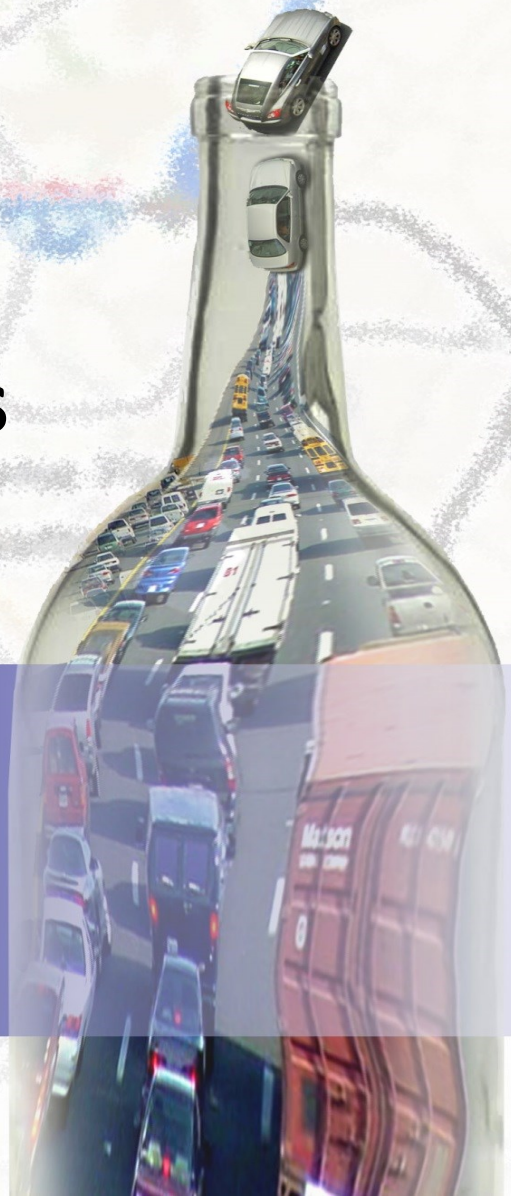
Baltimore Metropolitan Council

Quarterly Congestion Analysis Report for the Baltimore Region

Top 10 Bottleneck Locations



4th Quarter 2015

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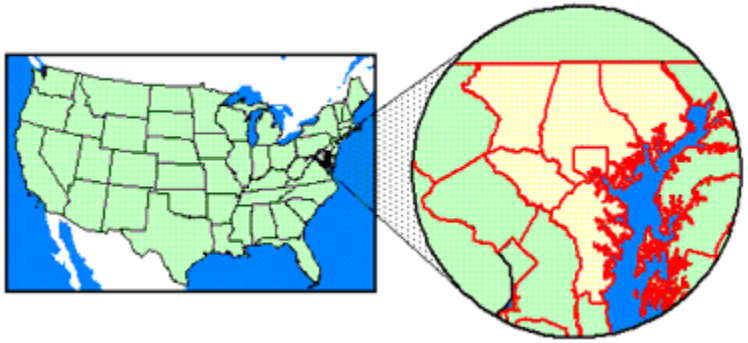
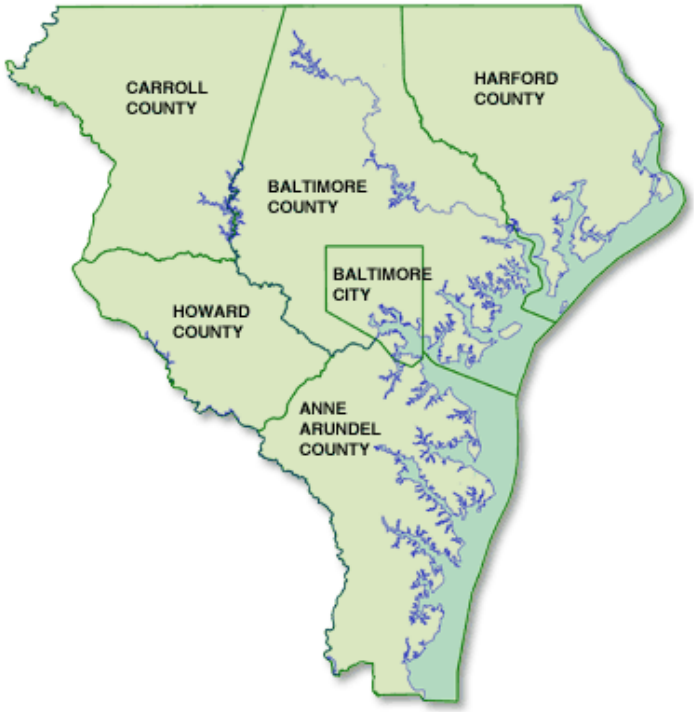
About the Region

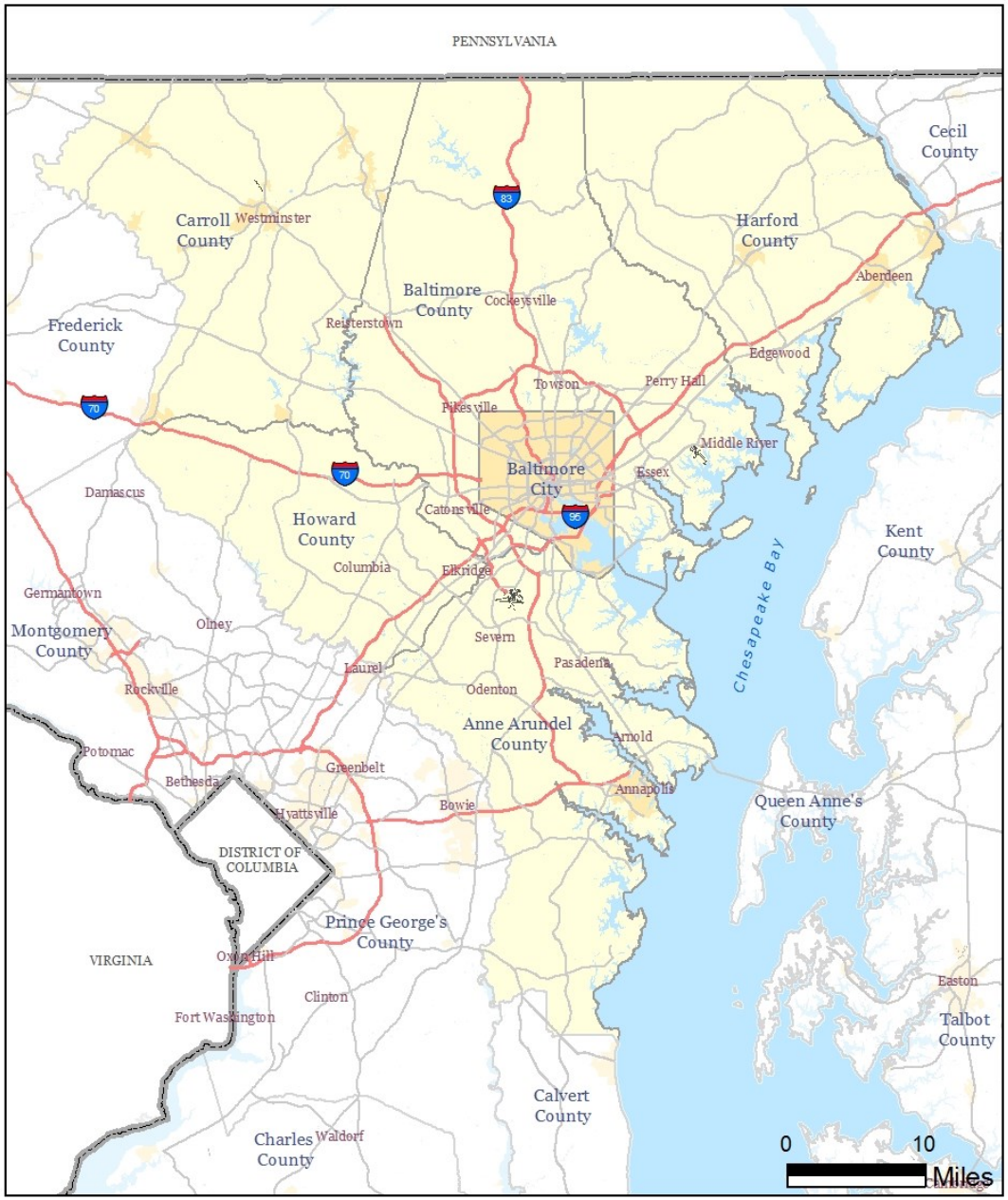
Located in the heart of the Mid-Atlantic on the east coast, the Baltimore region includes:

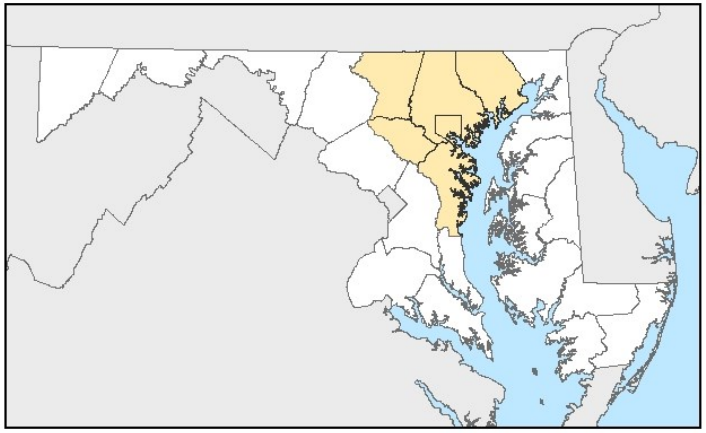




The Baltimore region is the nation's 19th largest market, with over 2.5 million people. The market also ranks among the top 20 in the country in the number of households, total effective buying income and retail sales.

Baltimore Metropolitan Region



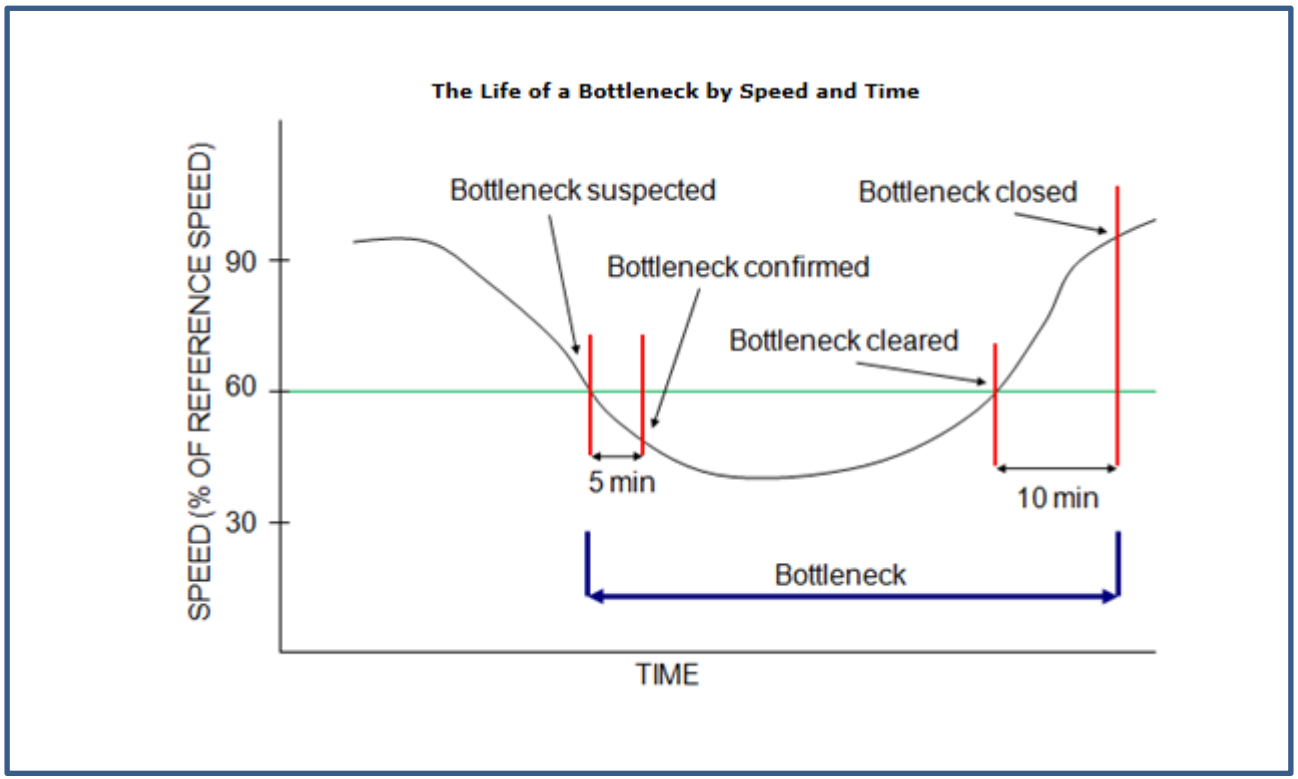


Prepared by
Transportation Planning Division
Projected Coordinate System: NAD 1983 State Plane (ft)
Data Source: BMC, © NAVTEQ 2013, TIGER/Line®, MTA
Printed - July 2013

How are bottleneck conditions tracked?

If the reported speed falls below 60% of the reference, the road segment is flagged as a potential bottleneck

Bottleneck conditions are determined by comparing the current reported speed to the reference speed for each segment of road. Reference speed values are provided by INRIX for each segment, and represent the 85th percentile observed speed for all time periods, with a maximum value of 65 mph. If the reported speed falls below 60% of the reference, the road segment is flagged as a potential bottleneck. If the reported speed stays below 60% for five minutes, the segment is confirmed as a bottleneck location. Adjacent road segments meeting this condition are joined together to form the bottleneck queue. When reported speeds on every segment associated with a bottleneck queue have returned to values greater than 60% of their reference values and remained that way for 10 minutes, the bottleneck is considered cleared. Bottlenecks whose total queue length, determined by adding the length of each road segment associated with the bottleneck is less than 0.3 miles are ignored. Queues may originate outside the Baltimore region but are reported on if any portion extends into the region.



Bottleneck Ranking Incident Icons

When showing event/incident icons on some of the graphs in the Bottleneck Ranking tool a minimalist approach has been taken. In order to reduce clutter and confusion on the graphs, icons have been simplified down to single shape and color. Each represents the following:

Red — Severe events and incidents

- Emergency Roadwork
- Injury
- Medical Emergency

Orange — Roadwork

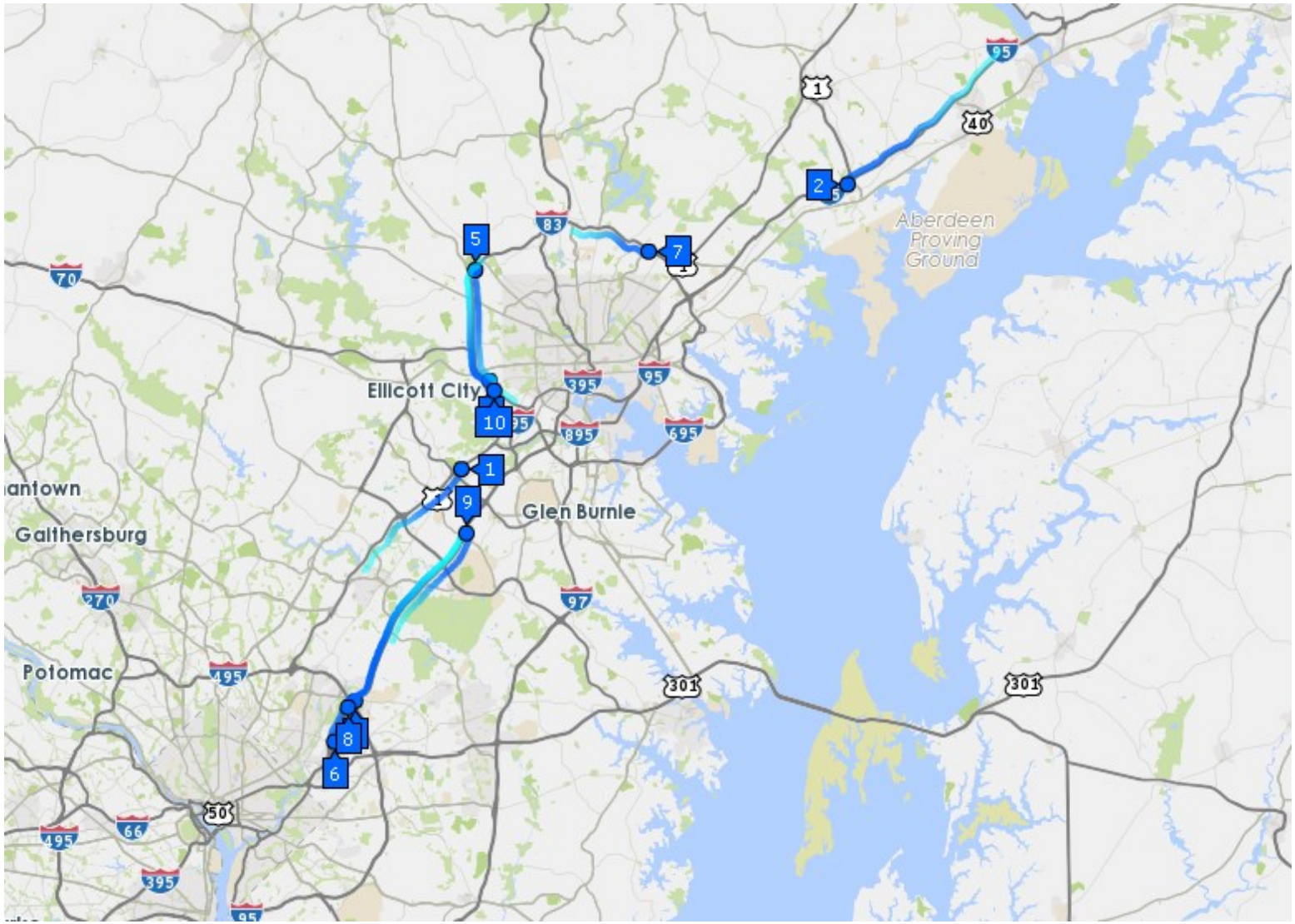
Yellow — All other events and incidents

More detailed icons may be used at times when a major incident was the cause of a bottleneck.

Incident/Event Icons

Top 10 Bottlenecks in the Baltimore Region
4th Quarter 2015

Overview Map



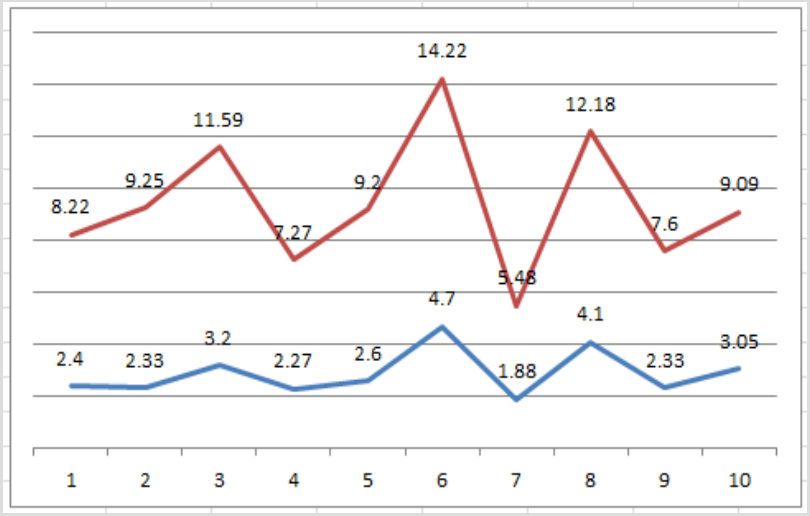
Top 10 Bottlenecks in the Baltimore Region
4th Quarter 2015

By Impact Factor

Number of Occurrences x Average Duration in Minutes x Average Length This table indicates the top 10 congested corridors in the region.

	Location	Average Duration	Average max length (miles)	Occurrences	Number of Incidents/ Events	Impact Factor
1	I-95 N @ MD-100/EXIT 43	2 h 24 m	8.22	116	161	137,375
2	I-95 S @ MD-24/EXIT 77	2 h 20 m	9.25	91	219	117,860
3	MD-295 S @ MD-193	3 h 12 m	11.59	52	103	115,736
4	I-695 CCW @ EDMONDSON AVE/EXIT 14	2 h 16 m	7.27	116	219	114,616
5	I-695 CW @ I-795/EXIT 19	2 h 36 m	9.2	77	390	110,563
6	MD-295 S @ RIVERDALE RD	4 h 42 m	14.22	27	151	108,271
7	I-695 CW @ MD-41/PERRING PKWY/EXIT 30	1 h 53 m	5.48	169	163	104,728
8	MD-295 S @ I-495/I-95	4 h 6 m	12.18	32	135	95,880
9	MD-295 N @ MD-175	2 h 20 m	7.6	83	112	88,269
10	I-695 CCW @ MD-144/FREDERICK RD/EXIT 13	3 h 3 m	9.09	50	290	83,216

CW = Clockwise CCW = Counterclockwise



Top 10 Bottlenecks in the Baltimore Region

By Impact Factor
(Number of Occurrences
x Average Duration in Minutes
x Average Length)

4th Quarter 2015

Average max length (miles)

Average duration (hours)

Top 10 Bottlenecks in the Baltimore Region
4th Quarter 2015

By Average Duration - This table indicates the longest lasting bottlenecks

	Location	Average Duration	Average max length (miles)	Occurrences	Number of Incidents/ Events	Impact Factor
1	MD-295 S @ RIVERDALE RD	4 h 42 m	14.22	27	151	108,271
2	MD-295 S @ MD-450	4 h 37 m	16.58	10	189	45,921
3	US-50 E @ MD-331/DOVER RD	4 h 8 m	11.57	3	9	8,611
4	MD-295 S @ I-495/I-95	4 h 6 m	12.18	32	135	95,880
5	MD-32 W @ TEN OAKS RD	3 h 35 m	5.75	6	4	7,415
6	MD-295 S @ MD-193	3 h 12 m	11.59	52	103	115,736
7	I-895 S @ MD-2/POTEE ST/EXIT 7	3 h 7 m	2.91	22	215	11,964
8	I-97 S @ MD-176/MD-162/EXIT 15	3 h 5 m	1.62	11	75	3,303
9	MD-295 N @ US-40/MULBERRY ST/FRANKLIN ST	3 h 4 m	2.41	39	3	17,314
10	I-695 CCW @ MD-144/FREDERICK RD/EXIT 13	3 h 3 m	9.09	50	290	83,216

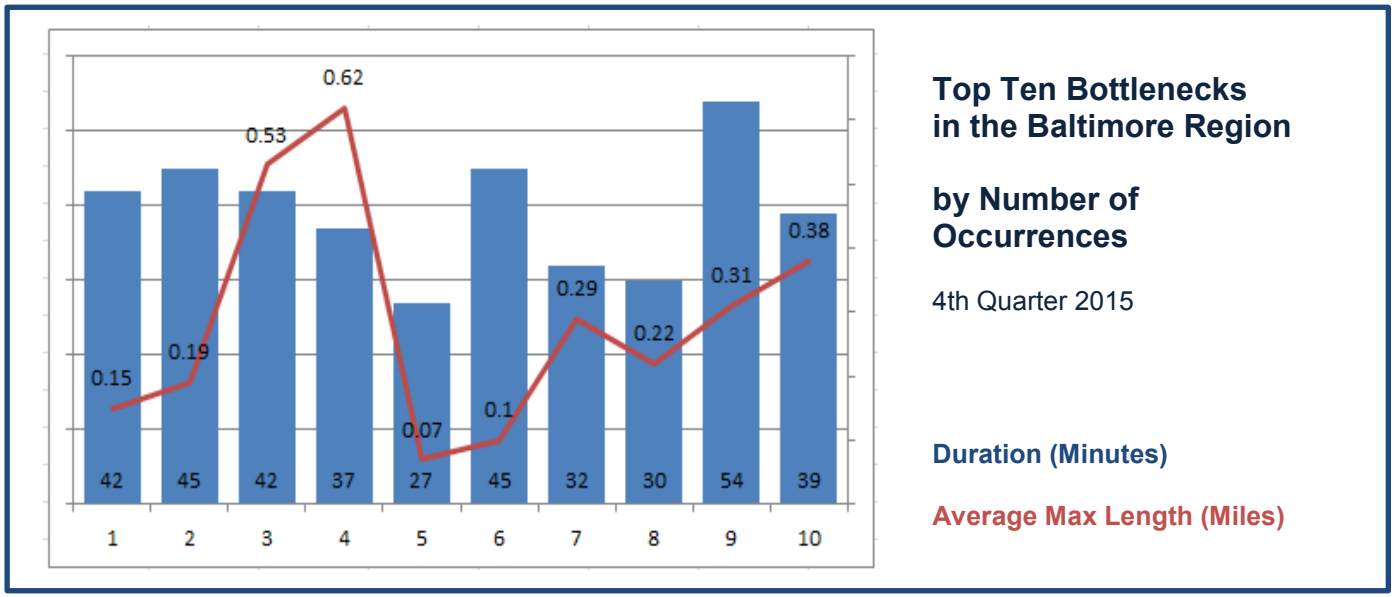
By Average Length - This table indicates the longest bottlenecks by distance.

	Location	Average Duration	Average max length (miles)	Occurrences	Number of Incidents/ Events	Impact Factor
1	MD-295 S @ MD-450	4 h 37 m	16.58	10	189	45,921
2	MD-295 S @ EASTERN AVE	2 h 31 m	15.14	2	175	4,571
3	MD-295 S @ RIVERDALE RD	4 h 42 m	14.22	27	151	108,271
4	MD-295 S @ I-495/I-95	4 h 6 m	12.18	32	135	95,880
5	US-50 E @ CHAPEL RD	1 h 27 m	11.6	1	10	1,009
6	MD-295 S @ MD-193	3 h 12 m	11.59	52	103	115,736
7	US-50 E @ MD-331/DOVER RD	4 h 8 m	11.57	3	9	8,611
8	MD-32 W @ I-70/US-40	2 h 48 m	10.21	2	11	3,432
9	I-95 S @ MD-24/EXIT 77	2 h 20 m	9.25	91	219	117,860
10	I-695 CW @ I-795/EXIT 19	2 h 36 m	9.2	77	390	110,563

Top 10 Bottlenecks in the Baltimore Region
4th Quarter 2015

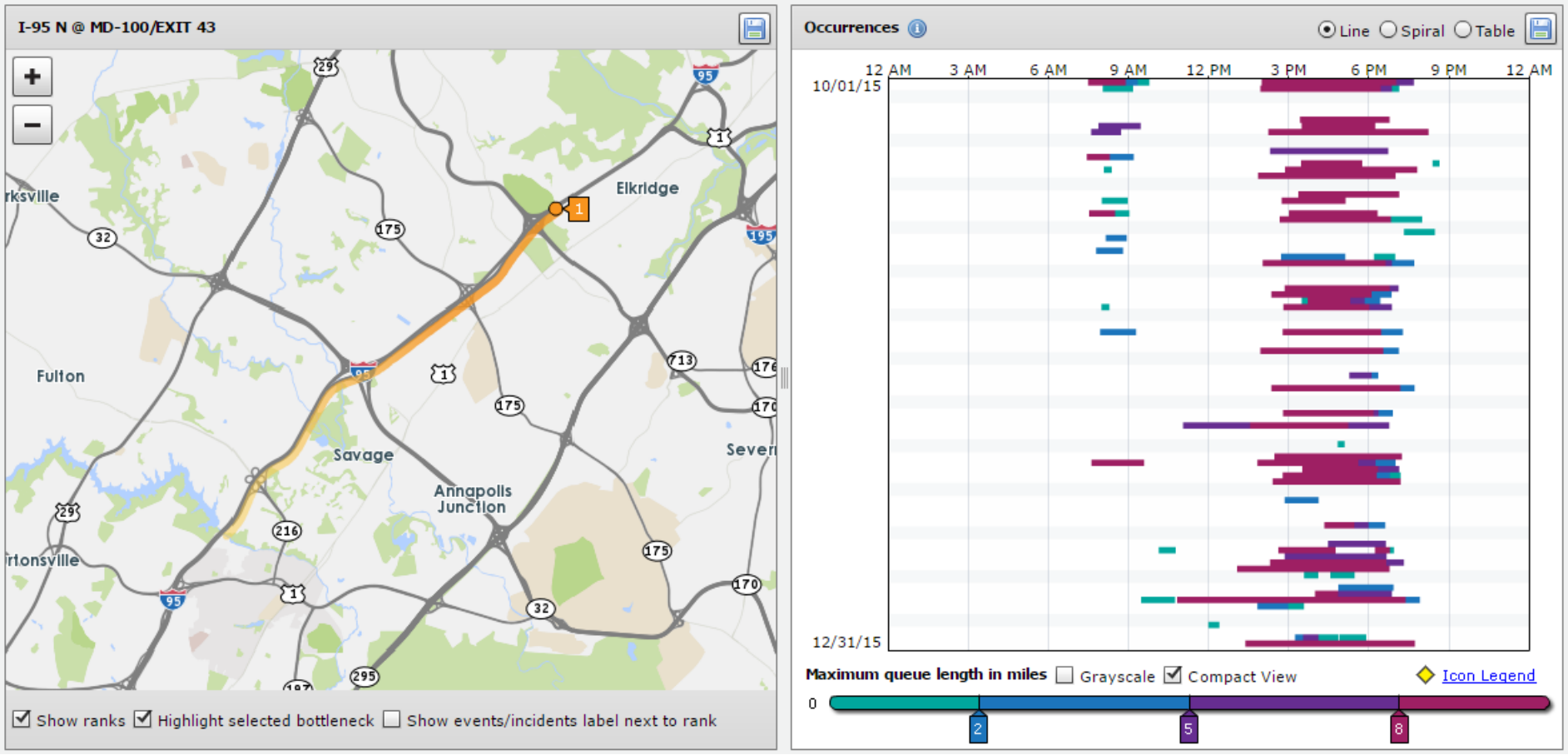
By Number of Occurrences - This table indicates the most frequently occurring bottlenecks.

	Location	Average Duration	Average max length (miles)	Occurrences	Number of Incidents/ Events	Impact Factor
1	I-83 S @ FAYETTE ST/EXIT 1	42 m	0.15	1342	0	8,531
2	I-895 N @ CHILDS ST/EXIT 9	45 m	0.19	1266	71	10,820
3	I-95 S @ FORT MCHENRY TUNNEL TOLL PLAZA	42 m	0.53	1116	20	24,982
4	I-95 N @ KEITH AVE/EXIT 56	37 m	0.62	1011	48	23,088
5	US-50 W @ MD-404/QUEEN ANNE HWY	27 m	0.07	984	10	1,903
6	I-895 S @ HARBOR TUNNEL TOLL PLAZA	45 m	0.1	848	38	3,682
7	I-95 N @ FORT MCHENRY TUNNEL TOLL PLAZA	32 m	0.29	831	204	7,828
8	MD-100 E @ MD-607/MAGOTHY BRIDGE RD	30 m	0.22	731	0	4,780
9	MD-295 N @ BAYARD ST	54 m	0.31	708	2	11,737
10	MD-100 W @ MD-607/MAGOTHY BRIDGE RD	39 m	0.38	628	0	9,338



#1 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2015

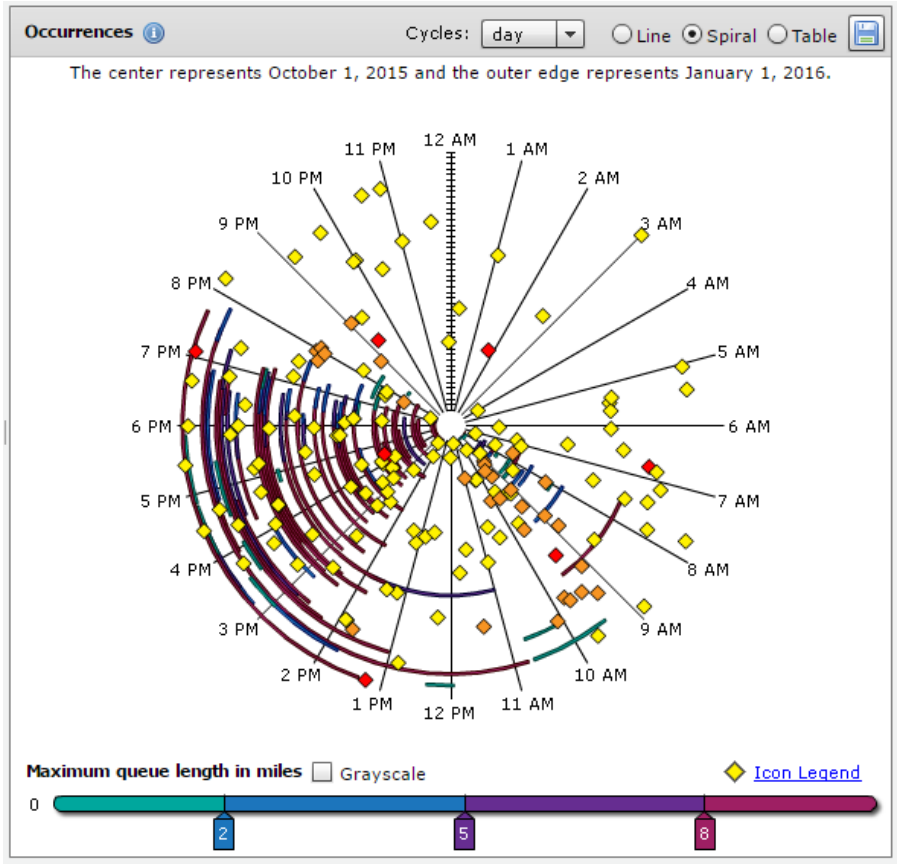
Location	Average Duration	Average max length (miles)	Occurrences	All Events/ Incidents	*Impact Factor
I-95 N @ MD-100/Exit 43	2 h 24 m	8.22	116	1610	137,375



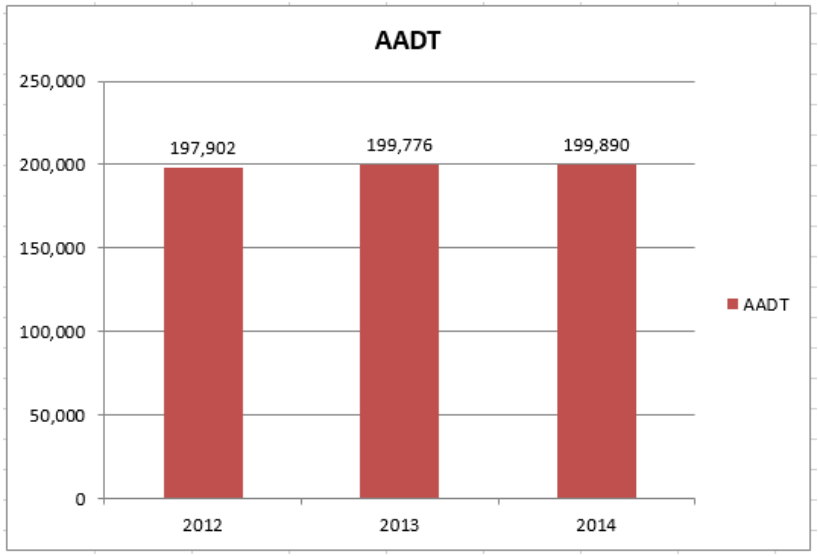
Notes: Congestion in the afternoon rush hour. Contributing factors include traffic entering at MD-175, weaving to exit at MD-100, and the half-mile uphill grade midway between MD-175 and MD-100.

#1 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2015

Location	Average Duration	Average max length (miles)	Occurrences	All Events/ Incidents	*Impact Factor
I-95 N @ MD-100/Exit 43	2 h 24 m	8.22	116	161	137,375

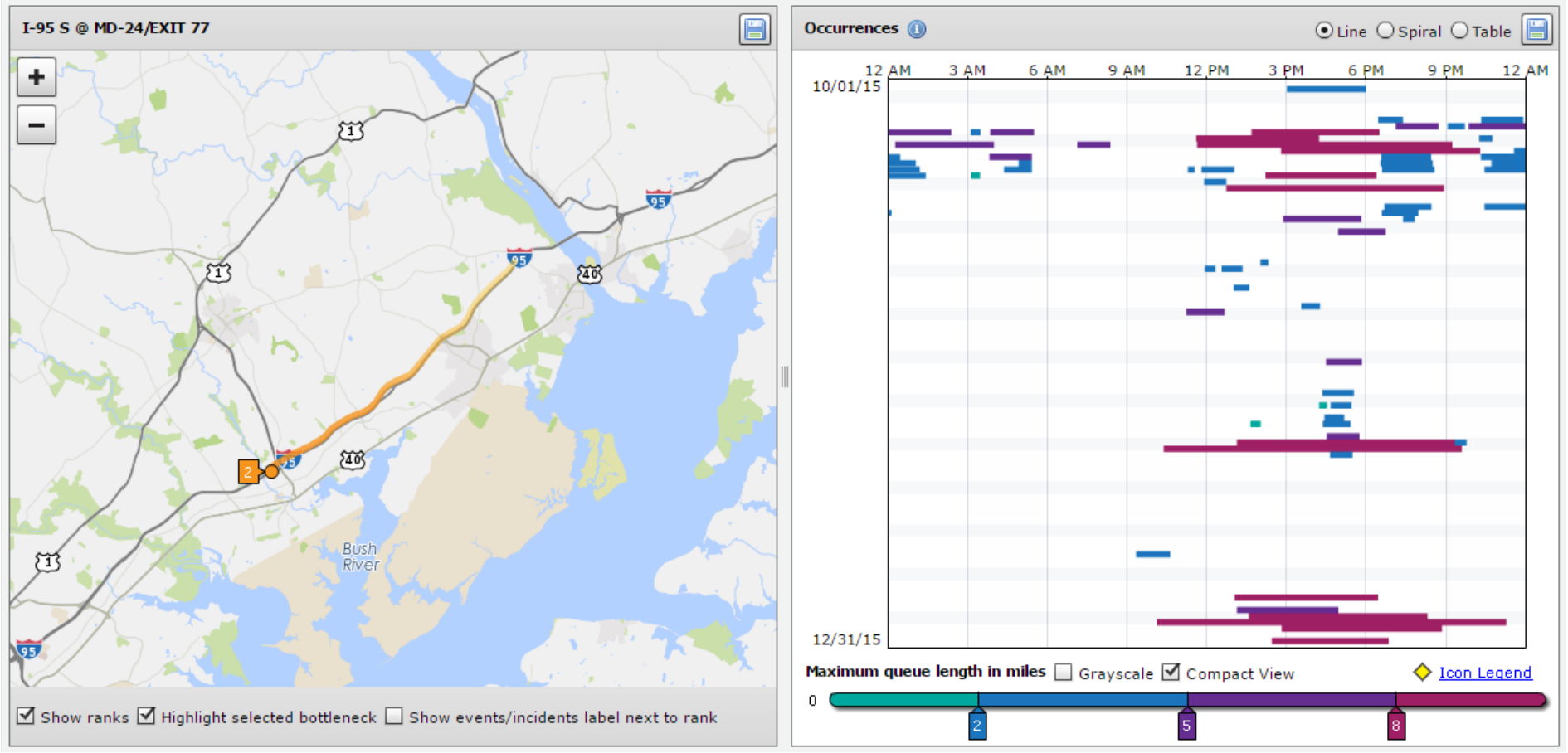


Traffic Volumes – Average Annual Daily Traffic (AADT)
STATION_DESCRIPTION IS 95 South of MD 103 (ATR#39)



#2 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2015

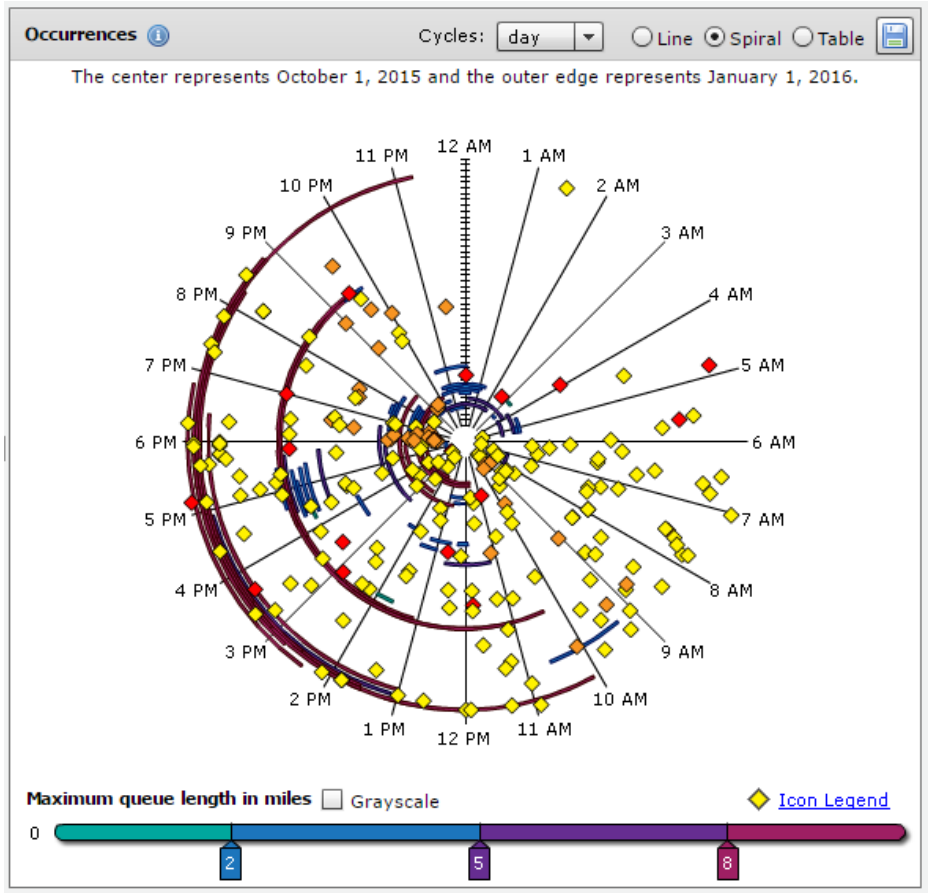
Location	Average Duration	Average max length (miles)	Occurrences	All Events/ Incidents	*Impact Factor
I-95 S @ MD-24/Exit 77	2 h 20 m	9.25	91	219	117,860



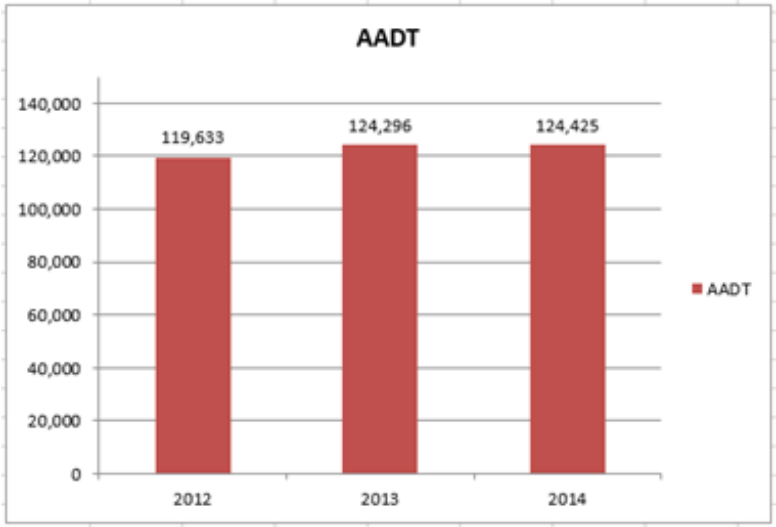
Notes: Right shoulder closures southbound on I-95 past Exit 77 B-A M.M. 76.5 to 75.5 contributed to this bottleneck

#2 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2015

Location	Average Duration	Average max length (miles)	Occurrences	All Events/ Incidents	*Impact Factor
I-95 S @ MD-24/Exit 77	2 h 20 m	9.25	91	219	117,860

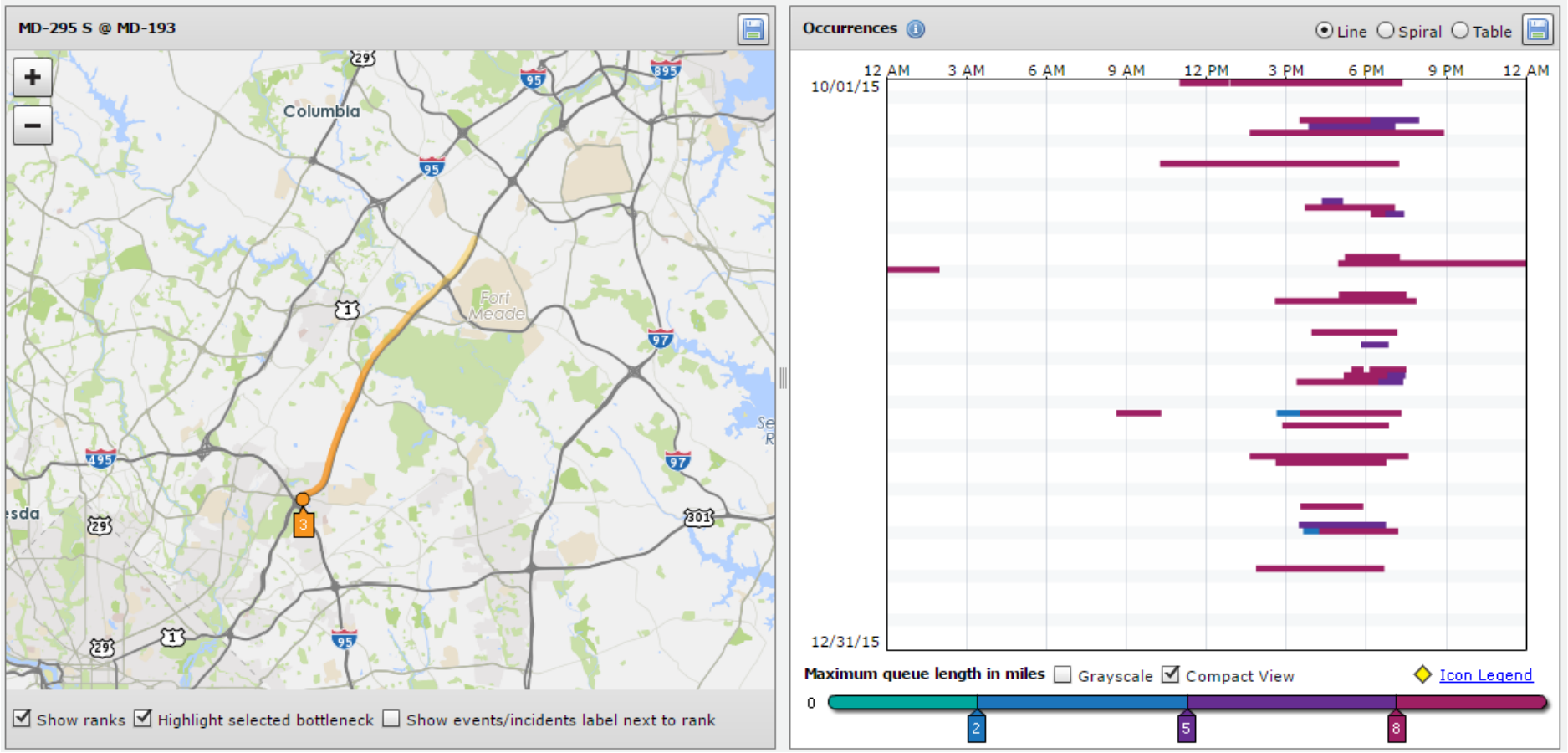


Traffic Volumes – Average Annual Daily Traffic (AADT)
STATION_DESCRIPTION IS95-.50 MI N OF MD24



#3 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2015

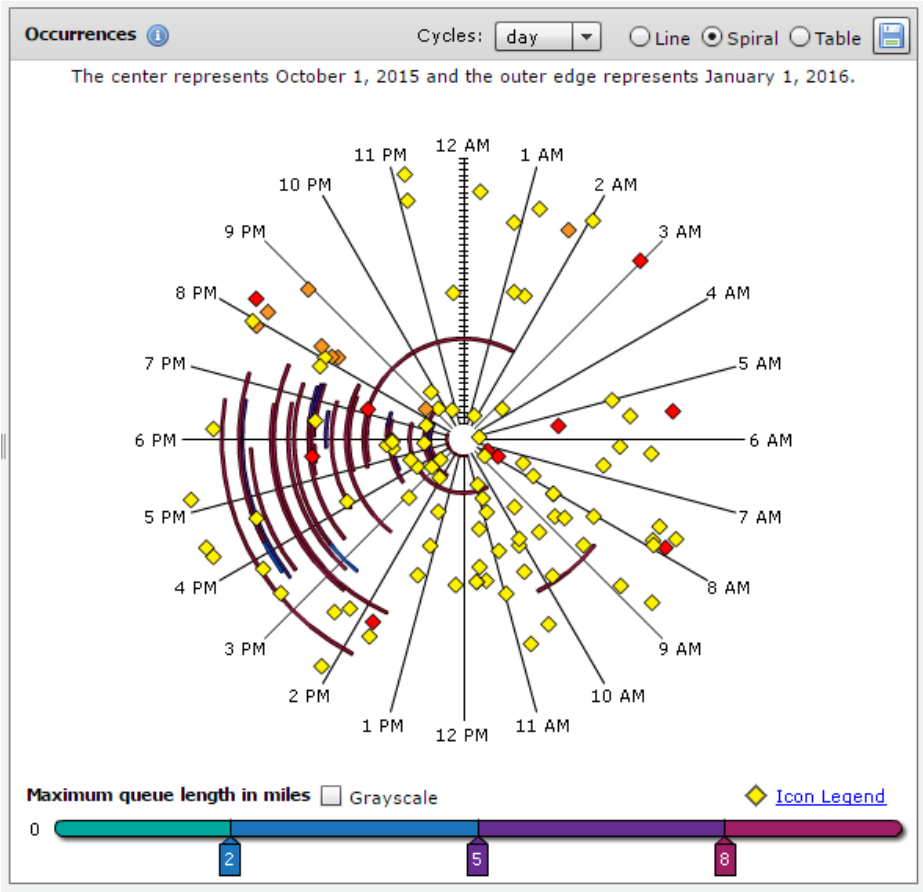
Location	Average Duration	Average max length (miles)	Occurrences	All Events/ Incidents	*Impact Factor
MD-295 S @ MD-193	3 h 12 m	11.59	52	103	115,736



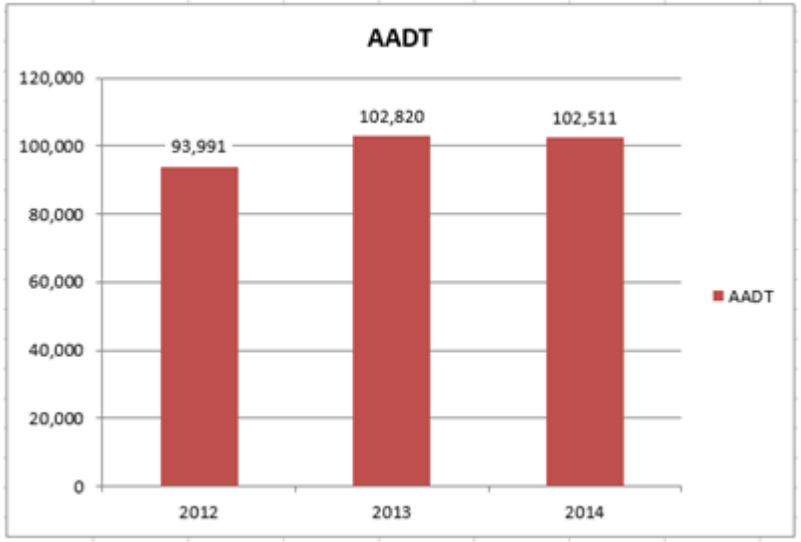
Notes: MD-295 merge with the Capital Beltway I-495. Congestion seen in the afternoon peak period sometimes extends into the southern portion of the Baltimore region near the Fort Meade area.

#3 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2015

Location	Average Duration	Average max length (miles)	Occurrences	All Events/ Incidents	*Impact Factor
MD-295 S @MD-193	3 h 12 m	11.59	52	103	115,736

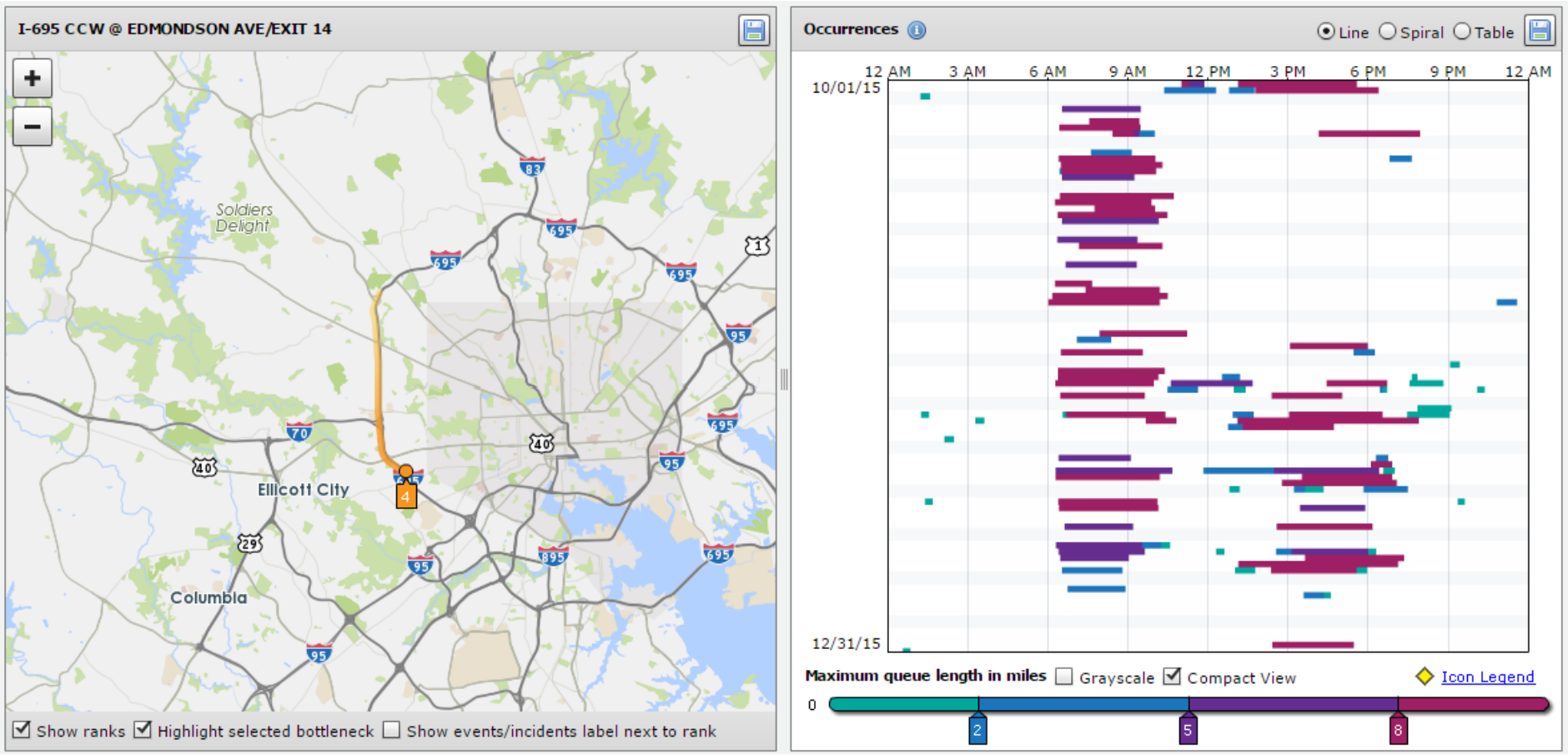


Traffic Volumes – Average Annual Daily Traffic (AADT)
STATION_DESCRIPTION MD295-.50 MI S OF MD32



#4 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2015

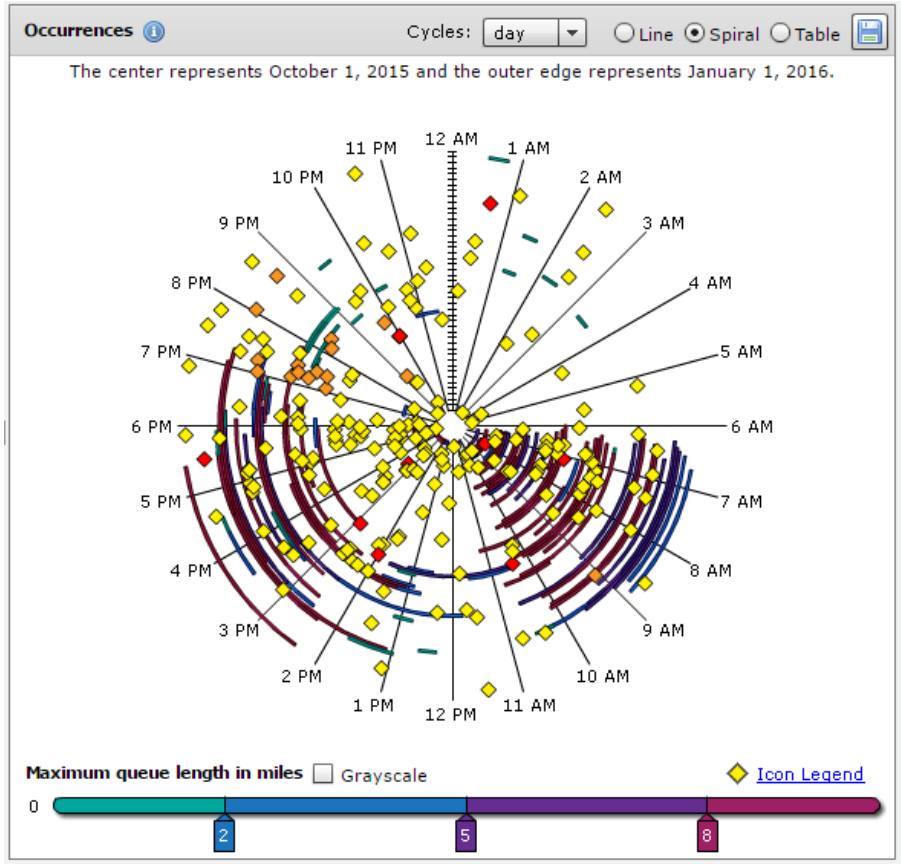
Location	Average Duration	Average max length (miles)	Occurrences	All Events/ Incidents	*Impact Factor
I-695 CCW @ Edmondson Ave/Exit 14	2 h 16 m	7.27	116	219	114,616



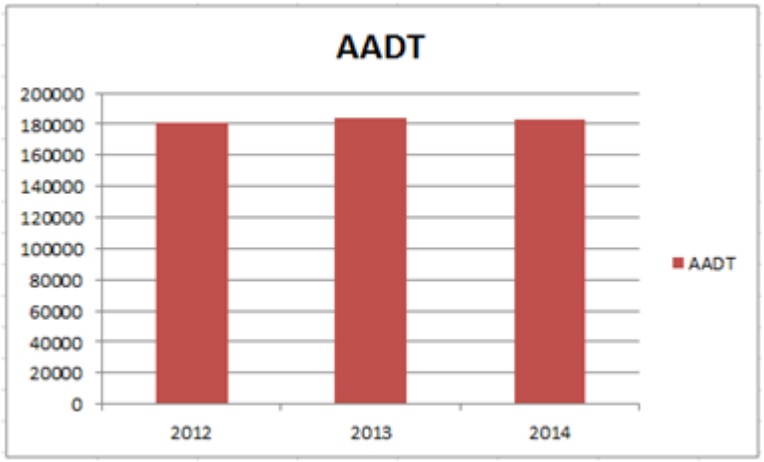
***Notes:** Longstanding bottleneck on the outer loop of the beltway primarily during the morning rush. High traffic volume area. Delays extend back as far as MD-26/Liberty Rd. Also contributing to congestion in the area is a beltway widening project which began in February. "The plan is for crews to add a fourth lane to the outer loop and widen the median in anticipation of a possible fifth lane. The bridges over Ingleside and Edmondson avenues will be replaced to increase the clearance height." (Source: The Baltimore Sun 2/23/15)*

#4 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2015

Location	Average Duration	Average max length (miles)	Occurrences	All Events/ Incidents	*Impact Factor
I-695 CCW @ Edmondson Ave/Exit 14	2 h 16 m	7.27	116	219	114,616

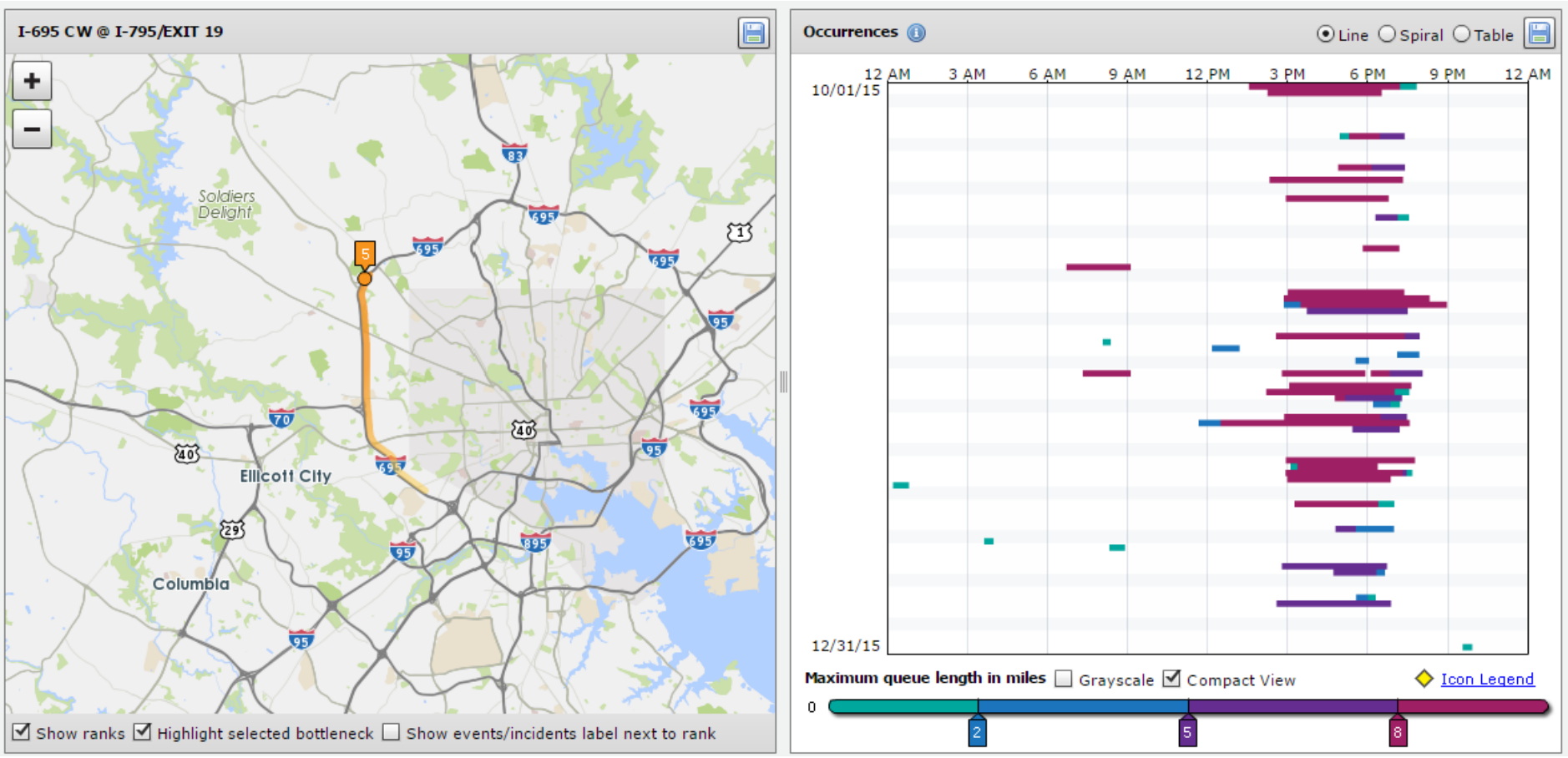


Traffic Volumes – Average Annual Daily Traffic (AADT)
STATION_DESCRIPTION IS 695 - South of Ingleside Ave (ATR#32)



#5 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2015

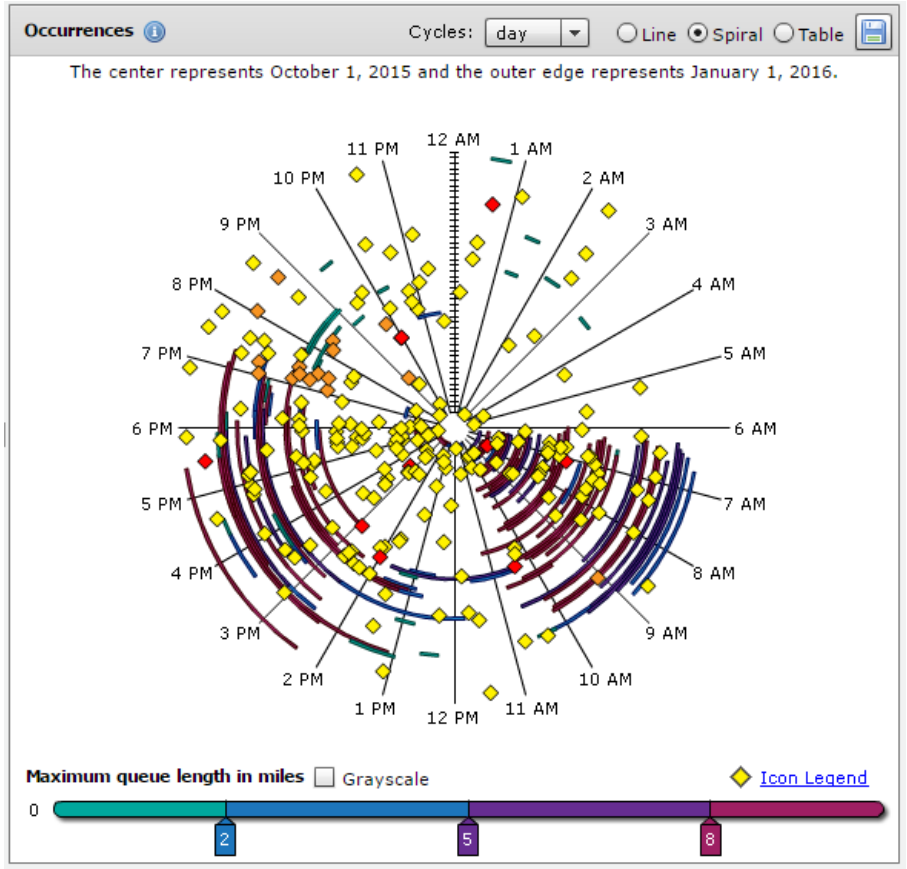
Location	Average Duration	Average max length (miles)	Occurrences	All Events/ Incidents	*Impact Factor
I-695 CW @ I-795/Exit 19	2 h 36 m	9.2	77	390	110,563



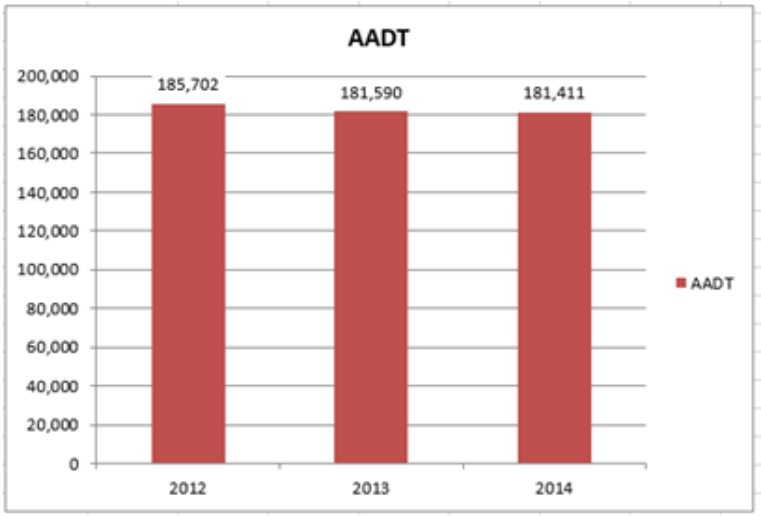
Notes: Longstanding westside beltway inner loop congestion in the afternoon.

#5 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2015

Location	Average Duration	Average max length (miles)	Occurrences	All Events/ Incidents	*Impact Factor
I-695 CW @ I-795/Exit 19	2 h 36 m	9.2	77	390	110,563

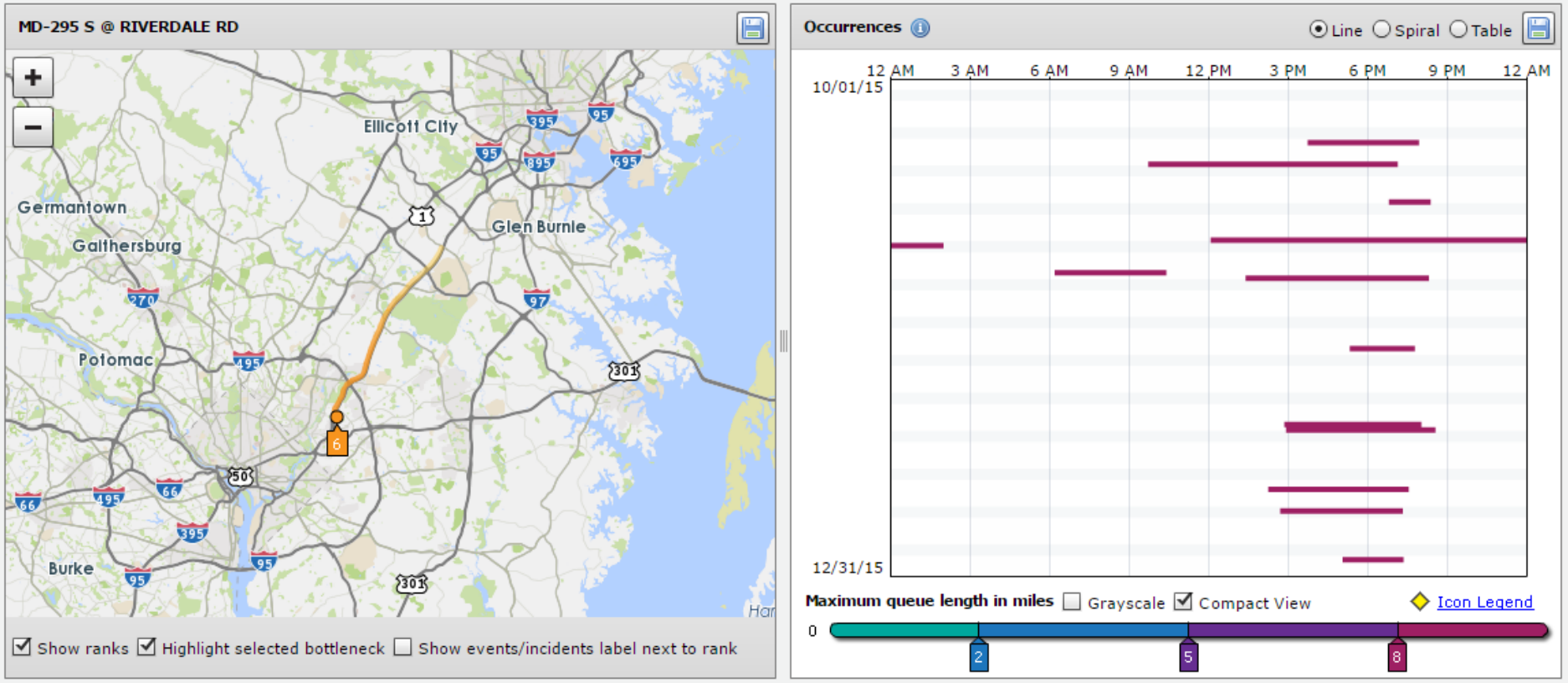


Traffic Volumes – Average Annual Daily Traffic (AADT)
STATION_DESCRIPTION IS695-.30 MI N OF IS795



#6 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2015

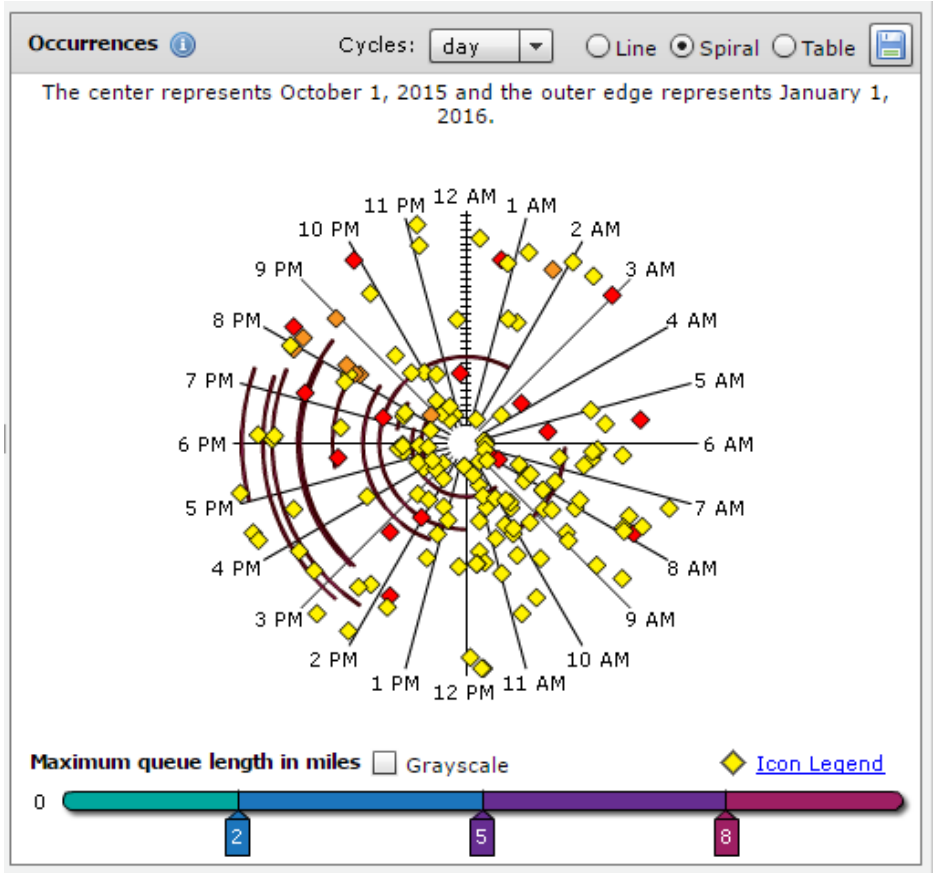
Location	Average Duration	Average max length (miles)	Occurrences	All Events/ Incidents	*Impact Factor
MD-295 S @ Riverdale Rd	4 h 42 m	14.22	27	151	108,271



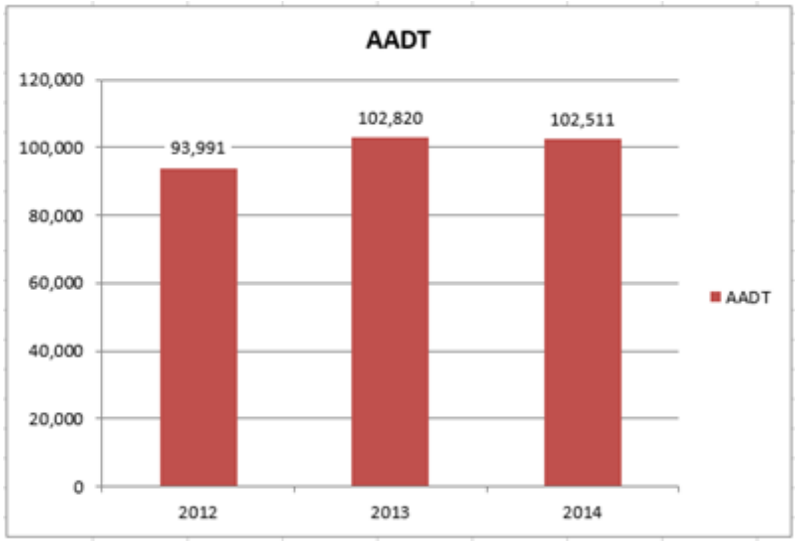
Notes: Southbound congestion extending from Riverdale Rd just barely extending into the southern portion of the Baltimore region near Fort Meade occurring during both the morning and afternoon peak periods.

#6 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2015

Location	Average Duration	Average max length (miles)	Occurrences	All Events/ Incidents	*Impact Factor
MD-295 S @ Riverdale Rd	4 h 42 m	14.22	27	151	108,271

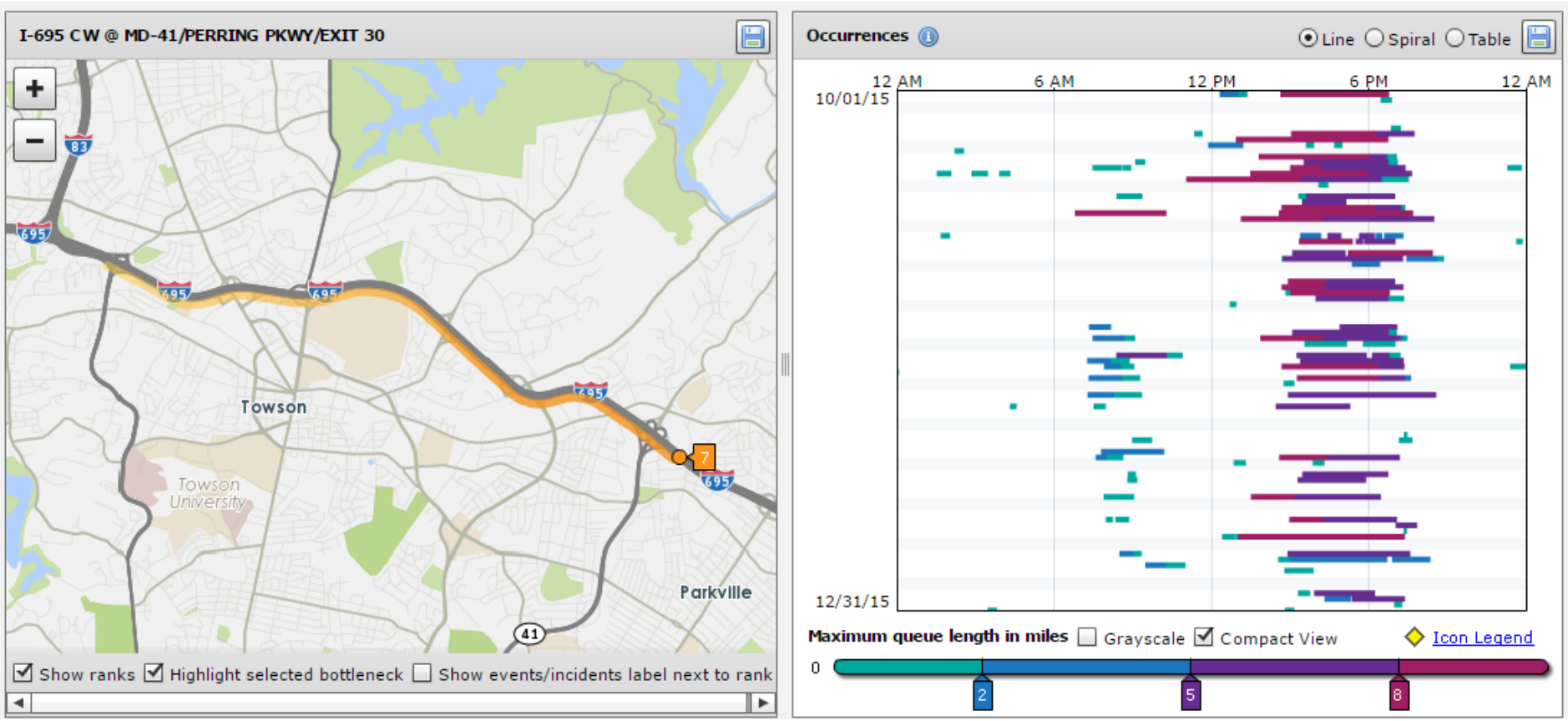


Traffic Volumes – Average Annual Daily Traffic (AADT)
STATION_DESCRIPTION MD295-.50 MI S OF MD32



#7 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2015

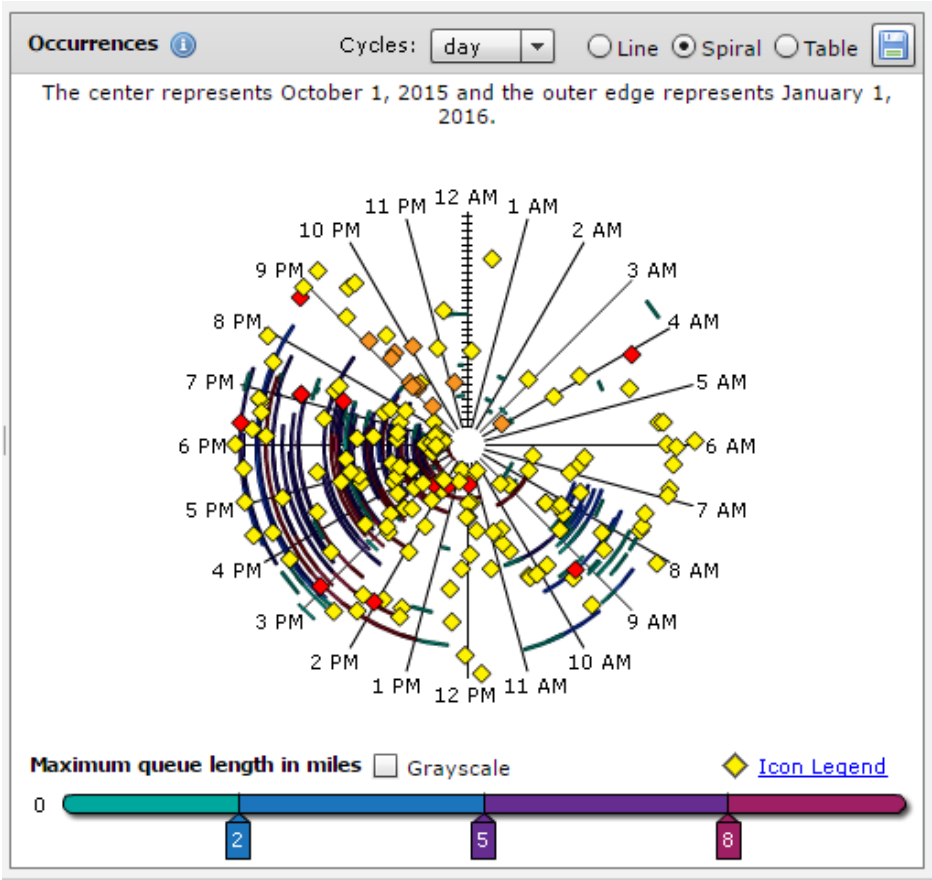
Location	Average Duration	Average max length (miles)	Occurrences	All Events/ Incidents	*Impact Factor
I-695 CW @ MD-41/Perring Pkwy/Exit 30	1 h 53 m	5.48	169	163	104,728



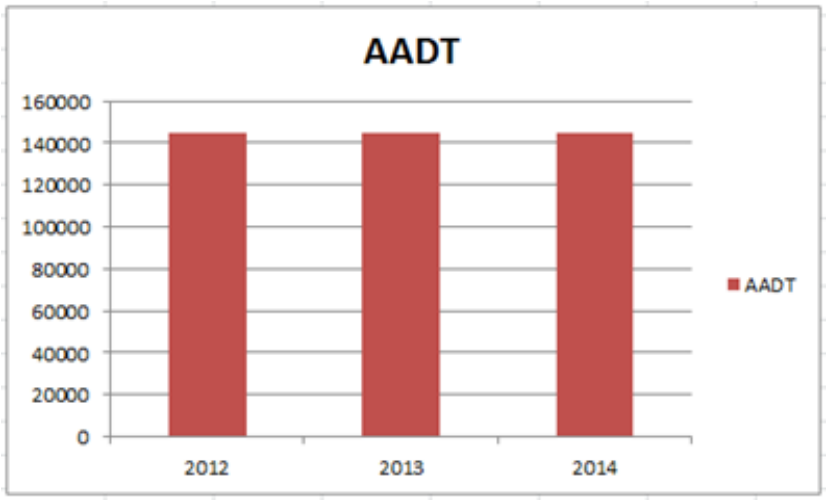
Notes: Congestion was most severe between I-83 and Providence Rd. Factors contributing to this long standing and extended congested zone: merging and weaving associated with traffic at each interchange and a lane drop (to 3 lanes) at MD-45/York Rd.

#7 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2015

Location	Average Duration	Average max length (miles)	Occurrences	All Events/ Incidents	*Impact Factor
I-695 CW @ MD-41/Perring Pkwy/Exit 30	1 h 53 m	5.48	169	163	104,728

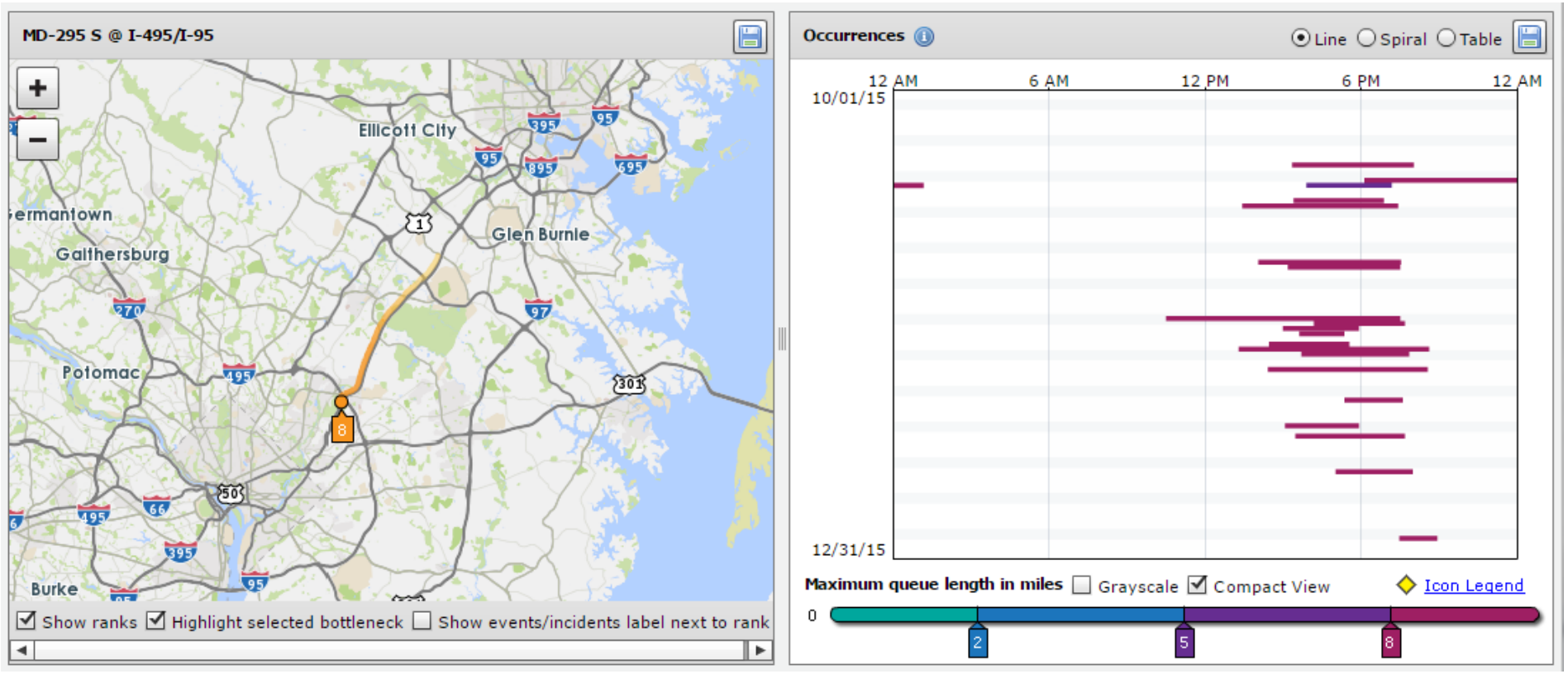


Traffic Volumes – Average Annual Daily Traffic (AADT)
STATION_DESCRIPTION IS695-.20 MI E OF MD542



#8 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2015

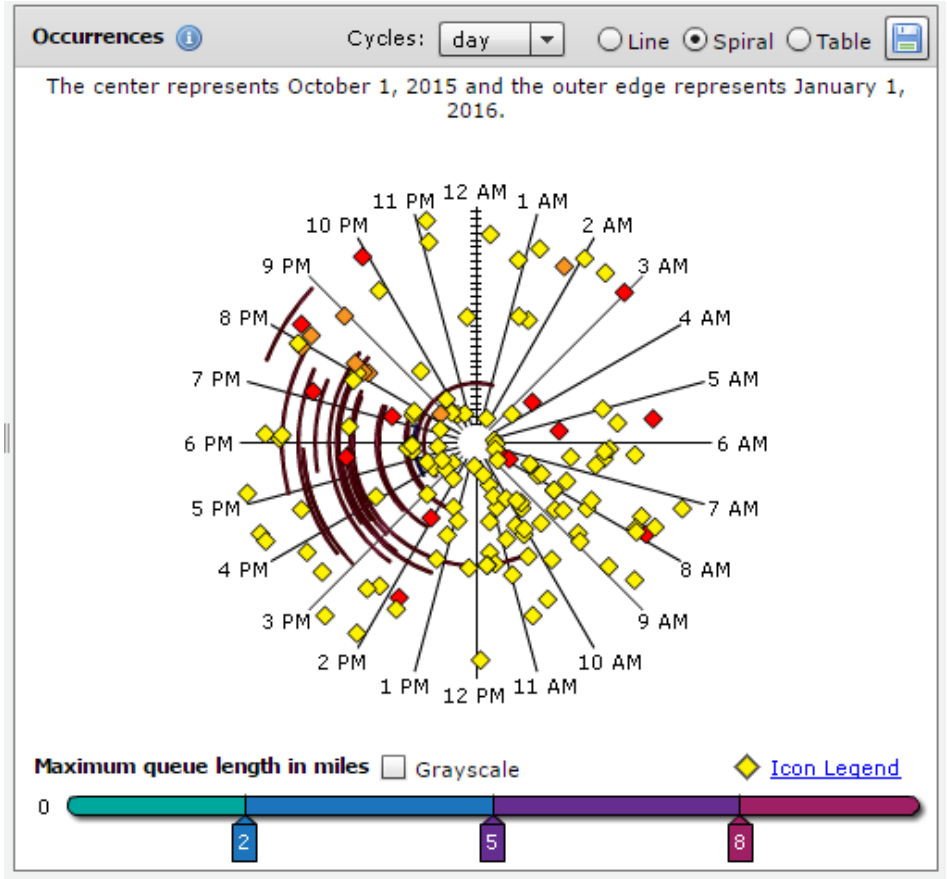
Location	Average Duration	Average max length (miles)	Occurrences	All Events/ Incidents	*Impact Factor
MD-295 S @ I-495/I-95	4 h 6 m	12.18	32	135	95,880



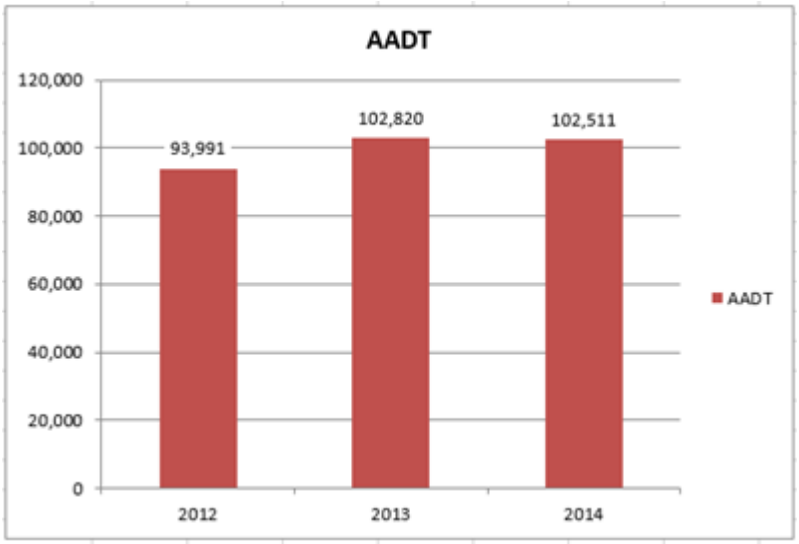
***Notes:** MD-295 merge with the Capital Beltway I-495. Congestion seen in the afternoon peak period sometimes extends into the southern portion of the Baltimore region near the Fort Meade area.*

#8 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2015

Location	Average Duration	Average max length (miles)	Occurrences	All Events/ Incidents	*Impact Factor
MD-295 S @ I-495/I-95	4 h 6 m	12.18	32	135	95,880

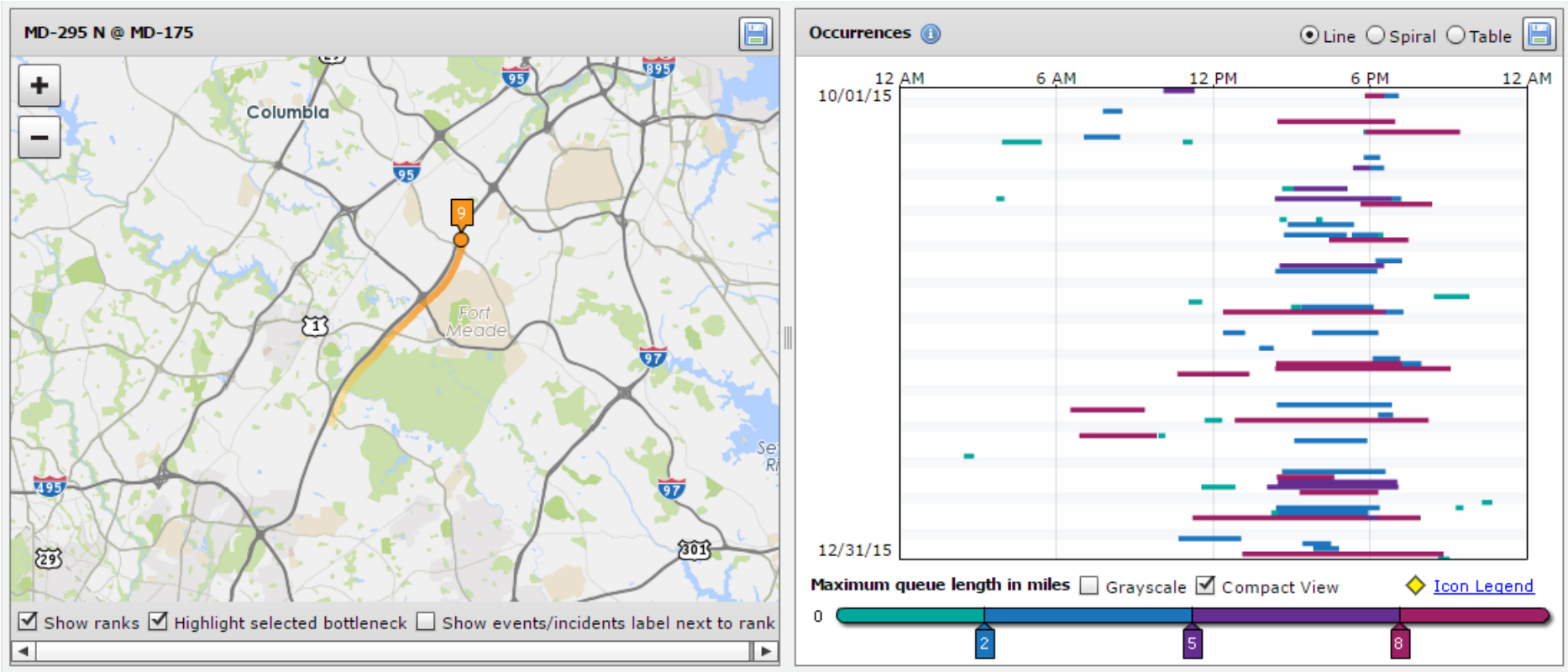


Traffic Volumes – Average Annual Daily Traffic (AADT)
STATION_DESCRIPTION MD295-.50 MI S OF MD32



#9 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2015

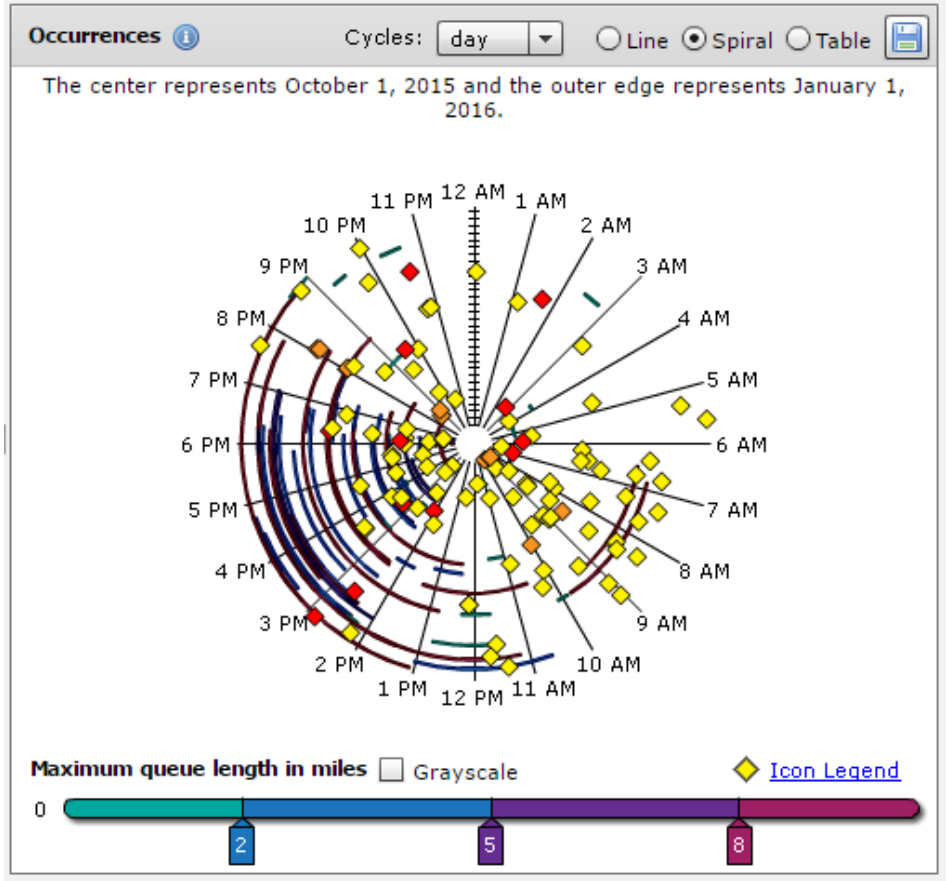
Location	Average Duration	Average max length (miles)	Occurrences	All Events/ Incidents	*Impact Factor
MD-295 N @ MD-175	2 h 20 m	7.6	83	112	88,269



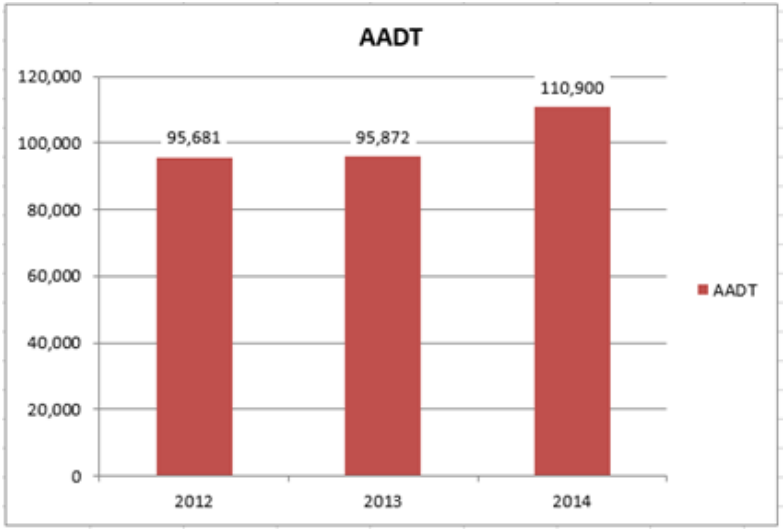
Notes: Recurring afternoon congestion. Level of Service "F" from 4:00 to 5:00pm. A primary cause appeared to be the discharge of traffic from NSA / Ft. Meade onto northbound MD 295 via the Connector Rd. Weaving and merging at the MD 32 interchange also contributed to the congestion.

#9 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2015

Location	Average Duration	Average max length (miles)	Occurrences	All Events/ Incidents	*Impact Factor
MD-295 N @ MD-175	2 h 20 m	7.6	83	112	88,269

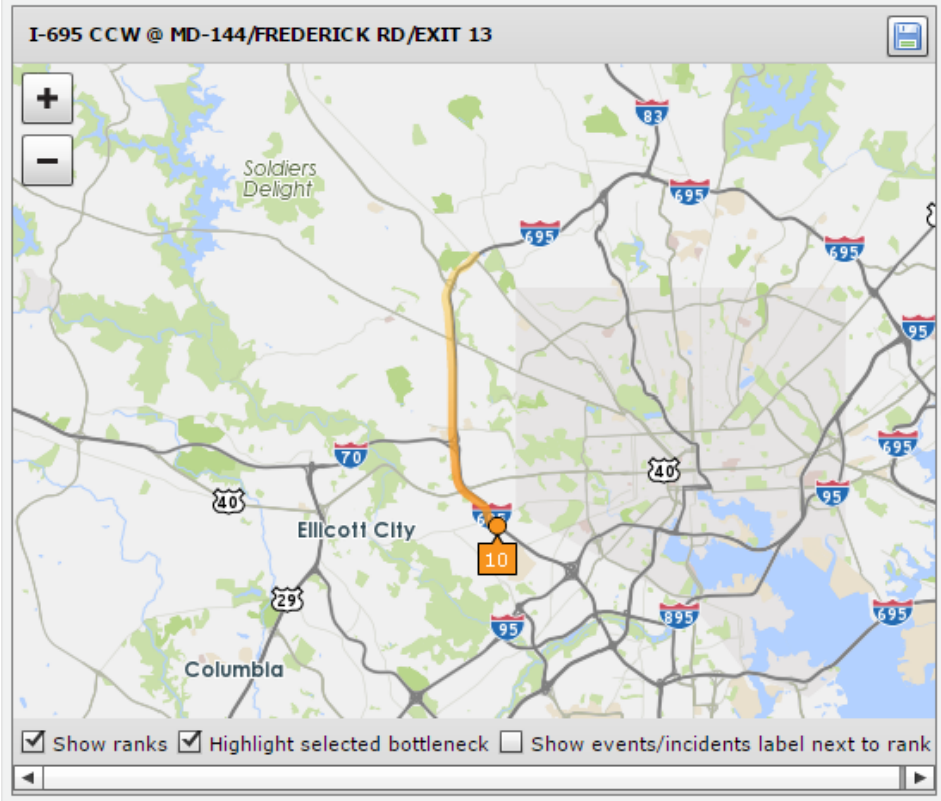


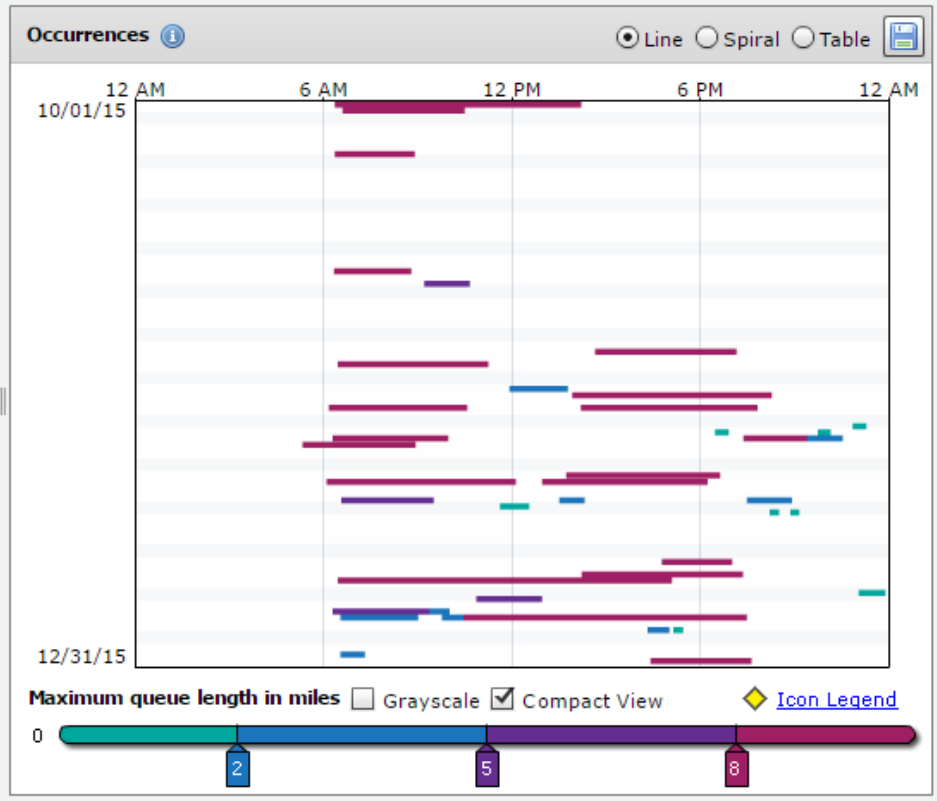
Traffic Volumes – Average Annual Daily Traffic (AADT)
STATION_DESCRIPTION MD295-.25 MI S OF MD175



#10 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2015

Location	Average Duration	Average max length (miles)	Occurrences	All Events/ Incidents	*Impact Factor
I-695 CCW @ MD-144/Frederick Rd/Exit 13	3 h 3 m	9.09	50	290	83,216

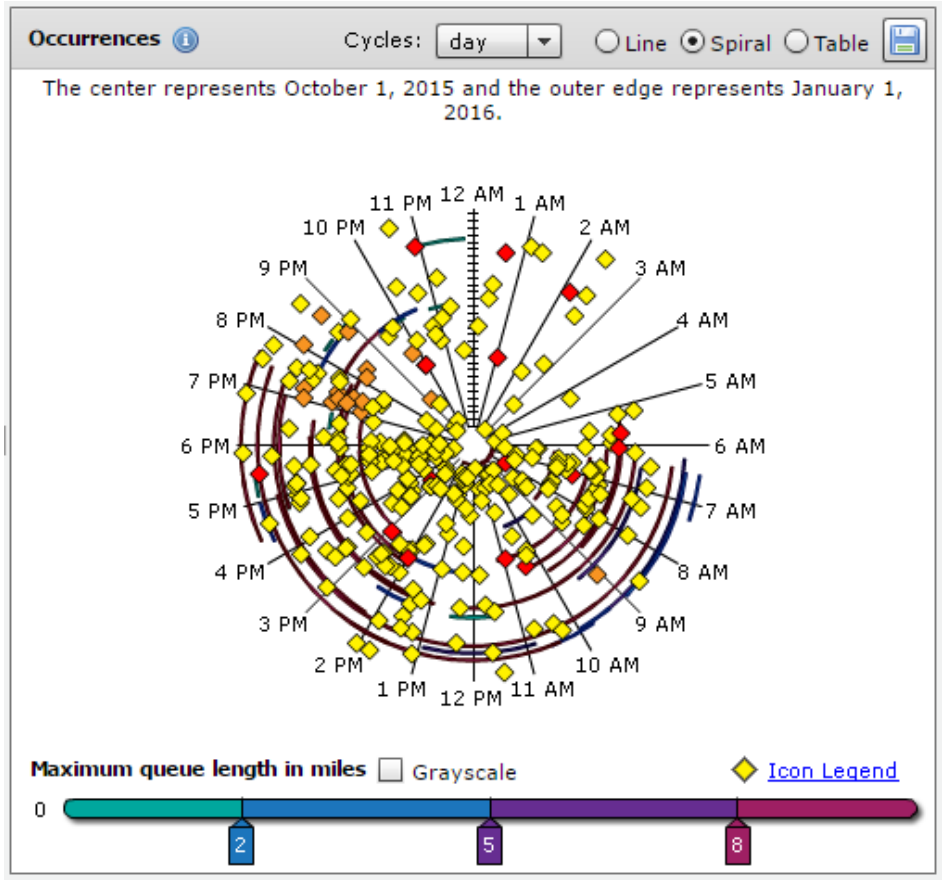




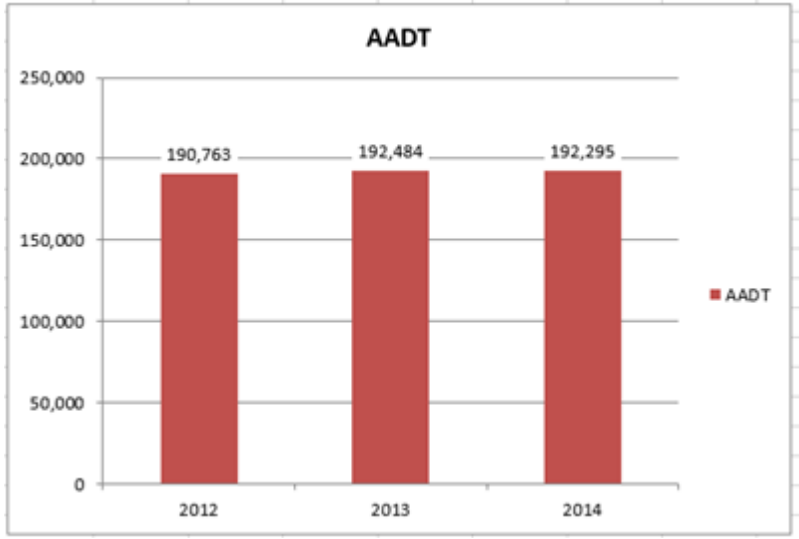
Notes: Delays found in both the morning and afternoon. Longstanding bottleneck on the outer loop of the beltway primarily during the morning rush. High traffic volume area. Delays extend back as far as MD-26/Liberty Rd. Also contributing to congestion in the area is a beltway widening project.

#10 Ranked Bottleneck in the Baltimore Region – 4th Quarter 2015

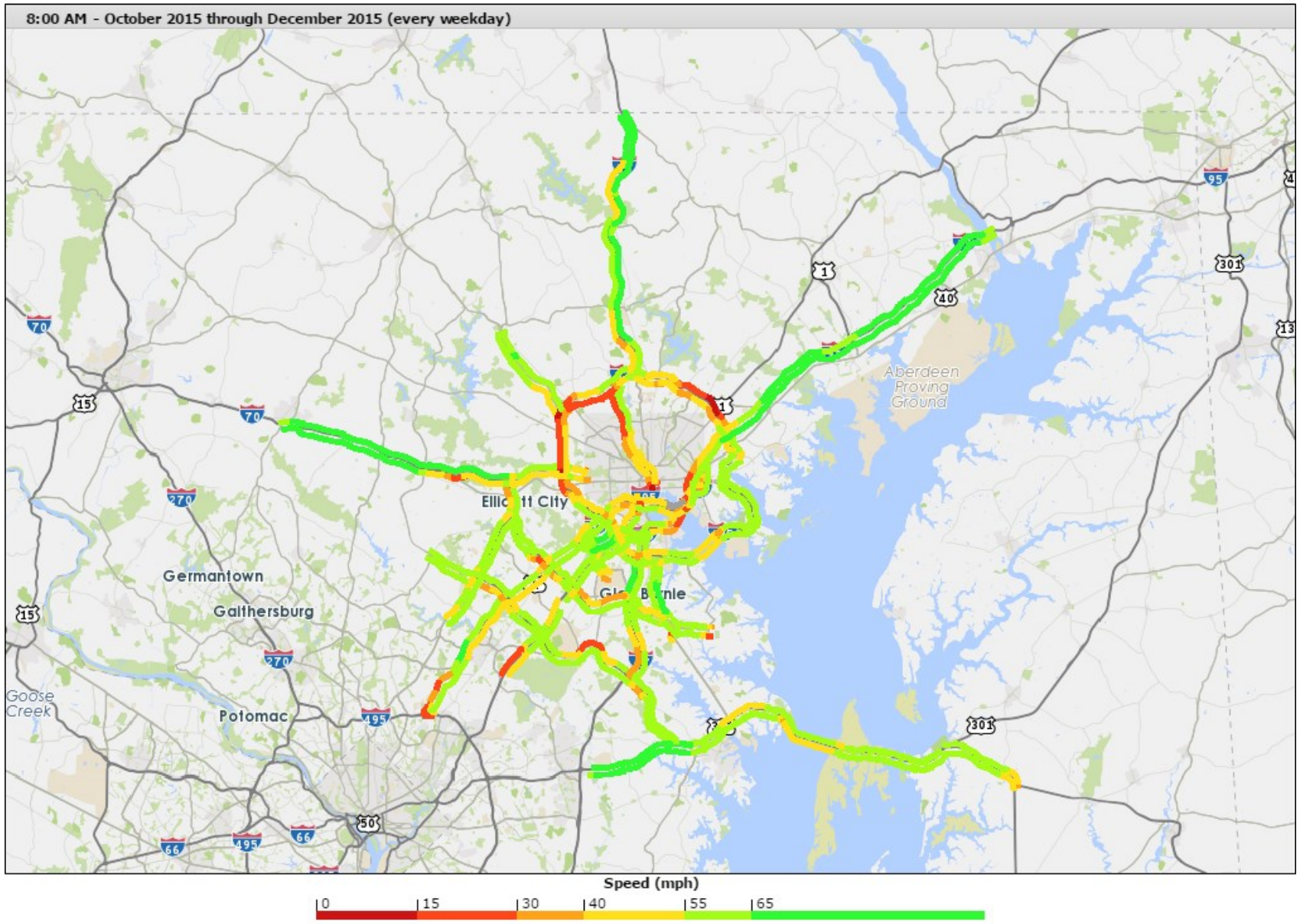
Location	Average Duration	Average max length (miles)	Occurrences	All Events/ Incidents	*Impact Factor
I-695 CCW @ MD-144/Frederick Rd/Exit 13	3 h 3 m	9.09	50	290	83,216



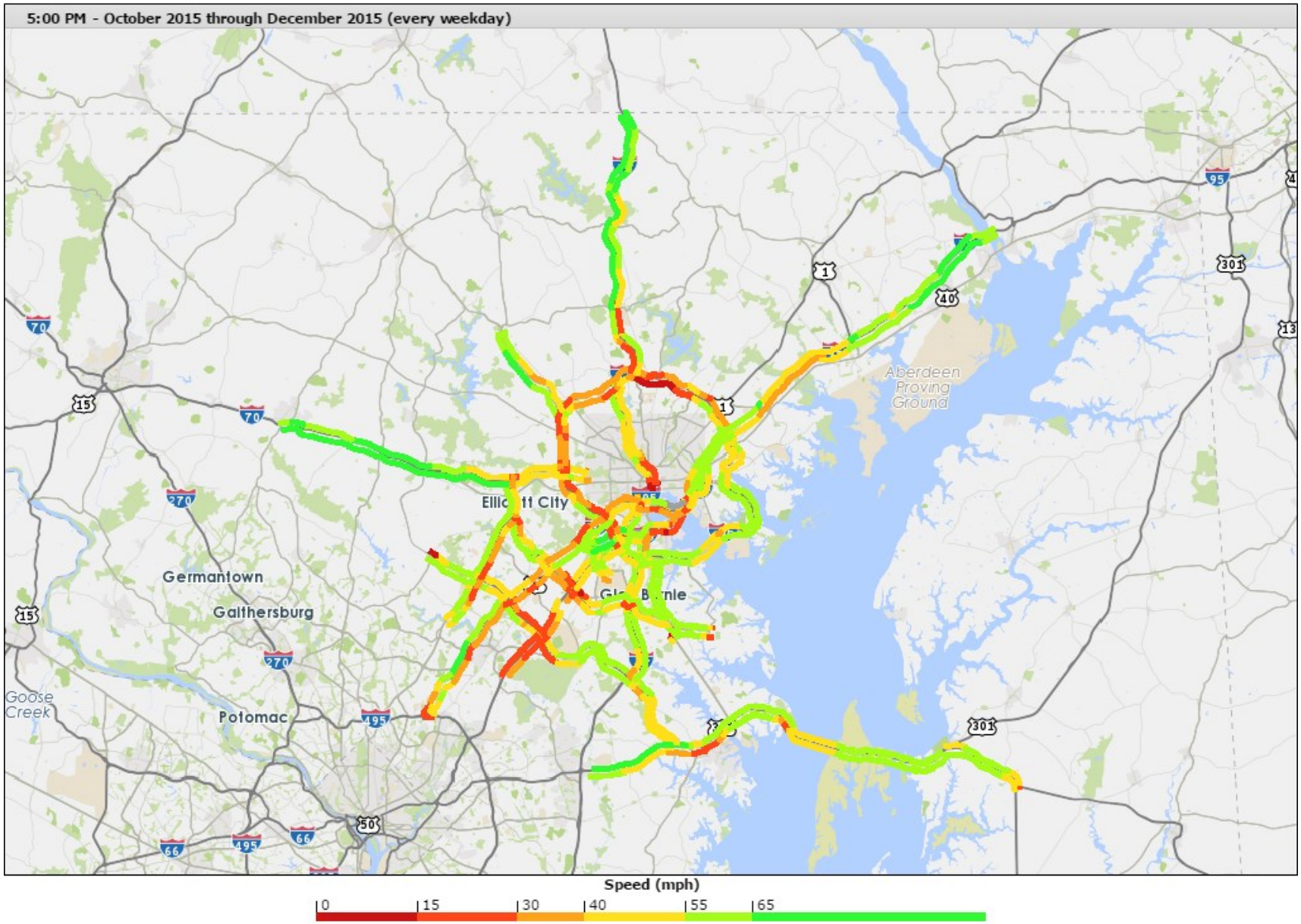
Traffic Volumes – Average Annual Daily Traffic (AADT)
STATION_DESCRIPTION IS695-.50 MI S OF IS70



Average Speed Maps – AM Peak Period 8:00-9:00 Weekdays: 4th Quarter 2015



Average Speed Maps – PM Peak Period 5:00-6:00 Weekdays: 4th Quarter 2015



The Vehicle Probe Project

Data and graphics in this report were generated from the *Vehicle Probe Project* suite. *The Vehicle Probe Project* (VPP) is a groundbreaking initiative and collaborative effort among the I-95 Corridor Coalition, University of Maryland, INRIX, HERE and Tom Tom and has been providing comprehensive and continuous real-time travel information for more than seven years. Member agencies like the Baltimore Metropolitan Council have found numerous uses for the data beyond simply travel information.

There are **now** **7,000 centerline freeway miles**, more than **20,000 freeway and arterial miles** in all, including continuous coverage of the I-95 corridor from New Jersey through Florida. Coverage also exists in Rhode Island. The network includes full coverage of freeways and major arterials in North Carolina and the Tidewater area of Virginia, full or nearly full coverage of limited access roads in New Jersey, Maryland and South Carolina and the northern and eastern portions of Florida. In addition, coverage now includes ramps at 160 major highway-to- highway interchanges, with all states having interchanges included except Georgia.

Agency Participation
As the value of the data from the Vehicle Probe Project is realized through the various applications and the continued quality via the validation efforts, the member states have increased their commitment to this project. In fact, all of the participating states have committed their own funds to continue this project and many have increased their coverage far beyond the initial core area.

Numerous Uses for the Data
I-95 Corridor Coalition member agencies have found many uses for the vehicle probe data, including:

- Travel Information for 511 (web and phone) Systems, Dynamic Message Signs, and Kiosks
- Travel Time Calculations for Message Boards
- Performance Measures and Travel Time Reliability Support
- Traffic Pattern Observations (in-state and multi-state)
- Trip Planning (www.i95travelinfo.net)
- Performance Measures Tool – Continuing the momentum in performance analysis, the newest initiative from the Coalition is the Vehicle Probe Project Suite. The basic tools include:

Bottleneck and Incident dashboard
Massive Raw Data Downloader
Historical Data Visualizations and Performance Measures (Congestion Scan)
UMD CATT Lab made the VPP suite available to participating agencies. For the training video, please visit http://vpp.ritis.org/suite/screencast/

Should you have any questions, please contact:

- For general project questions, Marygrace Parker at 518-852-4083 or *i95mgp@ttlc.net*
  For the Vehicle Probe Project Suite, Michael L. Pack at 301-405-0722 or *packml@umd.edu*

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