in 4th Quarter 2010 (total 1844 work zone and 9766 non work zone Events)



*Data source: the Regional Integrated Transportation Information System (www.RITIS.org). Data were not available for the District of Columbia.

Summary of 4th Quarter 2010

1. The overall congestion on the region's freeway system decreased significantly in the 4th quarter of 2010 compared to the same quarter in 2009 as detailed below.
   - The total delay experienced by a freeway traveler in this quarter was 23 hours, a 45% decrease from Q4/2009.
   - The congested freeway lane-miles during the PM peak Period (3 -7 pm) was 22% , a 23% decrease from Q4/2009.
   - The congested freeway lane-miles during the AM peak period (6 -10 am) was 15% , a 9% decrease from Q4/2009.

2. The overall congestion on the data-covered arterials in the region increased slightly in the 4th quarter of 2010 compared to the same time in 2009.
   - Travel Time Index increased 3% and 2% for AM peak period and PM peak period respectively, compared to Q4/2009.

3. The most severe bottlenecks were mainly on the I-95/395 corridor, I-66 corridor and the west and north portion of the Beltway.

4. The most unreliable freeway segments were mainly on the north portion of the Beltway, and the I-95/395 corridor.

5. The I-66 EB carried the slowest traffic to the Beltway in the AM peak hour (8-9 am) and the I-95 SB in Virginia carried the slowest traffic from the Beltway in the PM peak hour (5-6 pm).

6. A total of 11,610 incidents were recorded by RITIS in the 4th quarter of 2010, of which 45% had duration less than 30 minutes, and 1% were acted upon by the MATOC Program.

7. The causal factors influencing congestion levels this quarter compared to the same quarter last year cannot be definitively determined. However, known notable factors included:
   - Differencing weather conditions (a major snow storm hit this region on Dec. 19, 2009 and the impacts lasted for multiple days)
   - Higher fuel prices (p. 3)
   - Lower vehicle miles of travel (VMT) in total (p. 3)

Frequently Asked Questions

National Capital Region Congestion Report (Draft) | 4th Quarter 2010

1. Why to develop such a dashboard-style regional congestion report?

Inspired by various agency and jurisdictional dashboard efforts around the county (e.g., Virginia Department of Transportation Dashboard), driven by the emergent probe-based traffic speed data from the I-95 Corridor Coalition Vehicle Probe Project, this dashboard-style report tries to take advantage of and integrate several existing data sources to produce customized, easy-to-communicate, and quarterly updated congestion and transportation operations performance measures for the Transportation Planning Board (TPB) Planning Area. The goal of this effort is to make the Congestion Management Process "alive" on the TPB website that timely summarizes the region's congestion and the programs of the TPB and its member jurisdictions that would have an impact on congestion. The higher goal of this report is to help to facilitate performance-based transportation planning and programming process in the National Capital Region.

2. What is the targeted audience of this report?

The intended audience of this report includes the TPB, TPB advisory committees, TPB member jurisdictions, other regional stakeholders, transportation planners/engineers and interested citizens.

3. What is the spatial coverage of this report?

The spatial coverage of this report is limited to the TPB Planning Area. Highway performance measures are obtained from the majority of the region's freeway system (Figure 1) and a sample of the arterials (Figure 2).

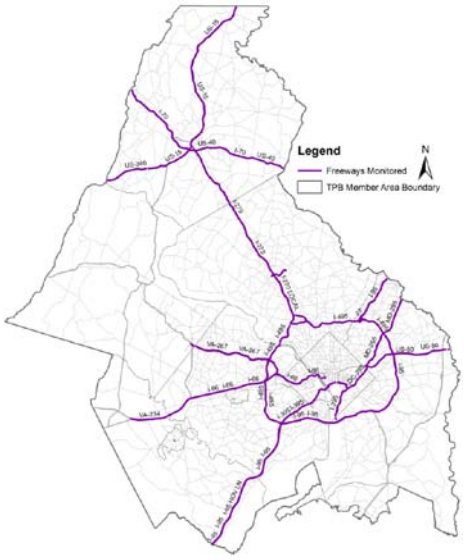


Figure 1: Freeways monitored by this report: 304 linear miles, or 91% of total.

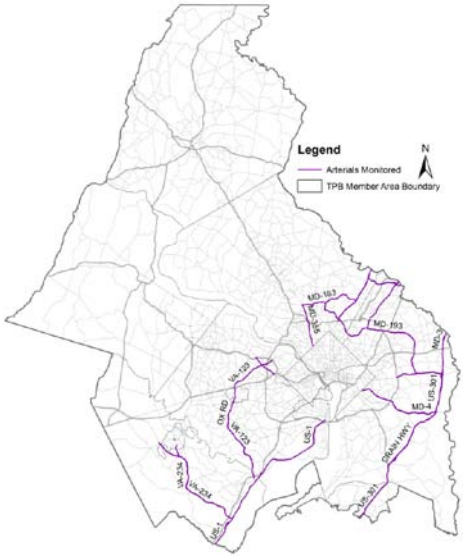


Figure 2: Arterials monitored by this report: 230 linear miles, a small sample of the total.

This limited roadway coverage is imposed by the availability of the traffic speed data from the I-95 Corridor Coalition Vehicle Probe Project.

All notifications from the Metropolitan Area Transportation Operations Coordination (MATOC) Program and the events/incidents recorded by the Regional Integrated Transportation Information System (RITIS) in the TPB planning area for the reporting quarter are included in this report.

4. What is the temporal coverage of this report?

Temporally, each quarter's report covers up to the most recent three years data, with the earliest data available since July 1, 2008 when the I-95 Corridor Coalition Vehicle Probe Project started.

5. What is the release schedule of this report?

This report is scheduled to release quarterly and the time lag of reporting is expected to be one to three months.

6. What is the source of the data for this report?

The source of data for this report includes: (1) traffic speed data from the I-95 Corridor Coalition Vehicle Probe Project (VPP) and its expansions; (2) traffic volume data from the FHWA Transportation Technology Innovation and Demonstration (TTID) Program and the Maryland Traffic Monitoring System; and (3) incidents and events data from the Regional Integrated Transportation Information System (RITIS) and the Metropolitan Area Transportation Operations Coordination (MATOC) Program.

The traffic speed data are integrated with the volume data to obtain delay per traveler and vehicle miles of travel (VMT); other highway performance measures are solely based on the speed data. MATOC notifications and RITIS-recorded events are summarized separately.

7. What is the methodology to integrate the traffic speed and volume data?

First, speed and volume data are aggregated respectively by hour of the day and day of the week for each month of the year, resulting 168 hours (24 hours a day * 7 days a week) of data for each month.

Then, match the TMC (Traffic Message Channel – an industry convention for roadway segmentation) that carries the speed data with the traffic detector station(s) that carries the volume data. This matching is conducted at an ad-hoc basis with the following rules of thumb:

1) Combine several TMCs to form a "segment" that includes at least one station.
2) A segment should be at least 1-mile long.
3) A segment ends/begins if:
    a. Number of lanes changes, and/or
    b. At a major interchange or a point of interest.

4) If a segment has multiple matched stations, use the average volume from the stations as the segment volume.

8. Why does this report not include transit-related performance measures?

This report has a primary focus on highway performance measures, in view of that the Washington Metropolitan Area Transit Authority (WMATA) already publishes the "Metro Scorecard", available at: http://www.wmata.com/about_metro/scorecard/.

9. Why does the "Uncongested" portion (in green) in the pie chart on page 1 seem too high?

The "Percentages of Freeway Lane-Miles by Congestion Level" are calculated by non-holiday weekday peak period data in the last quarter of 2010. The reason for the high percentages is largely due to the fact that the total freeway lane-miles includes both peak direction and non-peak direction and the congestion on freeways in Frederick County, MD is usually not as severe as in the DC core. It is tried to consider only the peak-direction, but the differentiation between the peak and non-peak directions is troublesome in some cases, e.g., the Beltway. The intention of this report is to show both system-wide summaries as well as individual experiences of freeway congestion, and the measure shown by the pie chart is for the former and the delay per traveler is for the latter.

10. What do the (blue) arrows on page 1 mean?

The value of the performance measure is compared to that of the same time last year: a down arrow indicates a decrease and an up arrow increase. The number in the arrow indicates the change in percentage. Pages 2 and 3 provide the previous year data.

11. How does this report quantify the value of time?

The TPB travel forecasting model estimates the value of time is 75% of hourly rate of income for work trips and 50% for non-work trips. This report uses the median household income to derive (interpolate) the average value of time for work and non-work trips respectively. A combined value of time of both work and non-work trips is obtained by finding the share of work and non-work trips (roughly 30% and 70%, respectively). Last, inflation is adjusted to reflect the present value of time.

The value of time used for the 4th quarter 2010 is $18.49/hour, which is slightly higher than the value used by the Texas Transportation Institute's 2011 Urban Mobility Report ($16.30/hour).

12. Why does this report use monthly average delay and cost on page 1?

Different reporting periods such as quarterly or daily average delay and cost have been tried and the monthly average is thought to make the most sense to travelers' experience. This is also consistent with the reporting period on page 2-5.

13. Why the delay and cost dropped 45% in Q4/2010 compared to the same time last year?

As mentioned by item 7 on page 11 of the report, the causal factors influencing congestion levels this quarter compared to the same quarter last year cannot be definitively determined. However, known notable factors included: differencing weather conditions (a major snow storm hit this region on December 19, 2009 and the impacts lasted for multiple days), higher fuel prices (p. 3), and lower vehicle miles of travel (VMT) in total (p. 3).

Identifying the causes of changes in congestion trend is a challenging task; this report will continue to improve in this aspect.

14. What is the methodology to identify the top 10 freeway bottlenecks?

The bottleneck identification method includes the following steps:

1) Aggregate the analysis period (quarterly) data into hourly average by day of the week, resulting 168 hours (24 hours a day * 7 days a week) data for each TMC (Traffic Message Channel – an industry convention for roadway segmentation).
2) Calculate the Travel Time Index (TTI) for each of the 168 hours.
3) Delete "uncongested" hours. An hour is congested if the TTI > 1.30, according to the National Transportation Operations Coalition Performance Measurement Initiative (2005).
4) Calculate the average TTI of the congested hours for each TMC.
5) Rank all TMCs using the product of the average TTI calculated in step 4) and the number of congested hours obtained in step 3).
6) Post process: if there are several spatially adjacent TMCs ranked very closely, the most severe one is chosen as the bottleneck. The rationale behind is that a bottle*neck*, rather than a congested stretch or corridor, is of interest.

15. What is the methodology to identify the top 10 most unreliable segments?

The top 10 most unreliable segments are determined by the Buffer Time Index, which is calculated by = (95th travel time – 50th travel time)/50th travel time.

16. Are the results of this report consistent with other studies?

Not necessarily. The discrepancies could be caused by the differences in:

1) Data spatial coverage. For example, the Texas Transportation Institute *Urban Mobility Report* covers the entire "Urban Area" - the developed area (population density more than 1,000 persons per square mile) within a metropolitan region, and the boundary of the Urban Area could change over time; the *INRIX National Traffic Scorecard* covers freeways and high-profile arterials in a Core Based Statistical Area (CBSA). The data spatial coverage of this report is explained in question 3.
2) Data temporal coverage. The *2011 Urban Mobility Report* and the *INRIX National Traffic Scorecard 2010 Annual Report* cover data year 2010. This report covers the last quarter of 2010.
3) Methodology.

It is common to have multiple different measurement systems over the same object (e.g., stock indices). The most important thing is to track the same measurement over time.

17. Will the source data used in this report replace the freeway aerial photography survey or the arterial travel time study?

The TPB's Traffic Monitoring Program is currently investigating a variety of data sources and technologies to enhance and improve the traffic monitoring efforts in the National Capital Region. The current understanding is that a single source can hardly provide the perfect data – different methods and data often complement each other to provide a comprehensive view of the actual traffic conditions.

18. What is the contact if I have additional questions or comments?

Please send questions or comments to COG/TPB staff Wenjing Pu: wpu@mwcog.org.