

CONGESTION REPORT

2nd Quarter 2018

A quarterly update of the National Capital Region's traffic congestion, travel time reliability, top-10 bottlenecks and featured spotlight

July 22, 2019



National Capital Region
Transportation Planning Board

ABOUT TPB

Transportation planning at the regional level is coordinated in the Washington area by the National Capital Region Transportation Planning Board (TPB). Members of the TPB include representatives of the transportation agencies of the states of Maryland and Virginia, and the District of Columbia, local governments, the Washington Metropolitan Area Transit Authority, the Maryland and Virginia General Assemblies, and nonvoting members from the Metropolitan Washington Airports Authority and federal agencies. The TPB is staffed by the Department of Transportation Planning of the Metropolitan Washington Council of Governments.

CREDITS

Author: Jan-Mou Li, C. Patrick Zilliacus, Daivamani Sivasailam

Project Management: Andrew J. Meese

Oversight: Kanti Srikanth

Data/Tools: I-95 Corridor Coalition Vehicle Probe Project; INRIX, Inc.; CATT Lab of University of Maryland

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2nd Quarter 2018

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CONGESTION – TRAVEL TIME INDEX (TTI)

Interstate System

TTI 2nd Quarter 2018: **1.35** ↑0.7% or 0.009¹
 TTI Trailing 4 Quarters: **1.36** ↑0.5% or 0.006²

Non-Interstate NHS³

TTI 2nd Quarter 2018: **1.16** ↓1.4% or -0.017
 TTI Trailing 4 Quarters: **1.19** ↓1.2% or -0.014

Transit-Significant⁴

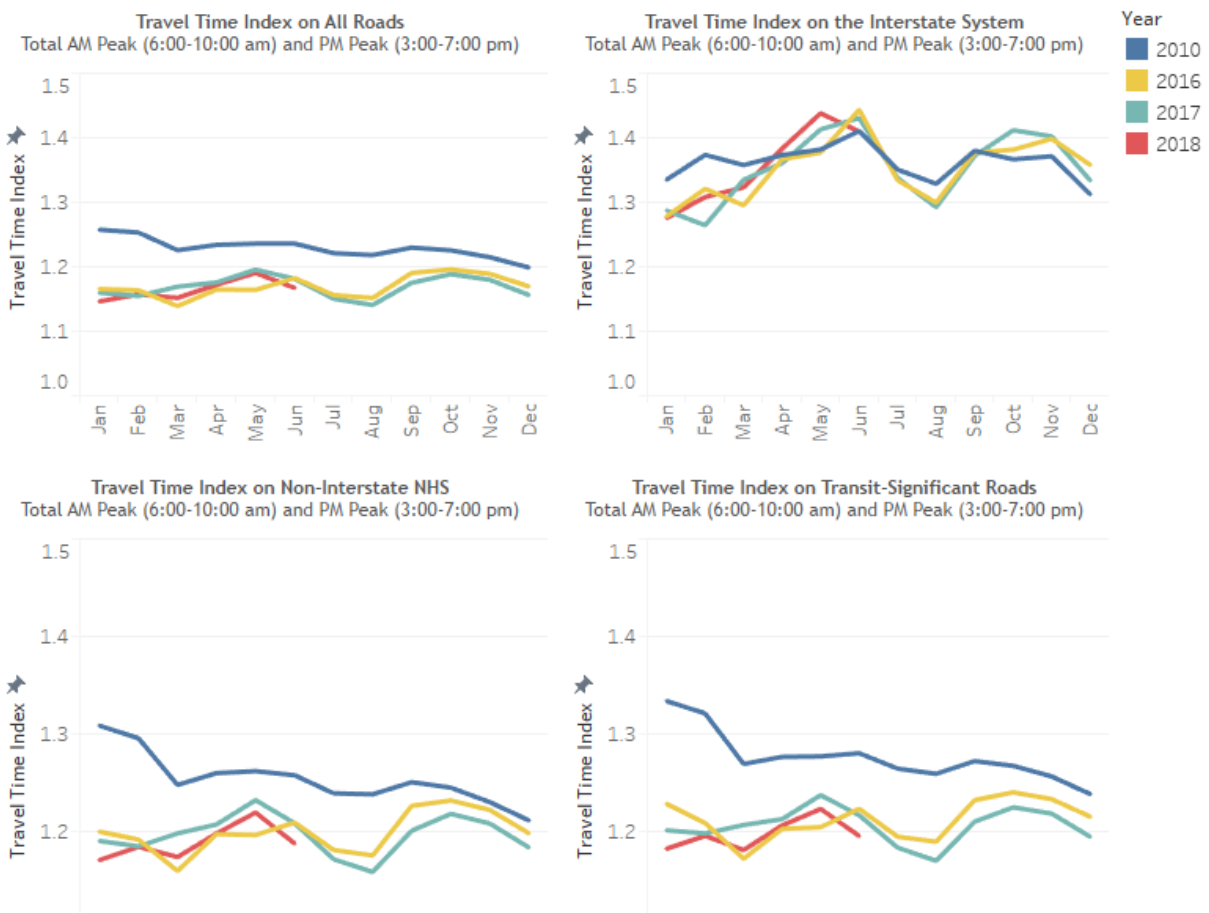
TTI 2nd Quarter 2018: **1.17** ↓2.1% or -0.025
 TTI Trailing 4 Quarters: **1.20** ↓1.2% or -0.02

All Roads

TTI 2nd Quarter 2018: **1.14** ↓1.1% or -0.012
 TTI Trailing 4 Quarters: **1.17** ↓0.7% or -0.7

¹ Compared to 2nd Quarter 2017; ²Compared to one year earlier; ³ NHS: National Highway System; ⁴ See “Background” section.

Figure 1 Monthly Travel Time Index for Total AM peak (6:00-10:00 am) and PM peak (3:00-7:00 pm)



Travel Time Index (TTI), defined as the ratio of actual travel time to free-flow travel time, measures the intensity of congestion. The higher the index, the more congested traffic conditions it represents, e.g., TTI = 1.00 means free flow conditions, while TTI = 1.30 indicates the actual travel time is 30% longer than the free-flow travel time.

RELIABILITY – PLANNING TIME INDEX (PTI)

Interstate System

PTI 2nd Quarter 2018: **1.88** ↑2.3% or 0.042¹
 PTI Trailing 4 Quarters: **1.88** ↑0.6% or 0.011²

Non-Interstate NHS³

PTI 2nd Quarter 2018: **1.39** ↓1.9% or -0.027
 PTI Trailing 4 Quarters: **1.44** ↓1.8% or -0.026

Transit-Significant⁴

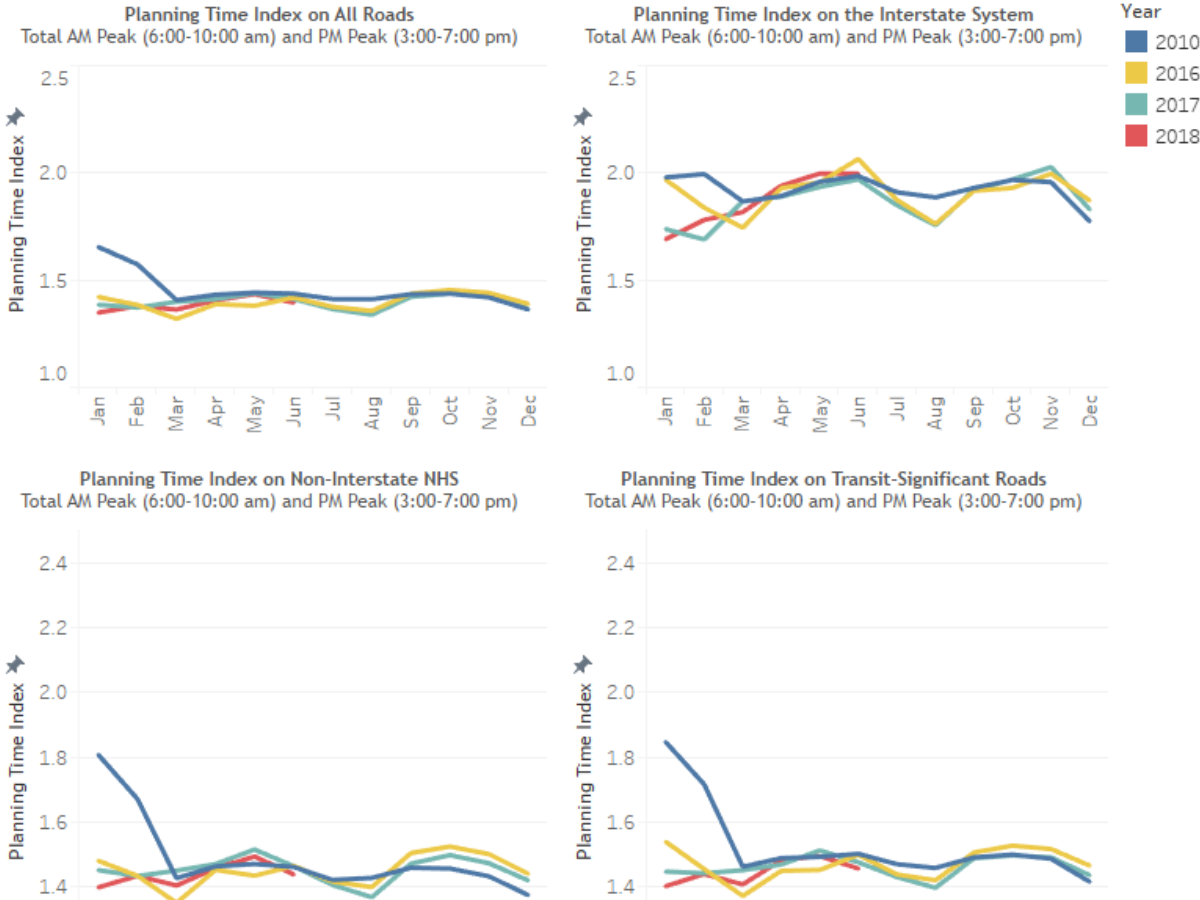
PTI 2nd Quarter 2018: **1.40** ↓3.0% or -0.043
 PTI Trailing 4 Quarters: **1.45** ↓1.4% or -0.02

All Roads

PTI 2nd Quarter 2018: **1.35** ↓1.6% or -0.021
 PTI Trailing 4 Quarters: **1.39** ↓1.2% or 0.02

¹ Compared to 2nd Quarter 2017; ² Compared to one year earlier; ³ NHS: National Highway System; ⁴ See “Background” section.

Figure 2 Monthly Planning Time Index for Total AM peak (6:00-10:00 am) and PM peak (3:00-7:00 pm)

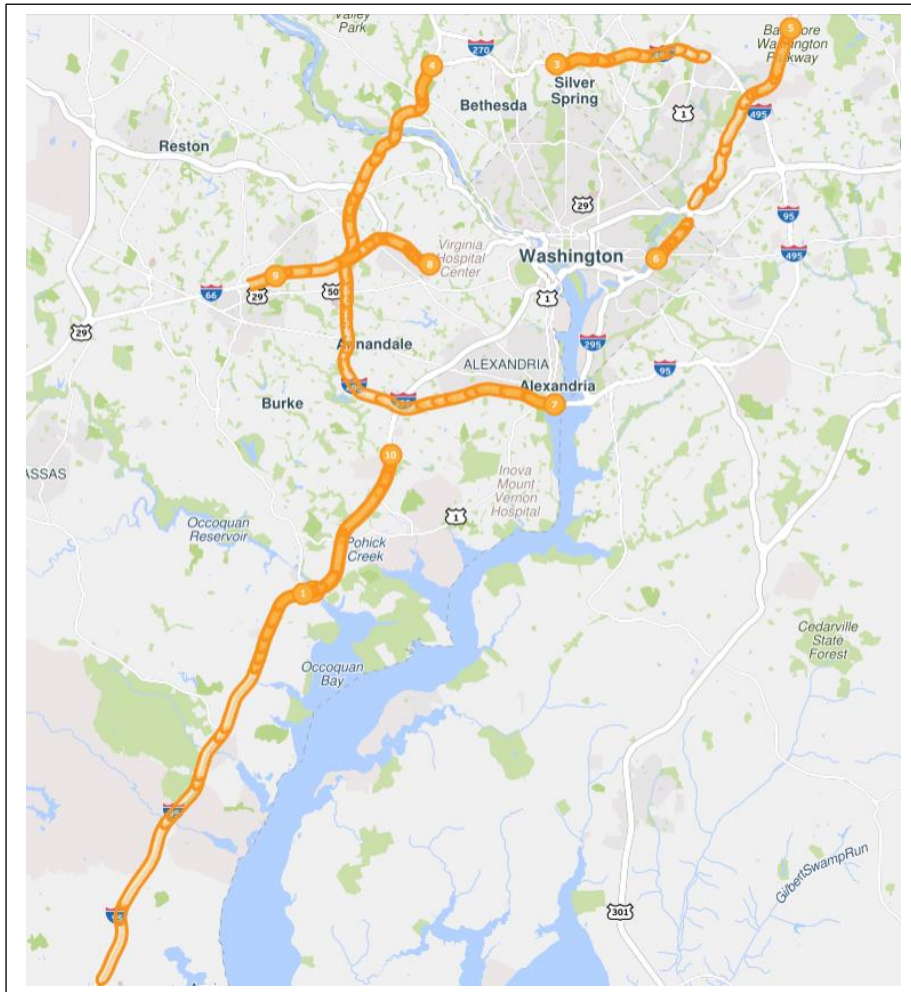


Planning Time Index (PTI), defined as the ratio of 95th percentile travel time to free flow travel time, measures travel time reliability. The higher the index, the less reliable traffic conditions it represents, e.g., PTI = 1.30 means a traveler must budget 30% longer than the uncongested travel time to arrive on time 95% of the instances (i.e., 19 out of 20 trips).

TOP 10 BOTTLENECKS

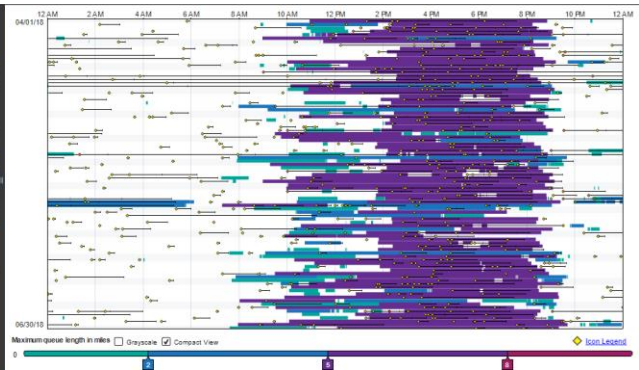
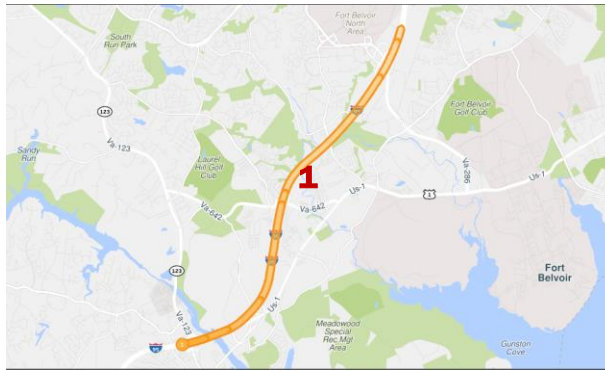
| Rank (Last Quarter Rank) | Location | Average duration | Average max length (miles) | Total duration | Impact factor |
|--------------------------|--|------------------|----------------------------|----------------|---------------|
| 1 (1) * | I-95 S @ VA-123/EXIT 160 | 9 h 18 m | 3.38 | 35 d 07 h 33 m | 168,180.20 |
| 2 (6) | I-95 N @ VA-123/EXIT 160 | 5 h 31 m | 3.57 | 20 d 22 h 14 m | 105,172.02 |
| 3 (2) | I-495 CCW @ MD-97/GEORGIA AVE/EXIT 31 | 5 h 21 m | 2.87 | 20 d 07 h 32 m | 102,664.39 |
| 4 (5) | I-495 CW @ I-270 SPUR | 2 h 52 m | 5.11 | 10 d 21 h 17 m | 98,361.67 |
| 5 (16) | MD-295 N @ POWDER MILL RD | 7 h 21 m | 2.68 | 27 d 21 h 36 m | 94,281.84 |
| 6 (4) | DC-295 S @ CAPITOL ST | 11 h 21 m | 1.25 | 43 d 01 h 15 m | 88,837.90 |
| 7 (32) | I-495 CCW @ WOODROW WILSON MEMORIAL BRIDGE | 2 h 53 m | 4.35 | 10 d 22 h 46 m | 86,031.68 |
| 8 (9) | I-66 E @ SYCAMORE ST/EXIT 69 | 7 h 46 m | 1.95 | 29 d 10 h 59 m | 84,352.10 |
| 9 (12) | I-66 W @ VADEN DR/EXIT 62 | 5 h 41 m | 1.48 | 21 d 14 h 37 m | 76,411.37 |
| 10 (24) | I-95 N @ BACKLICK RD/EXIT 167 | 3 h 47 m | 2.44 | 14 d 08 h 55 m | 74,948.55 |

* See "Bottlenecks" section in the "Background" chapter for ranking variability from quarter to quarter.

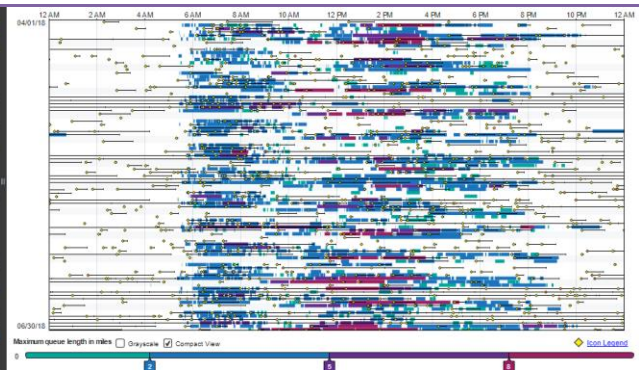
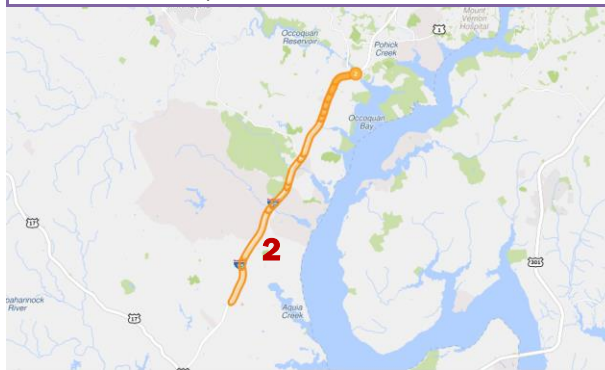


| Rank | Location | Average duration | Average max length (miles) | Total duration | Impact factor* |
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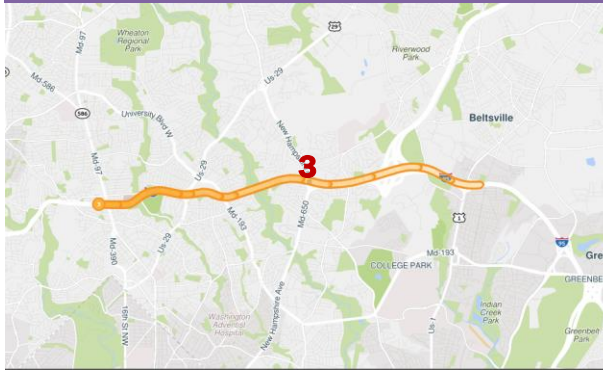
* The Impact Factor of a bottleneck is simply the product of the Average Duration (minutes), Average Max Length (miles) and the number of occurrences.



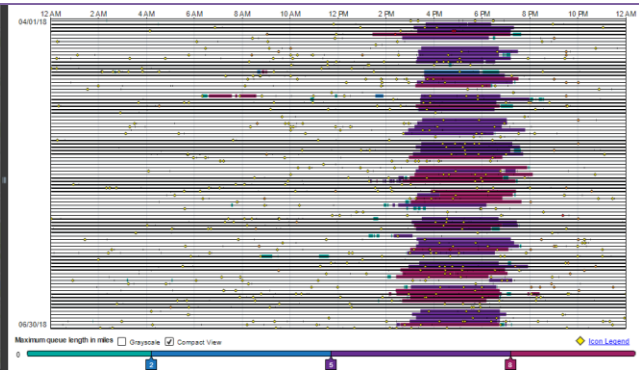
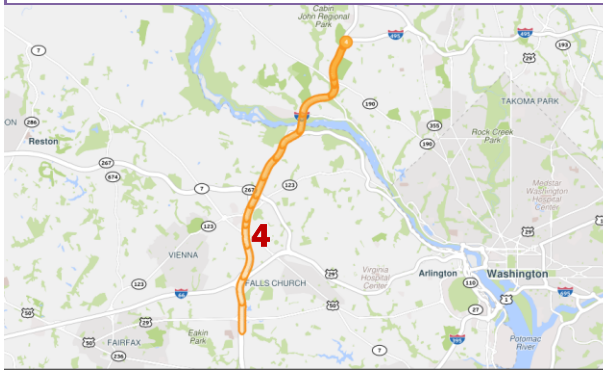
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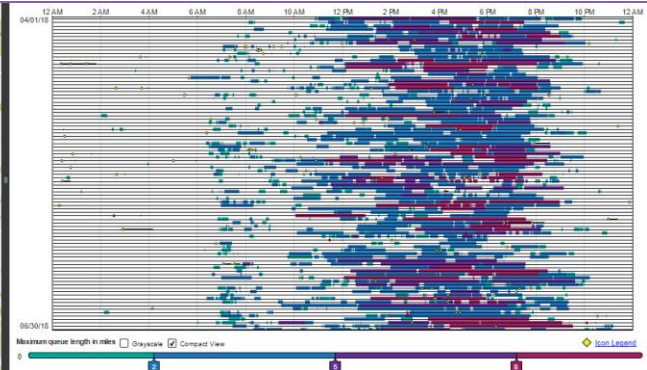
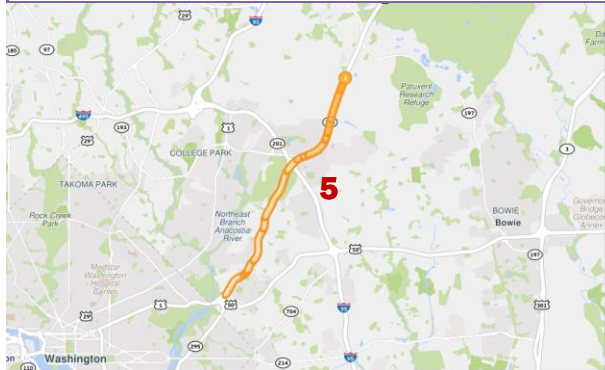
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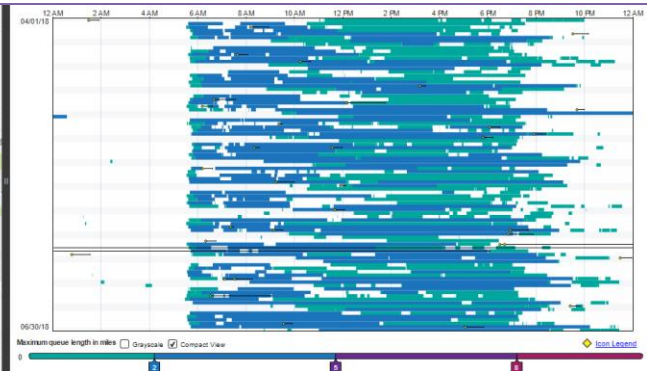
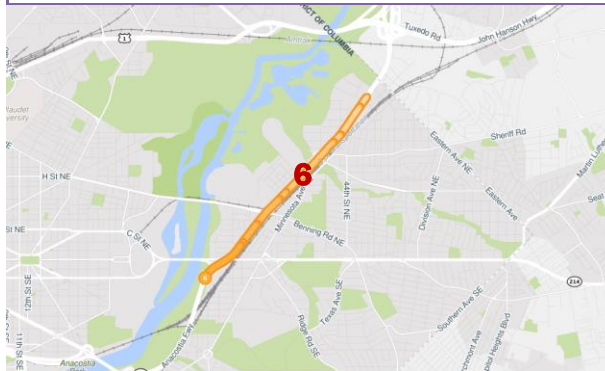
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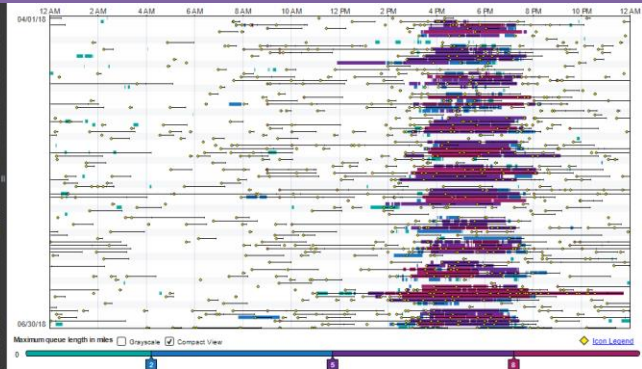
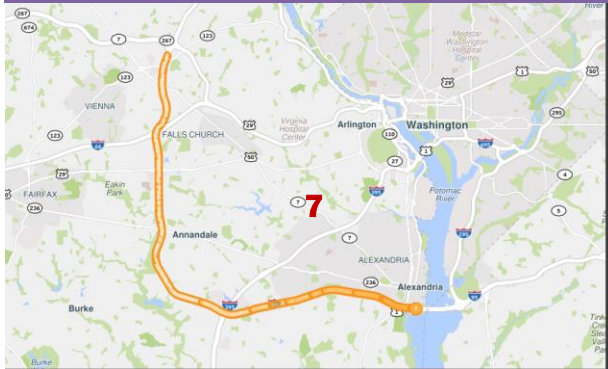
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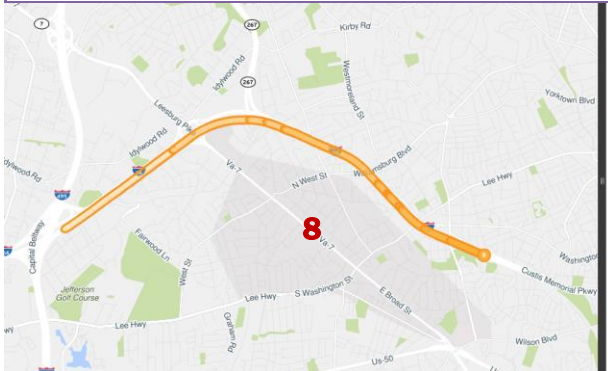
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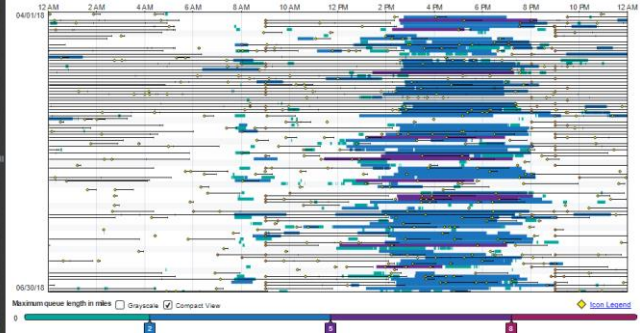
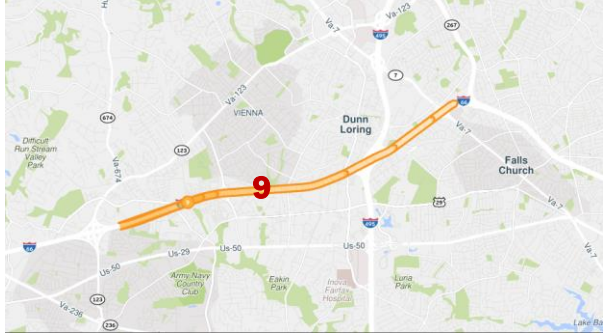
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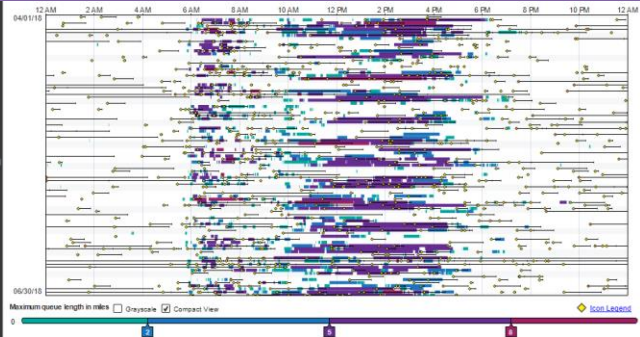
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|------|-------------------------------|------------------|----------------------------|----------------|---------------|
| 10 | I-95 N @ BACKLICK RD/EXIT 167 | 3 h 47 m | 2.44 | 14 d 08 h 55 m | 74,948.55 |



CONGESTION MAPS

Figure 3. Travel Time Index during weekday 8: 00-9:00 A.M. in 2nd Quarter of 2018

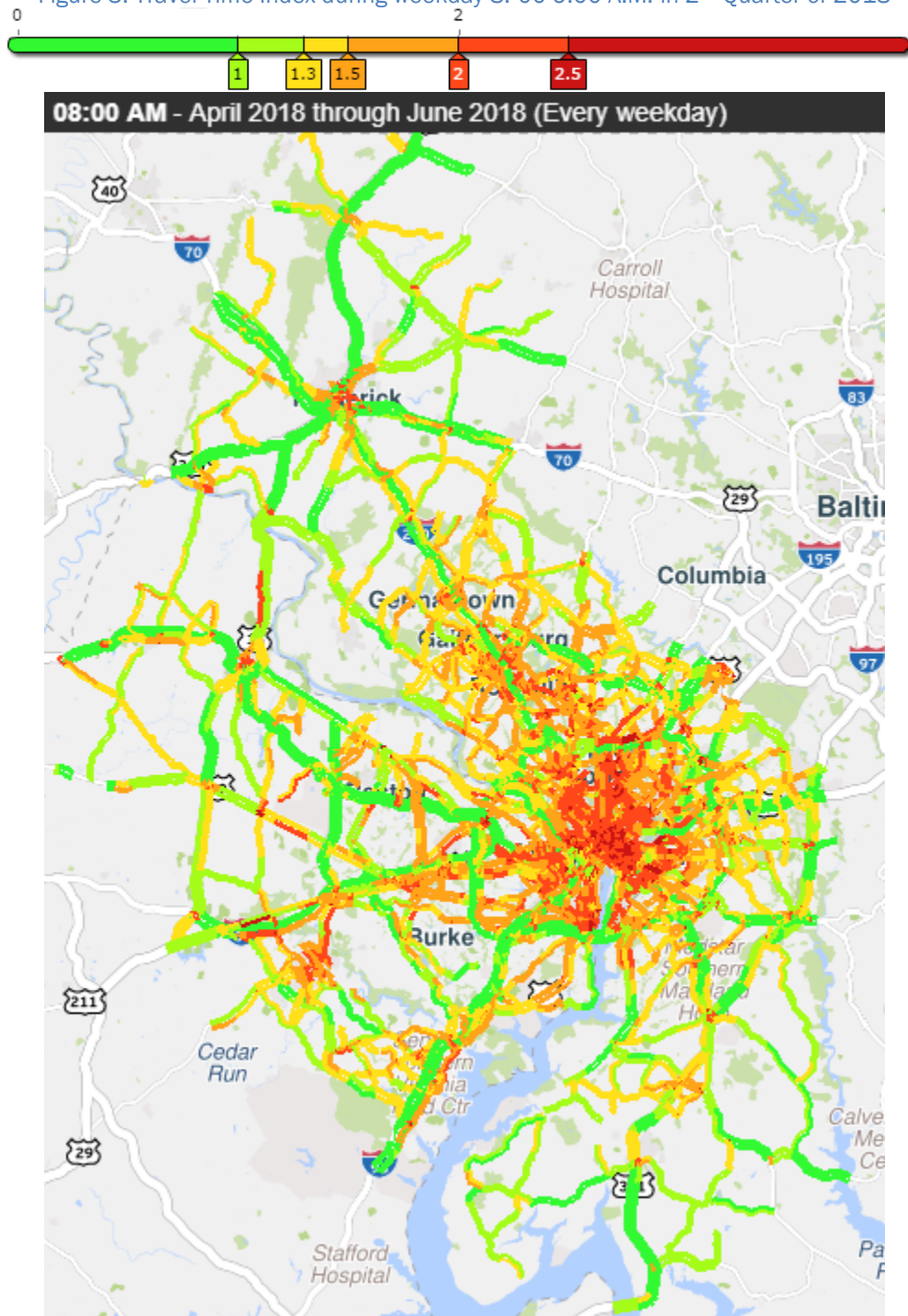
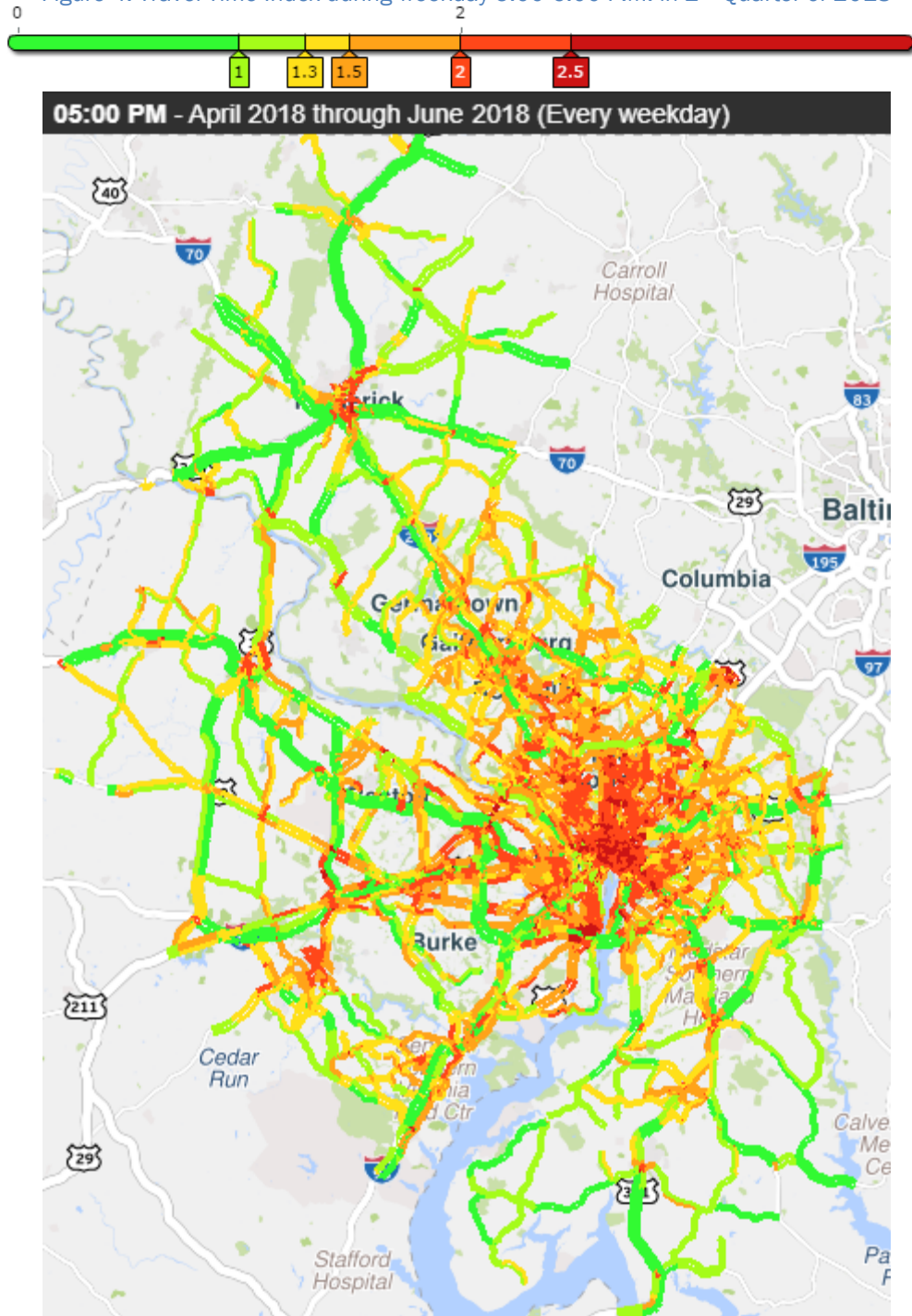


Figure 4. Travel Time Index during weekday 5:00-6:00 P.M. in 2nd Quarter of 2018



2018Q2 SPOTLIGHT – COSTS OF CONGESTION - JUNE 20 TRUCK CRASH ON WILSON BRIDGE

Could just one traffic incident on one day significantly change the National Capital Region's bottleneck rankings for an entire quarter? The answer, as evidenced earlier in this report, is yes. The second quarter of 2018 featured a tragic fatal June 20 crash on the I-95/I-495 Woodrow Wilson Bridge, one of the most impactful incidents in recent memory. The roadway segment including the Woodrow Wilson Bridge jumped from a regional bottleneck rank of 32 in the first quarter of 2018 to a bottleneck rank of seven (7) regionally in the second quarter, and the fatal truck incident on the bridge appears to be the primary factor in that jump.

Traffic Incident Management (TIM), a 2018 emphasis area for COG and TPB, was robust for the June 20 incident, and, despite delays and secondary incidents in the traffic backups caused, likely saved significant amounts of traveler delay. The multifaceted June 20 incident included a fatality of a tractor-trailer driver, a fire, and a maintenance “snooper” truck with a basket extending beside and under the bridge, stranding a crew performing maintenance activities, necessitating a water rescue. According to the Regional Integrated Transportation Information System (RITIS), the duration of the incident was more than 12 hours.

What did this mean for the National Capital Region's motorists? The data and tools available to TPB staff allow a quantitative examination of the traffic delay impacts of this tragic incident, toward an overall understanding of the **user delay cost** impacts of such incidents, and thus the importance of TIM actions to address such incidents.

Background and Methodology

Using the User Delay Cost Analysis tool of the Probe Data Analytics suite operated by the University of Maryland's Center for Advanced Transportation Technology Laboratory (CATT Lab), about 55 runs of the tool were run against the highway network of the region using data from 2018.

For a base case, four Wednesdays¹ prior to the truck crash were used, and data from the day of the crash was compared to the base.

- Three of the runs were of regionwide highway networks in aggregate, without regard to directions of travel:
Interstate highways (including U.S. 50 between I-95/I-495 and the Anne Arundel County/Prince George's County border);
- Non-Interstate National Highway System network, including freeways that are not part of the Interstate system; and
- A network combining the Interstates with non-Interstate freeways, expressways and National Park Service parkways which have “freeway-like” attributes, including full or nearly full access control, no traffic signals and at least four lanes divided.

Additionally, over 50 highway segments were analyzed with the tool – all of these were done in one direction at a time. This was done using the PDA tool and then downloading to Excel for graphing purposes. All of the Excel files are available and archived.

¹ May 23, 2018; May 30, 2018; June 6, 2018 and June 13, 2018.

Default settings of the tool were used – they were:

Hourly costs for passenger vehicles: \$17.91

Hourly costs for commercial vehicles: \$100.49

Passenger vehicles: 90% of traffic

Commercial vehicles: 10% of traffic

Cost of delay were aggregated to the hourly level. The period between 11AM and 10PM was used to quantify delays that appear to be related to the crash (the crash happened at about 10:20 AM on June 20, 2018 on the bridge that carries the “thru” lanes from Virginia to Maryland and was entirely cleared after 11:00 PM by Maryland State Police and the Maryland Department of Transportation/State Highway Administration).

Findings

All findings are for the period from the hours beginning at 11AM to 10PM.

Impact of The Incident on Regionwide Networks

1. The estimated cost of congestion on the Interstate network more than doubled, from about \$930,000 (average of the previous four Wednesdays) to about \$1,920,000 on June 20. This represents an increase in estimated cost of congestion of about \$990,000. See Figure 1 for an hour-by-hour summary of congestion costs.
2. Similarly, the estimated cost of congestion on the non-Interstate NHS network increased, from about \$940,000 to about \$1,530,000 on June 20. This represents an increase in estimated cost of congestion of about \$590,000 (see Figure 2).
3. When the Interstate network was combined with non-Interstate freeways and other controlled-access expressways and parkways, the estimated cost of congestion on this network almost doubled, from about \$1,270,000 to about \$2,510,000 on June 20. This represents an increase in estimated cost of congestion of about \$1,240,000. (see Figure 3).

Note that the first two findings above cannot be summed to come up with the third finding, which includes all Interstates but only a subset of the non-Interstate NHS network.

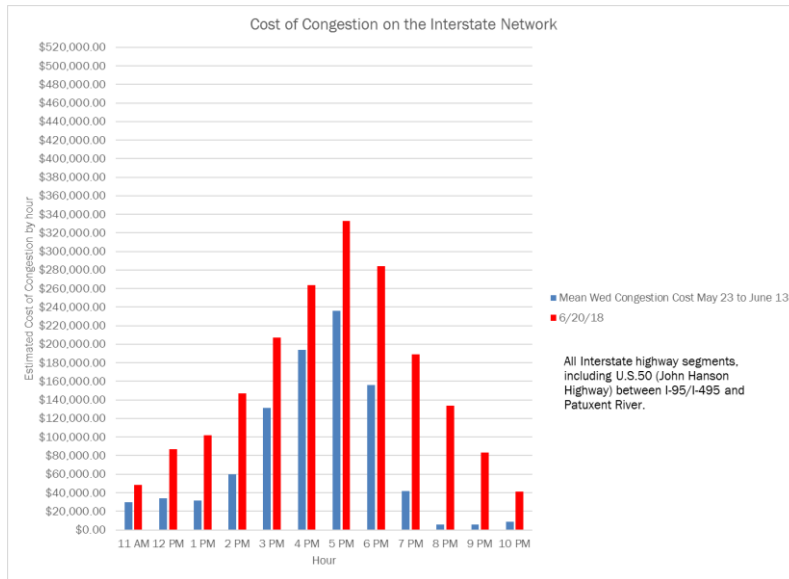


Figure 5

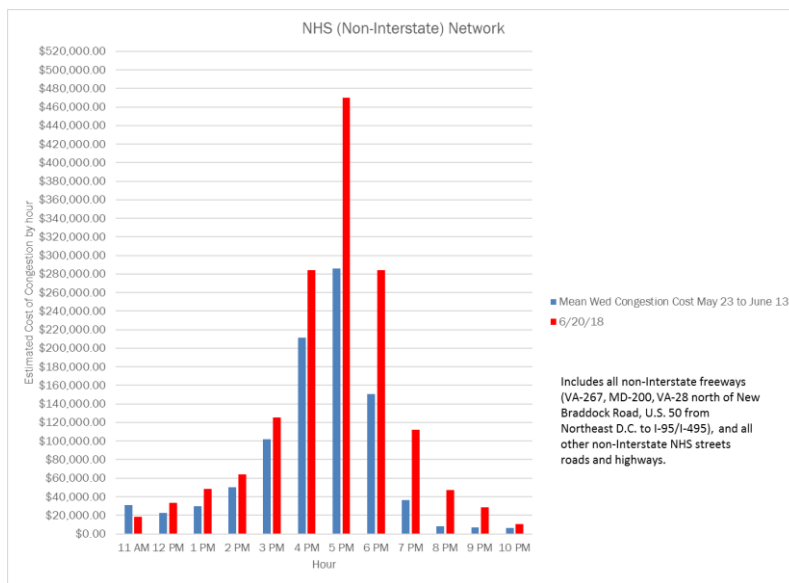


Figure 6

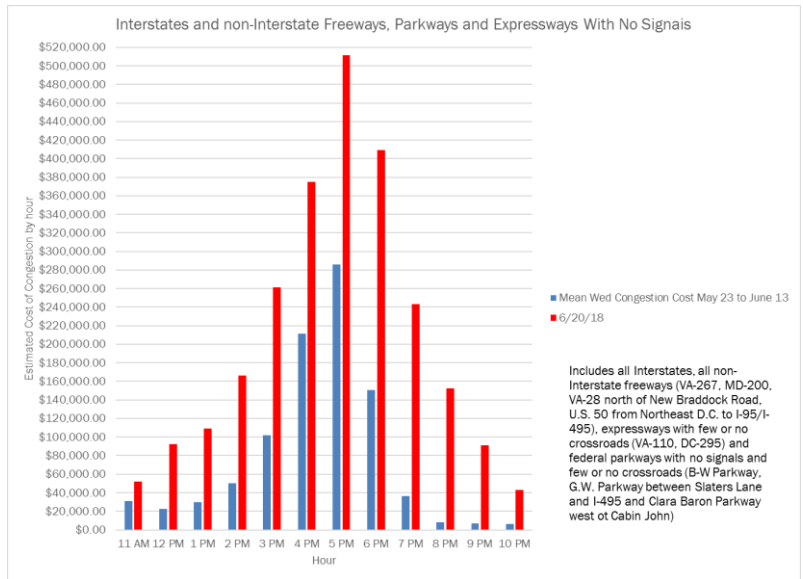


Figure 7

Specific Highway Segments That Were Impacted by The Incident

See Figure 4 for an overview map of the freeways, parkways and arterials that were determined to be impacted by the incident.

About 50 segments of the regional highway incidents were examined to assess if there was impact from the incident on the Woodrow Wilson Bridge. Only those segments with significant impact from the incident are included here.

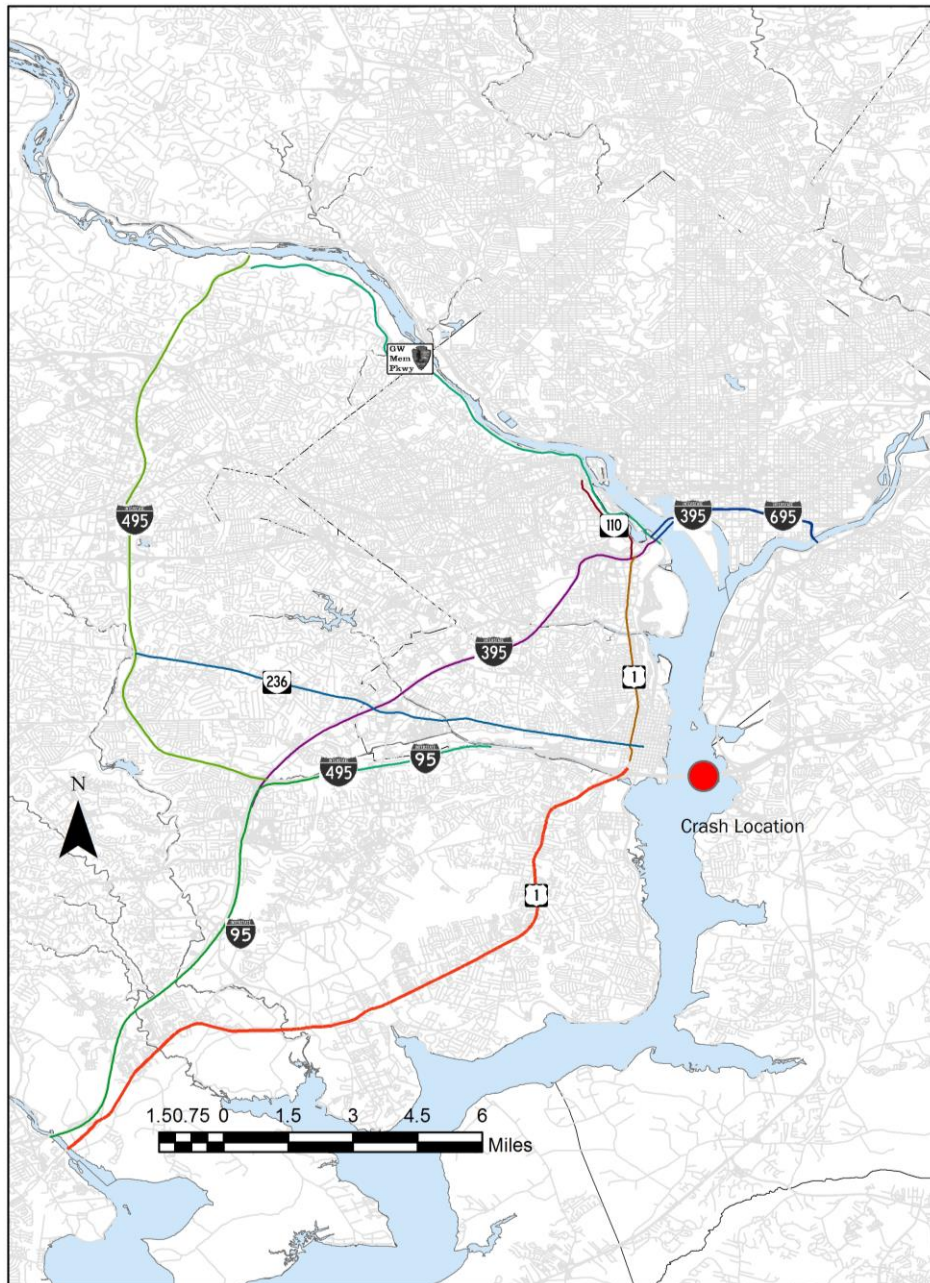


Figure 8

District of Columbia

The Southeast/Southwest Freeway (part of I-395 in D.C.; and all of I-695 in the District) showed apparent impacts in both directions during the incident. In the westbound direction from the Anacostia River to the Potomac River, congestion costs averaged about \$30,000 on the four Wednesdays before June 20. On June 20, the westbound cost of congestion increased to about \$80,000 (Figure 5).

In the eastbound direction, estimated cost of congestion was about \$60,000 for the previous Wednesdays but increased by about \$80,000 on the day of the incident to about \$140,000 (Figure 6). Since the incident on the Wilson Bridge was on the eastbound side, it makes sense that the impacts on the Southeast/Southwest Freeway were more significant on the eastbound side.

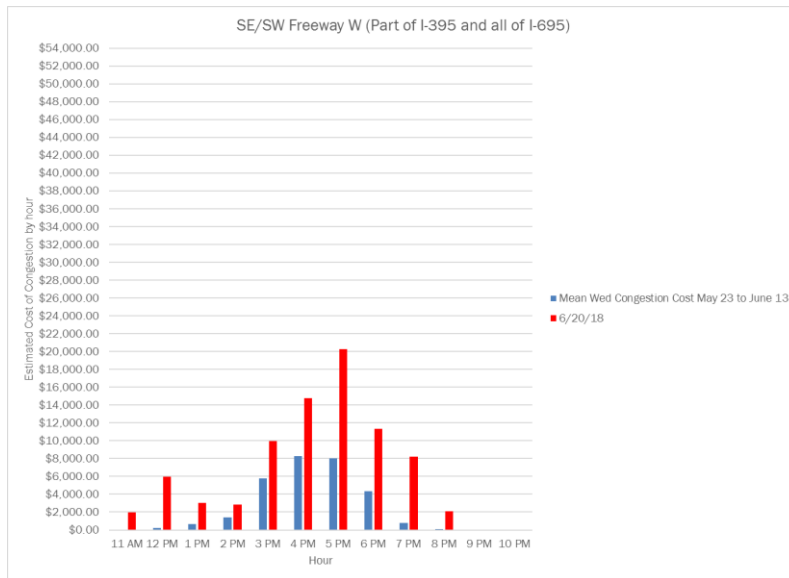


Figure 9

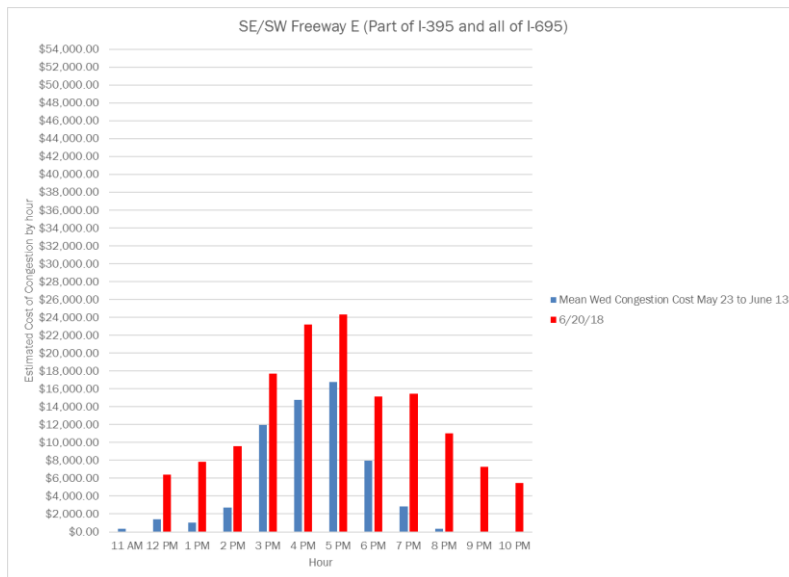


Figure 10

Virginia

I-495/I-95 part of Capital Beltway

The worst impacts were on the Outer Loop of the Beltway from the Springfield Interchange leading up to the scene of the incident on the Wilson Bridge. Average cost of congestion here was about \$60,000 for the previous Wednesdays but increased by about \$370,000 to about \$430,000 the day of the incident, in some cases over \$50,000 *per hour* (Figure 7). Congestion costs had two peaks along this section of the system, in the 2:00 PM and 7:00 PM hours.

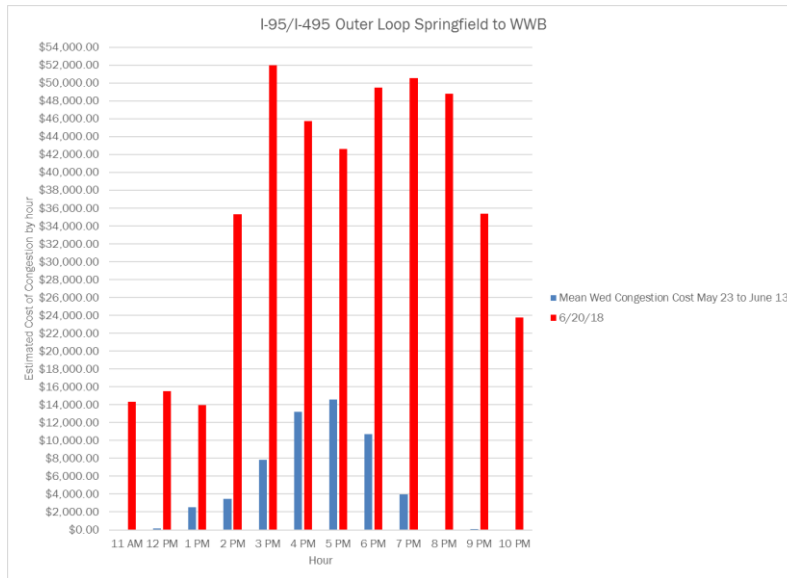


Figure 11

I-395 northbound in Virginia was also impacted (some of this congestion carried over into D.C. onto the Southwest/Southeast Freeway). Additional congestion cost was estimated at about \$250,000 (Figure 8).

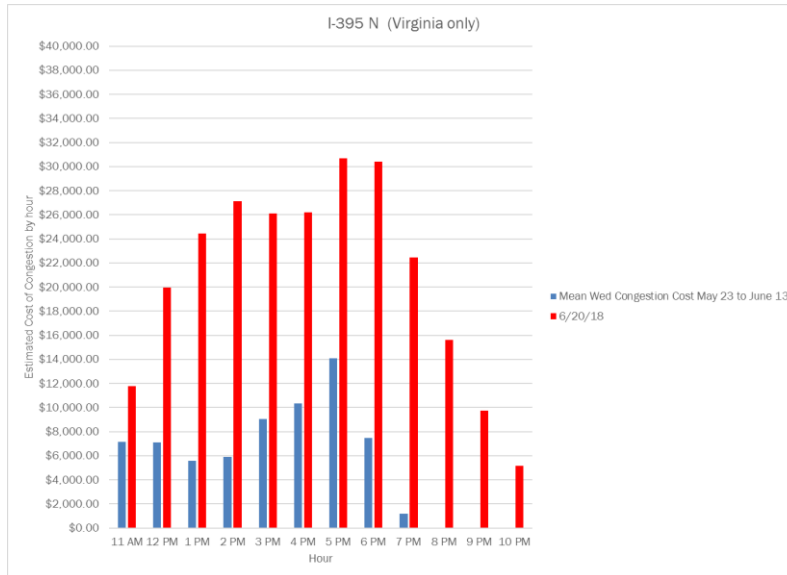


Figure 12

The Inner Loop of I-495 from Springfield to the American Legion Bridge was also impacted, though not as severely as the Outer Loop approaching the bridge in Virginia, with an added congestion cost of about \$100,000 (Figure 9).

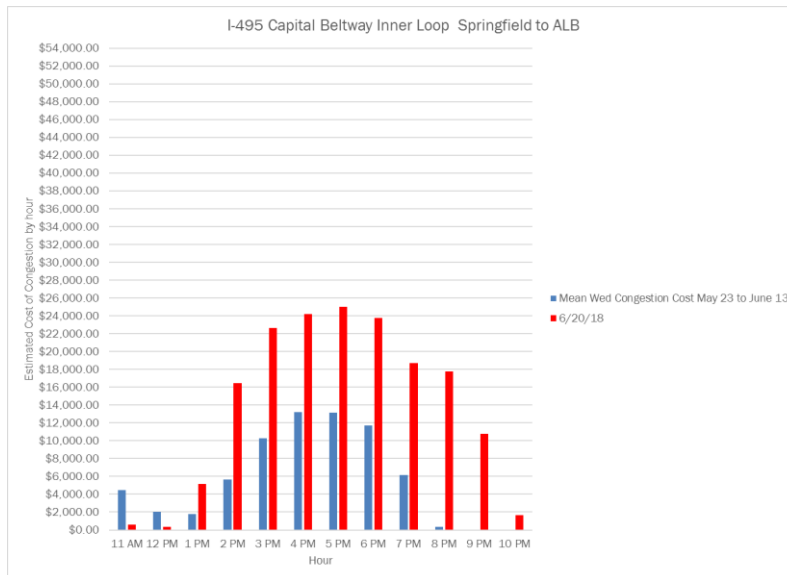


Figure 13

There were impacts on the southbound side of the George Washington Memorial Parkway between I-495 and I-395 as well as nearby southbound VA-110 (Figures 8 and 9 respectively). Staff believes this may be related to the congestion on northbound I-395 and the eastbound Southeast/Southwest Freeway discussed above (Figures 9 and 10).

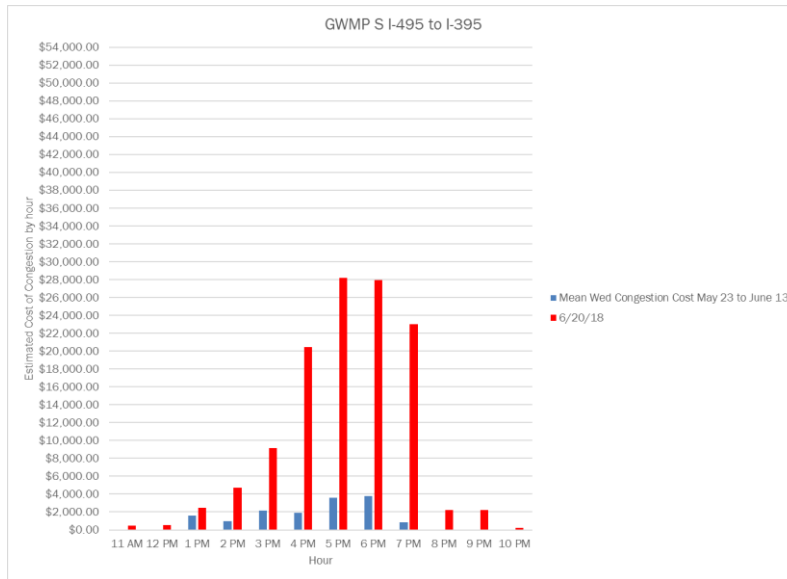


Figure 14

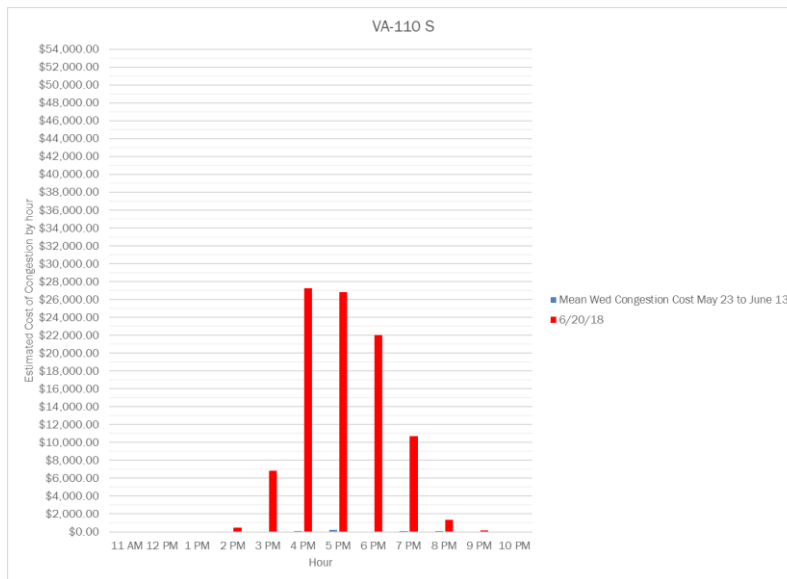


Figure 15

I-95 northbound in Fairfax County (Occoquan River to Springfield) was impacted early in the afternoon and again in the late afternoon early evening, with the highest congestion costs coming in two peaks, similar to the Outer Loop of I-95/I-495 approaching the scene of the incident but not elsewhere (Figure 12).

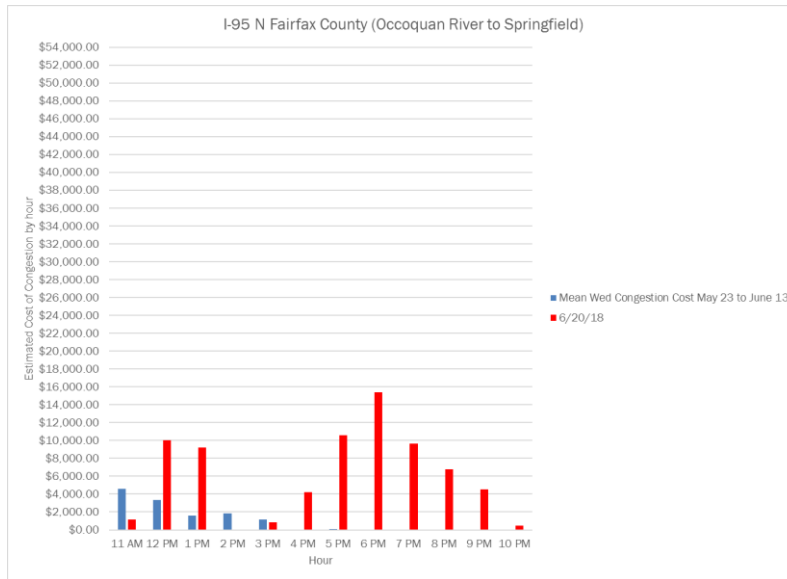


Figure 16

U.S. 1 was also impacted – north of the I-95/I-495 interchange, there was an increase in congestion cost for southbound traffic; and south of the I-95/I-495 interchange for northbound U.S. 1 traffic (Figures 13 and 14).

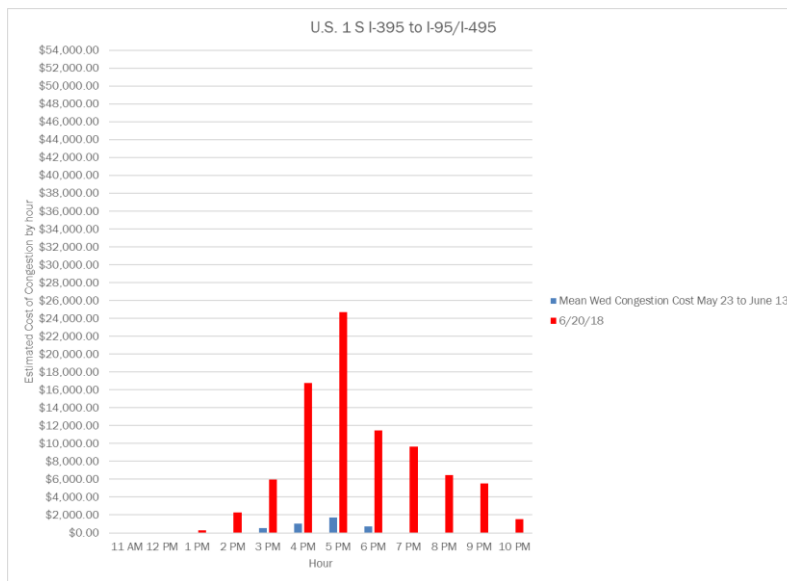


Figure 17

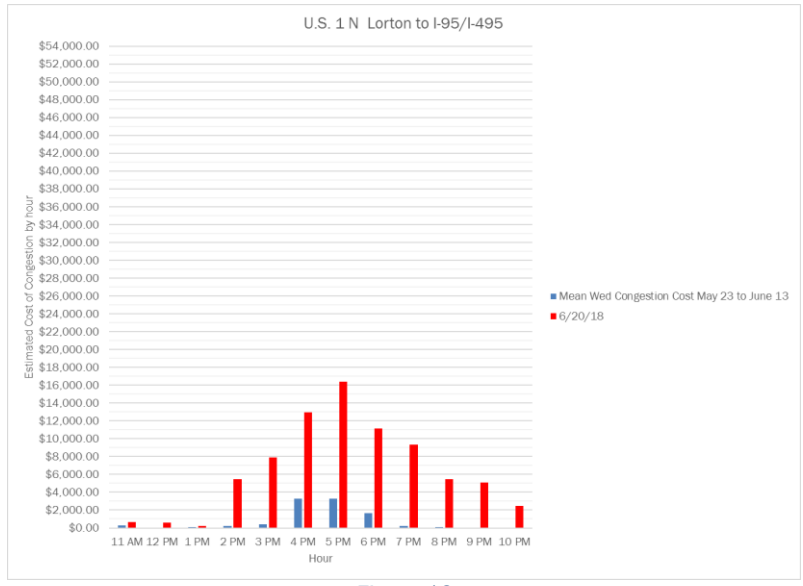


Figure 18

VA-236 (Duke Street in Alexandria and Little River Turnpike in Fairfax County) was impacted, especially in the 4:00 PM and 5:00 PM hours eastbound (Figure 15).

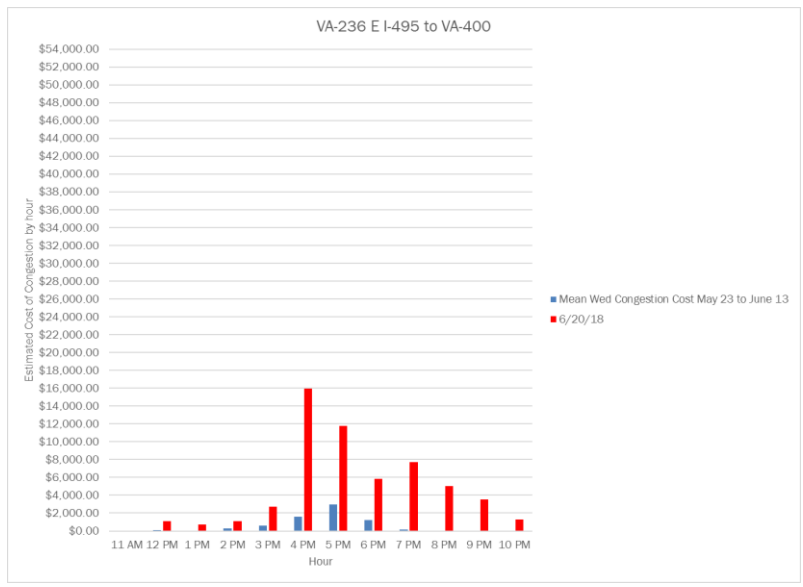


Figure 19



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777 North Capitol Street NE, Suite 300
Washington, DC 20002

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