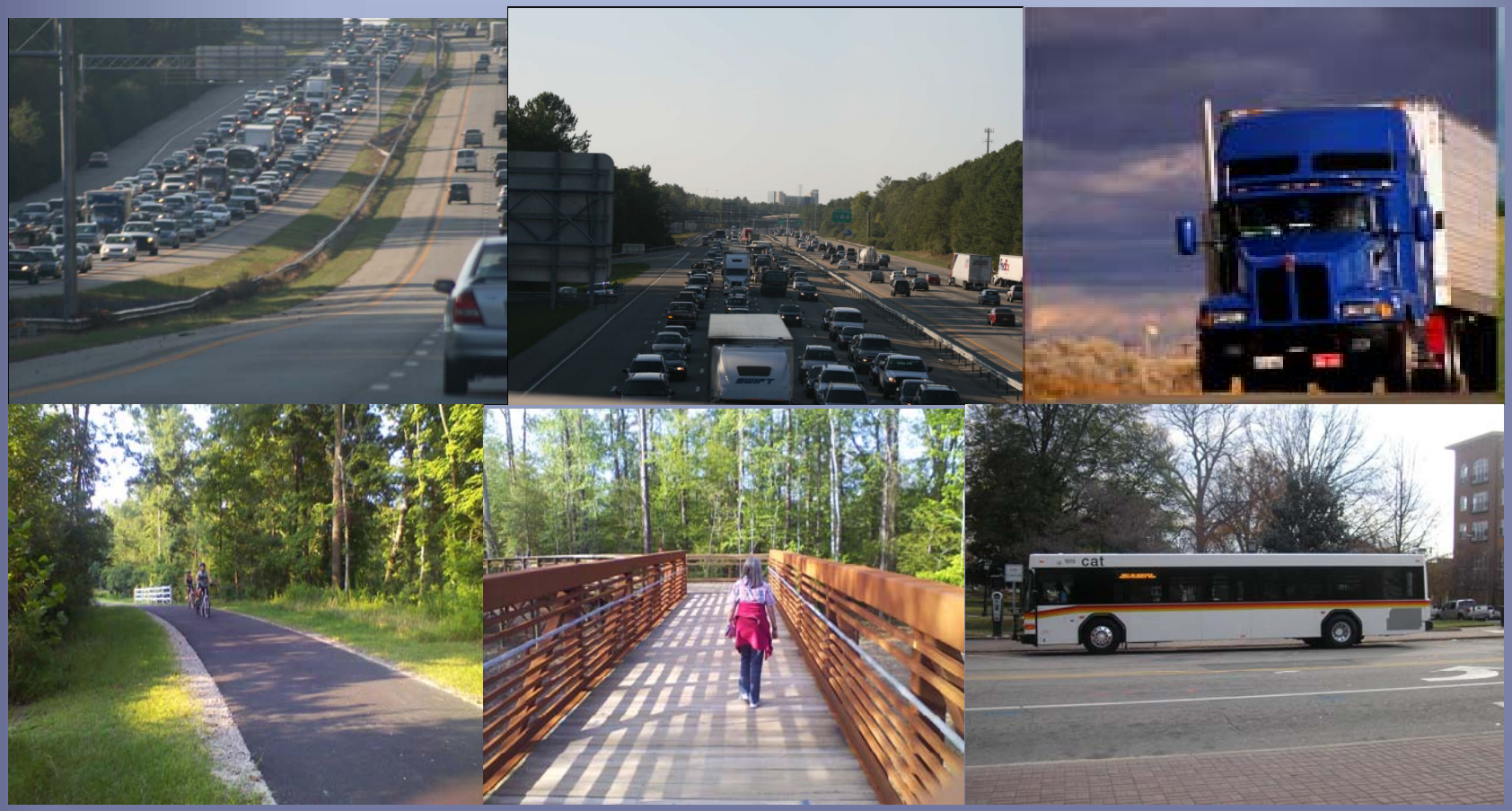

STATUS OF THE SYSTEM REPORT

BICYCLE/PEDESTRIAN, FREIGHT, & TRANSIT PERFORMANCE IN THE CAPITAL AREA REGION

[The Report as presented will address area highway bottlenecks; as well as presenting freight, transit, and bicycle and pedestrian performance measures within the Capital Area Metropolitan Planning boundary.]

North Carolina Capital Area
Metropolitan Planning Organization

Status of the System Report – 2013-2014

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STATUS OF THE SYSTEM EXECUTIVE SUMMARY

This is the second annual Status of the System (SOS) Report for the North Carolina Capital Area Metropolitan Planning Organization (CAMPO). This report addresses a particular form of highway congestion along with additional modal components within the area's transportation system. In general, the following major elements can be identified from this report:

- Explanation of this year's Status of the System Report and its purpose as a part of the Congestion Management Process;
- A quarter by quarter examination of the top fifteen Capital Area MPO bottlenecks during the calendar year of 2013, and an analysis of possible causes for the bottlenecks;
- Freight Movement in the Capital Area MPO
- Highlighting Transit and Transit performance data in the Capital Area MPO
- Bicycle and Pedestrian activity in the Capital Area MPO.
- The Public Health Costs of Congestion – Raleigh Area

The Capital Area MPO's Congestion Management Process (CMP) in 2013 expanded its scope with the development of the Incident Management Program. The proposed program addresses strategies aimed at improving responder safety and safe, quick clearance of incidents.

The National Unified Goal for Traffic Incident Management includes strategies for improving:

- Responder safety;
- Safe, quick clearance; and
- Prompt, reliable, interoperable communications

The TAC allotted funds from the remaining member share dues balance for the program. The funds have been used for the Incident Management Summit (August 15, 2013); as well as for the Media Buys using Radio/TV, Online, Billboards to educate the public on "Move Over" and "Fender Bender" laws. Following the Incident Management Summit, a select group consisting of law enforcement, fire, and emergency response personnel formed the "Incident Management Subcommittee' that has been working over the past few months to draft a Traffic Incident Management Memorandum of Understanding (MOU). Appendix A of this report contains the final draft of the MOU that will be presented to the CAMPO Technical Coordinating Committee and Executive Board in November.

Conclusions presented in this Report show that……...

The severity of bottlenecks in the CAMPO vary from quarter to quarter; however, there is one bottleneck that consistently measured to be in the top five of the most severe locations in each quarter. Furthermore, five bottlenecks were consistently measured to be the top 15 most severe bottlenecks for three quarters. Both NCDOT and CAMPO need to jointly address strategies to fund bottlenecks as specific projects where necessary.

Freight traffic in the CAMPO region travels at average speeds comparable to the state average of 57.2. The freight performance measures accurately show locations where slowdowns and bottlenecks occur for all traffic types of vehicular traffic. Chronic problems continue to occur along segments of I-440, I-40 at the Harrison Avenue interchange, and I-40 at the US 70 Bypass interchange. While freight traffic movement through the CAMPO area is less problematic than in larger metropolitan areas, any neglect to improvements for the network eventually will result in more intense congestion and produce negative economic impacts. The North Carolina Trucking Association (NCTA), in cooperation with NCDOT and the North Carolina Association of MPOs and RPOs need to establish a minimum average speed for highways that can be used as

a factor in determining highway improvements and prioritization for funding.

Transit usage in the CAMPO area is very good, particularly within the vicinity of North Carolina State University. This major employment center within the region has conducted an aggressive campaign to its students and staff to utilize transit service, and has invested a significant amount of funds into a transit fleet and maintenance facility. An area of improvement for some service providers includes on-time performance.

Bicycle and pedestrian travel activity in CAMPO is now being measured. CAMPO staff conducted a series of bicycle and pedestrian counts throughout the area last year. The highest activity occurred during the more favorable weather months; however, the counts also showed that the central business districts received high volumes of bicycle and pedestrian traffic regardless of the season.

The Fortify (I-40/I-440 Rebuild Traffic Mitigation) Project will address commuter travel and traffic congestion that will be expected during the reconstruction of both freeways through the southern portion of Raleigh beginning in January 2014 to September 2016. To address expected congestion problems, Project leaders discussed using possible congestion mitigation alternatives through possible rail options, bus transit and vanpool options, bicycle/pedestrian options, and transportation demand management strategies. The Project leaders determined that the best choices for moving people included using transit options through route extension, route expansion, and bus on shoulder service (BOSS) along I-40. Information on the Fortify Project can be found on the ncdot.gov website; and outreach has been conducted by NCDOT to local businesses directly affected by the Fortify Project.

The Harvard Center for Risk Analysis noted in the article featured in the May 25, 2011 edition of USA Today titled "The Public Health Costs of Traffic Congestion: A Health Risk Assessment" that the Raleigh area's VMT will increase by 54% between 2000 and 2030; and that public health impacts of traffic congestion exist and should also be considered when evaluating long term policy alternatives for addressing congestion through transportation management and operational procedures.

INTRODUCTION

The NC Capital Area MPO is required by federal law to develop and implement a Congestion Management Process (CMP) as part of routine transportation planning efforts. The MPO finalized its CMP toolkit and adopted its CMP on June 16, 2010. This Status of the System (SOS) Report, a product of the CMP provides an overview of the system for which the MPO provides long-range planning, and will:

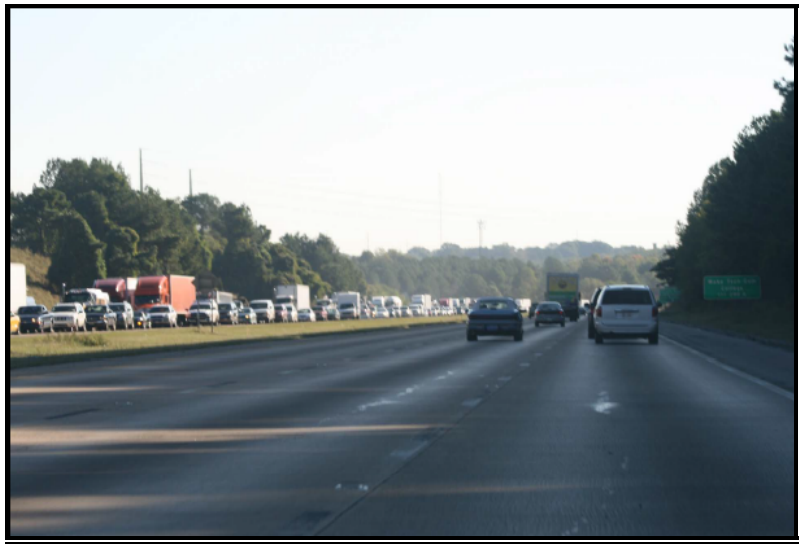
- Outline highly congested area bottlenecks,
- Identify solutions that can be implemented to address the congested areas,
- Identify Metropolitan Transportation Plan (MTP) projects that will be implemented in those bottleneck locations.

WHAT IS A CMP?

A Congestion Management Process (CMP) is a management system and process used by an MPO to improve traffic operations and safety by using strategies that: (1) reduce travel demand or (2) allow the implementation of operational improvements.

A CMP usually identifies low-cost improvements with short timeframes (5-10 years), where traditional projects (lane additions, etc.) can cost significantly more and have longer implementation timeframes. A major emphasis of this SOS report is to identify the top ranked bottlenecks by quarter during the calendar year of 2013 and early 2014. Some of these top-ranked bottlenecks can be addressed through low-cost signal improvements, however many bottlenecks will be addressed through capacity expansion of roads and highways.

The Report addresses the subject of bottlenecks, their ranking, and possible operational improvements. The bottleneck ranking is based on an "Impact Factor". The "Impact Factor" is derived from the multiplication of three variables which are average duration, average maximum length, and occurrences. The "Impact Factors" are addressed in the proceeding spreadsheets that shows aggregated information on each time during the date range when the listed locations were bottlenecked (speeds less than 60% of the reference for 5 minutes up until speeds rise above 60% and hold for 10 minutes). The three bullets show the variables and their definitions:



Bottleneck on I-40/I-440 at Lake Wheeler Road exit

- **Occurrences** - is the number of times the location experienced that condition during the date range.
- **Average max length** is calculated by summing the maximum length that the queue reached each time the location was bottlenecked and dividing by the number of occurrences.
- **Average duration** - is the sum of the durations of each bottleneck instance divided by the number of occurrences.

The bottleneck locations are then matched with CAMPO's Metropolitan Transportation Plan (MTP) Project numbers; and then matched with projects that were submitted to the SPOT 3.0 process as candidates for possible funding and inclusion within the State Transportation Improvement Program. Projects that could not be successfully incorporated for funding through the SPOT 3.0 process may be funded through a proposed SPOT Mobility Program.

Traffic Bottlenecks

Localized sections of highway where traffic experiences reduced speeds and delays due to recurring operational conditions or nonrecurring traffic-influencing events.

BOTTLENECKS IN THE CAPITAL AREA MPO

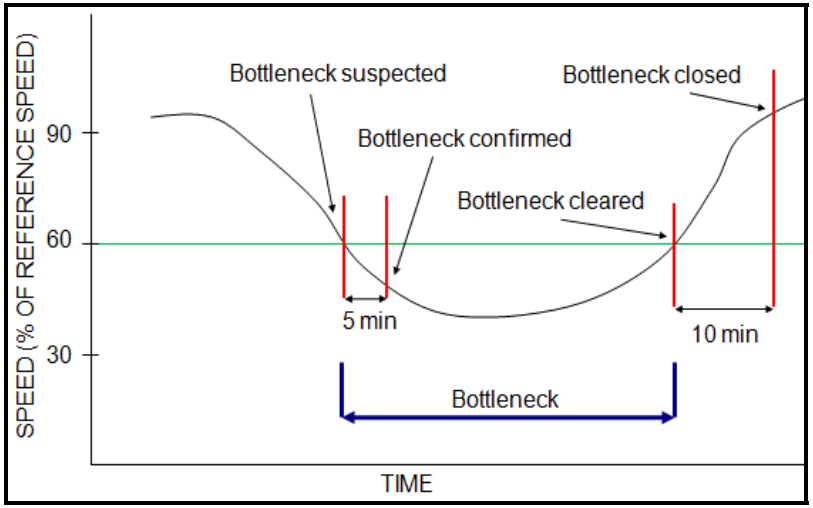
IDENTIFYING BOTTLENECKS & HOW THEY ARE TRACKED

Publications that are sponsored by the Federal Highway Administration (FHWA) define "highway bottlenecks" as "specific points on the highway system where traffic flow is restricted due to geometry, lane drops, weaving, or interchange-related merging maneuvers". A major element of the SOS report is identification of the top ranked (most severely congested) highway segments. This ranking is based on a technical, measurable evaluation of key mobility factors. This ranking system is used as the foundation for the MPO's Congestion Management Process (CMP).

How are bottleneck conditions tracked?

According to the Vehicle Project Probe Suite process as used by the University of Maryland in cooperation with various states Department of Transportation, bottleneck conditions are determined by comparing the current reported speed to the reference speed for each segment of road. Reference speed values are provided to us 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. The total duration of a bottleneck is the difference between the time when the congestion condition was first noticed (prior to the 5 minute lead in) and the time when the congestion condition recovered (prior to the 10 minute lead out). Bottlenecks whose total queue length, determined by adding the length of each road segment associated with the bottleneck which is less than 0.3 miles are ignored. This is illustrated in the graph below "The Life of a Bottleneck by Speed and Time"

The Life of a Bottleneck by Speed and Time



BOTTLENECKS & THEIR IMPACTS UPON THE REGION'S ECONOMY

As of July 2009, the National Highway System carries 40 percent of all U.S. traffic and 75 percent of truck traffic. America relies on trucks to deliver nearly 100 percent of our consumer goods and 70 percent of the nation's freight tonnage. Highways are the lifeline for the 80 percent of U.S. communities that are served solely by truck for freight transportation. According to the Texas Transportation Institute, congestion annually costs the U.S. economy $87.2 billion in the form of 4.2 billion lost hours and 2.8 billion gallons of wasted fuel. If key congestion bottlenecks were eliminated, the trucking industry alone could save 4.1 billion gallons of fuel over 10 years and 45.2 million tons of carbon dioxide emissions. Fortunately, the CAMPO area does not have one of the nation's 250 Freight Significant Highway Locations as recognized by the American Transportation Research Institute (ATRI); however, there are bottlenecks and areas of congestion that impact the region's economy. As of 2011, the Texas Transportation Institute ranked the Raleigh area in terms of congestion cost at number 55 nationally with a total cost of $396 million. The "Commuter Stress" rank for our area is 45. Congestion produces stressed and frustrated motorists, encouraging road rage and reduced health of motorists. As a non-productive activity for most people, congestion reduces regional economic health. The table shows the highway system performance data for the Raleigh-Durham area during 2011.

Mobility Data for Raleigh-Durham, North Carolina

System Performance	2011
Congested Travel (% of peak VMT)	50
Congested System (% of lane-miles)	52
Congested Time (number of "Rush Hours")	4.00
Annual Excess Fuel Consumed	
Total Fuel (1000 gallons)	8,407
Rank	55
Fuel per Peak Auto Commuter (gallons)	11
Rank	80
Annual Delay	
Total Delay (1000s of person-hours)	17,923
Rank	54
Delay per Peak Auto Commuter (pers-hrs)	23
Rank	83
Travel Time Index	1.14
Rank	61
Commuter Stress Index	1.21
Rank	45
Freeway Planning Time Index (95th Pctile)	2.34
Rank	68
Freeway Planning Time Index (80th Pctile)	1.33
Rank	68
Excess CO_2 Due to Congestion	
Congested CO_2 (million pounds)	170
Rank	55
CO2 Per Peak Auto Commuter (pounds)	217
Rank	77
Truck Congestion Cost ($ millions)	96
Truck Commodity Value ($ millions)	50,194
Congestion Cost	
Total Cost ($ millions)	396
Rank	55
Cost per Peak Auto Commuter ($)	502
Rank	82

TOP TEN BOTTLENECKS AND THEIR SEASONAL TRENDS

The four tables on the next two pages show the top ten CAMPO bottlenecks as captured through the Vehicle Project Program Suite software during each quarter of 2013. The maps and spiral graphs associated with each of the bottlenecks are located in Appendix B. As mentioned earlier in the Report, the bottlenecks were matched with existing FY 2045 Metropolitan Transportation Plan (MTP) projects. Also mentioned earlier, the bottlenecks were ranked based on the equation: Impact Factor = Average Duration (in minutes) * Average Max Length * Number of Occurrences. "Impact factor" is a term created by the University of Maryland Center for Advanced Transportation Technology (UMD CATT) Laboratory specifically for use in ranking bottleneck locations, and is intended to provide a simple metric on which multiple locations can be compared.

Top 10 Bottlenecks matched with MTP Projects

January - March 2013

Rank	Location	Direction	Average Duration (Minutes)	Average max length (miles)	Occurrences	Impact factor	CAMPO Project Number
1	US-70 E @ I-440/US-1	EASTBOUND	45 m	0.91	989	40,430	None
2	US-1 N @ Burlington Mills Rd	NORTHBOUND	65m	3.31	107	23,015	F11-1b
3	US-70 E @ US-70 (Clayton)	EASTBOUND	193m	18.61	5	17,954	A301
4	US-70 W @ Lynn Rd	WESTBOUND	34 m	0.81	599	16,436	A101
5	US-70 W @ T W Alexander Dr	WESTBOUND	28 m	0.59	911	15,091	A155b, A412, A645
6	US-70 W @ NC-50/Creedmoor Rd	WESTBOUND	29 m	0.42	1179	14,378	None
7	I-40 E @ US-70/Exit 306	EASTBOUND	52 m	3.31	80	13,770	F44a, F41, A300
8	I-40 W @ Jones Sausage Rd/Exit 303	WESTBOUND	56 m	5.16	45	12,992	F41, F44a, A138c
9	Leesville Rd E @ I-540	EASTBOUND	32 m	0.83	479	12,759	F42b
10	US-1 S @ Perry Creek Rd/Durant Rd	SOUTHBOUND	50 m	3.31	76	12,560	F11-1a

Table One

Top 10 Bottlenecks Matched with MTP Projects

April - June 2013

Rank	Location	Direction	Average Duration (Minutes)	Average max length (miles)	Occurrences	Impact factor	CAMPO Project Number
1	US-70 E @ I-440/US-1	EASTBOUND	43 m	0.86	1120	41,595	None
2	I-40 W @ US-70/Exit 306	WESTBOUND	96m	6.59	50	31,629	F44a, F41, A300
3	I-40 E @ US-70/Exit 306	EASTBOUND	69	4.08	95	26,765	F44a, F41, A301
4	I-40 E @ Harrison Ave/Exit 287	EASTBOUND	79	7.48	36	21,282	F40
5	US-70 W @ T W Alexander Dr	WESTBOUND	29 m	0.62	926	16,706	A155b, A412, A645
6	Forestville Rd N @ Burlington Mills Rd	NORTHBOUND	50 m	3.24	97	15,725	A133
7	US-70 E @ W Millbrook Rd/Duraleigh Rd	EASTBOUND	31 m	0.57	862	15,187	A101
8	I-40 E @ Aviation Pkwy/Exit 285	EASTBOUND	74 m	4.88	42	15,178	F40
9	US-70 W @ Lynn Rd	WESTBOUND	32 m	0.76	585	14,283	A101
10	Leesville Rd E @ I-540	EASTBOUND	30 m	0.79	586	13,946	F42b

Table Two

First quarter analysis showed that the majority of the bottlenecks occurred throughout a twelve-hour period during the day (7:00 am to 7:00 pm). The number one bottleneck was the eastbound movement of traffic occurred in the vicinity of the US 70 (Glenwood Avenue) interchange at I-440. This is due to the weave movement of traffic merging from US 70 onto I-440, along with a traffic signal delay for traffic exiting from I-440 turning westbound onto Glenwood Avenue. Both Capital Boulevard and Glenwood experienced the highest number of bottleneck occurrences

Second quarter analysis showed that while most bottlenecks occurred throughout a twelve-hour period, an intense bottleneck would occur during the afternoon peak at the following location (Forestville Rd N @ Burlington Mills Rd). This is the only major bottleneck in the region that did not involve either and arterial road, or freeway, or interstate. The queue length covered the segment of Forestville Road between Burlington Mills Road and US 401. Homebound commuter traffic headed north from US 401to the subdivision experienced heavy delays along the two-lane road; particularly as the day-light hour became longer.

Top 10 Bottlenecks Matched with MTP Projects

July - September 2013

Rank	Location	Direction	Average Duration (Minutes)	Average max length (miles)	Occurrences	Impact factor	CAMPO Project Number
1	I-40 W @ US-70/Exit 306	WESTBOUND	126m	8.37	59	62,208	F44a, F41, A300
2	US-70 E @ I-440/US-1	EASTBOUND	36 m	0.85	1106	33,948	None
3	I-40 E @ US-70/Exit 306	EASTBOUND	76 m	4.17	96	30,424	F44a, F41, A300
4	US-1 N @ Burlington Mills Rd	NORTHBOUND	53 m	3.25	158	27,226	F11-1b
5	I-40 E @ Harrison Ave/Exit 287	EASTBOUND	76 m	6.66	38	19,231	F40
6	I-40 E @ Aviation Pkwy/Exit 285	EASTBOUND	70 m	4.46	54	16,875	F40
7	Leesville Rd E @ I-540	EASTBOUND	28 m	0.88	554	13,682	F42b
8	US-64 E @ US-1/Tryon Rd	EASTBOUND	32 m	1.52	273	13,276	F110, F15a
9	I-440 W @ Western Blvd/Exit 2	WESTBOUND	52 m	3.08	75	12,009	F10
10	I-540 E @ Leesville Rd/Exit 7	EASTBOUND	74 m	3.58	43	11,399	F42b

Table Three

Top 10 Bottlenecks Matched with MTP Projects

October - December 2013

Rank	Location	Direction	Average Duration (Minutes)	Average max length (miles)	Occurrences	Impact factor	CAMPO Project Number
1	US-1 N @ Burlington Mills Rd	NORTHBOUND	57 m	3.84	186	40,735	F11-1b
2	US-70 E @ I-440/US-1	EASTBOUND	38 m	0.84	1233	39,386	None
3	I-40 E @ Harrison Ave/Exit 287	EASTBOUND	87 m	6.74	37	21,683	F40
4	I-440 W @ Wade Ave/Exit 4	WESTBOUND	57 m	4.97	71	20,098	A562
5	I-40 E @ US-70/Exit 306	EASTBOUND	69 m	3.46	84	20,077	F44, F41, A300
6	US-1 N @ I-540/Old Wake Forest Rd	NORTHBOUND	35 m	1.92	287	19,336	F42b
7	Leesville Rd E @ I-540	EASTBOUND	32 m	0.91	625	18,189	F42b
8	US-70 W @ Lynn Rd	WESTBOUND	32 m	0.77	648	15,985	A101
9	US-64 E @ US-1/Tryon Rd	EASTBOUND	39 m	1.7	237	15,739	F110, F15a
10	I-440 W @ Melbourne Rd/Exit 1	WESTBOUND	75 m	4.43	46	15,274	F10

Table Four

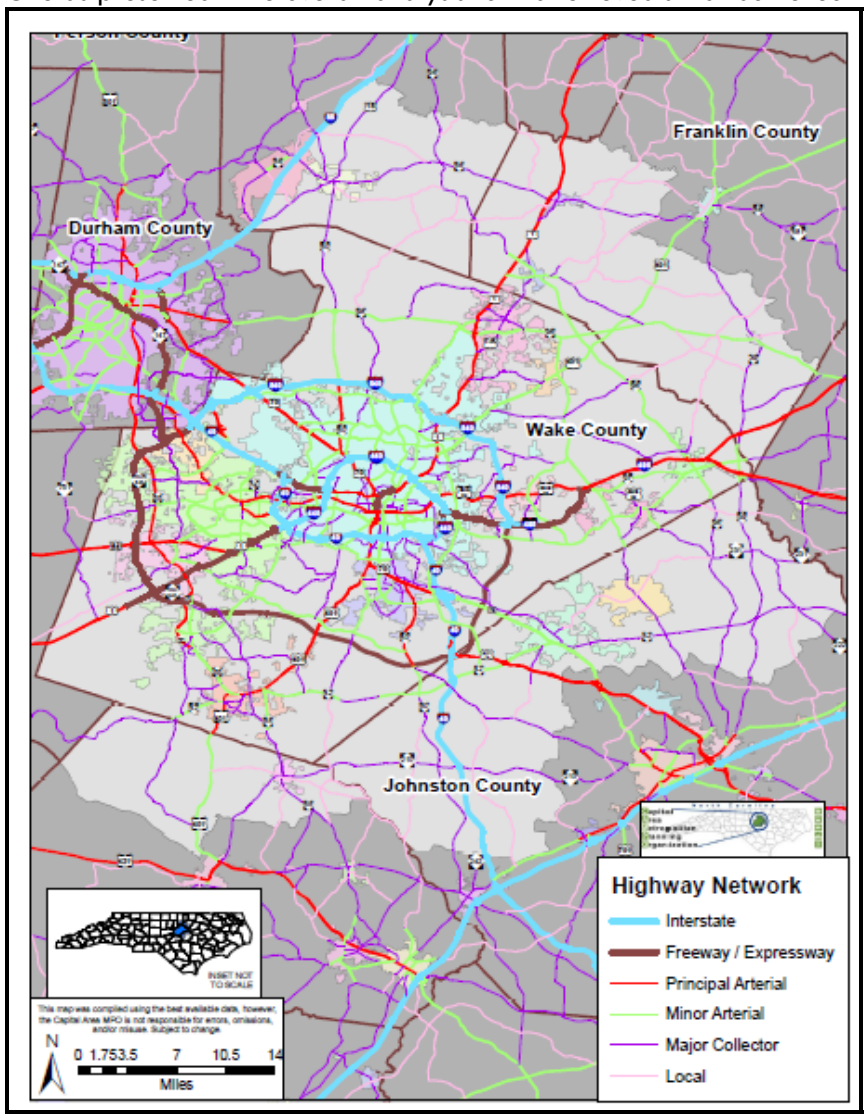
Third quarter analysis revealed a higher intensity of bottlenecks occurring in the afternoon peak as compared to the former quarters due to more summertime/vacation activities along with more hours of daylight. This does not mean that there were no intense bottlenecks during the morning peak. Both the I-40 (westbound) @ US-70 (Exit 306) interchange and the US-64 (eastbound) @ US 1/Tryon Road interchange experienced frequent bottlenecks during the morning peak hours along with significant queue lengths.

The fourth quarter analysis shows that most bottlenecks occurred within the existing (and proposed) 540 loop perimeter. Only the US 1 N @ Burlington Mills Rd intersection is one of the top ten area bottlenecks located outside of the I-540 loop. US-1 (northbound) is furthermore represented with a bottleneck further south between its intersection with Old Wake Forest Road and the I-540 flyover ramp onto US-1. The majority of the bottlenecks occurred during the afternoon in most of the locations; with the exceptions being the US-70 (eastbound)@I-440/US-1 interchange, the US-1(northbound)@I-540/Old Wake Forest Road interchange, and the Leesville Road (eastbound)@I-540 interchange where bottleneck conditions may occur throughout (and even beyond) a 12-hour period.

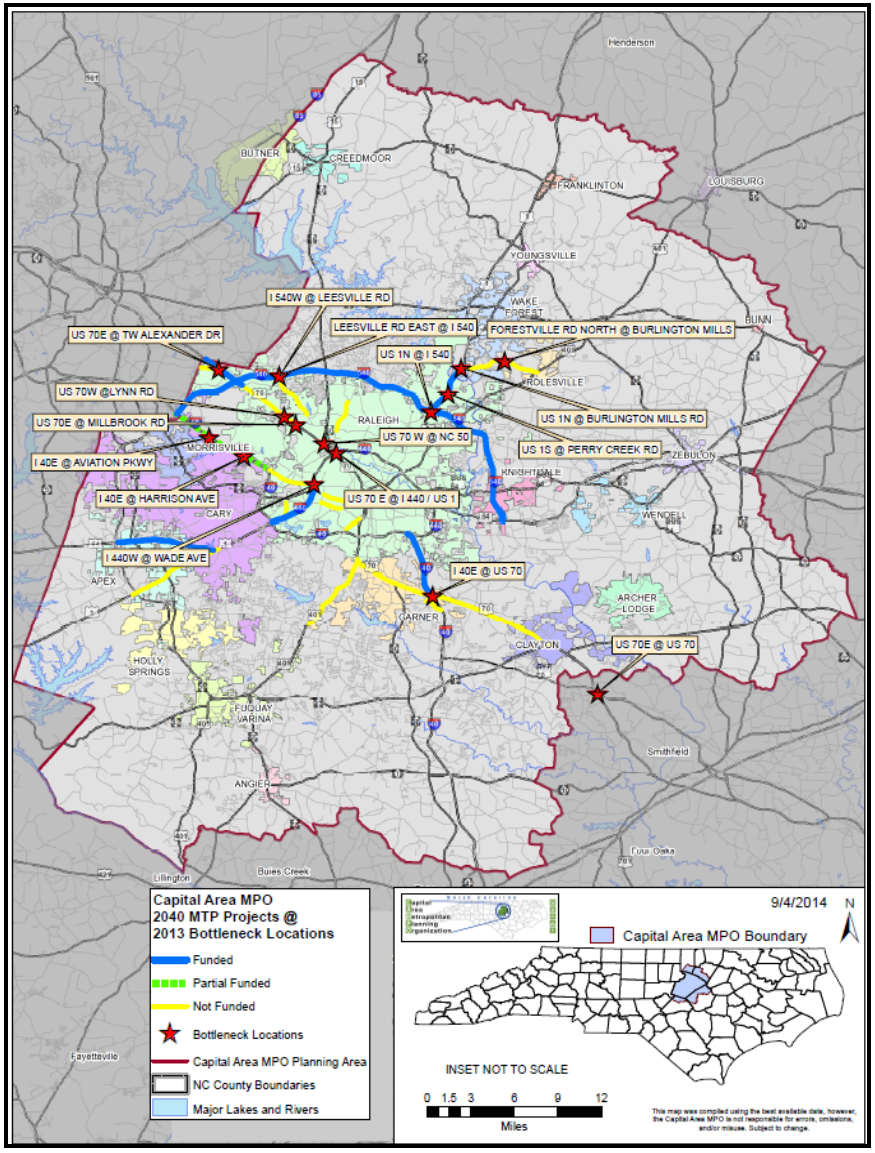
The bottleneck that consistently ranked in the top five for the region was the eastbound segment of US 70 (Glenwood Avenue) at the I-440 interchange area (as marked in yellow). Other notable bottleneck locations that had high impact factors included I-40 (eastbound)@US-70 (Exit 306), I-40 (eastbound)@Harrison Avenue (Exit 287), and US-1(northbound)@Burlington Mills Road.

Please note that most of the top five identified bottleneck segments are along highways that contain funded or partially funded projects in SPOT 3.0.
When looking at the overall Capital Area MPO Highway Network map along with Map One, Map One shows the locations of the area's top bottlenecks in relation to highways listed in the 2040 MTP, as well as currently funded, partially funded, or unfunded projects in SPOT 3.0. Most of the bottlenecks occur within the most urban portion of the Highway Network map. Table Five is the list of locations that corresponds to Map

One as presented. The overall analysis for 2013 reveals that bottleneck



conditions at most of the noted locations occur throughout a regular 12 to 14 hour workday. Certain locations, however, experience more intense bottleneck occurrence during the morning and afternoon peak hour time periods. Capital Area MPO staff will monitor these locations throughout 2014 to validate the bottleneck trends and occurrences; while at the same time encouraging NCDOT staff to develop a process that addresses funding for bottleneck projects.



Map One

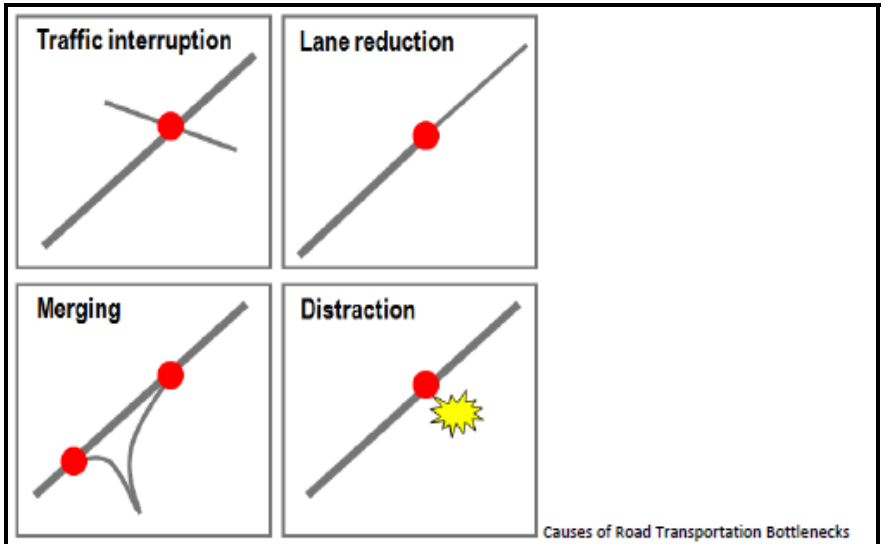
Bottlenecks matched with 2040 MTP Projects

Location	CAMPO Project Number
US-70 E @ US-70 (Clayton)	A301
Forestville Rd N @ Burlington Mills Rd	A133
I-40 E @ Aviation Pkwy/Exit 285	F40
I-40 E @ Harrison Ave/Exit 287	F40
I-40 E @ US-70/Exit 306	F44a, F41, A300
US-70 W @ Lynn Rd	A101
US-70 W @ Lynn Rd	A101
US-70 E @ I-440/US-1	
US-70 W @ NC-50/Creedmoor Rd	
I-440 W @ Wade Ave/Exit 4	A562
I-440 W @ Western Blvd/Exit 2	F10
I-540 W @ Leesville Rd/Exit 7	F42b
Leesville Rd E @ I-540	F42b
US-1 N @ Burlington Mills Rd	F11-1b, A133
US-1 N @ I-540/Old Wake Forest Rd	F42b
US-1 S @ Perry Creek Rd/Durant Rd	F11-1a
US-64 E @ US-1/Tryon Rd	F110, F15a
US-64 E @ US-1/Tryon Rd	F110, F15a
US-70 E @ W Millbrook Rd/Duraleigh Rd	A101
US-70 W @ T W Alexander Drive	A155b, A412, A645

Table Five

Possible Causes

The possible causes for the bottlenecks can vary based on traffic, roadway capacity and design, and timing. Illustration One below includes diagrams and definitions of the four major causes of traffic bottlenecks.



Causes of Road Transportation Bottlenecks

Bottlenecks are major impediments to the free flow of traffic and occur under specific circumstances, mostly when nearing capacity. Under such circumstances, a small bottleneck can have important consequences. Four major causes can be identified:

- **Traffic interruption**. By far the most common cause and include traffic lights, stop signs, tolls and railway crossings. When traffic lights are not well synchronized with the direction and flow of traffic, significant delays may occur while traffic accumulates in one direction. Tolls can also be a major bottleneck, especially in urban areas, as significant time can be spend waiting to pay the manually collected fare.
- **Lane reduction**. The merging required when the number of lanes is reduced can easily become a bottleneck, especially if the capacity on the segment becomes lower than the traffic on the previous segment. The unmet demand thus becomes traffic delays.
- **Merging**. Although highways are designed to provide an uninterrupted flow to traffic, merging can be a cause for bottlenecks as cars are slowing down and changing lanes. This is notably the case at the intersection of two major highways where a large amount of traffic shifts from one highway to another.
- **Distraction**. This type of bottleneck is created by a psychological reaction of drivers to an unusual event that, although does not directly influence the capacity, is distracting the traffic and causing a slowdown. Distractions can often be trivial as a car that was pulled over by police. Glare during sunrises and sunsets is also known to create bottlenecks over specific highway segments.

Illustration One

When analyzing the four previous tables; and taking into account the definitions in Illustration One, you must look at length of queue and occurrences to try to understand what is happening at the bottlenecks. The bottlenecks with four or more occurrences are usually incidents. The bottlenecks with 20 or more occurrences are usually peak hour bottlenecks. Those bottlenecks with 300 occurrences or more are usually due to a combination of causes such as a distraction, an incident, or merging traffic. This could explain why the Western Boulevard segment at I-440 ranks as a consistently high regional bottleneck.

Among the bottlenecks ranked consistently in the top five, Western Boulevard and Capital Boulevard are unique in that both highways are classified as principal arterials; whereas most the other noted projects are classified as freeways. The Western Boulevard bottleneck location is also unique in its design characteristics when compared with regional freeway bottlenecks based on the fact that the vertical and horizontal curves change significantly in less than one mile, and there are signals at both ends and ramps. The Capital Boulevard (US-1North) bottleneck is caused by delay occurring on the region's most important north-south transportation facility between I-85 and I-95. The Burlington Mills Road intersection at US 1 is a "tee" intersection with significant residential and commercial development occurring along Burlington Mills Road.

The bottlenecks occurring along the freeway locations (I-40/US 70, I-40/Harrison Avenue) are due to weave movements being done by a heavy flow of traffic through those interchanges (particularly at the I-40/Harrison Avenue interchange); as well as a reduction in the number of travel lane (at the I-40/US 70 interchange).

Possible Solutions

Many of the top 15 bottlenecks are included within projects evaluated for NCDOT's Strategic Prioritization Process. However, those projects not addressed within the currently proposed highway projects must be targeted for operational improvements. These operational improvements can be address through the proposed NCDOT SPOT Mobility Program. The SPOT Mobility Program would use funds set aside for operation improvements to roadways, intersections, and interchanges that are not in current TIPs. Also, CAMPO could possibly use CMAQ (Congestion Mitigation Air Quality) funds in future years for specific bottleneck projects. Finally, the Texas Transportation Institute's 2012 Urban Mobility Report recommends operational treatments within the Capital Area MPOs highway network through (1) freeway incident management, (2) arterial street signal coordination, and (3) arterial street access management.

FREIGHT MOVEMENT IN THE CAPITAL AREA MPO

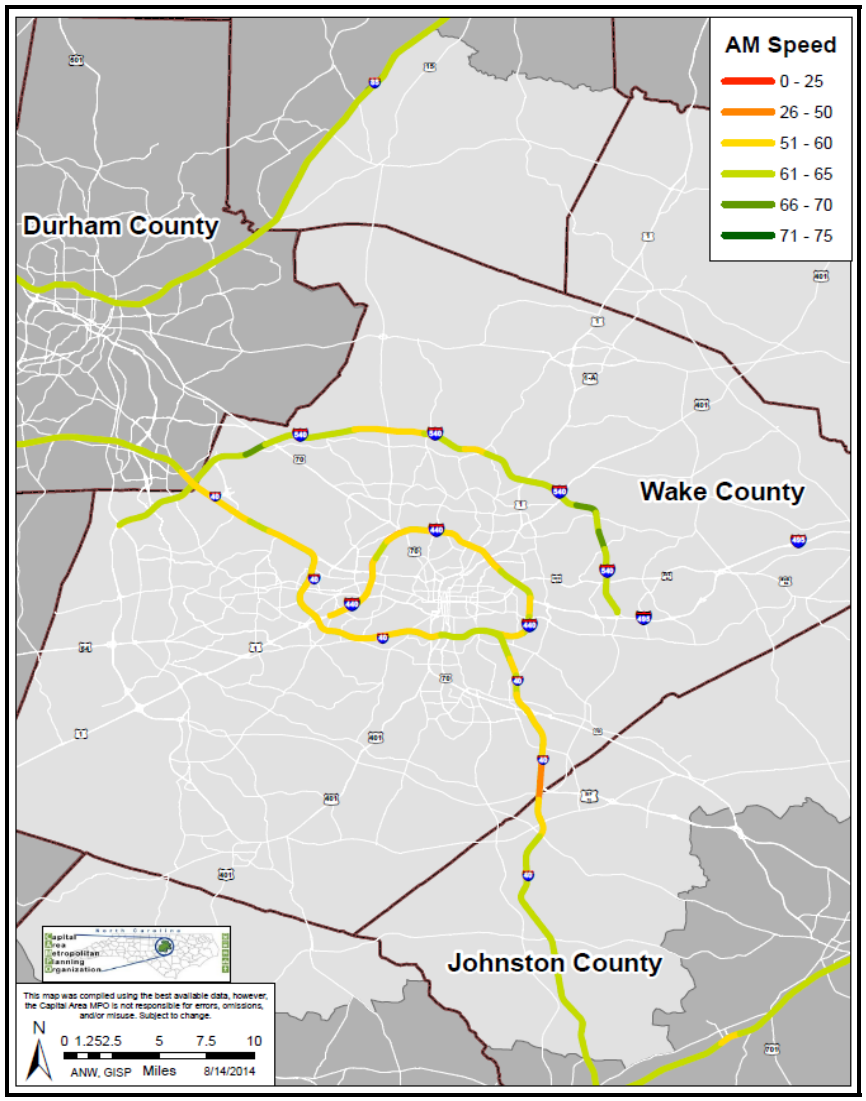
CAMPO is an agency that is active in its desire to understand freight movement along its transportation network; beginning with the first US 1 (North) Corridor Study in 2007 to the adopted 2045 Metropolitan Transportation Plan (MTP). Integrating freight and freight generating land uses into the transportation planning process is essential in order for the CAMPO area to attract jobs, tax dollars, and provide goods to a region growing in population and businesses.

The current state of freight mobility in the CAMPO area will be addressed using five maps that represent data gathered from the American Transportation Research Institute's (ATRI), National Corridors Analysis and Speed Tool (N-CAST). Currently, data contained within N-CAST covers and significant portion of the National Highway System (NHS) and nearly all interstate mileage in the continental United States. N-CAST is the product of a collaborative effort between ATRI and the Federal Highway Administration (FHWA) to design and implement the "Freight Performance Measures" Initiative that continuously generates and monitors a variety of performance measures related to the nation's freight transportation system. The performance measure that will be addressed within this report is average spot speed through the CAMPO area. With the issue of bottlenecks addressed earlier in the report, the presumptive hypothesis to be addressed is whether or not the area's bottlenecks have a direct impact upon the average spot speed of freight moving through the area.

The NC Statewide Logistics Plan addresses an implementation strategy of developing a "Comprehensive Freight Logistics Plan" that would include a short term initiative "Interstate highway and other limited access corridor enhancement and expansion"; and a mid-term initiative of "Eliminating freight bottlenecks". Using five maps based on N-CAST data, this report will identify locations where interstate highway enhancement and expansion may be identified; which in turn may mitigate potential freight bottlenecks and eliminate existing bottlenecks. A total of six speed bins are identified in the maps; with two of the speed bins (26 – 50 mph, and 51 – 60 mph) occurring in locations for potential bottlenecks and/or have existing congestion problems.

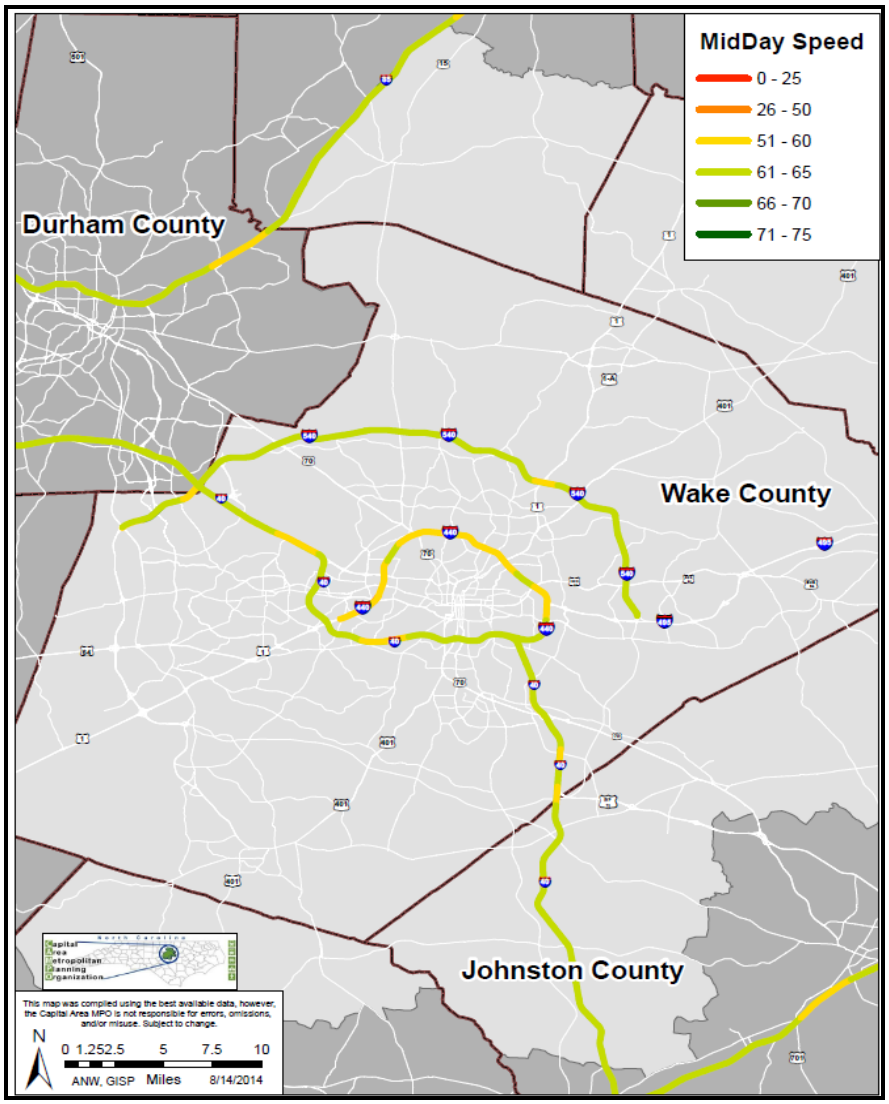
The five maps on the following pages illustrate average spot speed that has occurred within five time bins during the Year 2013, which are:

- AM – AM Peak (6:00 AM – 9:59 AM)
- MD – Midday (10:00 AM – 2:59 PM)
- PM – PM Peak (3:00 PM – 6:59 PM)
- OP – Off-Peak (7:00 PM – 5:59 AM)
- AVG – Average of all hours (12:00 AM – 11:59 PM)



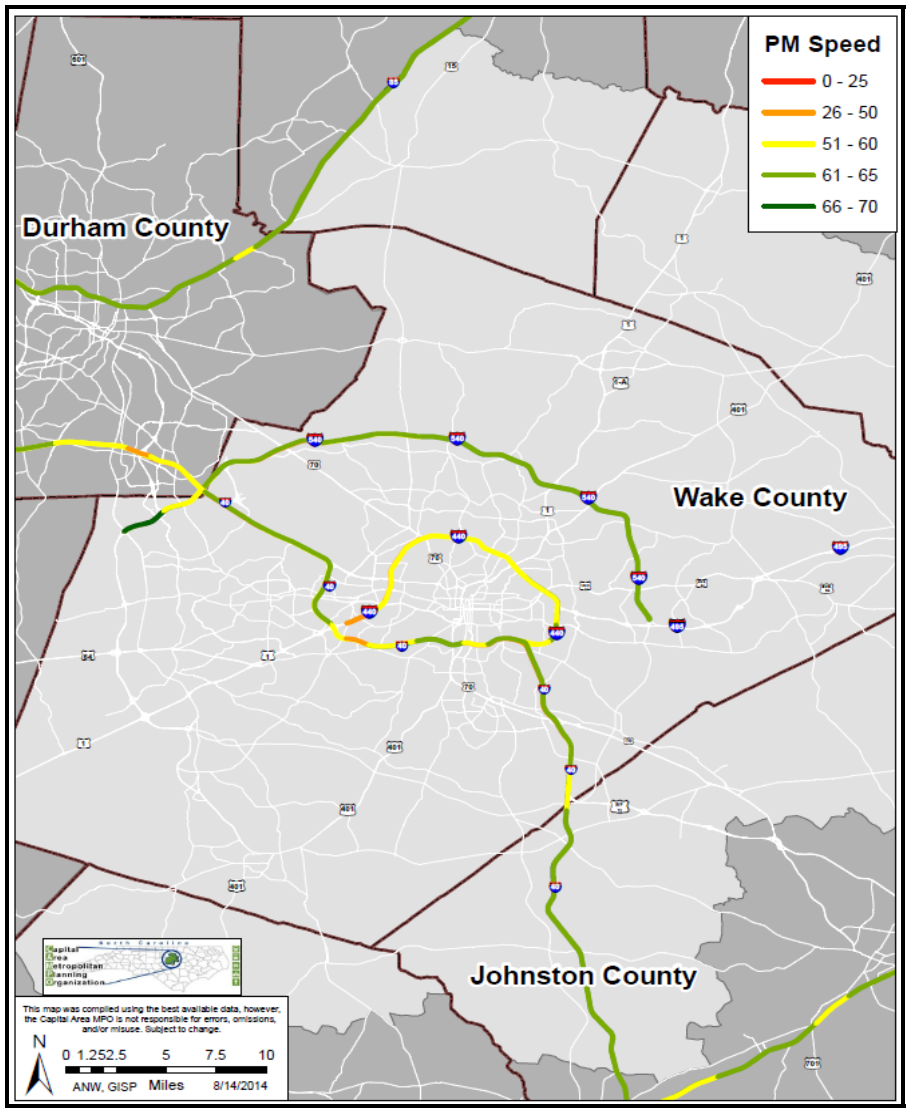
AM Peak Truck Speed through CAMPO area

The work zone area at the I-40/US 70 Bypass interchange recorded the lowest average truck speed in the peak hour.



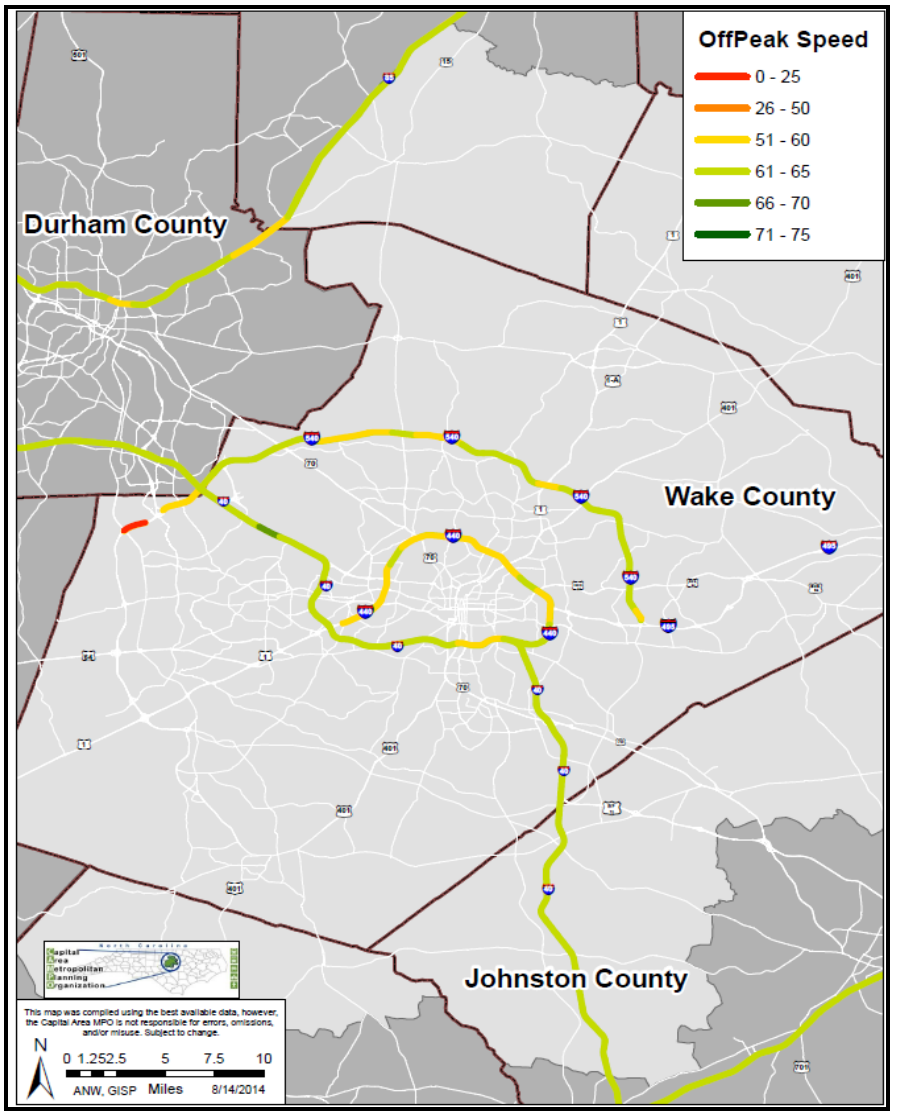
Midday Peak Truck Speed through CAMPO area

The lowest average speeds occurred along the heavily congested sections of the I-440 beltline, and at interchanges I-540/US 1 North, I-40/US 70 bypass, I-40 at Harrison Avenue, and I-540/I-40 near RTP.



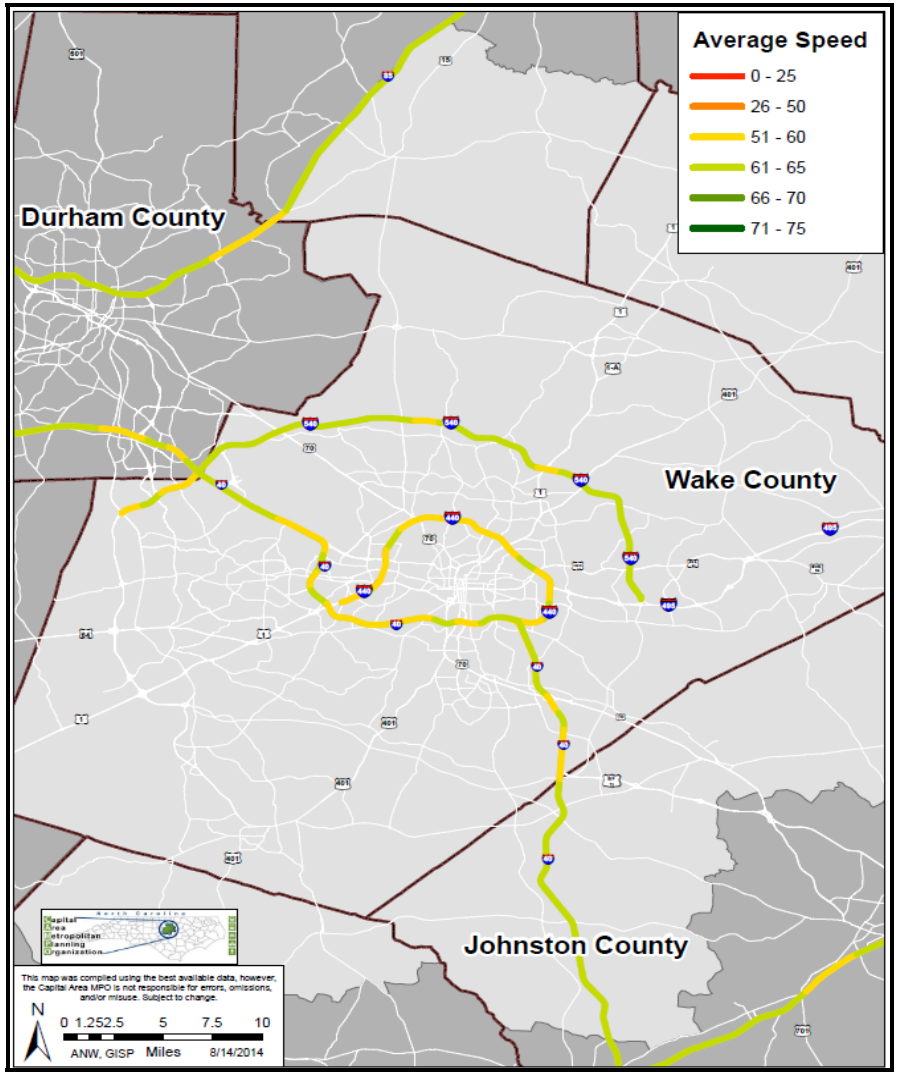
PM Peak Truck Speed through CAMPO area

Truck speeds are significantly lowest along the I-440 beltline; particularly in the area of the I40/I-440/US 1/US 64 interchange.



Off Peak Truck Speed through CAMPO area

General truck speeds through the CAMPO area are fairly good. The lower truck speeds on NC 540 near NC 55 may be due to trucks initiating their trek onto NC 540 from NC 55 heading east onto I-40.



Average Truck Speed through CAMPO area

The average truck speed on interstate highways in the state of North Carolina is 57.3 mph. The map above indicates that average truck speed through the CAMPO falls mainly within the two speed bins that area closest to that average speed. While truck speeds are captured along the interstates that the traverse through the CAMPO area, this data should not be viewed as indicative of the truck speeds along other NHS roadways through the area. Furthermore the speeds captured at the various data points along interstates within the CAMPO highway network do correlate to locations where current bottlenecks occur and where proposed TIP projects are planned or under construction. Overall, the N-CAST tool is indicating that overall freight speed through the CAMPO area is comparable to the state average, yet there are some mobility impediments in the system (particularly along the I-440 "inner" beltline).

Trucker drivers and freight community advocates desire to move their goods and services at safe, free flow speeds. Congested road and highway facilities (particularly at chronically congested locations) directly impact the producers, carriers, and consumers of freight goods through the loss of wages, reduced safety and profitability, and higher costs for purchases of the goods. To serve the freight stakeholders and general public that use road and highway systems, planners, engineers, and other transportation professionals need to have access to better tools to address freight movement not only on interstate freeways, but also on lower tiered highways and roads. The merging of data using the University of Maryland's Vehicle Probe Project, and the American Transportation Research Institute's (ATRI), National Corridors Analysis and Speed Tool (N-CAST) would provide planners, engineers, and other transportation professionals a useful tool that would analyze freight speeds, volumes, and other data interstates, freeways, principal arterials, and other road classifications that are useful to the freight community.

Until a comprehensive Freight Logistics Plan is developed by the state, CAMPO can pursue the initiatives identified at the beginning of the "Freight Movement in the Capital Area MPO" section by:

1. Encouraging ATRI and the University of Maryland's Vehicle Probe Project to combine datasets and gather truck speed data down to the arterial roads.,
2. Encouraging both NCDOT and NCTA to cooperate and develop statewide freight mode, and enhance current regional models used by the MPOs to model freight volumes and speeds, and
3. Encouraging both NCDOT and NCTA to determine minimum truck speed thresholds for urban, suburban, and rural areas in order to have a "logistically operable" roadway system that can be prioritized using technical data.

The steps outlined above can ensure that the CAMPO area and the state can have competitive edge when pursuing future economic development opportunities.

TRANSIT PERFORMANCE DATA IN THE CAPITAL AREA MPO

The Capital Area MPO has a large geographic footprint in the state and contains 20 municipalities and five counties with different concerns, goals and interests. Transit service is an important part of many of these communities. The Report addresses the performance data for four of the transit services operating within the Capital Area MPO. The transit services are: (1) Capital Area Transit (CAT), (2) Cary Transit (C-Tran), (3) Triangle Transit, and (4) North Carolina State University's "Wolfline" transit service. The performance data that is included within the Report includes : (a) number of riders (per system serving within the Capital Area MPO), (b) Measure total route miles traveled (per system serving within the Capital Area MPO), and (c) average weekday boardings by route (per system serving within the Capital Area MPO).

Performance Measures for Capital Area MPO's Transit Providers

	Capital Area Transit	Triangle Transit	N.C. State Wolfline	Cary Transit
Passenger Trips (per system serving within the Capital Area MPO)	6,396,026	711,556	2,884,464	264,441
Measure total route miles traveled (per system serving within the Capital Area MPO)	3,186,997	1,053,492	731,526	565,888.10
Average Weekday Boardings (per system serving within the Capital Area MPO)	20897	2733.82	17,500	900
Actual Vehicle Revenue Hours	211,988	49,948	67,068	27,041
Systemwide On-Time Performance	80%	90%	79%	90.40%

Table Six

The four transit providers are showing strong performances in terms of passenger trips and average weekday boardings. This is particularly true for NC State's "Wolfline" service that has a limited coverage area around the university. The university and its transportation department have conducted an effective campaign to encourage the student population (and other associated populations) to utilize the transit service for trips around the campus. Furthermore, the university has invested in a modern bus fleet that is reliable and convenient for its patrons. Based on Table Six above, the time performance for both Capital Area Transit and the "Wolfline" would seem indicative for a need to be improved in order to attract and capture a higher ridership population; however that may not be the case. While Triangle Transit has a higher system wide on-time performance level as compared to CAT and "Wolfline" service, route characteristics such as number and frequency of stops, delay based on boardings and/or traffic conditions, weather, road/highway routing, etc. directly impact system performance. Furthermore, note the difference between the average weekday boardings between the systems; with CAT having nearly 10 times the number of average weekday boardings as compared to Triangle Transit. For reporting purposes, the data should only serve as a snapshot for transit activity by each service provider in the region. Comparing performance levels between each transit provider is not feasible because of differences in operating environments and therefore the results can be easily misinterpreted. The transit providers should only benchmark against their own system's performance, which is the only benchmarking really needed.

BICYCLE & PEDESTRIAN ACTIVITY

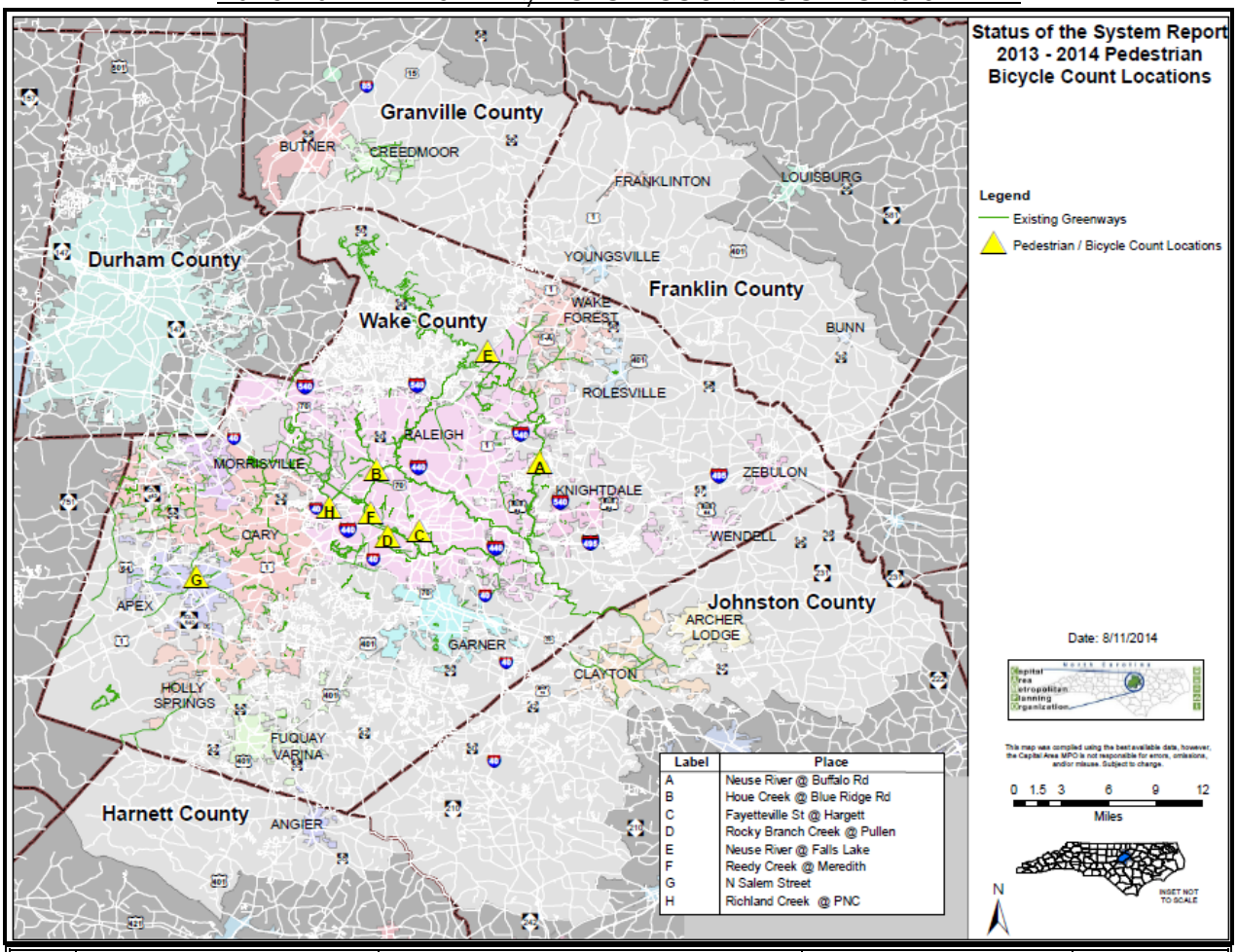
CAMPO has been an advocate for bicycle and pedestrian planning for over a decade. The first Capital Area MPO Bicycle and Pedestrian Plan was adopted by the Capital Area MPO Transportation Advisory Committee on March 19, 2003. Since the adoption of the Bicycle and Pedestrian Plan, numerous actions in the region have expanded the role of bicycle and pedestrian planning, policies, and infrastructure for public consumption. As of August 30, 2013 CAMPO began to embark upon an effort to collect bicycle and pedestrian count data at various locations in the region using the Eco-counter pyro-box device as shown below. The map and chart on the next page shows the locations that bicycle and pedestrian count data were gathered during the latter part of 2013 and early 2014.

Eco-counter Pyro-box and Assembly parts
Count data was gathered at various locations under varied weather conditions depending upon the season. Initial counting periods lasted between five and eight days. As the weather turned cooler counting periods extended to two weeks to as long as one month. As expected, bicycle and pedestrian activity was greater during favorable weather conditions. Two of the count locations, which were downtown Raleigh (midblock of Fayetteville Street between Hargett and Martin Streets) and downtown Apex (at the North Salem Street site), had the highest counts due to the urban characteristics of those centers as well as the community activities that they support.

Based on the data gathered, as well as reviewing literature from other communities across the nation, CAMPO staff believes that useful bicycle\pedestrian count equipment should be installed at a determined location for a minimum of seven days. Depending upon the season, count equipment, which carefully monitored, can remain installed at a location for up to three and four weeks. Currently, Wake County alone has over 100 miles of greenways and trails. With the encouragement of "Complete Street" policies on the state and local level, mixed-used development in towns and cities, and a favorable attitude toward bicycle and pedestrian accommodations by the general public, CAMPO and its constituent local governments should be encouraged to invest in data counting equipment to evaluate the benefits of bicycle and pedestrian accommodations, and to determine the need for bicycle and pedestrian accommodations within the transportation network. Also, the counter gives CAMPO good data about the average daily use of bicycle and pedestrian traffic that was previously unavailable. This same data is requested within the SPOT prioritization process.


Eco-counter device on site at Reedy Creek Greenway

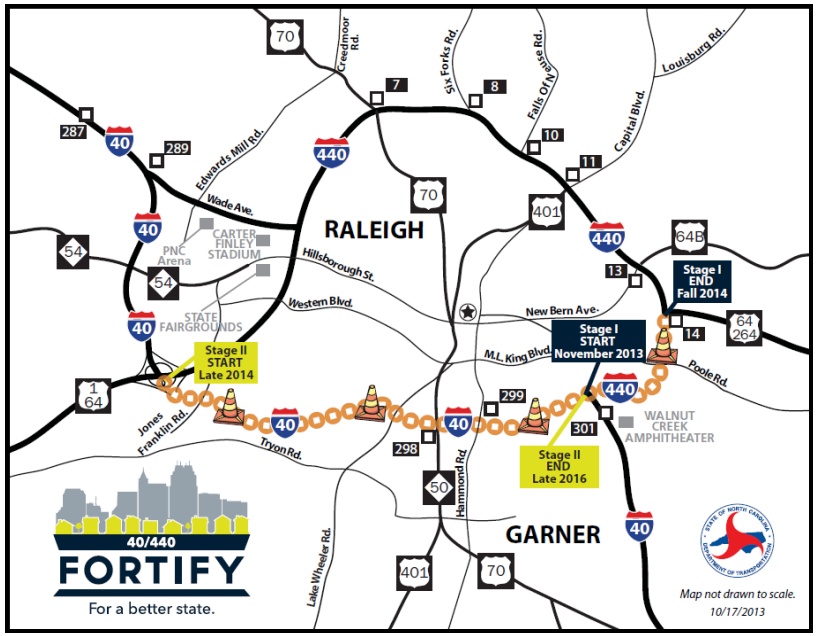
2013-2014 PEDESTRIAN/BICYCLE COUNT LOCATIONS & DATA



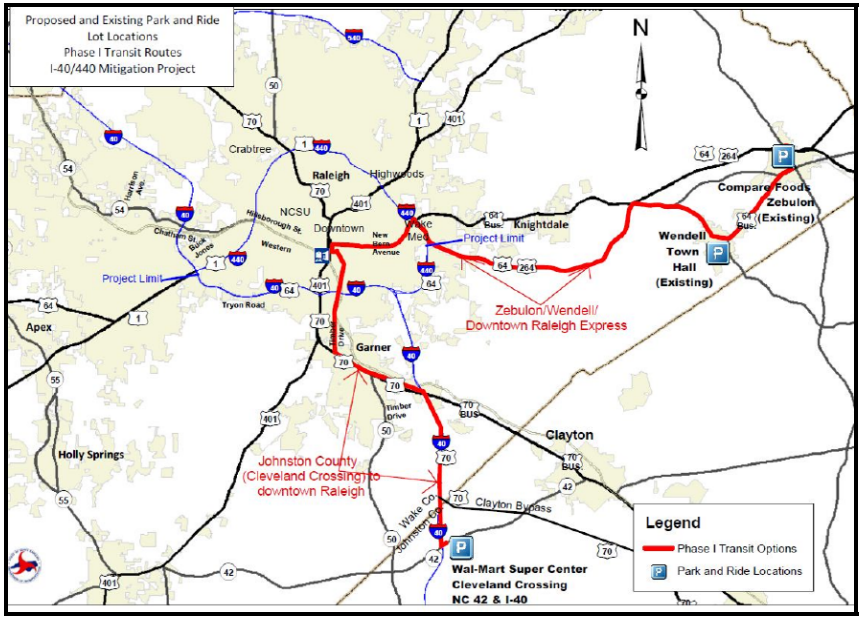
	COUNT DURATION	LOCATION OF COUNT	WEATHER	PED/BIKE COUNT
A	Aug. 28, 2013 - Sept. 4, 2013	Neuse River Greenway - At Buffalo Road Park	Sunny, Hot, Humid	3682
B	Sept. 12, 2013 - Sept. 20, 2013	House Creek Greenway - At Blue Ridge Road	Sunny, Hot, Humid	2420
C	Sept. 25, 2013 - Sept. 30, 2013	Fayetteville Street @ Midblock - Between Hargett and Martin Streets	Sunny, Seasonably warm, cool nights	50716
D	Nov. 4, 2013 - Nov. 18, 2013	Rocky Branch Greenway - Between Pullen Road and Ashe Avenue	Sunny, seasonable temp changes	1824
E	Nov. 18, 2013 - Dec 2, 2013	Neuse River Greenway - Upper Neuse location at Falls Lake Dam	Sunny, seasonable temp changes	3502
F	Dec 17, 2013 - Jan 6, 2014	Reedy Creek Greenway - At Meredith College Campus	Seasonable temp changes	2786
G	Jan 17, 2014 - February 7, 2014	North Salem Street - Downtown Apex, NC	Seasonable temp changes	10333
H	Feb 24, 2014 - March 24, 2014	Richland Creek Greenway - West of PNC Arena	Seasonable temp changes	3402

I-40/I-440 "Fortify" Project

The Fortify (also known as the I-40/I-440 Rebuild Traffic Mitigation) Project involves removing and replacing an 11.5-mile stretch of I-40 and I-440 to address immediate safety concerns. The Fortify Project Team was established in February 2013 to address traffic movement and the congestion to be expected during the reconstruction of both freeways through the southern portion of Raleigh from January 2014 to September 2016. The Team consists of staff members from NCDOT, Capital Area Transit, Cary Transit, Triangle Transit, and the Capital Area MPO. Subjects discussed during the meetings have addressed rail options, bus transit and vanpool options, bicycle/pedestrian options, and transportation demand management strategies. One of the major hurdles involves the process for funding and providing transit services. A series of TIP amendments may be necessary along with the execution of agreements between local governments and NCDOT. Coordination for the actual rebuild related work is ongoing and the Capital Area MPO TAC had approved a TIP amendment for the Fortify Project at their November 20, 2013 meeting.

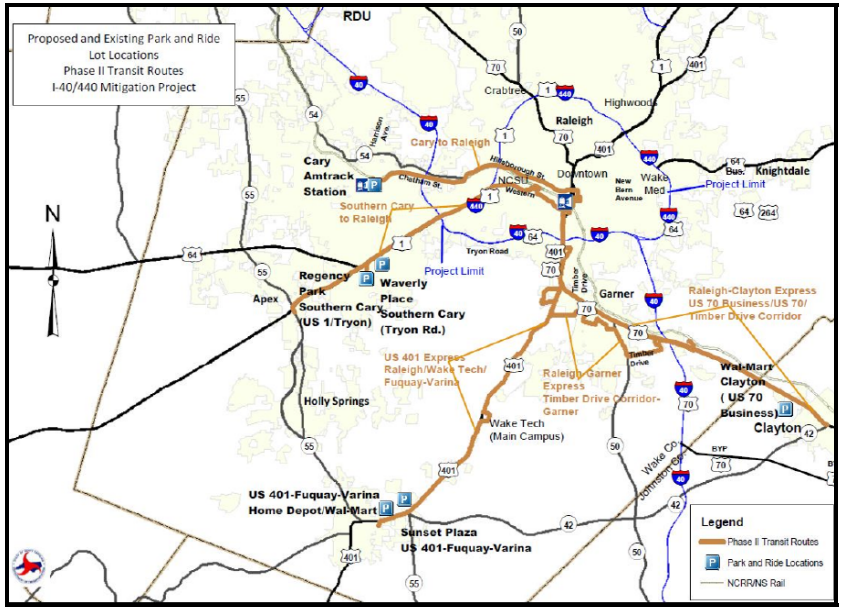


The attached map shows that the project will be constructed in two stages; with the first stage of work to occur on I-440 from the I-40/I-440/US 64 "split" to just north of the US 64 (Knightdale) Bypass. The second phase of the project will occur along I-40/I440 from the I-40/I-440/US 64 "split" to the US 1/US 64 interchange. Bus on Shoulder Service (BOSS), which was initiated along I-40 in Durham County in 2012, is now available from Raleigh on I-40 to Exit 312 in Johnston County.



A map showing the various transit routes are below or on the following page. Both Triangle Transit and Capita Area Transit are offering expanded transit coverage during both phases of the project. NCDOT has done an extensive job in publicizing this project through the website http://www.ncdot.gov/fortifync. The website addresses items from traffic pattern updates to the noted transit options. Meetings have occurred with NCDOT staff and staff members from Raleigh and Cary to address signal system timing for roads that access the "Fortify" project area. Outreach has been

made by NCDOT officials to local employers and the Regional Transportation Alliance (RTA) to ensure that there are minimal impacts upon businesses.



Public Health Costs of Traffic Congestion - Raleigh Area

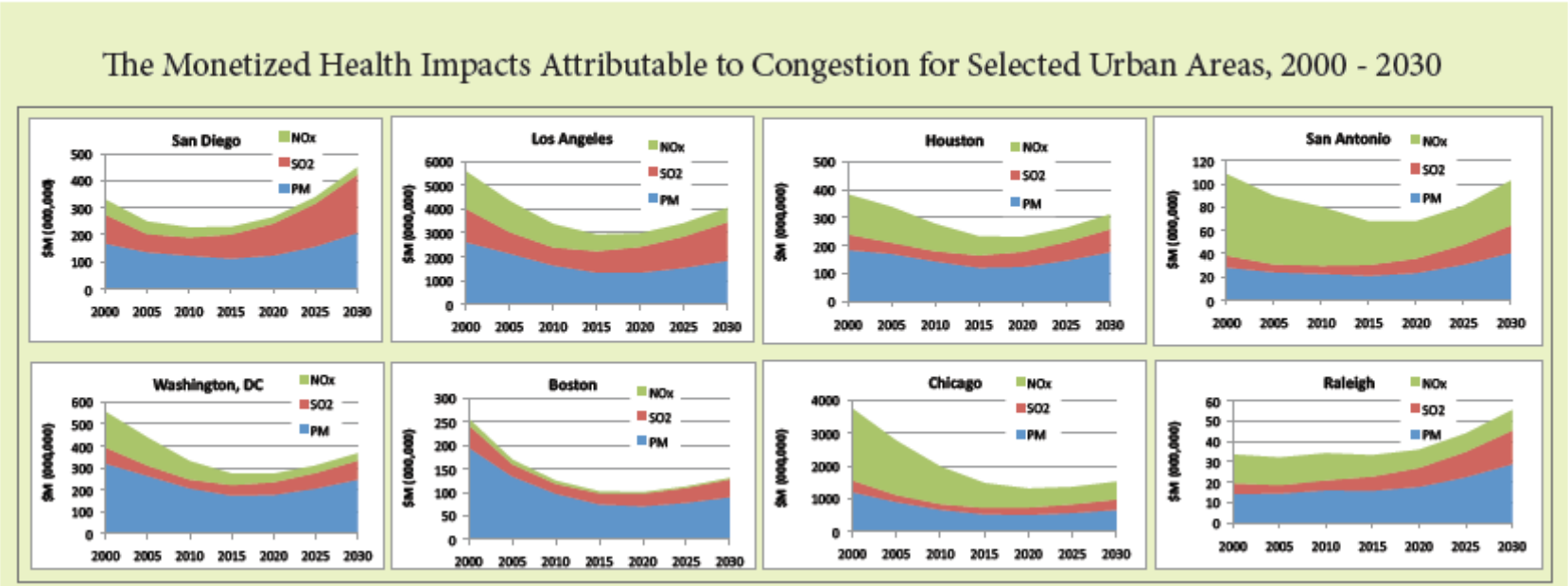
The Harvard Center for Risk Analysis, which is within the Harvard School of Public Health published an article featured in the May 25, 2011 edition of USA Today titled "The Public Health Costs of Traffic Congestion: A Health Risk Assessment". The article is based on a study led by Jonathan Levy, Katherine von Stackelberg, and Jonathan Buonocore. While there are previous analyses that estimate the economic costs of congestion based on fuel and time wasted; this study is believed to be the first to quantify and include the costs of potential public health impacts.

The study used models to estimate the amount of traffic congestion and fuel emission pollution in 83 of the nation's largest urban areas from 2000 to 2030, adjusting for anticipated emissions improvements over the next few years. The data was gathered from the Center for Urban Transportation Research (CUTR) at the University of Central Florida. They also used the MOBILE6 model developed by the US EPA to estimate city-specific emissions per VMT based on year, temperature profile, and average vehicle speed. Emissions are examined from the baseline year (2000) to 2030. The authors noted that premature deaths and the public health care costs associated with congestion have been declining slightly for a decade, but are expected to rise starting in 2030.

The results indicate that public health impacts of traffic congestion exist and should also be considered when evaluating long term policy alternatives for addressing congestion through transportation management and operational procedures such as congestion pricing, traffic incident management, signal synchronization, highway capacity expansion, and public transit capacity.

The City of Raleigh was highlighted in this study in both illustration and tabular form. Figure 2 as shown below is an illustration of "The Monetized Health Impacts Attributable to Congestion for Selected Urban Areas, 2000-2030" in which Raleigh is compared with other selected cities in the nation.

Figure 2



The article noted Raleigh in this way, "These trajectories differ as a function of differential population growth, congestion; population density and atmospheric chemistry. For example, monetized health impacts increase steadily over time in cities such as Raleigh NC and San Diego CA, in which VMT and population growth and significant and primary $PM_{2.5}$ makes a substantial contribution to health risk."

The tabled "Forecast Increase in Vehicle Miles Traveled - U.S. Urban Area Sample: 2000-2030" (which was sourced from the same article) notes Raleigh as having an increase in VMT of 11% between 2000 and 2005, and predicts an increase of 54% between 2000 and 2030. The researchers were careful to note that, "the estimates for individual urban areas are more uncertain than the overall estimated for all 83 urban areas combined, and should be interpreted with caution. The model does not capture the nuances and dynamics of each individual urban area."

Forecast Increase in Vehicle Miles Traveled - U.S. Urban Area Sample: 2000-2030

Urban Area	Percent VMT Increase					
	2000-2005	2000-2010	2000-2015	2000-2020	2000-2025	2000-2030
Atlanta, GA	7%	14%	19%	22%	24%	27%
Austin, TX	6%	12%	17%	21%	25%	29%
Columbia, SC	-2%	7%	15%	23%	31%	36%
Columbus, OH	-1%	2%	6%	10%	13%	17%
Minneapolis, MN	0%	5%	9%	14%	17%	20%
Nashville-Davidson, TN	-12%	-3%	4%	11%	17%	24%
Raleigh, NC	11%	28%	37%	43%	49%	54%
Richmond, VA	-4%	5%	14%	22%	31%	36%
Salt Lake City, UT	6%	17%	27%	35%	40%	45%
San Antonia, TX	5%	15%	22%	28%	35%	42%
San Diego, CA	1%	10%	15%	20%	26%	31%

Appendix A

Capital Area MPO Traffic Incident Management MOU

In September, 2012 the CAMPO TAC adopted the state of North Carolina's first MPO funded Incident Management Program. The goal of the program is to directly address strategies aimed at improving responder safety and safe, quick clearance of incidents.

The National Unified Goal for Traffic Incident Management includes strategies for improving:

- Responder safety;
- Safe, quick clearance; and
- Prompt, reliable, interoperable communications

The commitment by the TAC of $17,000 as funding for this program in FY 2012-2013 was used to accomplish the following:

- Incident Management Summit – August 15, 2013
- Establishment of the Incident Management Subcommittee – December 4, 2013

The first meeting of the Incident Management Subcommittee was held at the Lake Wheeler Park Conference Center on Friday, January 24, 2014. One of the items discussed included "Agreements and Understandings: Establishing cooperative efforts and procedures for handling traffic incidents in the region". The general consensus of the Subcommittee was to use the Florida version as a template for a Memorandum of Understanding (MOU) instead of the Massachusetts's version, which had to go through a lot of legal review. Furthermore, the Subcommittee added two appendices which were, "the North Carolina State Highway Patrol MOU for Quick Clearance" and Chapter 61 of the "Manual on Uniform Traffic Control Devices". Final edits and changes were wholly accepted by the Subcommittee; which turned its attention to outreach for the MOU. This final draft of the MOU was presented at the Wake County Law Enforcement Meeting on Wednesday, June 11, 2014; and the MOU was also presented to the County Fire Marshalls offices in Wake, Franklin, Granville, Hargett, and Johnston counties during the summer of 2014. The CAMPO Traffic Incident Management MOU was officially adopted by the Transportation Advisory Committee (TAC) on _____ __, 2014.

INTERAGENCY MEMORANDUM OF UNDERSTANDING FOR TRAFFIC INCIDENT MANAGEMENT

This Interagency Memorandum of Understanding for Traffic Incident Management is made this _____day of _____, 2014 by and between the North Carolina Department of Transportation (NCDOT), the Capital Area Metropolitan Planning Organization (CAMPO) and it's member counties and municipalities, and other area incident response agencies to provide guidance for the framework and protocols to promote a collaborative effort for Traffic Incident Management (TIM) within the CAMPO Planning Area, and to further refine and promote the TIM program within the Triangle Region.

WHEREAS, the National Traffic Incident Management Coalition (NTIMC) estimates that traffic incidents are the cause of about one-quarter of the congestion on US roadways, and that for every minute a freeway lane is blocked during a peak travel period, four minutes of travel delay results after the incident is cleared[1]; and

WHEREAS, responders to these incidents, both urban and rural, routinely face dangers at incidents and are sometimes victims of secondary crashes, as are other travelers; and

WHEREAS, the NCDOT has developed a Traffic Incident Management Plan to identify programs and actions to sustain the commitment to and expand the Traffic Incident Management Program in North Carolina to better meet the transportation needs of the Triangle Region and North Carolina; and

WHEREAS, the NCDOT has reached a milestone where the Department can now strengthen its already successful TIM Program to reach new levels of leadership and vision; and

WHEREAS, the CAMPO Transportation Advisory Committee, consisting of the elected officials of its member municipalities, realizing the economic and quality of life benefits that come from good Traffic Incident Management procedures and first responder agency cooperation, approved and funded an initiative to further refine and promote good Traffic Incident Management practices; and

WHEREAS, the Traffic Incident Management Program's future success will include increased agency member participation, an in depth understanding of stakeholder needs, a regional, statewide and national perspective on transportation management and operations, and credibility to lead the Traffic Incident Management community to achieve new goals; and

WHEREAS, all parties recognize and understand the importance of data and resource-sharing and public safety through efficient and timely use of good Traffic Incident Management;

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[1] NTIMC: *Benefits of Traffic Incident Management*, available online: http://www.ce.siue.edu/faculty/hzhou/Information%20CD/Menu%20Files/Materials/20-Managing%20Emergency%20Incidents%20on%20the%20Roadway/NTIMC_NUG%20Information/Benefits%20of%20TIM.pdf

NOW THERFORE, the NCDOT, the CAMPO, its member municipalities and other undersigned first responder agencies each agree to the following common goals, objectives, and guidelines, and to participate in collaborative efforts intended to advance the interest of the Traffic Incident Management program for the benefit of public safety.

Goal 1: Endorsement of the Statewide Quick Clearance Law.

TIM Objective:

The goal for roadway and incident scene clearance is to have all incidents cleared from the roadway within 90 minutes of the arrival of the first responding agency. By recognizing and understanding the importance of Quick Clearance, the undersigned parties, in partnership, agree to work toward meeting this goal.

The North Carolina Legislature has enacted specific legislation authorizing the immediate removal of vehicles and/or property which interfere with the regular flow of traffic. The North Carolina State Highway Patrol (NCSHP) and the NCDOT agreed to quickly clear incidents along the state's roadways as described in Attachment A. Attachment A is a Memorandum of Understanding based on NCGS 20-161(f), more commonly known as the Quick Clearance Law, which establishes a policy for NCSHP and NCDOT personnel to expedite the removal of vehicles, cargo, and debris from roadways on the State Highway System to restore, in an urgent manner, the safe and orderly flow of traffic following a motor vehicle crash or incident on North Carolina's roadways. This is done in an effort to minimize the potential personal injury and/or economic loss associated with disruptions to the regular flow of traffic.

Goal 2: Definition of Incident Scene Roles and Responsibilities.

TIM Objective:

This section provides the definition of the incident scene roles for participating agencies as established by the participating agencies themselves and based on National Incident Management System and Incident Command System guidance. Pursuant to current NIMS directives, the first arriving response units should establish a Command presence and set up Incident Command as deemed necessary. As personnel from an appropriate Lead Agency arrive, as dictated by the type/level of the incident, Command is transferred as necessary. Extended operations involving multiple response agencies should operate under the Unified Command concept. These roles and responsibilities should generally be allocated as follows, and pursuant to agency internal SOP and policies:

Appendix A

1. Law Enforcement

   Including State, County, City and Municipality Department of Law Enforcement

   A. Secures incident scene
   B. Assists responders in accessing the incident scene
   C. Establishes emergency access routes
   D. Controls arrival and departure of incident responders
   E. Polices perimeter of incident scene and impact area
   F. Conducts crash/crime scene investigation
   G. Authorizes vehicle movement/removal
   H. Performs traffic control
   I. Assumes role of Incident Commander, if appropriate
   J. Supports unified command, as necessary

2. Fire and Rescue

   Including State, County, Municipal and Local Fire and Rescue Departments (including career, volunteer, and combination)

   A. Protects incident scene
   B. Rescues/extricates victims
   C. Performs first responder duties
   D. Extinguishes fires
   E. Responds to and assesses incidents involving a hazardous materials release
   F. Contains or mitigates a hazardous materials release
   G. Performs traffic control, as appropriate
   H. Assumes role of Incident Commander, if appropriate
   I. Supports unified command, as necessary

3. Emergency Medical Services (EMS)

   Including State, County, Municipal and Local Medical Departments (including career, volunteer, and combination)

   A. Provides medical treatment to those injured at the incident scene
   B. Determines destination and transportation requirements for injured victims
   C. Transports victims for additional medical treatment
   D. Assumes role of Incident Commander, if appropriate
   E. Supports unified command, as necessary

4. Emergency Management Agencies

   Including State, County and City Emergency Operation Centers

   A. Coordinates government response and resources
   B. Provides technical expertise
   C. Provides evacuation recommendations
   D. Facilitates communication and coordination across jurisdictions
   E. Coordinates response from other State and Federal agencies
   F. Assumes role of Incident Commander, if appropriate

5. Environmental Agencies

   Including the Department of Environment and Natural Resources and other local agencies involved in spill response/clean up

   A. Provide technical expertise
   B. Ensure hazardous material releases are remediated properly
   C. Respond to and assess incidents involving hazardous materials
   D. Coordinate the responsible party response to the incident
   E. Supports unified command, as necessary

6. Transportation Agencies

   Including Highway Maintenance, Incident Management Patrols, Transportation Management Centers (TMC), and Metropolitan Planning Organization

   A. Protects incident scene
   B. Implements traffic control strategies and provides supporting resources
   C. Monitors traffic operations
   D. Disseminates motorist information
   E. Mitigates incidental vehicle fluid spill confined to the roadway. Assist with damming/diking where conditions allow. (IMAP/County Maintenance)
   F. Assists with incident and Quick Clearance activities (IMAP/County Maintenance)
   G. May perform first responder duties (IMAP)
   H. Clears minor incidents (IMAP)
   I. Performs incident detection and verification (IMAP/TMC)
   J. Develops and operates alternate routes (TMC/IMAP/County Maintenance)
   K. Assesses and performs emergency roadwork and infrastructure repair
   L. Assumes role of Incident Commander, if appropriate
   M. Supports unified command, as necessary

7. Towing and Recovery

   A. Recovers vehicles and cargoes
   B. Removes disabled or wrecked vehicles and debris from incident scene
   C. Mitigates non-hazardous material (cargo) spills
   D. Supports unified command, as necessary

Goal 3: Establishment of a local incident scene Lighting Guideline.

TIM Objective:

The creation of internal Lighting Guidelines establishes the on-scene lighting procedures developed with the guidance of the 2012 Manual on Uniform Traffic Control Devices (MUTCD) Section 6I.05 shown in Attachment B.

Public safety agencies should examine their policies and guidelines on the use of emergency-vehicle lighting, especially after a traffic incident scene is secured, with the intent of reducing the use of this lighting as much as possible while not endangering those at the scene. Special

consideration should be given to reducing or extinguishing forward facing emergency-vehicle lighting, especially on divided roadways, to reduce distractions to oncoming road users.

Public safety agencies should consider turning off vehicle headlights at night when not needed for illumination or to provide notice to other road users of the incident response vehicle being in an unexpected location.

By recognizing and understanding the importance appropriate lighting discipline at incident scenes to reduce unintended negative impacts to the vision of approaching drivers, and to minimize distractions for approaching drivers, participating agencies agree to consider restricting the use of incident scene lighting as described herein.

Goal 4: Establishment of a local incident Communication Guideline.

TIM Objective:

Participating agencies understand the need for common on scene communications. With that in mind, all participating agencies will work toward the development of a common communications plan to include local and state partners as well as appropriate non-governmental agencies.

This MOU is not intended to be a binding legal document, and no party will have any legal rights of enforcement hereunder. There are no third party beneficiaries to this MOU. Nothing in this MOU shall create or give to third parties any claim or right of action against an undersigned party.

In witness whereof, the parties of this Capital Area MPO Traffic Incident Management Memorandum of Understanding have been authorized by appropriate and proper resolutions to sign the same, The Town of Angier by its Mayor, the Town of Apex by its Mayor, the Town of Archer Lodge by its Mayor, the Town of Bunn by its Mayor, the Town of Cary by its Mayor, the Town of Clayton by its Mayor, the City of Creedmoor by its Mayor, the Town of Franklinton by its Mayor, the Town of Fuquay-Varina by its Mayor, the Town of Garner by its Mayor, the Town of Holly Springs by its Mayor, the Town of Knightdale by its Mayor, the Town of Morrisville by its Mayor, the City of Raleigh by its Manager, the Town of Rolesville by its Mayor, the Town of Wake Forest by its Mayor, the Town of Wendell by its Mayor, the Town of Youngsville by its Mayor, the Town of Zebulon by its Mayor, the RDU Airport Authority by its Chief Executive Officer, Franklin County by its Chairman of the Board of Commissioners, Granville County by its Chairman of the Board of Commissioners, Harnett County by its Chairman of the Board of Commissioners, Johnston County by its Chairman of the Board of Commissioners, Wake County by its Chairman of the Board of Commissioners, and by the Secretary of Transportation on behalf of the Governor of the State of North Carolina and the North Carolina Department of Transportation, this the _____ day of _____, 2014.

[SIGNATURE PAGES TO FOLLOW]

Appendix A

INTERAGENCY MEMORANDUM OF UNDERSTANDING
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISON OF HIGHWAYS
NORTH CAROLINA DEPARTMENT OF CRIME CONTROL AND PUBLIC SAFETY
DIVISON OF STATE HIGHWAY PATROL

REMOVAL OF VEHICLES FROM ROADWAY

This memorandum of understanding made this 1ST day of JUNE, 2011 by and between the North Carolina Department of Transportation (NCDOT) and the North Carolina State Highway Patrol (SHP) is to provide guidance for implementation of the Quick Clearance provision of N.C.G.S. 20-161(f) on the State highway system.

WHEREAS, in an effort to minimize the potential personal injury and/or economic loss associated with disruptions to the regular flow of traffic, the North Carolina Legislature has enacted specific legislation authorizing the immediate removal (Quick Clearance) of vehicles and/or property which interfere with the regular flow of traffic or otherwise constitute a hazard on the State highway system; and

WHEREAS, the parties herein recognize the potential hazards and economic loss that may occur from wrecked, abandoned, disabled, unattended, burned, or partially dismantled vehicles, cargo, or other personal property on the State highway system when such occurrence or condition interferes with the regular flow of traffic; and

WHEREAS, the North Carolina Legislature has vested in investigating law enforcement officers the authority to immediately remove or cause to be removed such vehicles or property only when such vehicle or property interferes with the regular flow of traffic or otherwise constitutes a hazard and when done in conjunction with the concurrence of the North Carolina Department of Transportation;

NOW THEREFORE, the North Carolina Department of Transportation and State Highway Patrol each agree to the following described guidelines and delineation of specific authority and obligations in order to implement the provisions of the Quick Clearance legislation.

I. General:

Whenever a state highway is closed or partially blocked by a wrecked, abandoned, disabled, unattended, burned, or partially dismantled vehicle, cargo, or other personal property, the priority shall be to clear the road and reopen the roadway as soon as possible. It is understood that damage to vehicles and / or cargo may occur as a result of clearing the road on an urgent basis. Nonetheless, while reasonable attempts to avoid such damage should be taken, the highest priority is public safety. Additionally, while consideration for the vehicle and /or owner's preference for utilization of a wrecker service and related service providers and for the integrity of the power unit, trailer and cargo are not to be ignored in every circumstance, public safety and convenience of the motoring public shall be paramount. Consistent with this public safety and motoring public priority, the following procedure is hereby established.

Appendix A

II. SHP Duties and Responsibilities

Members and officers of the North Carolina Highway Patrol who respond to any of the above-described conditions (vehicle wrecks, spilled cargo, etc) on the State highway system must make an initial assessment of the scene and determine whether the Quick Clearance provisions of N.C.G.S. 20-161(f) are appropriate.

While it is understandable that vehicle and cargo owners may desire extreme measures be taken to protect their property from further damage, such measures may not be prudent if it is a time consuming endeavor that will require restricting the flow of traffic or may constitute a hazardous situation. In such cases, the authority of N.C.G.S. 20-161(f) should be utilized to get the vehicles and cargo off the road so that the flow of traffic may resume in a timely manner.

Consistent with the need to get the highway open, if required, members and officers of the State Highway Patrol will conduct their required investigation in as expedient a manner as possible, considering the severity of the collision and the need to maintain a high quality investigation. This may mean that certain "non-critical" portions of an investigation be conducted at a later time when traffic congestion is non-existent (i.e., non-peak periods). However, in the event of a motor vehicle wreck or other occurrence involving death or serious personal injury, no removal shall occur until the investigating member or officer determines that adequate information has been obtained for preparation of a crash report (DMV-349).

With the concurrence of the Division Engineer or his representative, the investigating member or officer may initiate appropriate steps to immediately clear the road of vehicles, cargo and other obstructions and debris consistent with this MOU and N.C.G.S. 20-161(f). In order to accomplish this task, the investigating member or officer may request the assistance of the Division Engineer or his representative and may utilize the services of immediately available rotation wrecker firms, the closest available rotation wrecker firm and/or available DOT resources. For major lane blocking or traffic disruption related incidents, such as overturned tractor trailers, hazardous material spills, fatal investigations or multi-vehicle wrecks, contact should be made with the NCDOT State Traffic Operations Center (STOC) at 877-627-7862 (877-NCS-STOC). If concurrence between NCDOT and SHP is given, the STOC can assist with the coordination of detours, traveler information, traffic conditions and contacting appropriate towing and recovery resources.

III. Procedure / Requirements – NCDOT

A. General

By signing this memorandum of understating, SHP concurs that for minor incidents, such as abandoned or disabled vehicles and minor crashes that occur on the paved or main-traveled portion of any highway that IMAP service patrols, if available, may properly mark the location of vehicles, assist in traffic control and/or relocate vehicles to a non-hazardous location without additional concurrence for Quick Clearance from the Highway Patrol. In cases where abandoned or disabled vehicles are left in a non-hazardous position off the roadway, the vehicles may be tagged and removed after 24 hours by the Highway Patrol, IMAP, or another law enforcement agency. IMAP shall contact SHP communications with the vehicle's tag and VIN

information so that proper investigation can be performed. In the event that IMAP tags a vehicle and it is later towed based on IMAP's time stamp, litigation or complaints that arise due to elapsed time issues will be borne by NCDOT and/or their Attorney General's office.

NCDOT will make every effort to ensure that there are designated on-duty personnel with the authority and expertise to grant the necessary concurrence to put into effect the Quick Clearance procedures described herein.

NCDOT will make every effort to ensure that each Highway Patrol Troop Communications Center is kept apprised of all necessary recall numbers for on-duty personnel responsible for implementing Quick Clearance procedures. This information will be also readily available at the STOC at 877-627-7862.

NCDOT will make every effort to cooperate with the Highway Patrol in responding to all major incidents and in determining whether and to what extent the Quick Clearance procedures authorized by N.C.G.S. 20-161(f) is warranted. For major incidents where Quick Clearance occurs or other issues arise, NCDOT will perform after incident reviews to discuss positive and/or negative effects of decisions made at the incident scene.

In any case where a determination is made that the use of NCDOT equipment is the most expedient and prudent manner in which to move vehicles, cargo or other personal property, NCDOT will make every effort to relocate cargo or other personal property in the shortest possible time, using whatever equipment is necessary. All such materials will be relocated as short a distance as necessary to clear the travel lanes or otherwise avoid any traffic hazard.

In any case where NCDOT personnel and equipment are used to clear a highway pursuant to the provisions of this MOU, the Division Engineer or his representative shall prepare a list of the personnel, materials, traffic control devices, and equipment used and the work hours involved so that the party responsible or owner of the vehicle and / or cargo can be billed for the work pursuant to the provisions of N.C.G.S. 20-161(g).

B. Hazardous / Flammable / Exploding Materials

No attempt shall be made by NCDOT personnel to move any hazardous, flammable, or explosive materials for any reason. If NCDOT is first on the scene and cargo content is not readily identifiable, the Division Engineer or his representative will contact the proper authorities to ascertain if special measures should be taken.

Only after the load has been identified and appropriate Haz Mat precautions and/or clean up procedures have been completed shall the Quick-Clearance measures described herein be adhered to.

IV. Public Safety Priority:

As indicated above, this MOU reflects the understanding and agreement of NCDOT and SHP that public safety must be afforded the highest priority in reopening traffic lanes

blocked by motor vehicle crashes or other incident. Further, utilization of the Quick Clearance procedures authorized by N.C.G.S. 20-161 to expeditiously remove vehicles and cargo blocking highways, and thereby creating a safety hazard, may require the utilization of available resources and should immediately be put into effect.

Appropriate NCDOT and SHP personnel shall review this MOU on an as needed basis to determine if any modifications are necessary.

In Witness Whereof, each party hereto has caused this agreement to be executed in its name and on its behalf by its duly authorized officer or agent as of this day and year first above written.

Reuben F. Young
Secretary
North Carolina Crime Control
and Public Safety

Eugene A. Conti, Jr.
Secretary
North Carolina Department of Transportation

Michael W. Gilchrist
Colonel
North Carolina State Highway Patrol

Terry R. Gibson, P.E.
State Highway Administrator
North Carolina Department of Transportation

Attachment B

Include other applicable standards and/or references such as MUTCD standards for reduced lighting and NIMS Directive for ICS.

Appendix A

U.S. Department of Transportation
Federal Highway Administration

FHWA Home | Feedback

Manual on Uniform Traffic Control Devices (MUTCD)

Knowledge

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2009 Edition Chapter 6I. Control Of Traffic Through Traffic Incident Management Areas

Section 6I.01 General

Support:

01 The National Incident Management System (NIMS) requires the use of the Incident Command System (ICS) at traffic incident management scenes.

02 A traffic incident is an emergency road user occurrence, a natural disaster, or other unplanned event that affects or impedes the normal flow of traffic.

03 A traffic incident management area is an area of a highway where temporary traffic controls are installed, as authorized by a public authority or the official having jurisdiction of the roadway, in response to a road user incident, natural disaster, hazardous material spill, or other unplanned incident. It is a type of TTC zone and extends from the first warning device (such as a sign, light, or cone) to the last TTC device or to a point where vehicles return to the original lane alignment and are clear of the incident.

04 Traffic incidents can be divided into three general classes of duration, each of which has unique traffic control characteristics and needs. These classes are:

A. Major—expected duration of more than 2 hours,
B. Intermediate—expected duration of 30 minutes to 2 hours, and
C. Minor—expected duration under 30 minutes.

05 The primary functions of TTC at a traffic incident management area are to inform road users of the incident and to provide guidance information on the path to follow through the incident area. Alerting road users and establishing a well defined path to guide road users through the incident area will serve to protect the incident responders and those involved in working at the incident scene and will aid in moving road users expeditiously past or around the traffic incident, will reduce the likelihood of secondary traffic crashes, and will preclude unnecessary use of the surrounding local road system. Examples include a stalled vehicle blocking a lane, a traffic crash blocking the traveled way, a hazardous material spill along a highway, and natural disasters such as floods and severe storm damage.

Guidance:

06 *In order to reduce response time for traffic incidents, highway agencies, appropriate public safety agencies (law enforcement, fire and rescue, emergency communications, emergency medical, and other emergency management), and private sector responders (towing and recovery and hazardous materials contractors) should mutually plan for occurrences of traffic incidents along the major and heavily traveled highway and street system.*

07 *On-scene responder organizations should train their personnel in TTC practices for accomplishing their tasks in and near traffic and in the requirements for traffic incident management contained in this Manual. On-scene responders should take measures to move the incident off the traveled roadway or to provide for appropriate warning. All on-scene responders and news media personnel should constantly be aware of their visibility to oncoming traffic and wear high-visibility apparel.*

08 *Emergency vehicles should be safe-positioned (see definition in Section 1A.13) such that traffic flow through the incident scene is optimized. All emergency vehicles that subsequently arrive should be positioned in a manner that does not interfere with the established temporary traffic flow.*

09 *Responders arriving at a traffic incident should estimate the magnitude of the traffic incident, the expected time duration of the traffic incident, and the expected vehicle queue length, and then should set up the appropriate temporary traffic controls for these estimates.*

Option:
10 Warning and guide signs used for TTC traffic incident management situations may have a black legend and border on a fluorescent pink background (see Figure 6I-1).

Figure 6I-1 Examples of Traffic Incident Management Area Signs

Support:
11 While some traffic incidents might be anticipated and planned for, emergencies and disasters might pose more severe and unpredictable problems. The ability to quickly install proper temporary traffic controls might greatly reduce the effects of an incident, such as secondary crashes or excessive traffic delays. An essential part of fire, rescue, spill clean-up, highway agency, and enforcement activities is the proper control of road users through the traffic incident management area in order to protect responders, victims, and other personnel at the site. These operations might need corroborating legislative authority for the implementation and enforcement of appropriate road user regulations, parking controls, and speed zoning. It is desirable for these statutes to provide sufficient flexibility in the authority for, and implementation of, TTC to respond to the needs of changing conditions found in traffic incident management areas.

Option:
12 For traffic incidents, particularly those of an emergency nature, TTC devices on hand may be used for the initial response as long as they do not themselves create unnecessary additional hazards.

Section 6I.02 Major Traffic Incidents

Support:
01 Major traffic incidents are typically traffic incidents involving hazardous materials, fatal traffic crashes involving numerous vehicles, and other natural or man-made disasters. These traffic incidents typically involve closing all or part of a roadway facility for a period exceeding 2 hours.

Guidance:
02 *If the traffic incident is anticipated to last more than 24 hours, applicable procedures and devices set forth in other Chapters of Part 6 should be used.*

Support:
03 A road closure can be caused by a traffic incident such as a road user crash that blocks the traveled way. Road users are usually diverted through lane shifts or detoured around the traffic incident and back to the original roadway. A combination of traffic engineering and enforcement preparations is needed to determine the detour route, and to install, maintain or operate, and then to remove the necessary traffic control devices when the detour is terminated. Large trucks are a significant concern in such a detour, especially when detouring them from a controlled-access roadway onto local or arterial streets.

04 During traffic incidents, large trucks might need to follow a route separate from that of automobiles because of bridge, weight, clearance, or geometric restrictions. Also, vehicles carrying hazardous material might need to follow a different route from other vehicles.

05 Some traffic incidents such as hazardous material spills might require closure of an entire highway. Through road users must have adequate guidance around the traffic incident. Maintaining good public relations is desirable. The cooperation of the news media in publicizing the existence of, and reasons for, traffic incident management areas and their TTC can be of great assistance in keeping road users and the general public well informed.

06 The establishment, maintenance, and prompt removal of lane diversions can be effectively managed by interagency planning that includes representatives of highway and public safety agencies.

Guidance:
07 *All traffic control devices needed to set up the TTC at a traffic incident should be available so that they can be readily deployed for all major traffic incidents. The TTC should include the proper traffic diversions, tapered lane closures, and upstream warning devices to alert traffic approaching the queue and to encourage early diversion to an appropriate alternative route.*

08 *Attention should be paid to the upstream end of the traffic queue such that warning is given to road users approaching the back of the queue.*

09 *If manual traffic control is needed, it should be provided by qualified flaggers or uniformed law enforcement officers.*

Option:
10 If flaggers are used to provide traffic control for an incident management situation, the flaggers may use appropriate traffic control devices that are readily available or that can be brought to the traffic incident scene on short notice.

Guidance:
11 *When light sticks or flares are used to establish the initial traffic control at incident scenes, channelizing devices (see Section 6F.63) should be installed as soon thereafter as practical.*

Option:
12 The light sticks or flares may remain in place if they are being used to supplement the channelizing devices.

Guidance:
13 *The light sticks, flares, and channelizing devices should be removed after the incident is terminated.*

Appendix A

Section 6I.03 Intermediate Traffic Incidents

Support:
01 Intermediate traffic incidents typically affect travel lanes for a time period of 30 minutes to 2 hours, and usually require traffic control on the scene to divert road users past the blockage. Full roadway closures might be needed for short periods during traffic incident clearance to allow traffic incident responders to accomplish their tasks.

02 The establishment, maintenance, and prompt removal of lane diversions can be effectively managed by interagency planning that includes representatives of highway and public safety agencies.

Guidance:
03 *All traffic control devices needed to set up the TTC at a traffic incident should be available so that they can be readily deployed for intermediate traffic incidents. The TTC should include the proper traffic diversions, tapered lane closures, and upstream warning devices to alert traffic approaching the queue and to encourage early diversion to an appropriate alternative route.*

04 *Attention should be paid to the upstream end of the traffic queue such that warning is given to road users approaching the back of the queue.*

05 *If manual traffic control is needed, it should be provided by qualified flaggers or uniformed law enforcement officers.*

Option:
06 If flaggers are used to provide traffic control for an incident management situation, the flaggers may use appropriate traffic control devices that are readily available or that can be brought to the traffic incident scene on short notice.

Guidance:
07 *When light sticks or flares are used to establish the initial traffic control at incident scenes, channelizing devices (see Section 6F.63) should be installed as soon thereafter as practical.*

Option:
08 The light sticks or flares may remain in place if they are being used to supplement the channelizing devices.

Guidance:
09 *The light sticks, flares, and channelizing devices should be removed after the incident is terminated.*

Section 6I.04 Minor Traffic Incidents

Support:
01 Minor traffic incidents are typically disabled vehicles and minor crashes that result in lane closures of less than 30 minutes. On-scene responders are typically law enforcement and towing companies, and occasionally highway agency service patrol vehicles.

02 Diversion of traffic into other lanes is often not needed or is needed only briefly. It is not generally possible or practical to set up a lane closure with traffic control devices for a minor traffic incident. Traffic control is the responsibility of on-scene responders.

Guidance:
03 *When a minor traffic incident blocks a travel lane, it should be removed from that lane to the shoulder as quickly as possible.*

Appendix A

Section 6I.05 Use of Emergency-Vehicle Lighting

Support:

01 The use of emergency-vehicle lighting (such as high-intensity rotating, flashing, oscillating, or strobe lights) is essential, especially in the initial stages of a traffic incident, for the safety of emergency responders and persons involved in the traffic incident, as well as road users approaching the traffic incident. Emergency-vehicle lighting, however, provides warning only and provides no effective traffic control. The use of too many lights at an incident scene can be distracting and can create confusion for approaching road users, especially at night. Road users approaching the traffic incident from the opposite direction on a divided facility are often distracted by emergency-vehicle lighting and slow their vehicles to look at the traffic incident posing a hazard to themselves and others traveling in their direction.

02 The use of emergency-vehicle lighting can be reduced if good traffic control has been established at a traffic incident scene. This is especially true for major traffic incidents that might involve a number of emergency vehicles. If good traffic control is established through placement of advanced warning signs and traffic control devices to divert or detour traffic, then public safety agencies can perform their tasks on scene with minimal emergency-vehicle lighting.

Guidance:

03 *Public safety agencies should examine their policies on the use of emergency-vehicle lighting, especially after a traffic incident scene is secured, with the intent of reducing the use of this lighting as much as possible while not endangering those at the scene. Special consideration should be given to reducing or extinguishing forward facing emergency-vehicle lighting, especially on divided roadways, to reduce distractions to oncoming road users.*

04 *Because the glare from floodlights or vehicle headlights can impair the nighttime vision of approaching road users, any floodlights or vehicle headlights that are not needed for illumination, or to provide notice to other road users of an incident response vehicle being in an unexpected location, should be turned off at night.*

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FHWA

APPENDIX B

Maps and spiral graphs of Top 10 Area Bottlenecks (Quarterly)

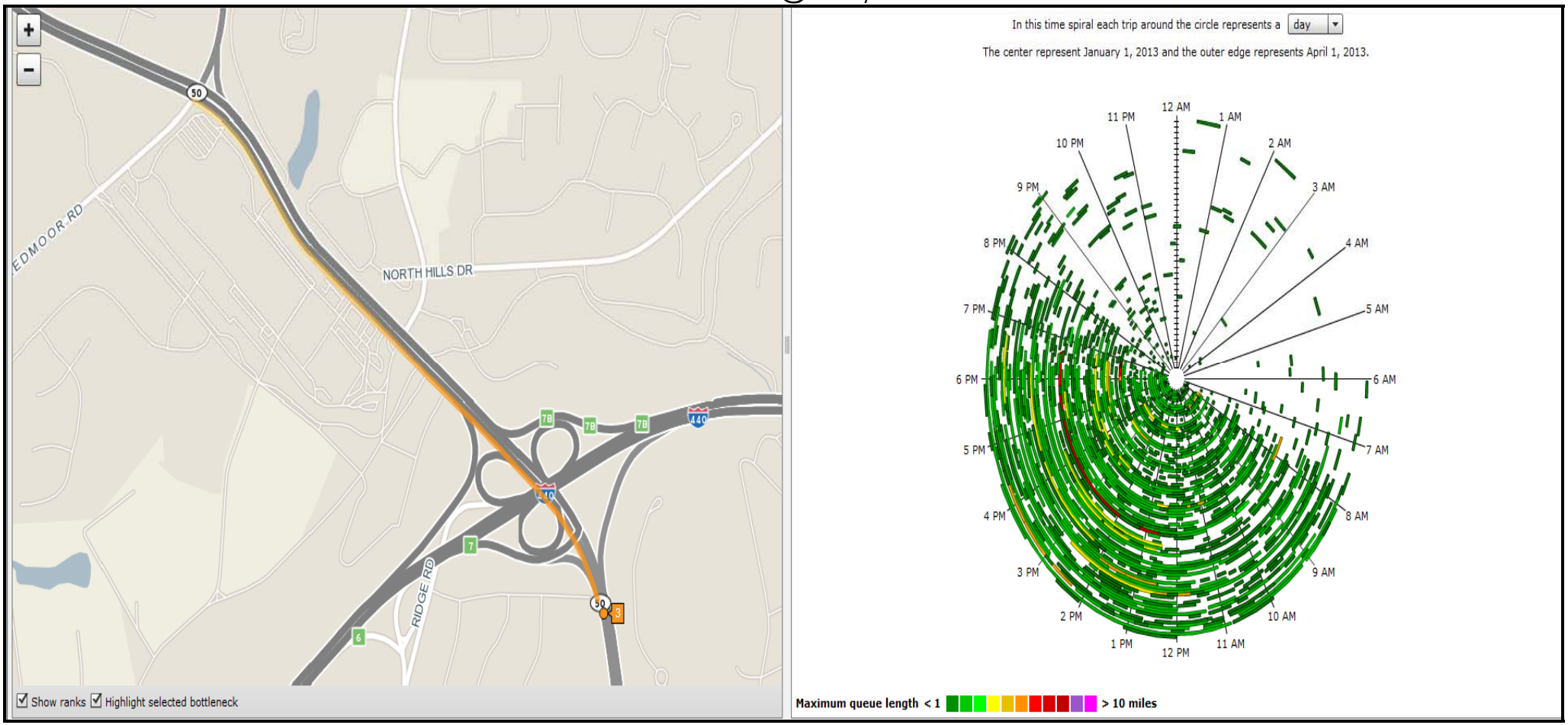
The following pages are maps and spiral graphs of the top 10 bottlenecks for each quarter in 2013 as discussed earlier in the Report. Each page will include the map and spiral graph associated with the specific bottleneck during that particular quarter. Please give careful attention to the occurrences associated in the spiral graphs that are identified for the bottlenecks.

APPENDIX B

APPENDIX B

First Quarter - January 1 through March 31, 2013

#1 – US-70 E @ I-440/US-1



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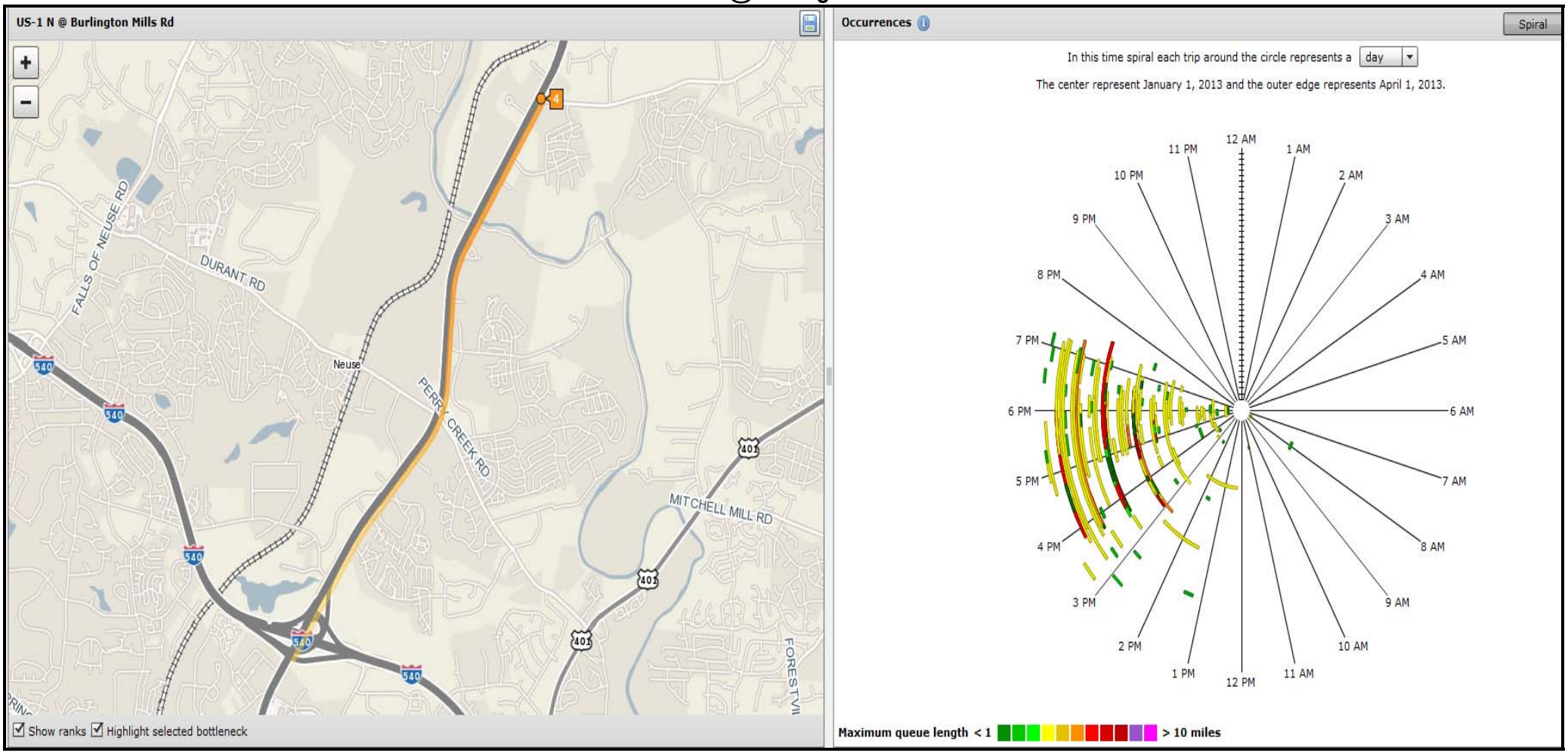
First Quarter

#2 – US-1 N @ Burlington Mills Rd



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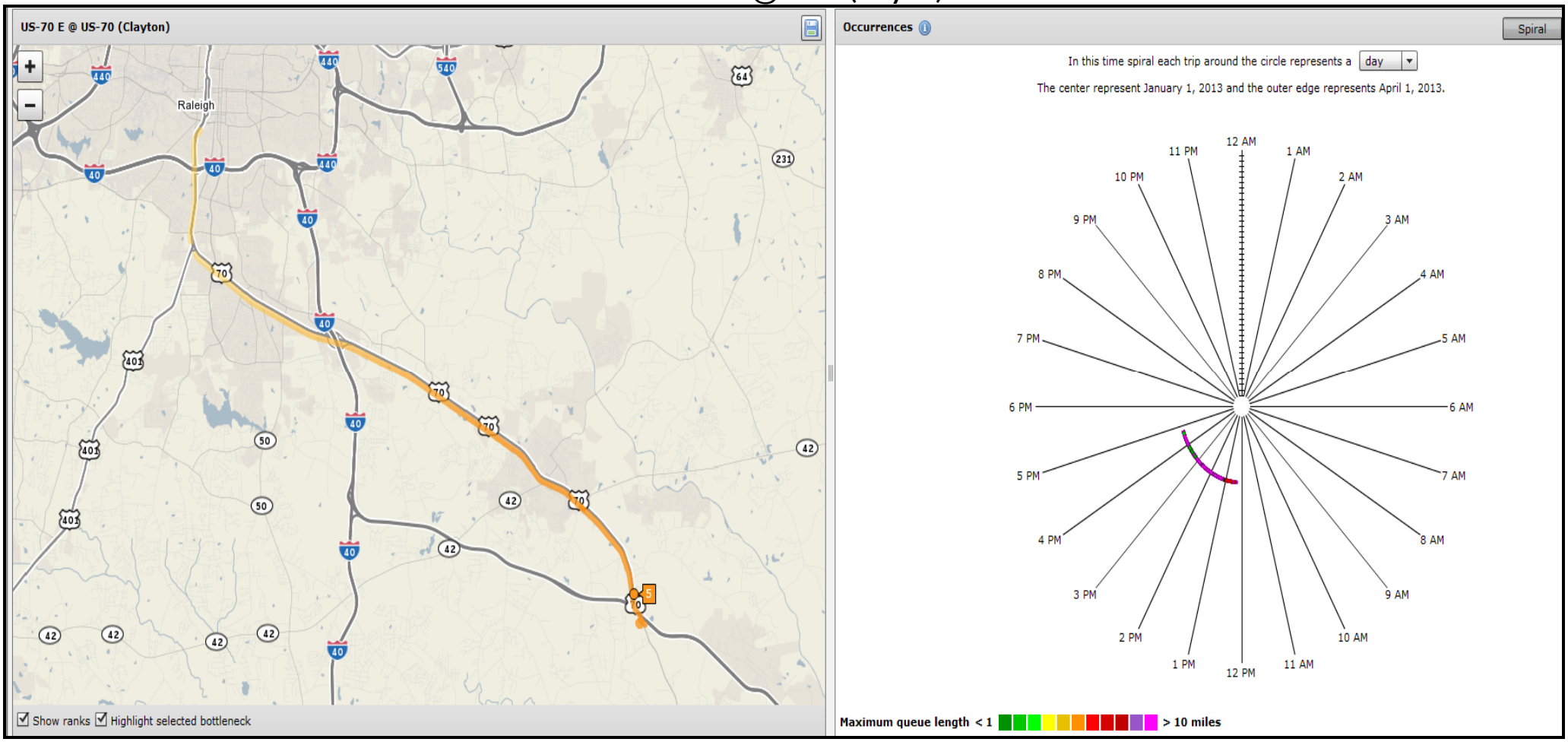
#3 – US-70 E @ US-70 (Clayton)



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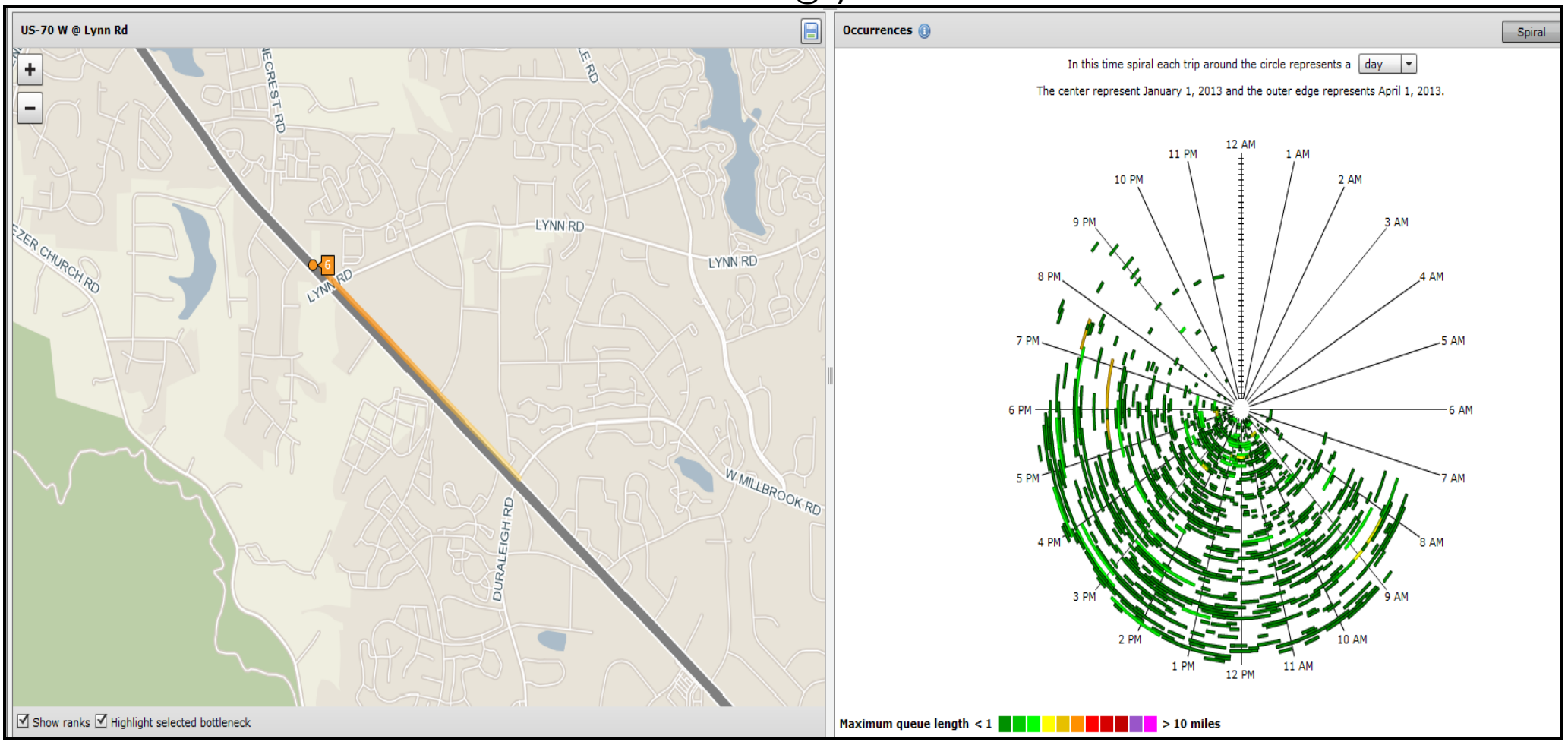
First Quarter

#4 – US-70 W @ Lynn Rd



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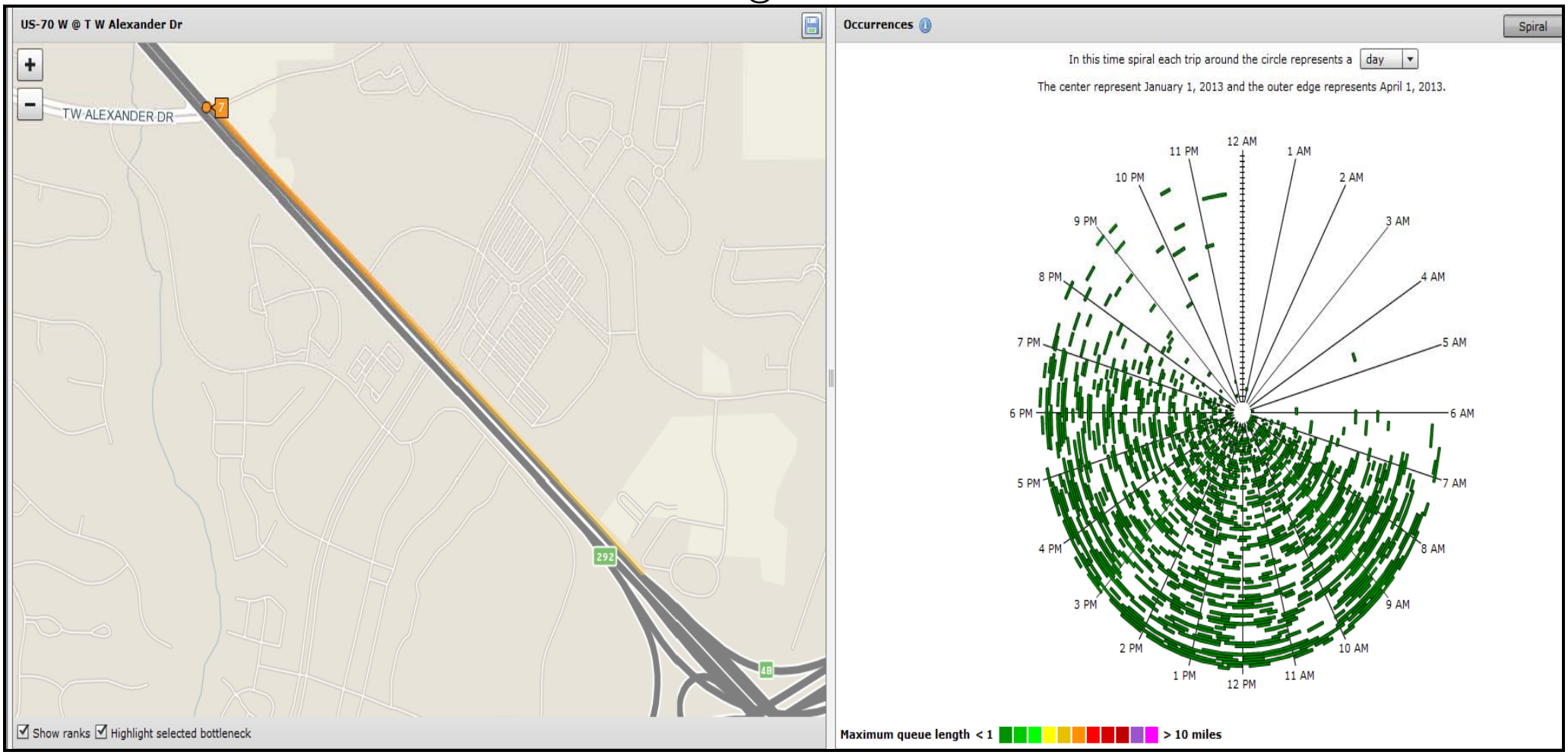
First Quarter

#5 – US-70 W @ T W Alexander Dr



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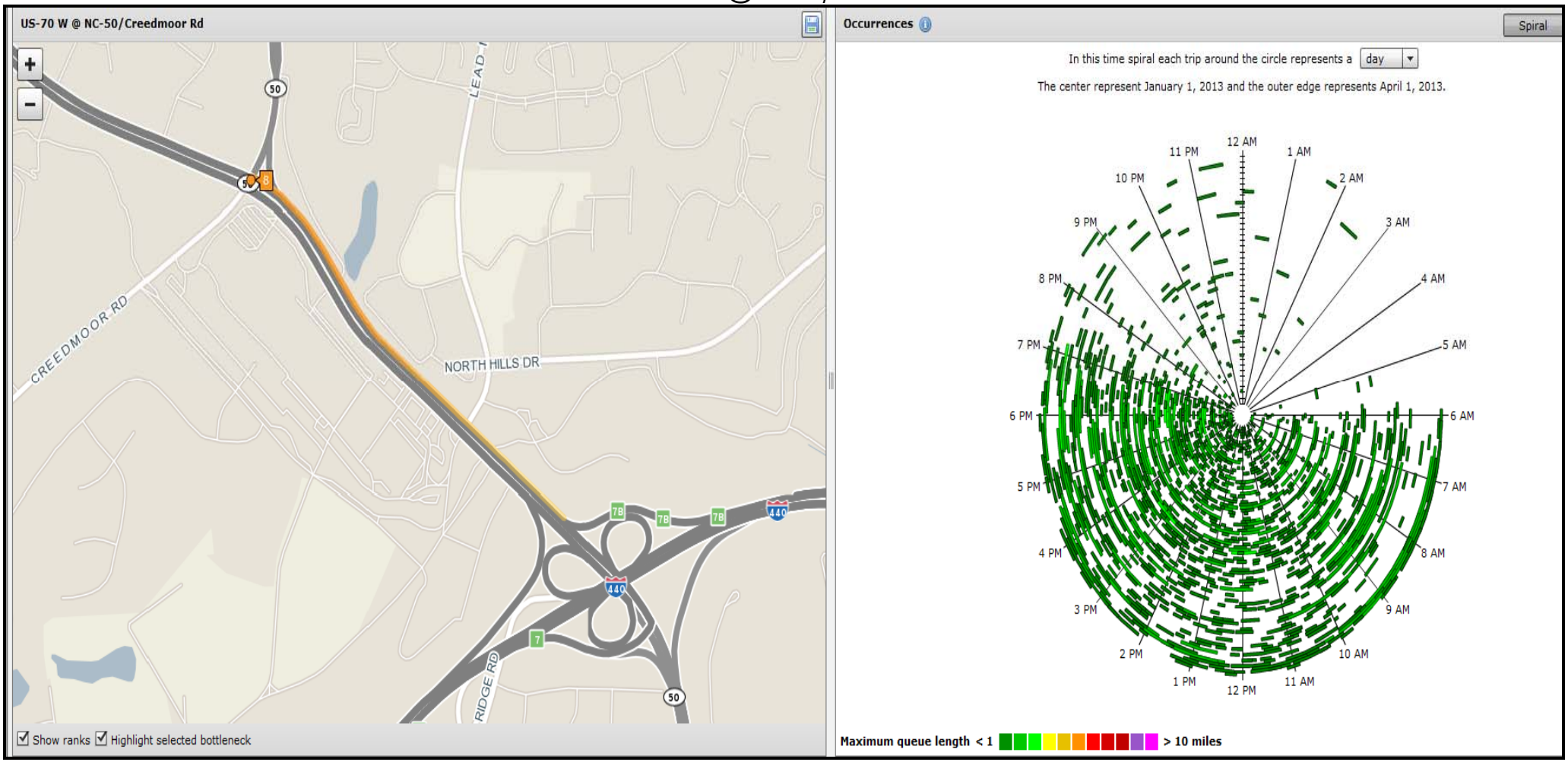
First Quarter

#6 – US-70 W @ NC-50/Creedmoor Rd



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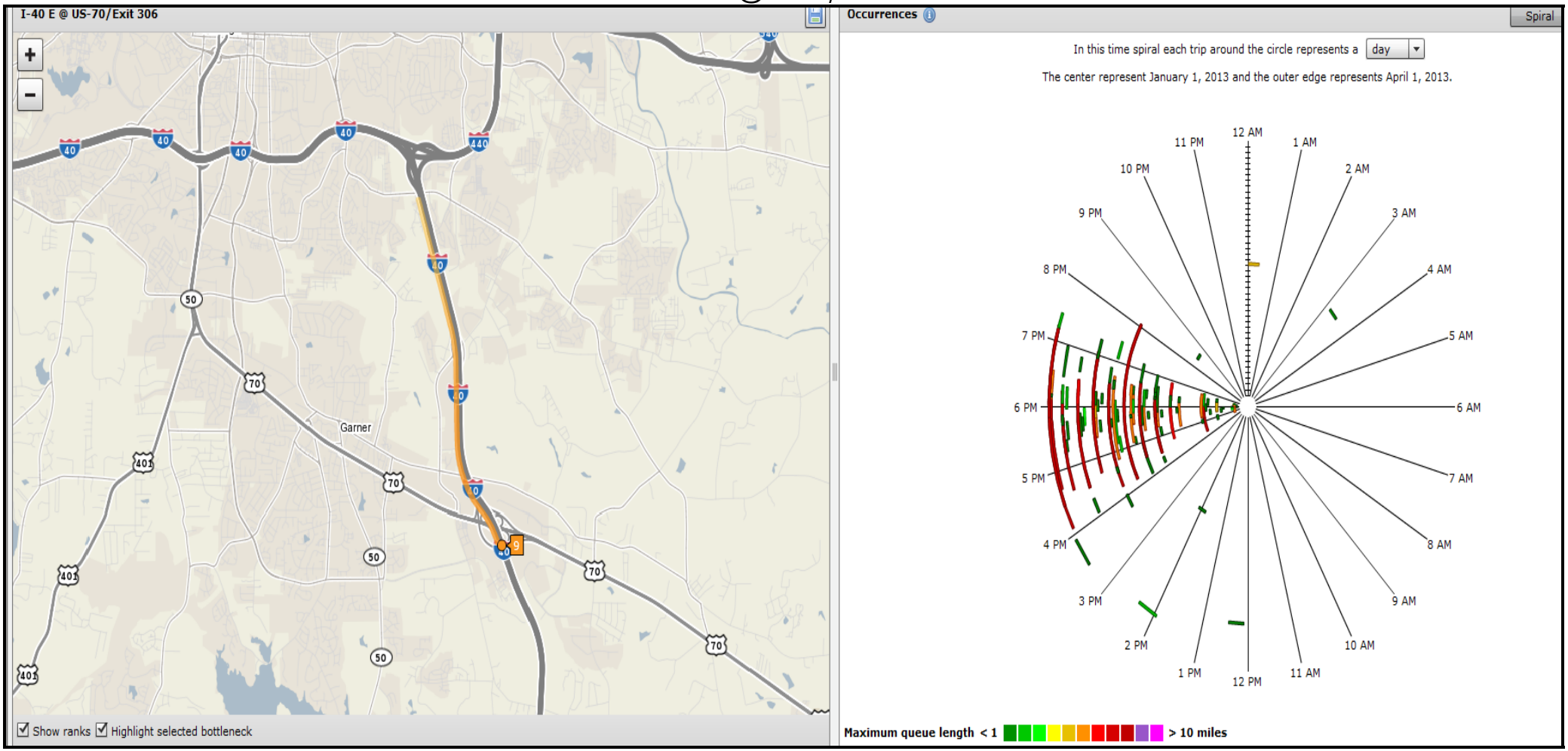
First Quarter

#7 - I-40 E @ US-70/Exit 306



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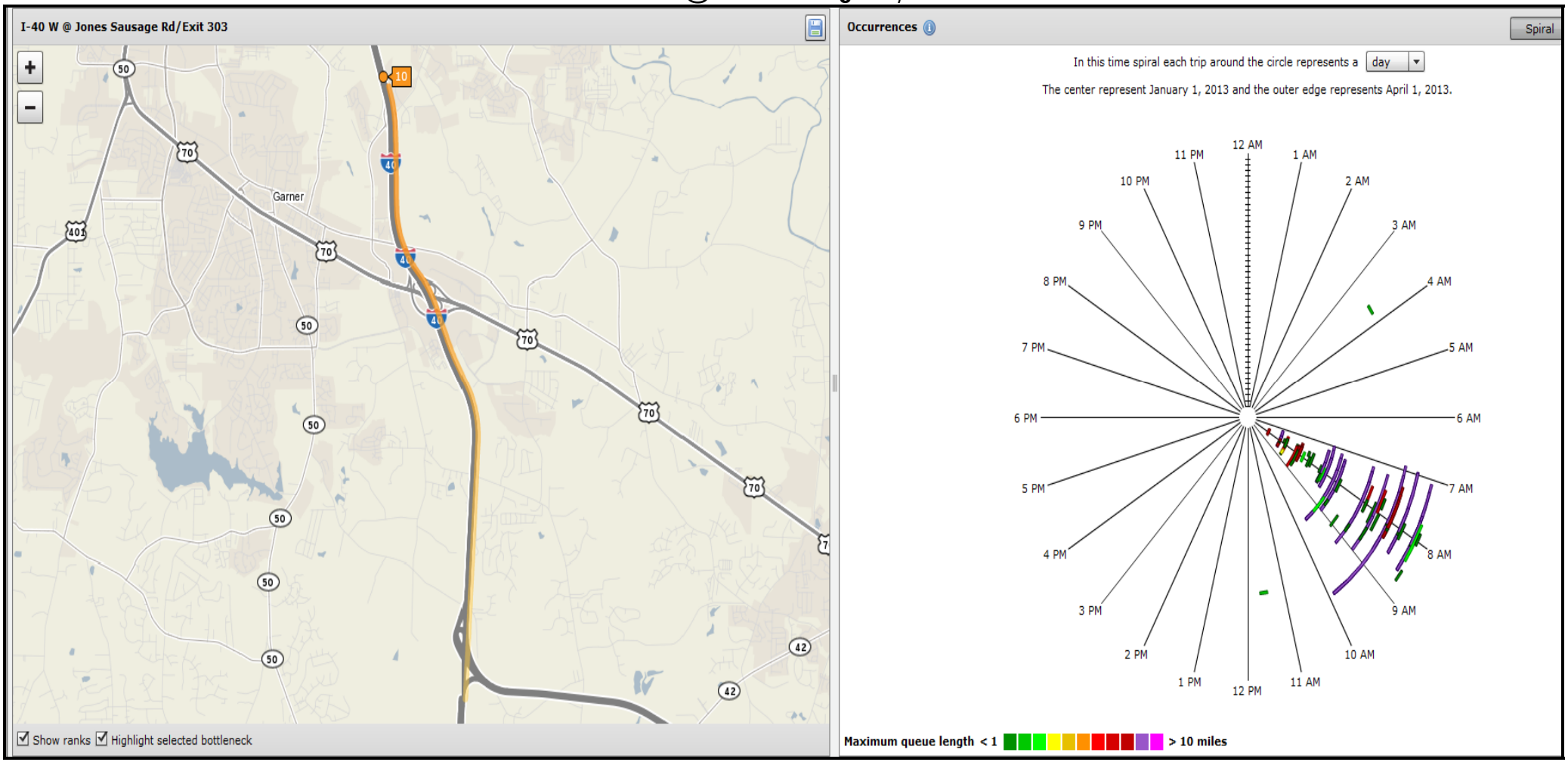
#8 – I-40 W @ Jones Sausage Rd/Exit 303



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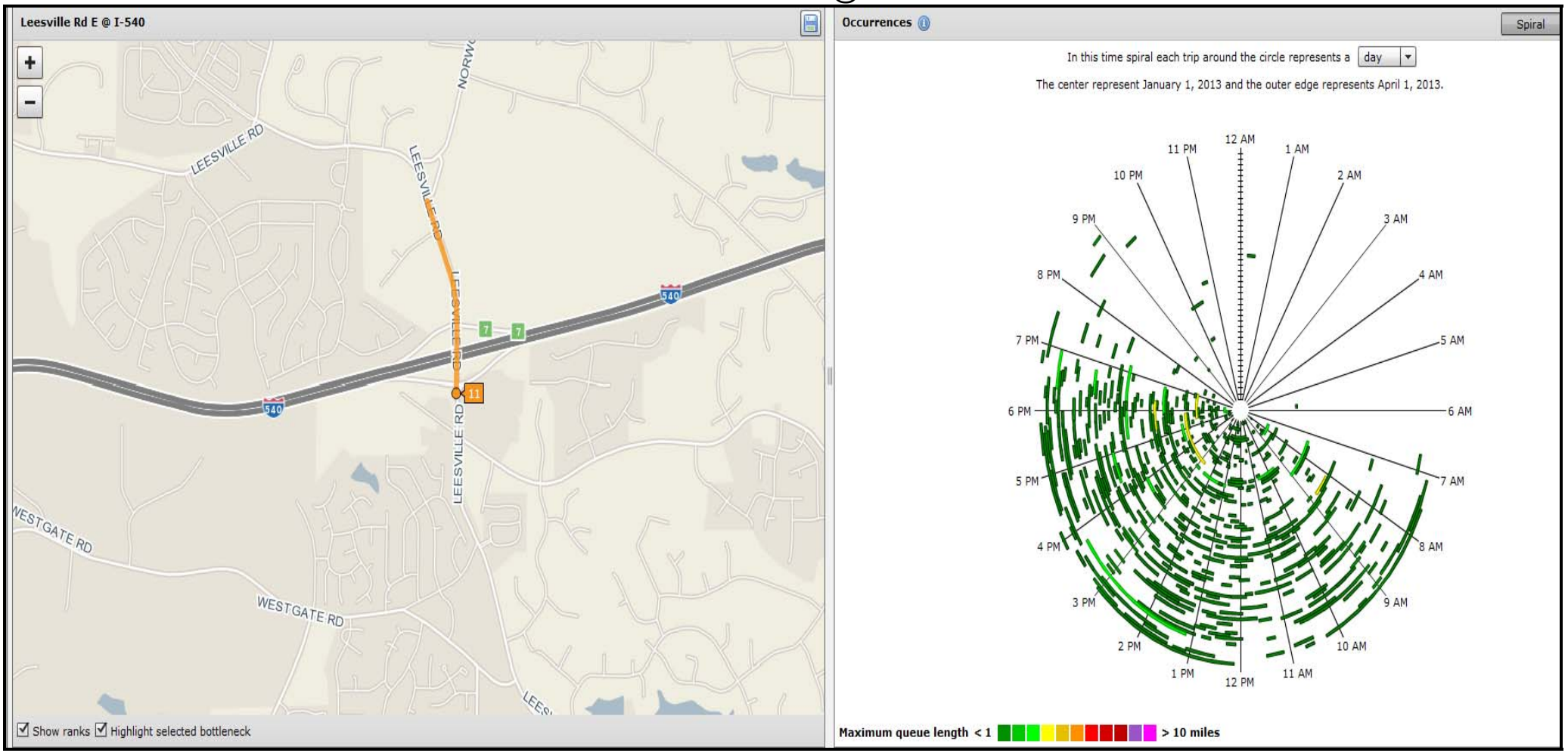
#9 – Leesville Rd E @ I-540



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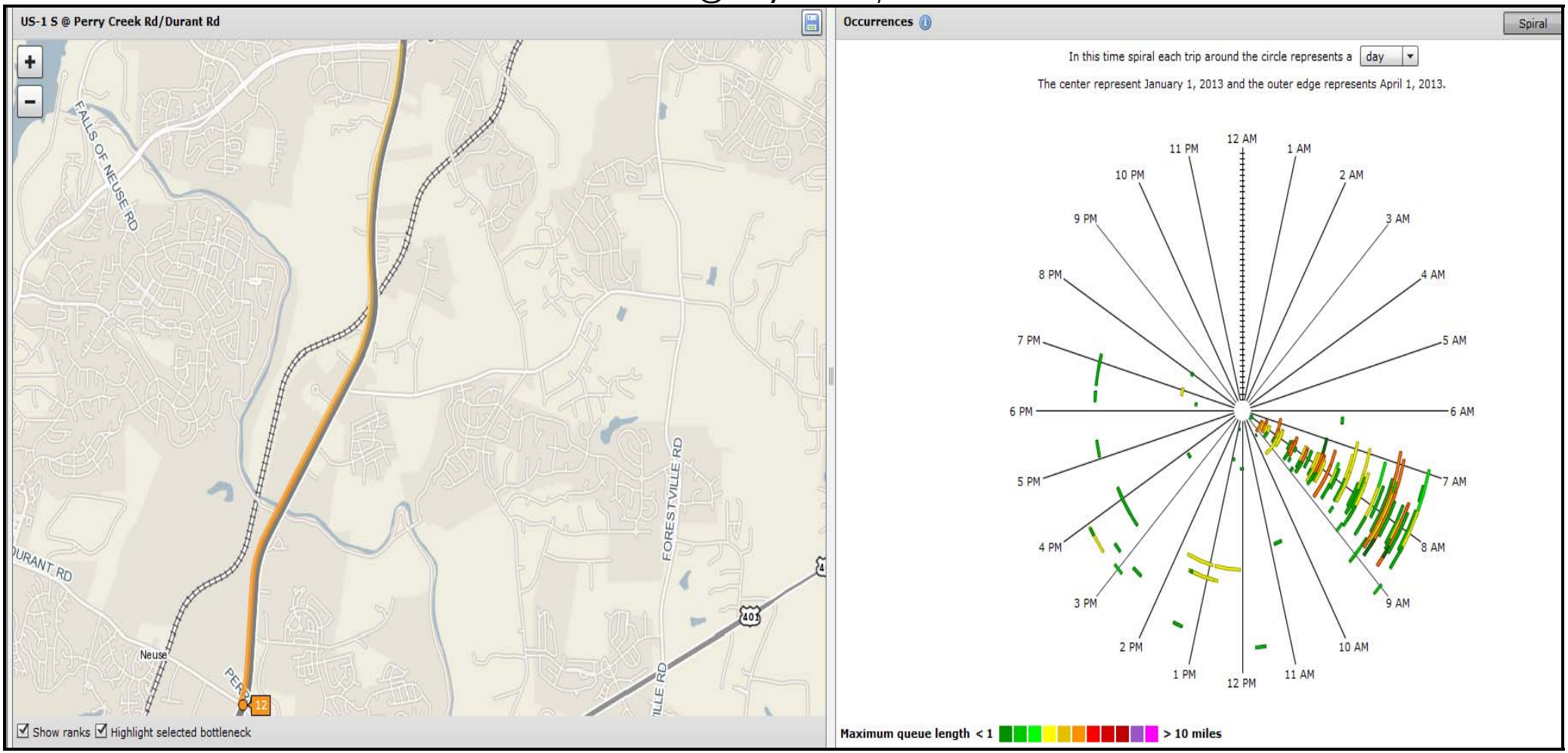
First Quarter

#10 – US-1 S @ Perry Creek Rd/Durant Rd



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Second Quarter – April 1 through June 30, 2013

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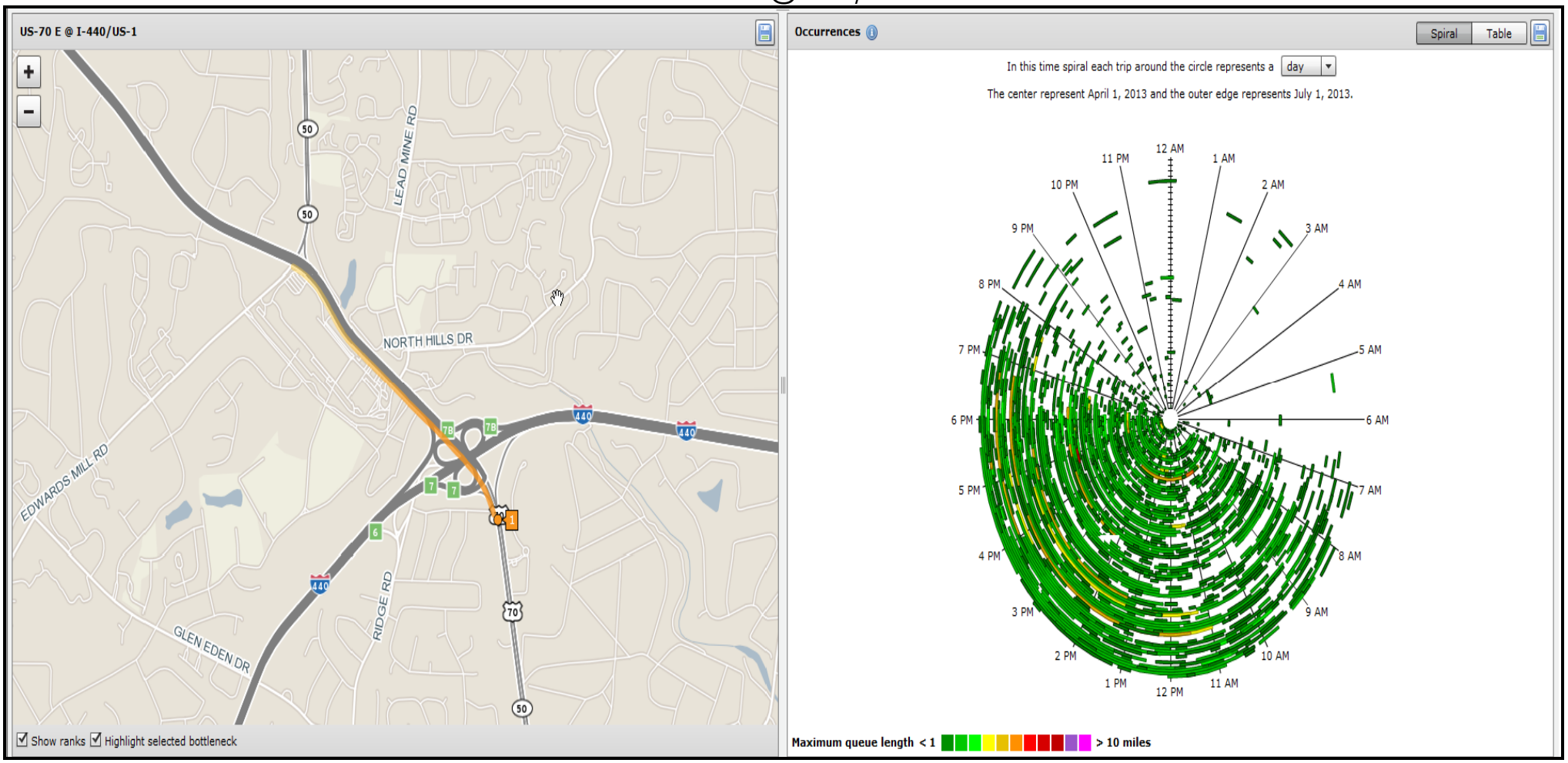
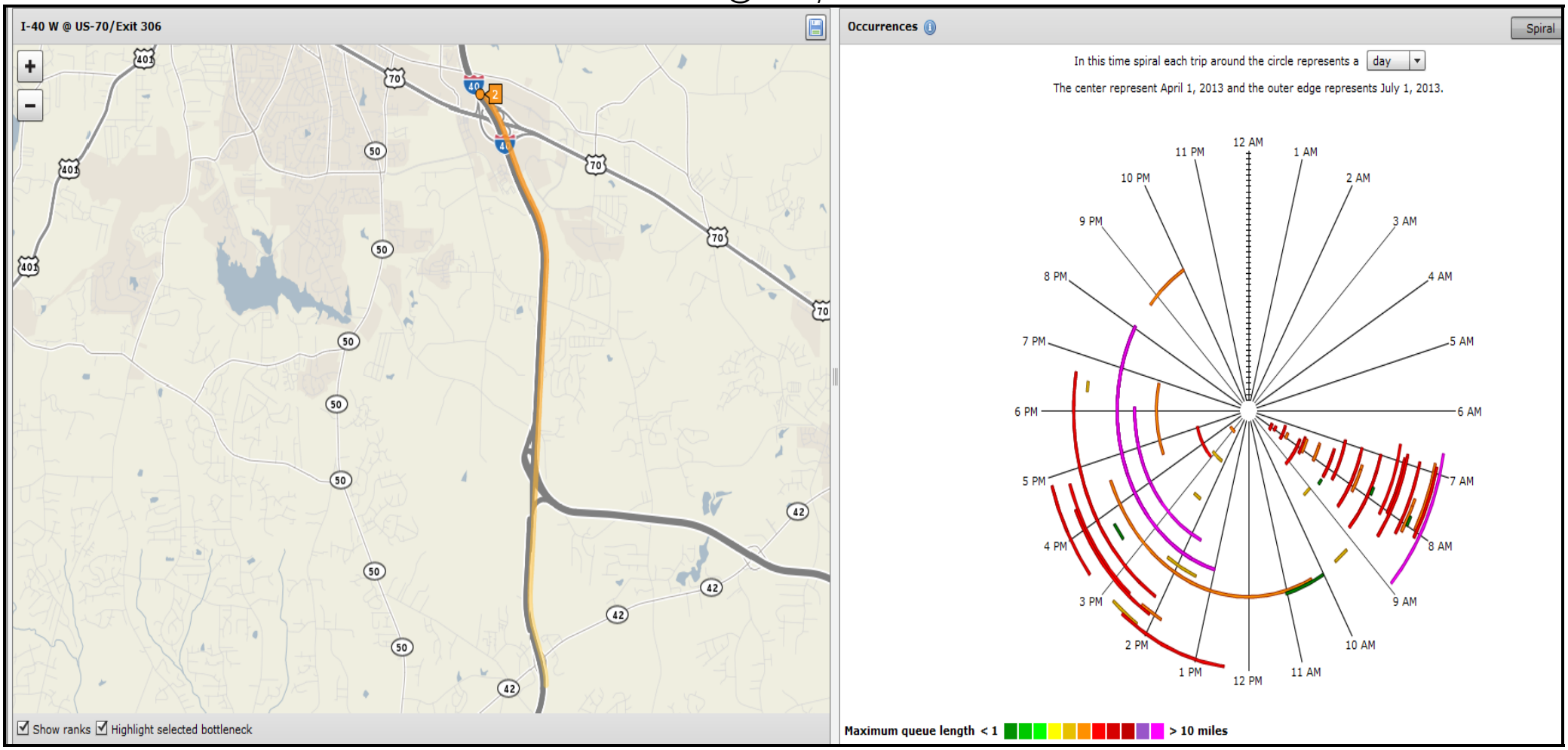


APPENDIX B

Second Quarter

2 I-40 W @ US-70/Exit 306



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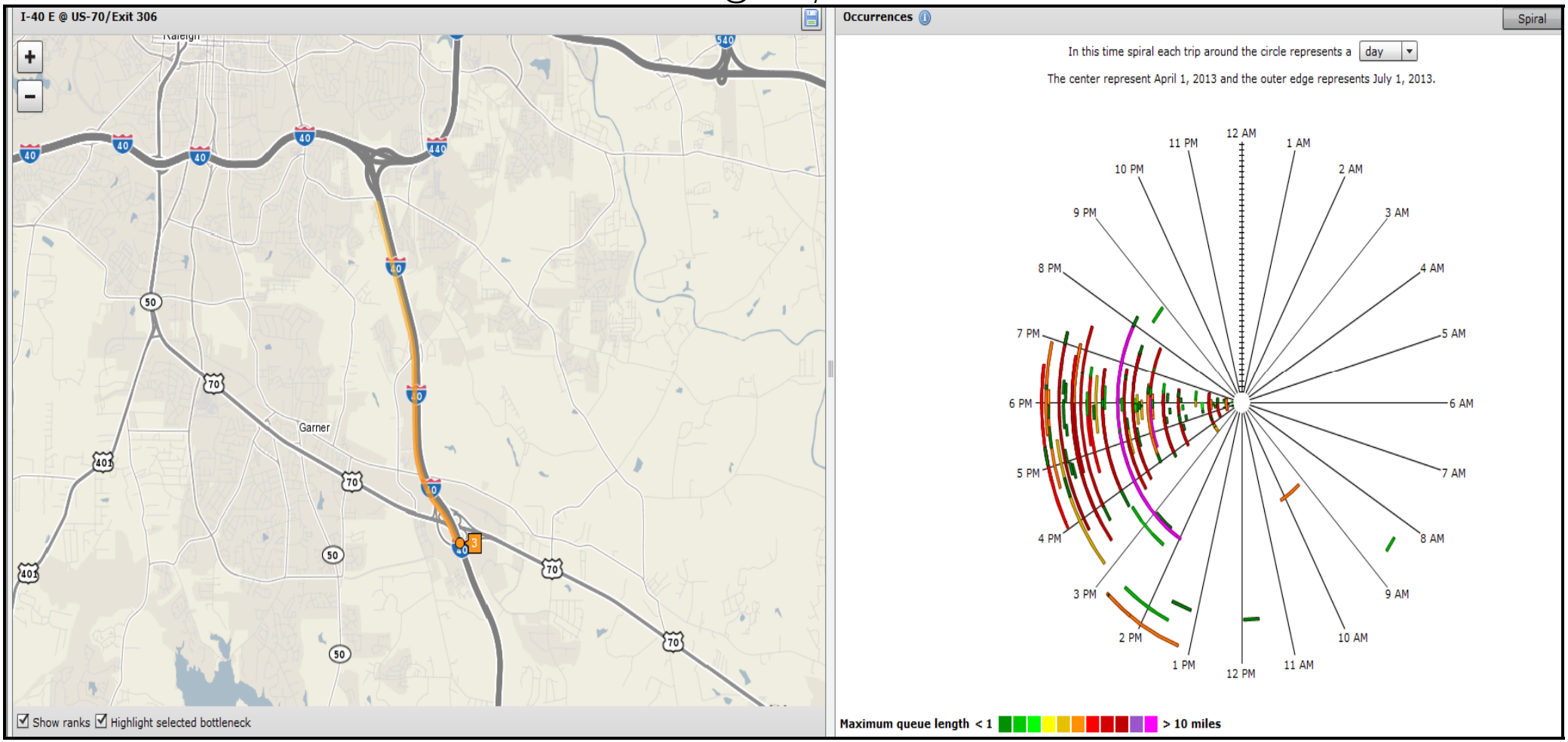
Second Quarter

3 I-40 E @ US-70/Exit 306



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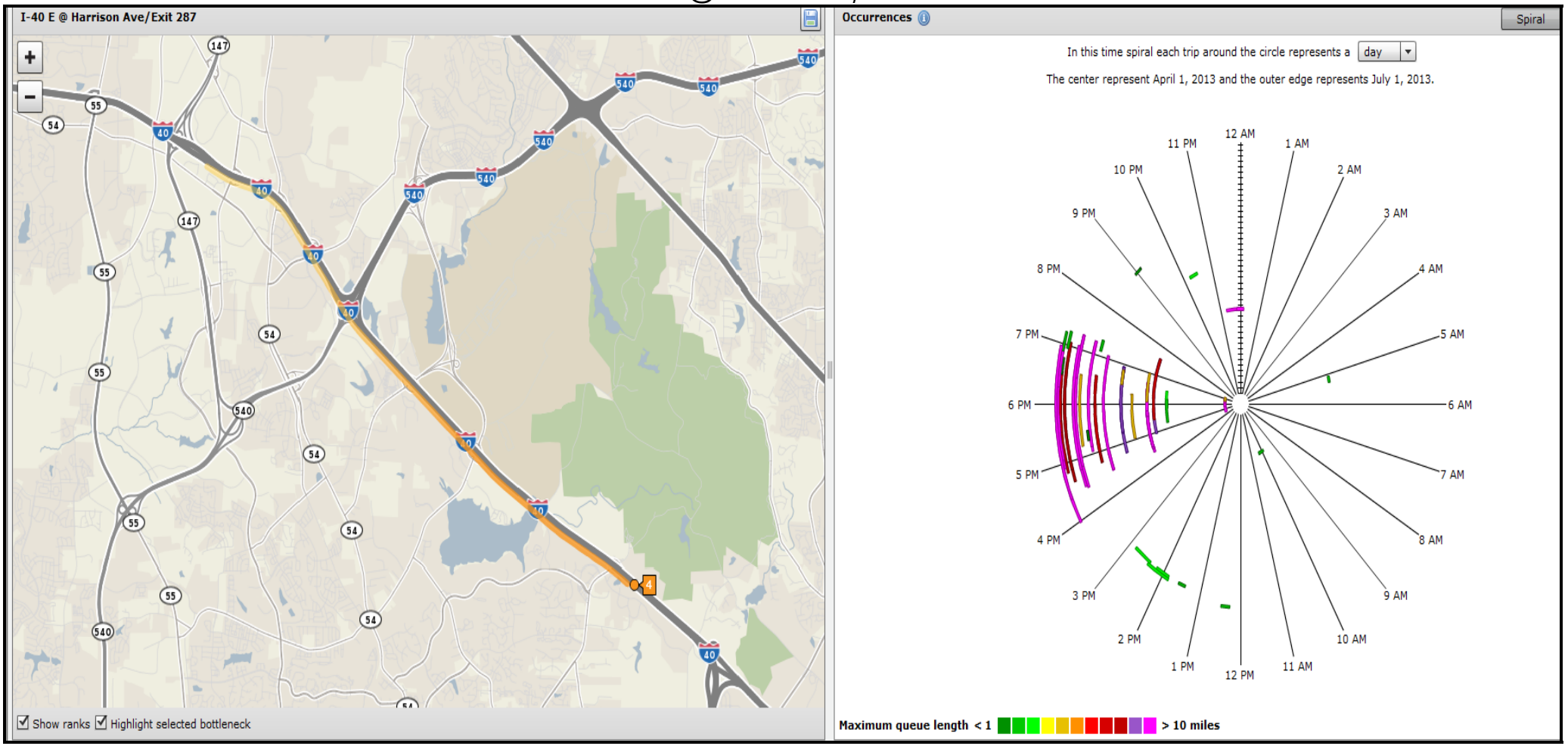
Second Quarter

4 I-40 E @ Harrison Ave/Exit 287



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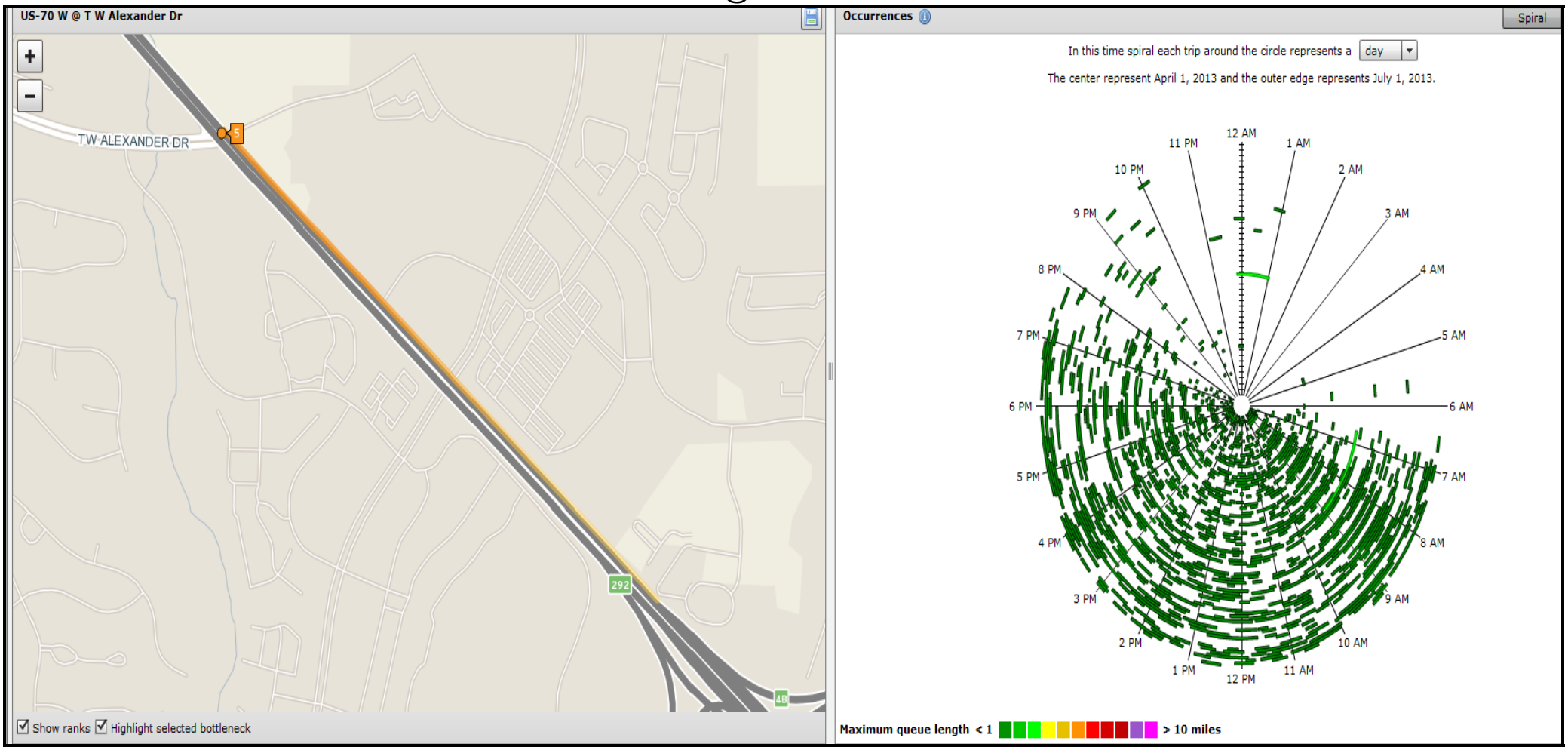
Second Quarter

5 US-70 W @ T W Alexander Dr



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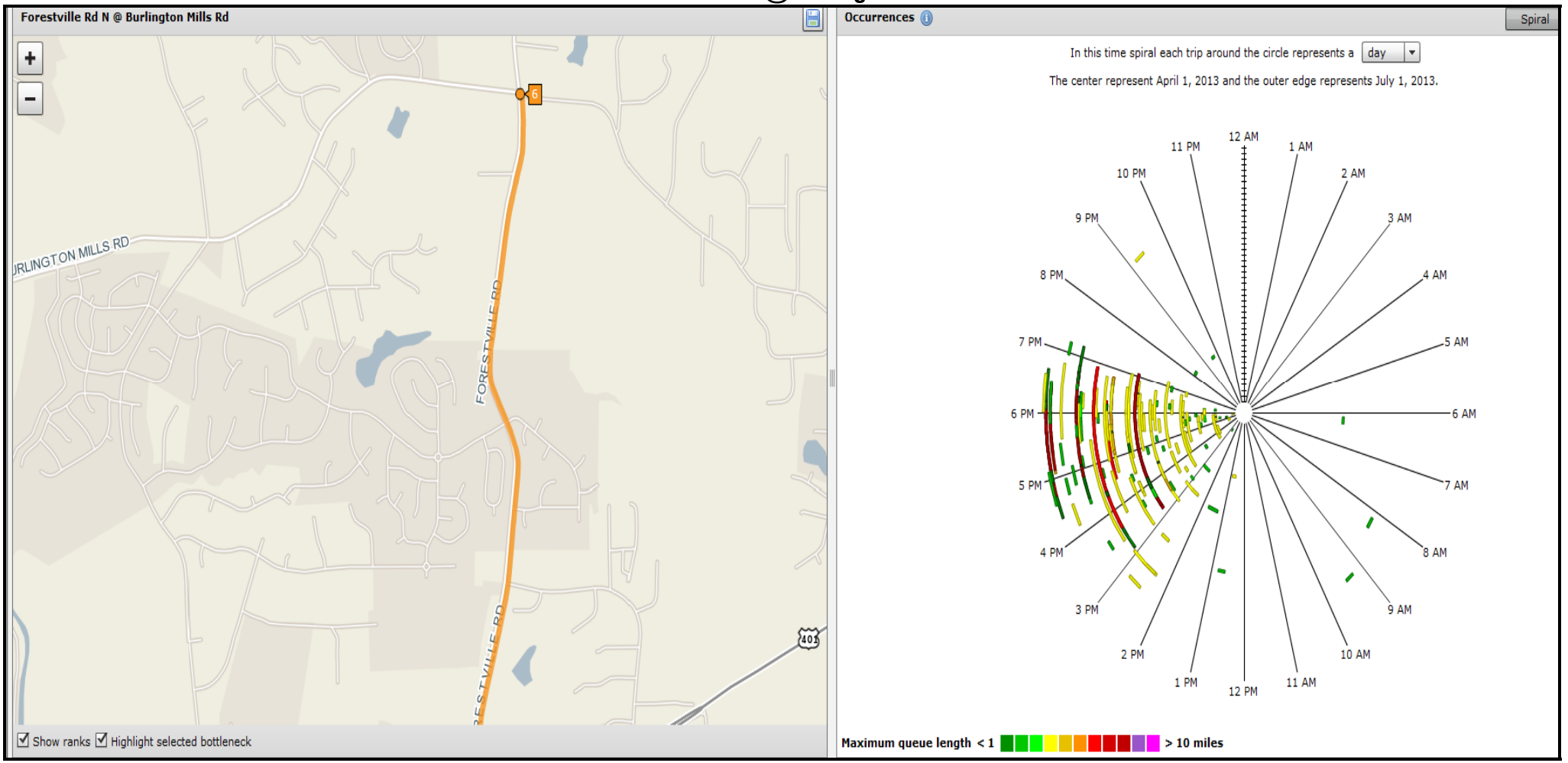
Second Quarter

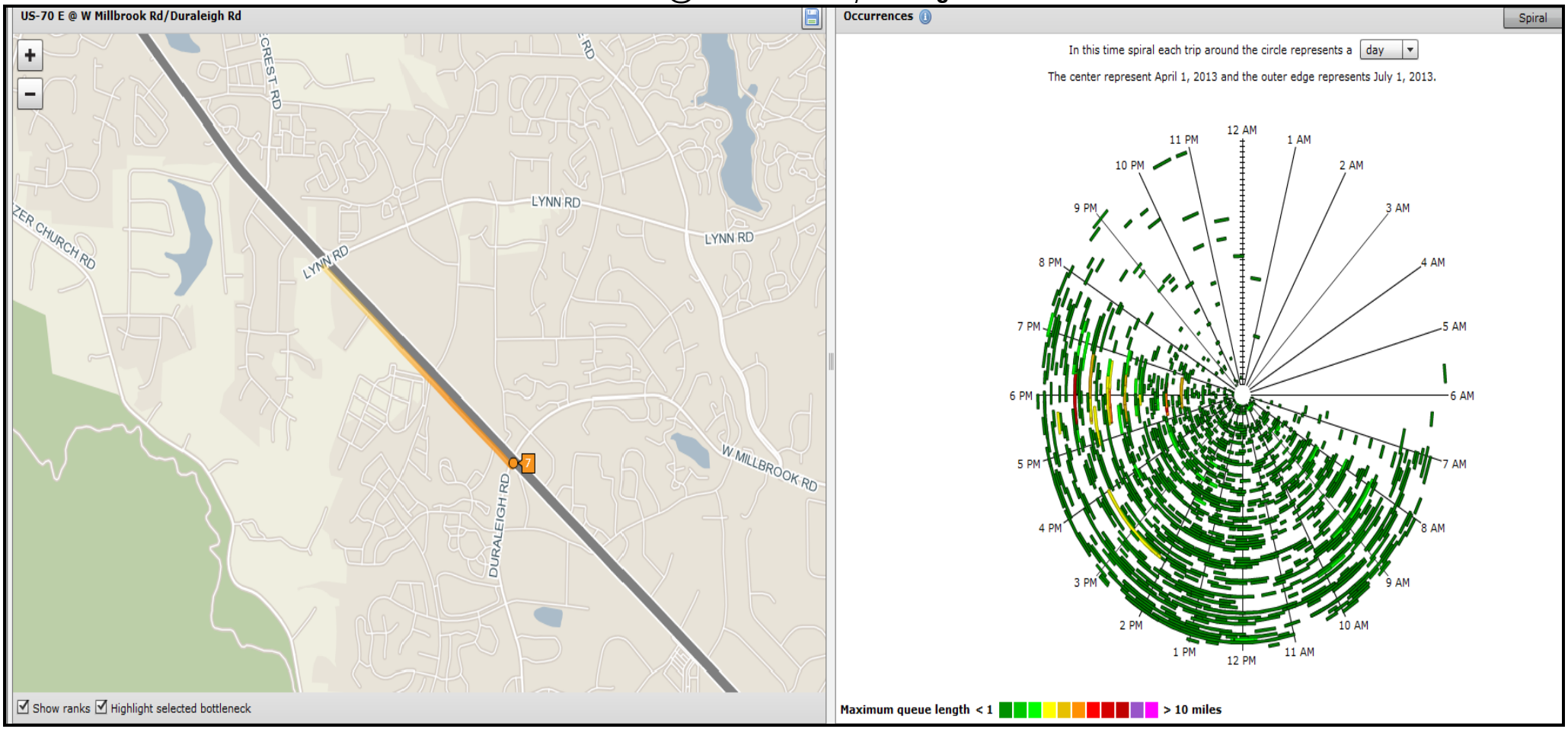
6 Forestville Rd N @ Burlington Mills Rd



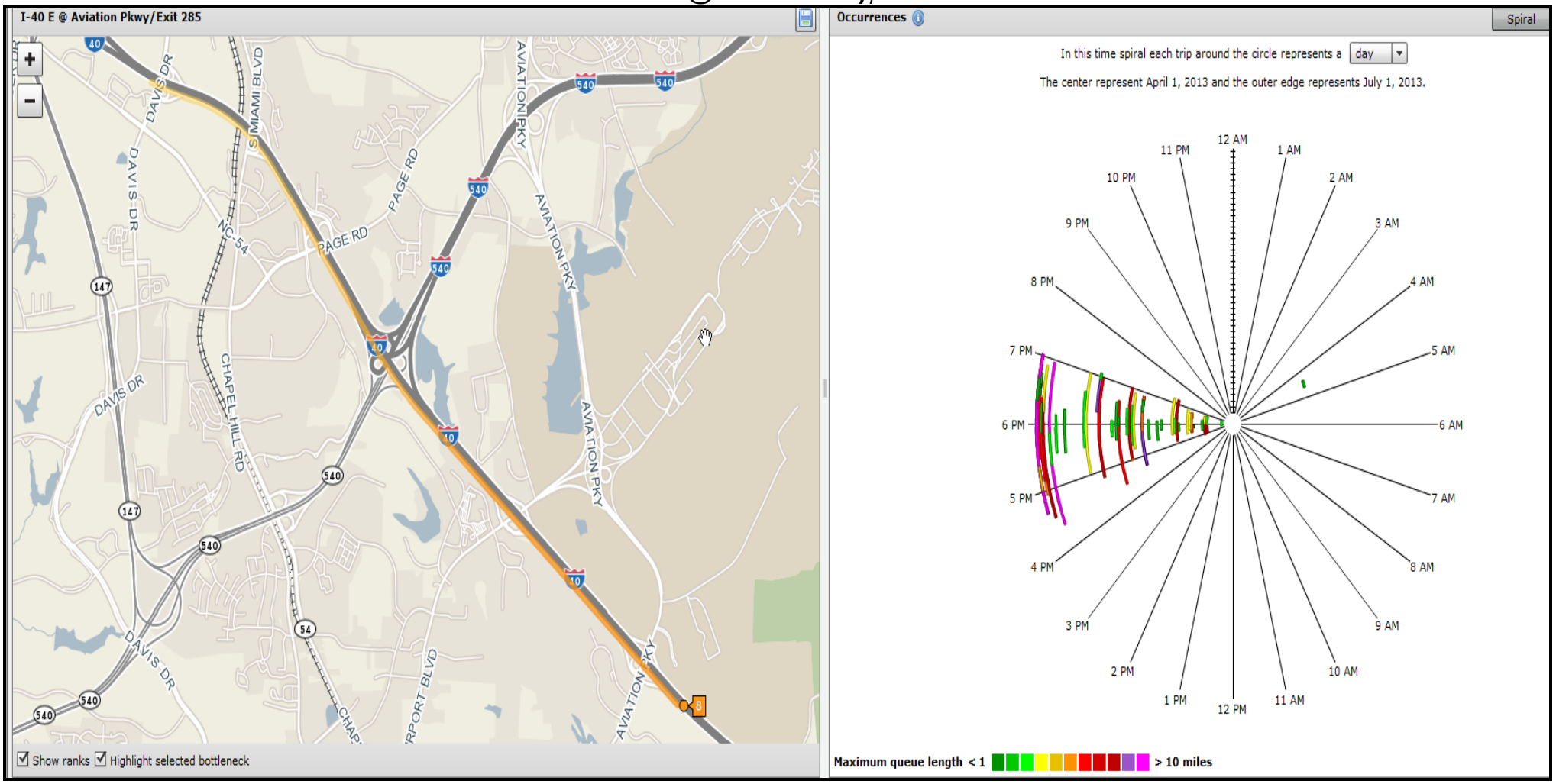
APPENDIX B

Second Quarter

7 US-70 E @ W Millbrook Rd/Duraleigh Rd



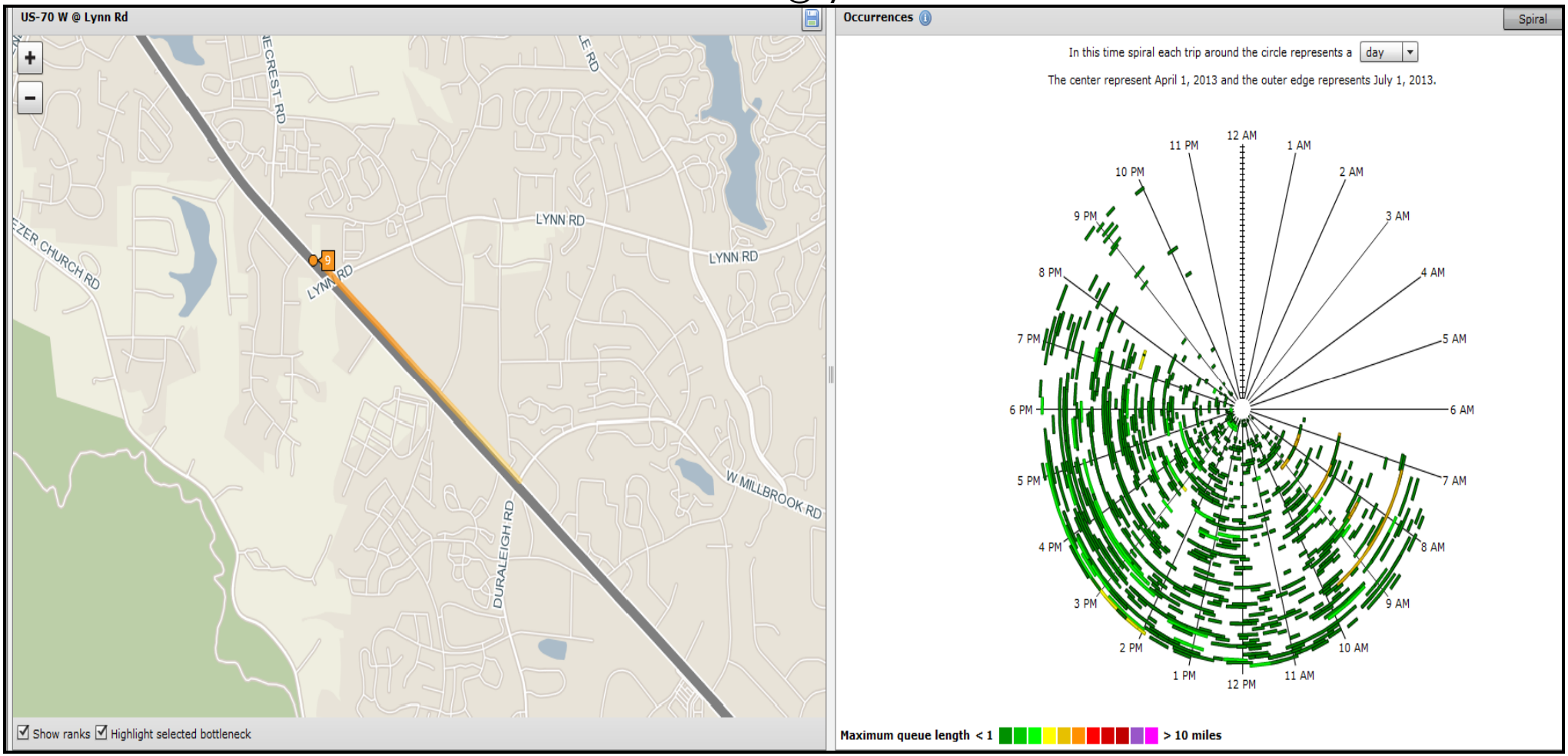
8 I-40 E @ Aviation Pkwy/Exit 285



APPENDIX B

Second Quarter

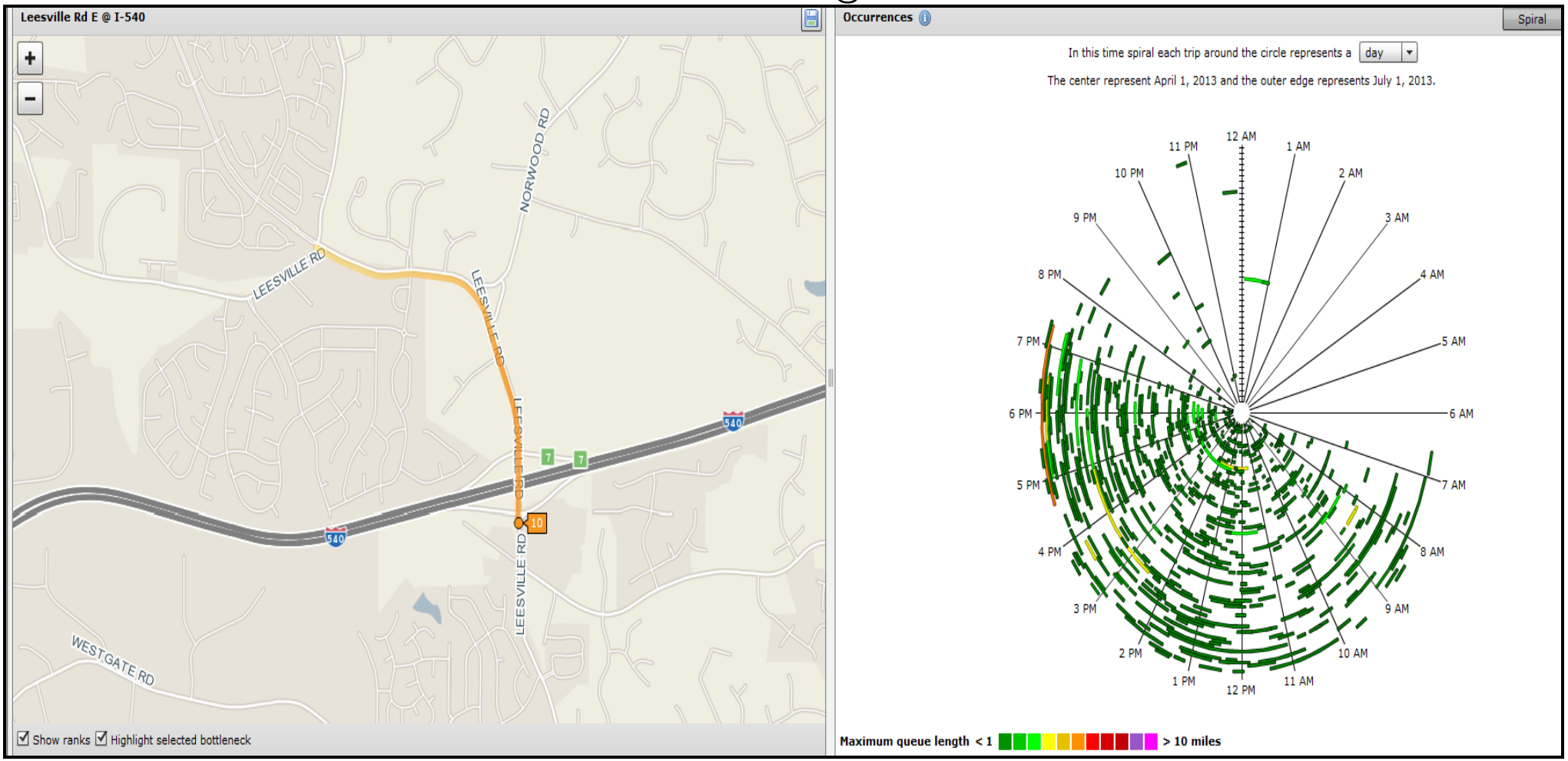
9 US-70 W @ Lynn Rd



APPENDIX B

Second Quarter

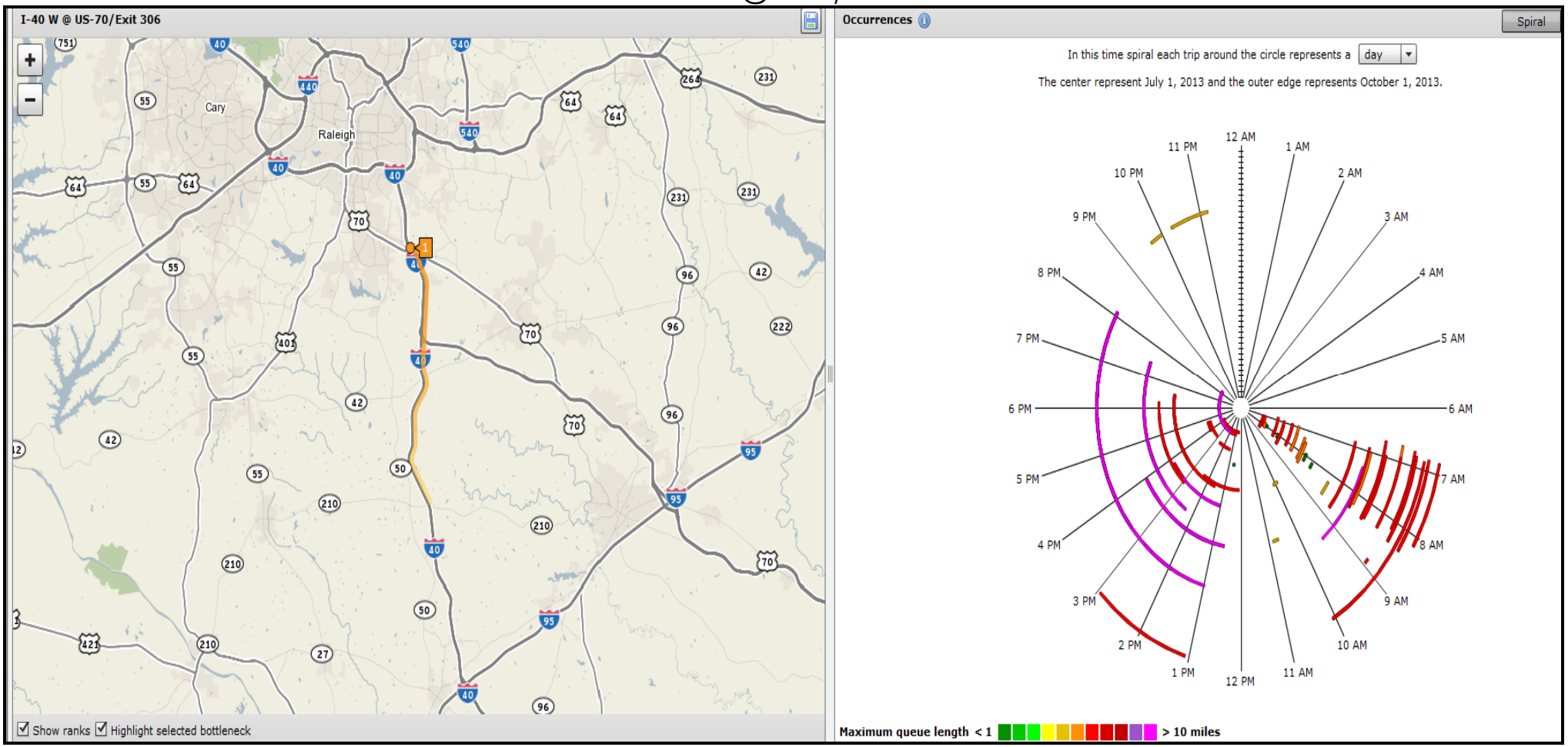
10 Leesville Rd E @ I-540



APPENDIX B

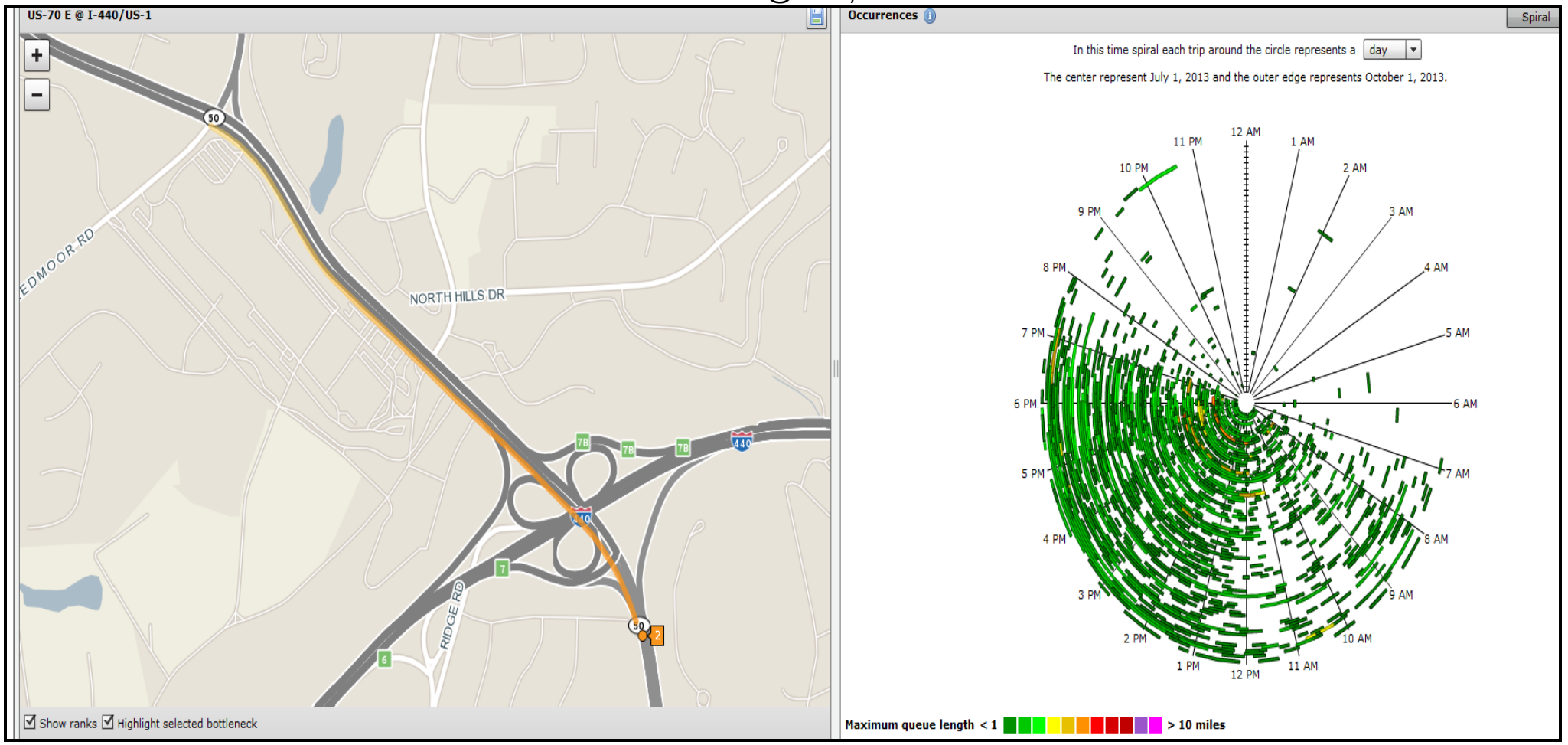
Third Quarter - July 1 through September 30, 2013

1 I-40 W @ US-70/Exit 306



APPENDIX B

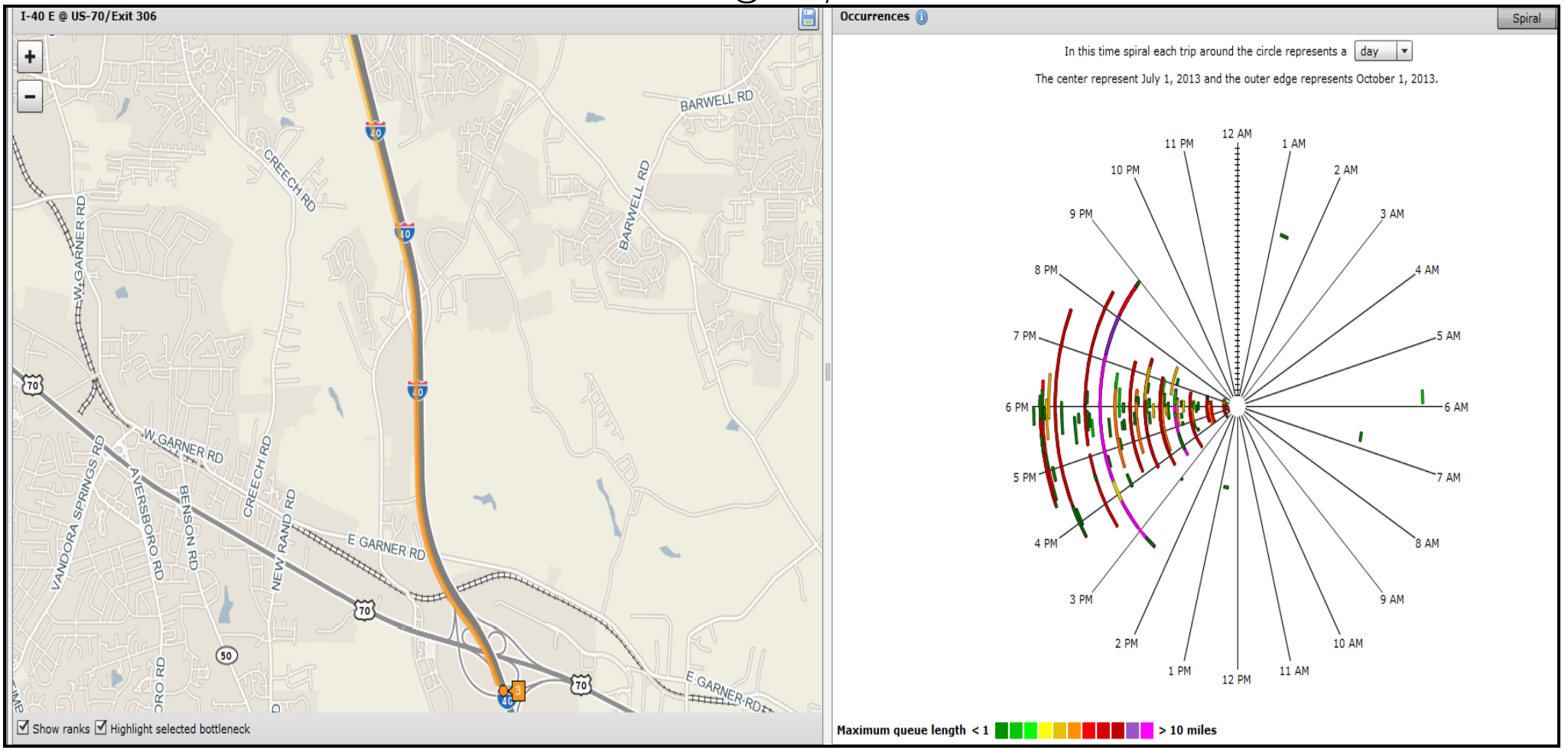
2 US-70 E @ I-440/US-1



APPENDIX B

Third Quarter

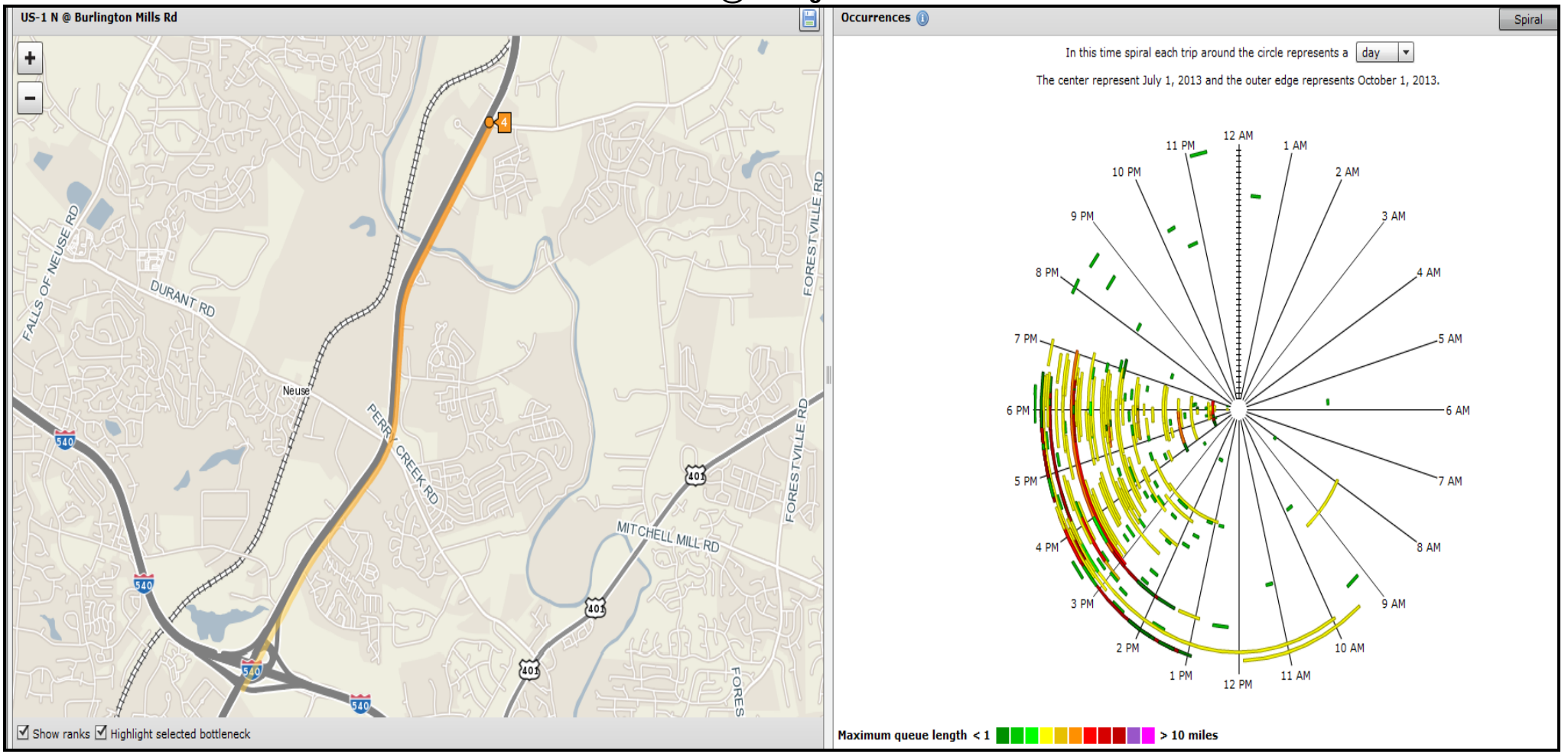
3 I-40 E @ US-70/Exit 306



APPENDIX B

Third Quarter

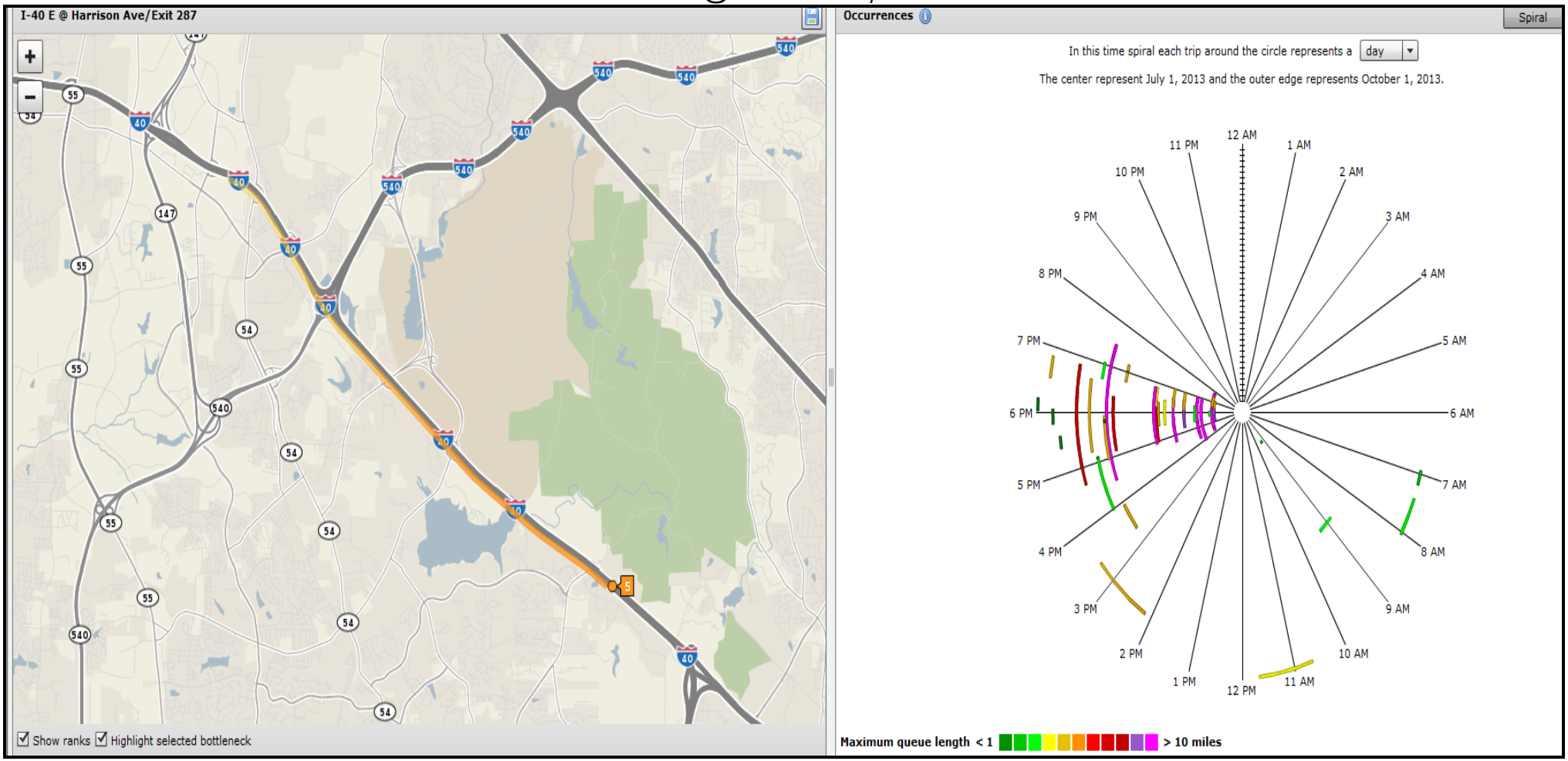
4 US-1 N @ Burlington Mills Rd



APPENDIX B

Third Quarter

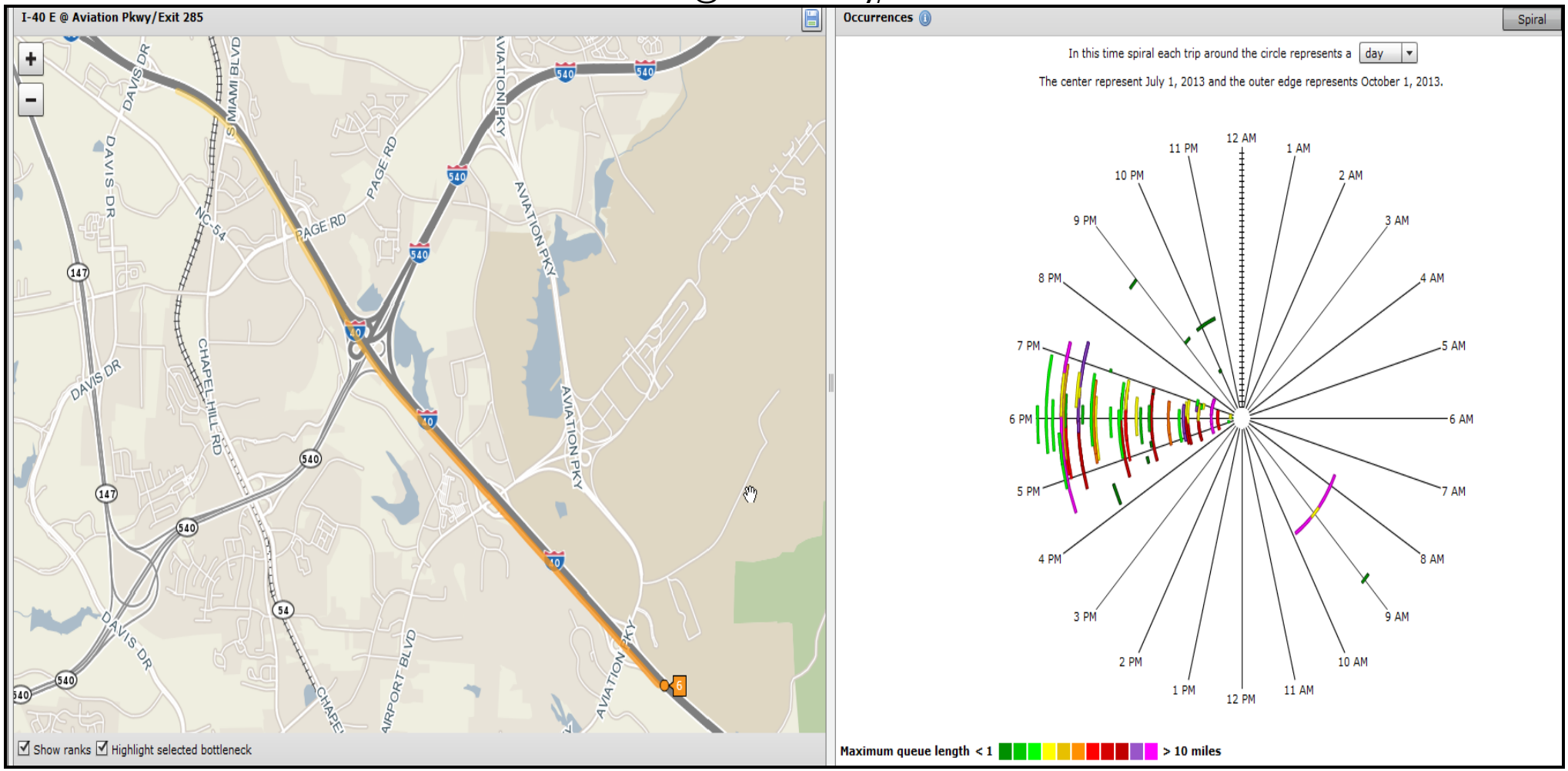
5 I-40 E @ Harrison Ave/Exit 287



APPENDIX B

Third Quarter

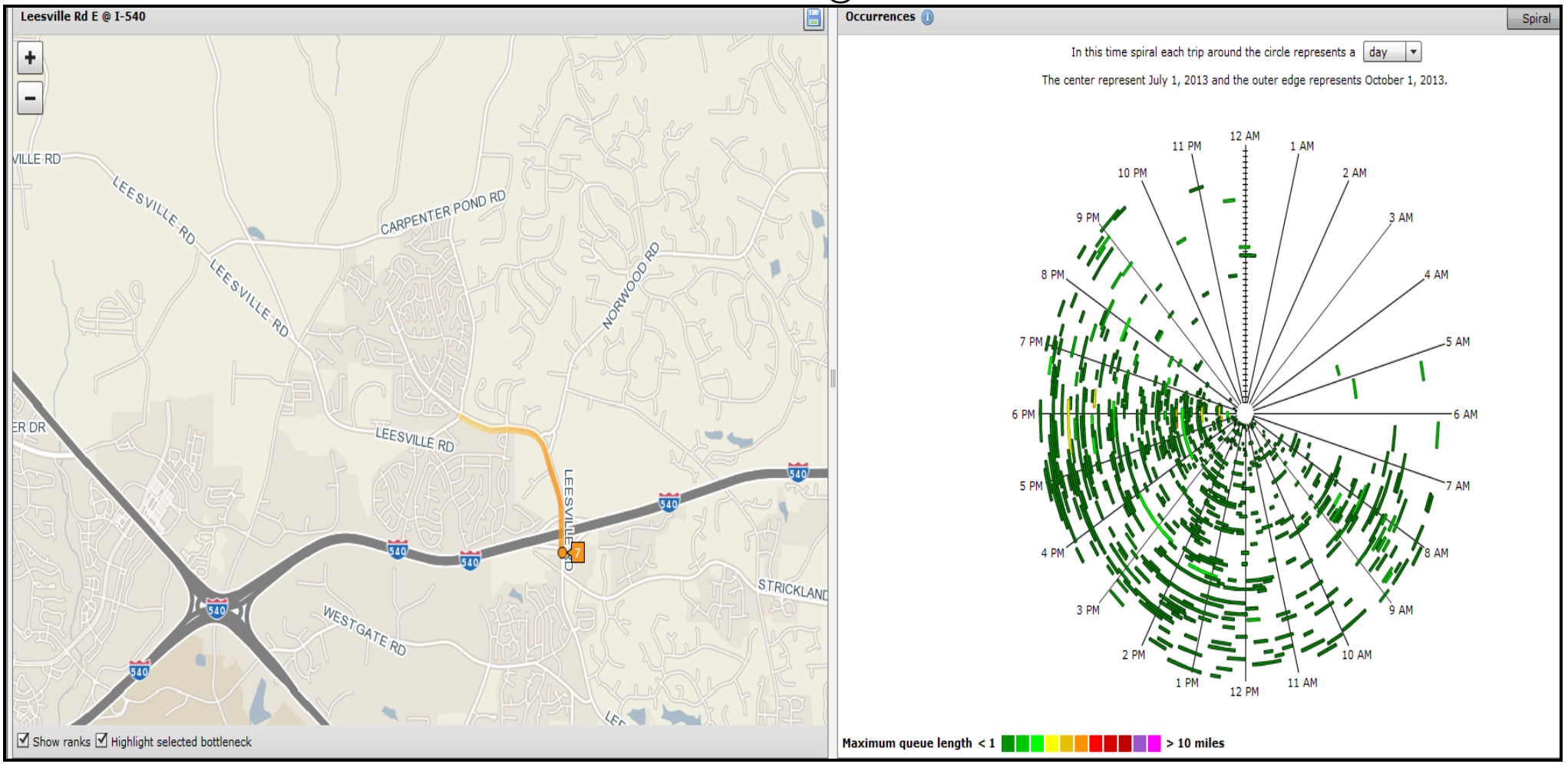
6 I-40 E @ Aviation Pkwy/Exit 285



APPENDIX B

Third Quarter

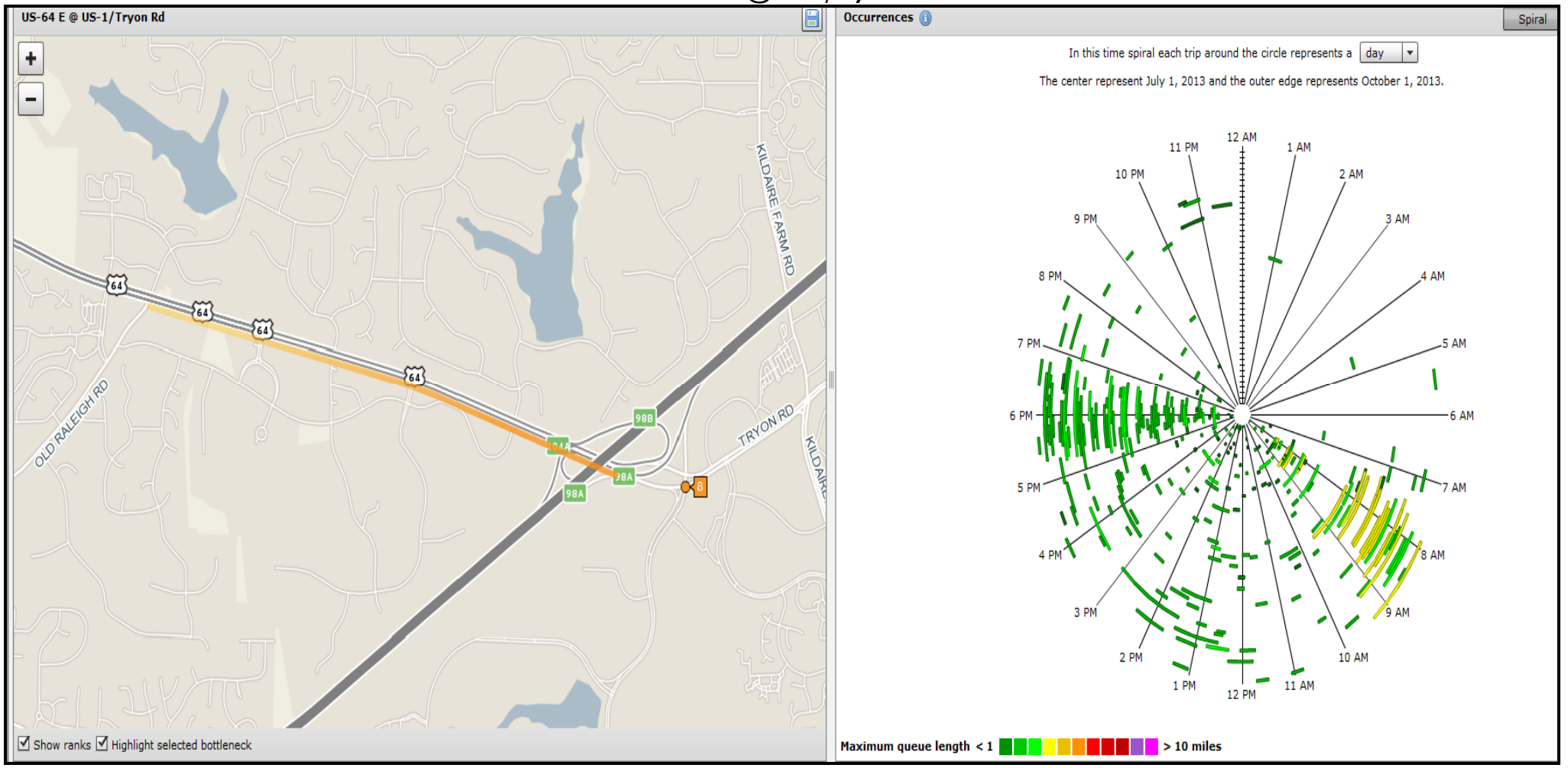
7 Leesville Rd E @ I-540



APPENDIX B

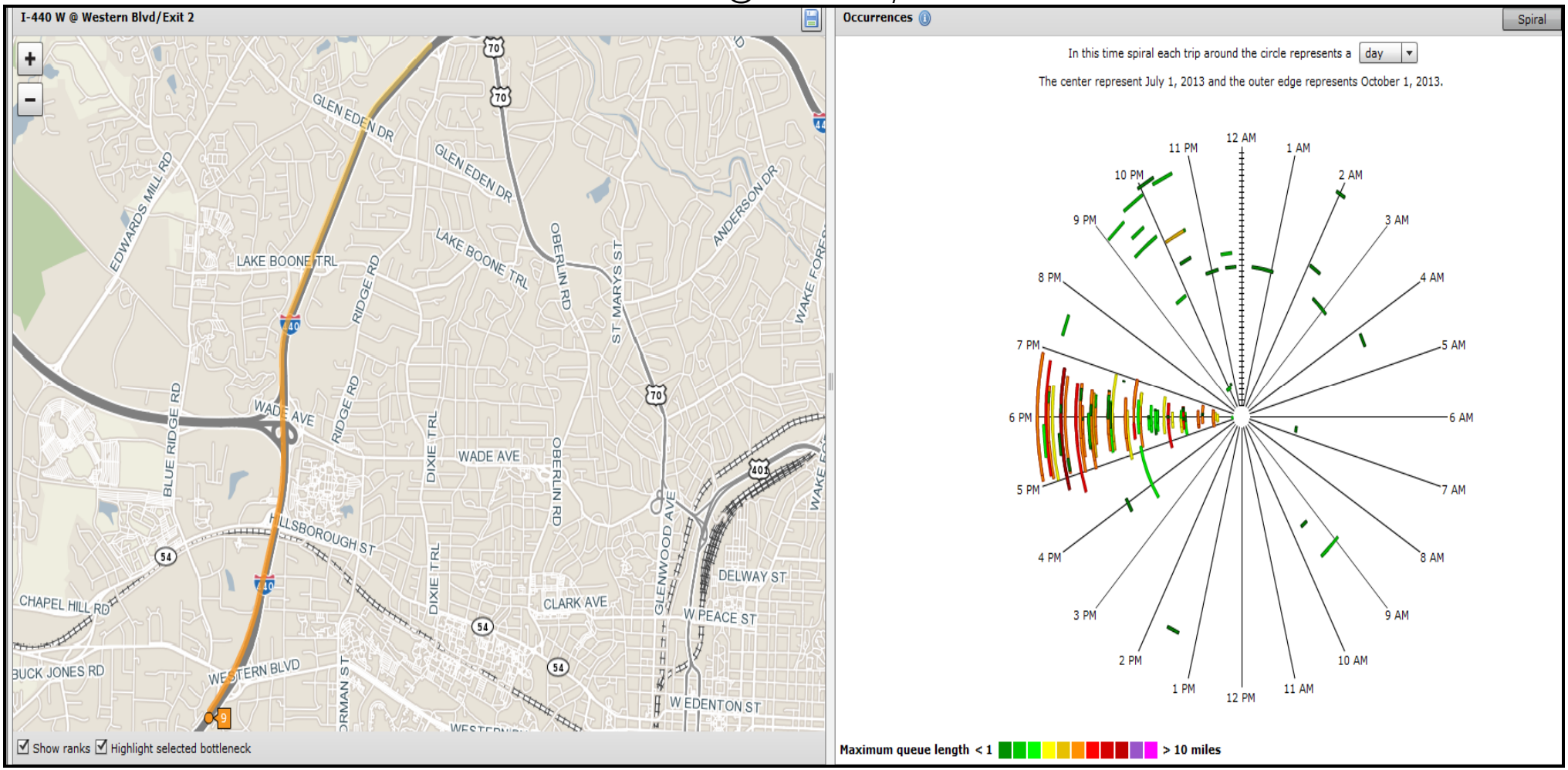
Third Quarter

8 US-64 E @ US-1/Tryon Rd



APPENDIX B

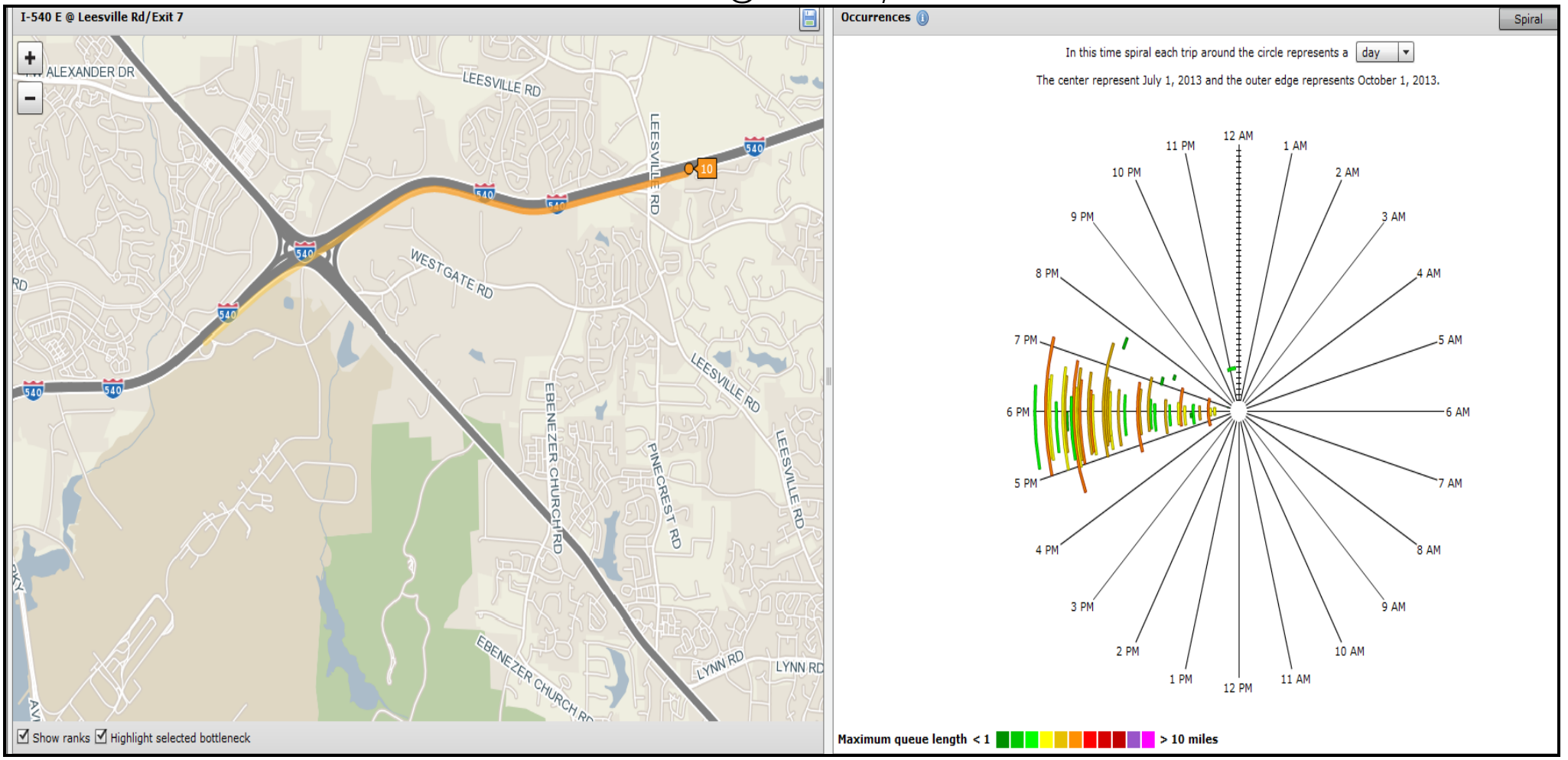
9 I-440 W @ Western Blvd/Exit 2



APPENDIX B

Third Quarter

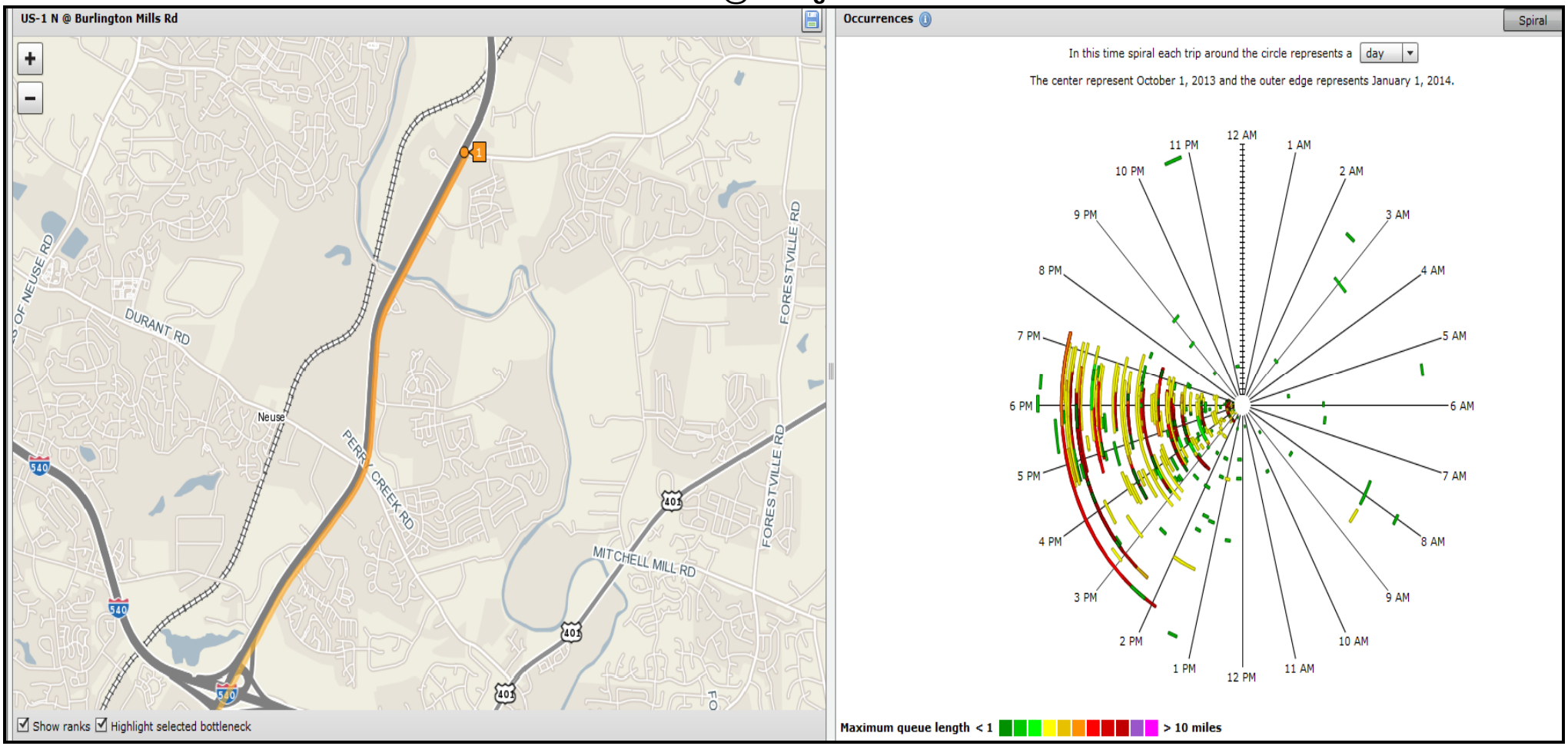
10 I-540 E @ Leesville Rd/Exit 7



APPENDIX B

Fourth Quarter - October 1 through December 31, 2013

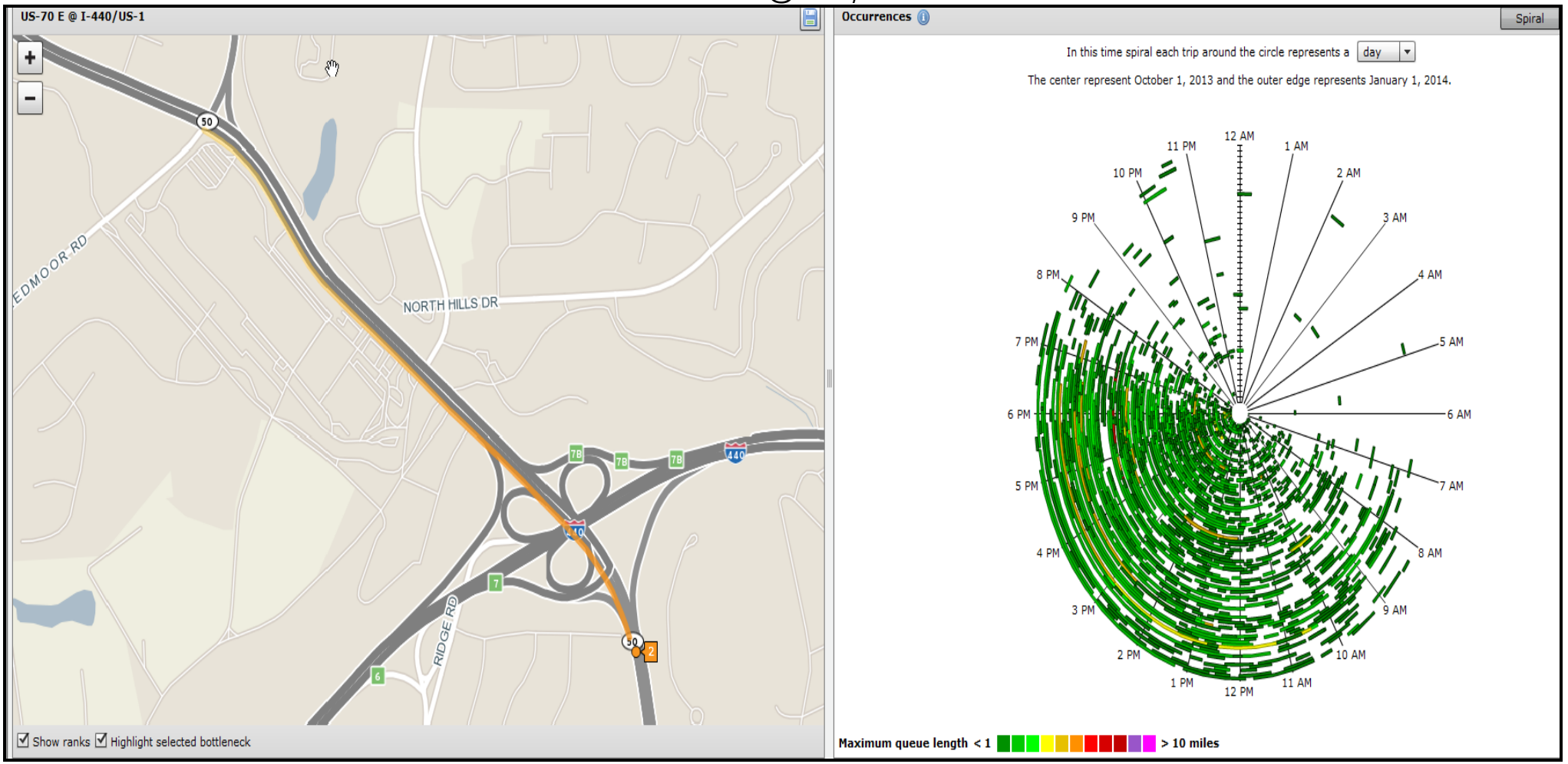
1 US-1 N @ Burlington Mills Rd



APPENDIX B

Fourth Quarter

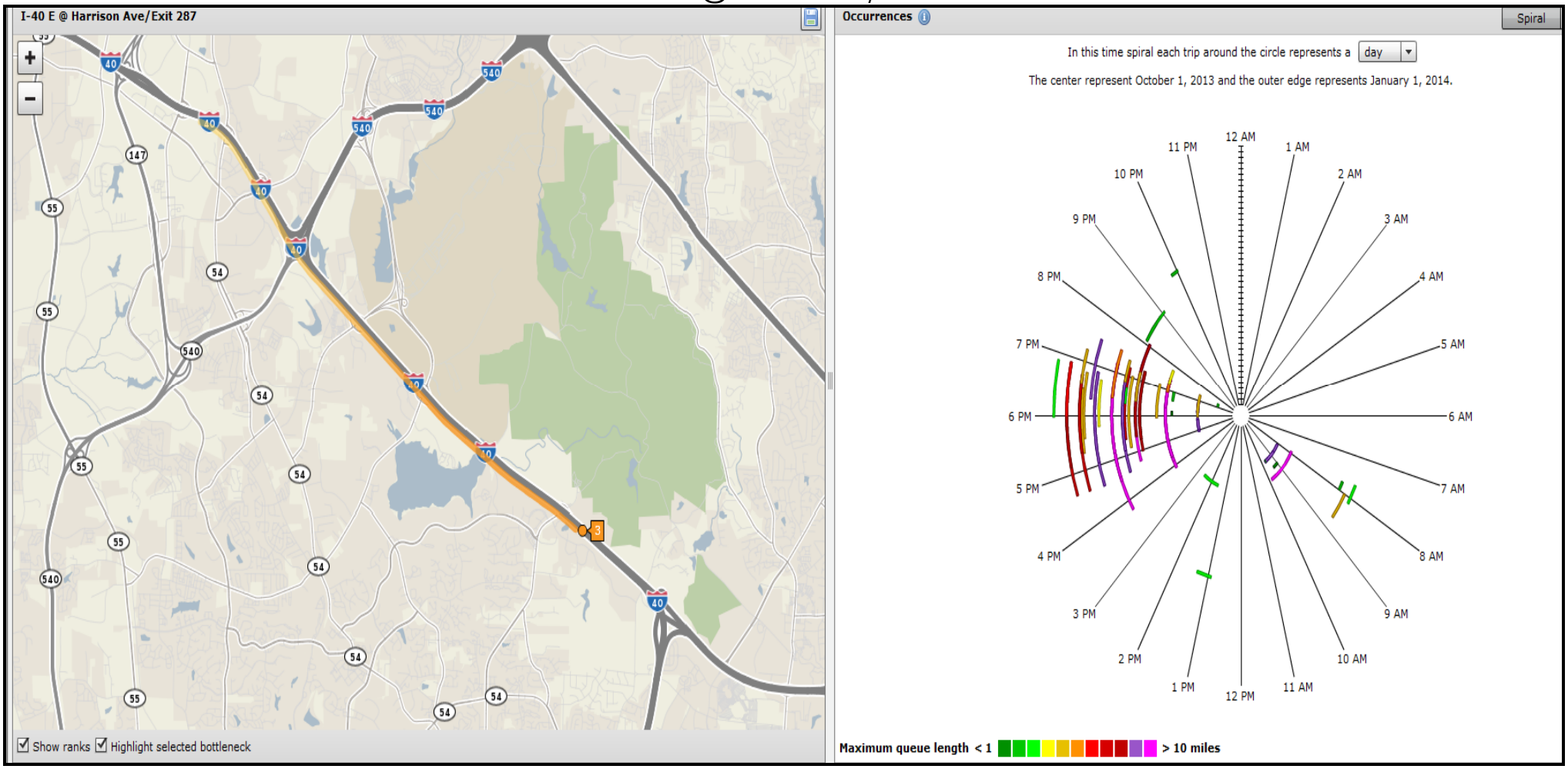
2 US-70 E @ I-440/US-1



APPENDIX B

Fourth Quarter

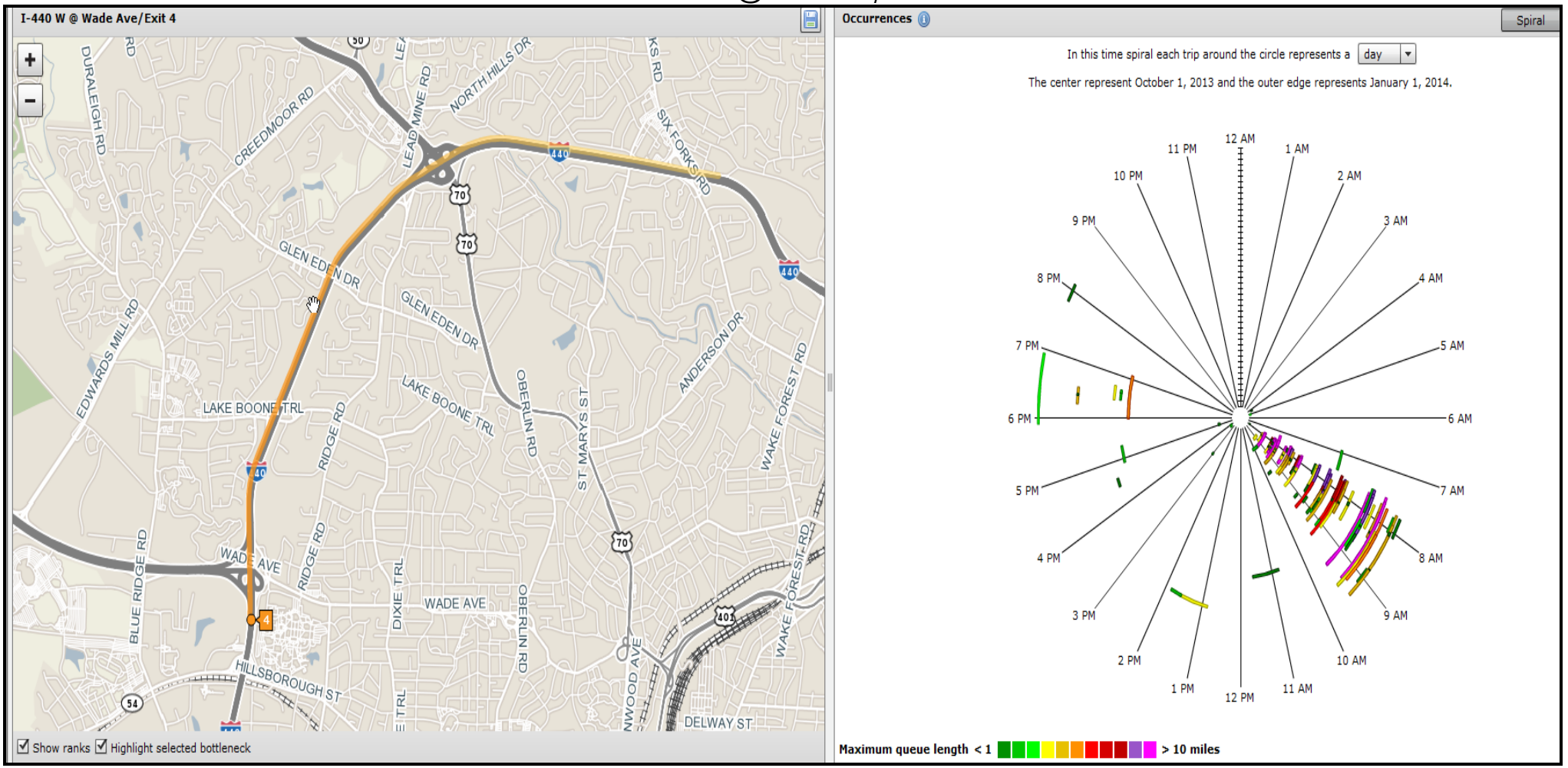
3 I-40 E @ Harrison Ave/Exit 287



APPENDIX B

Fourth Quarter

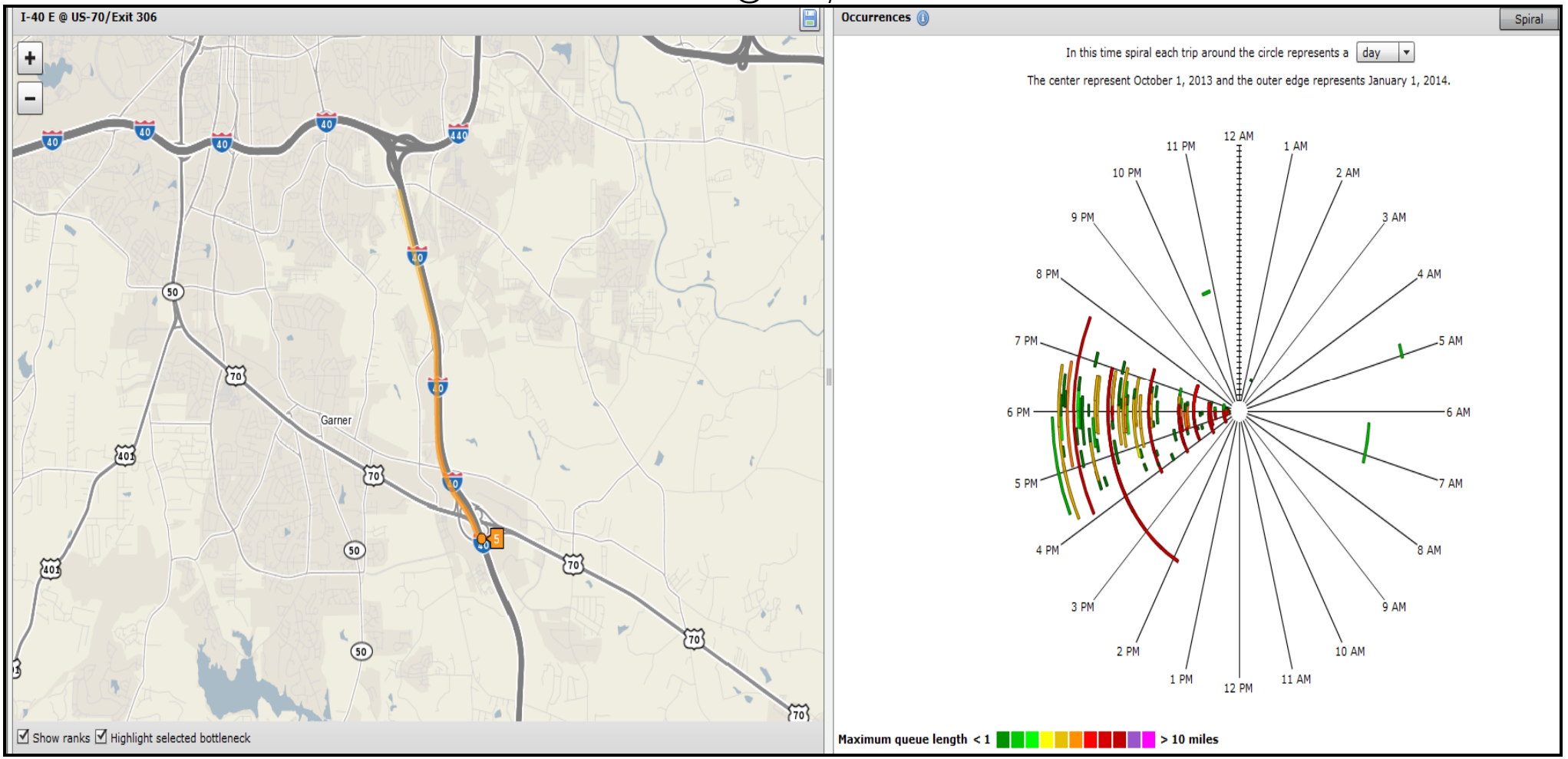
4 I-440 W @ Wade Ave/Exit 4



APPENDIX B

Fourth Quarter

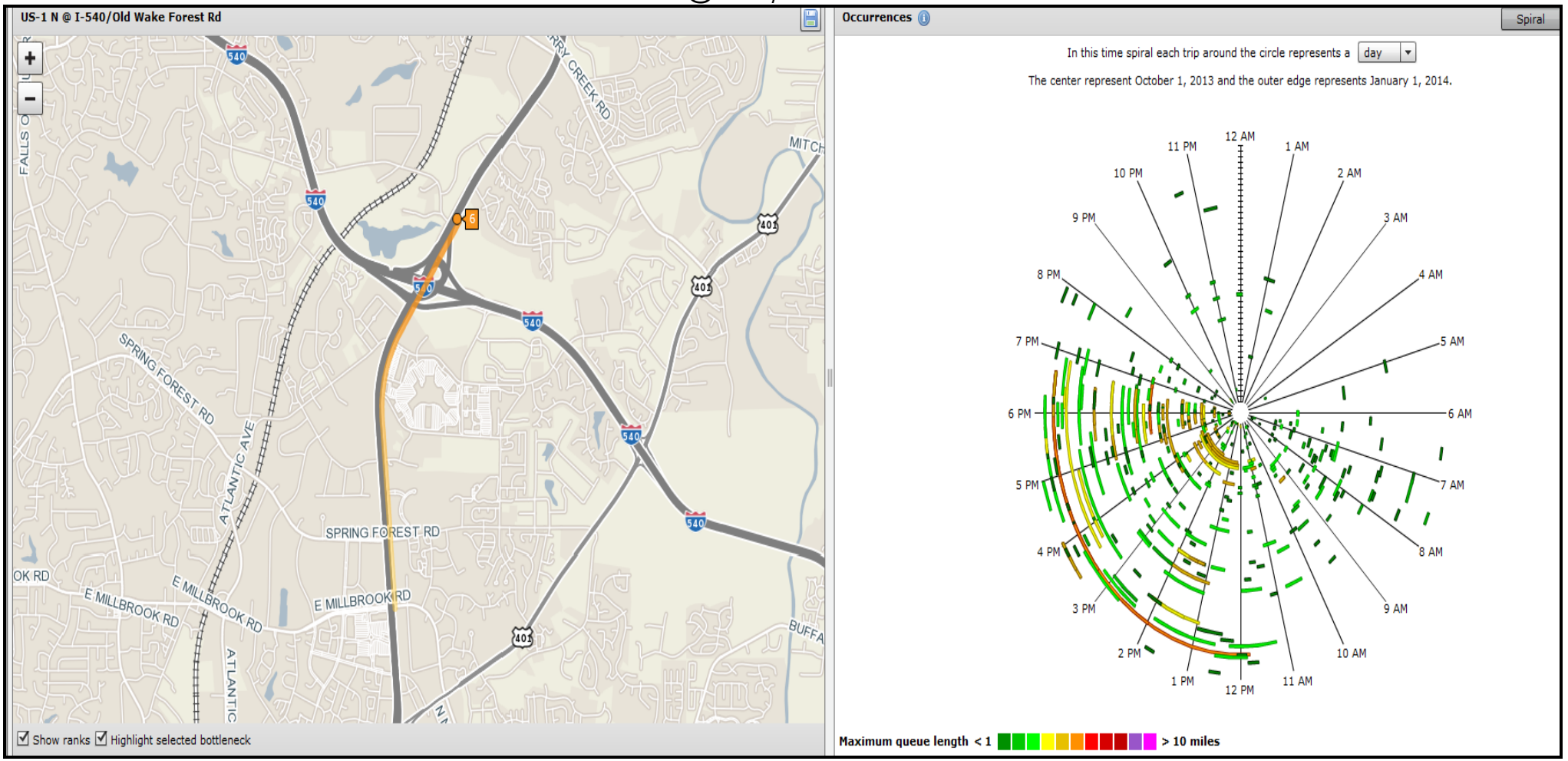
5 I-40 E @ US-70/Exit 306



APPENDIX B

Fourth Quarter

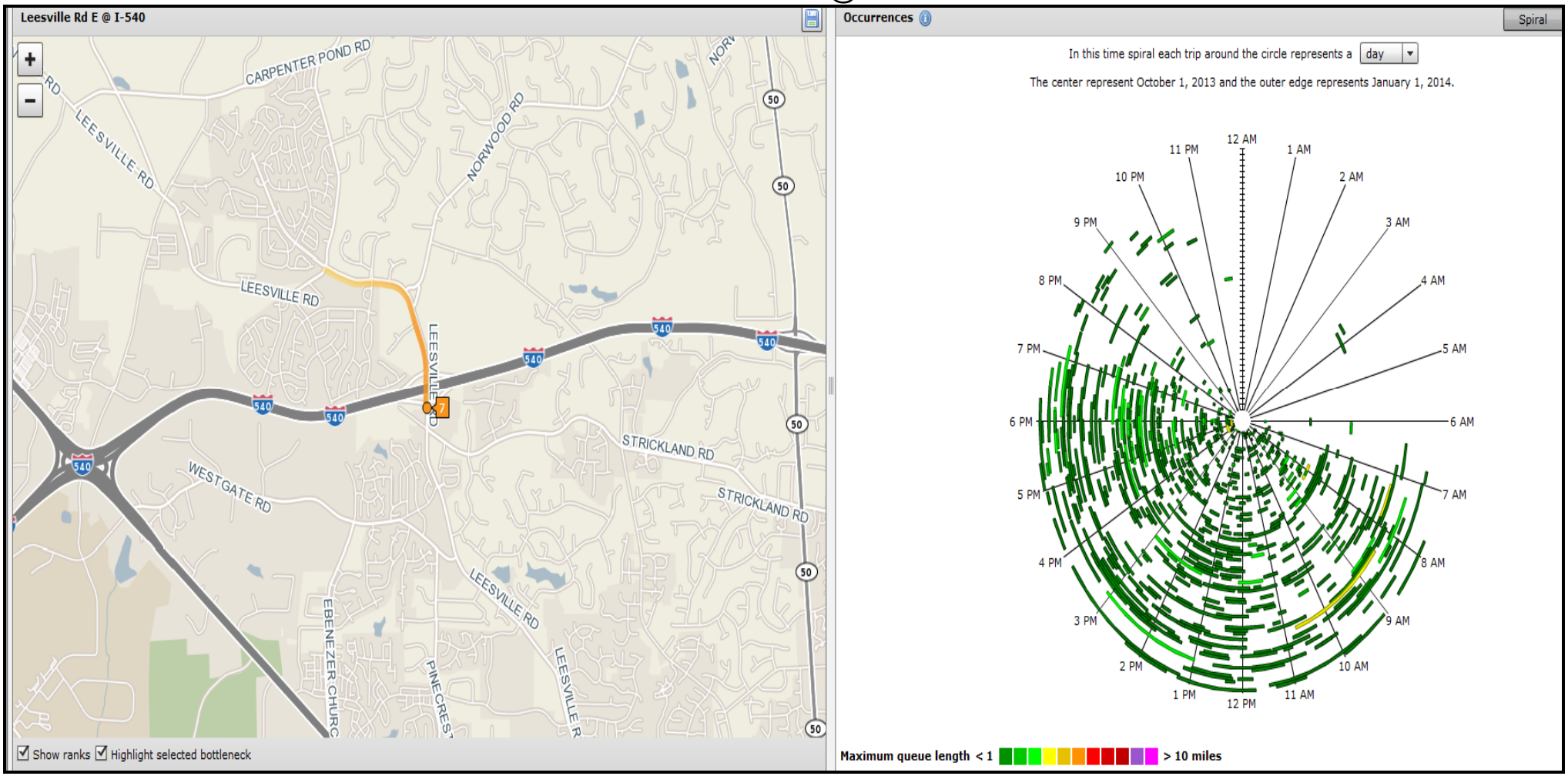
6 US-1 N @ I-540/Old Wake Forest Rd



APPENDIX B

Fourth Quarter

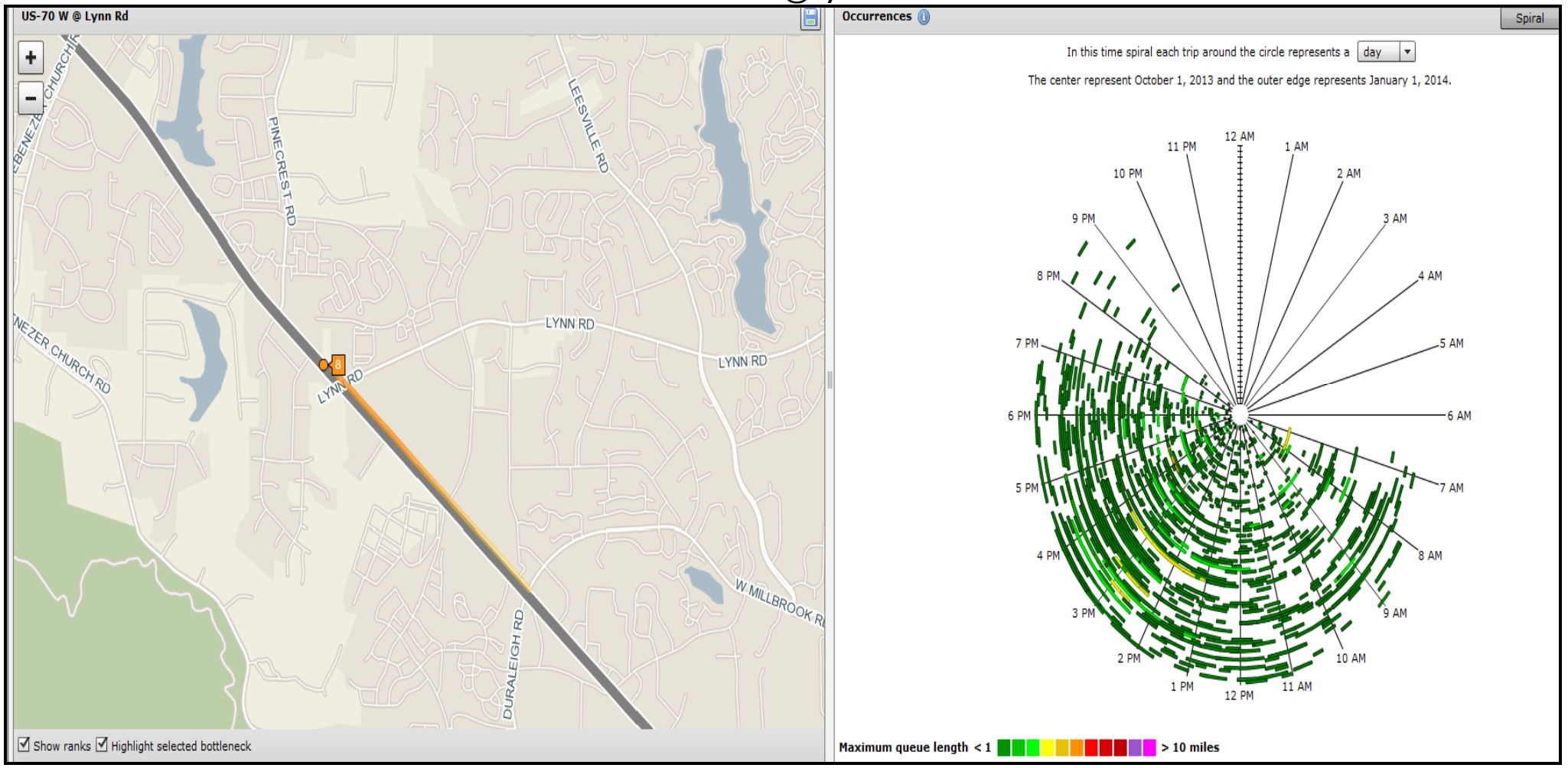
7 Leesville Rd E @ I-540



APPENDIX B

Fourth Quarter

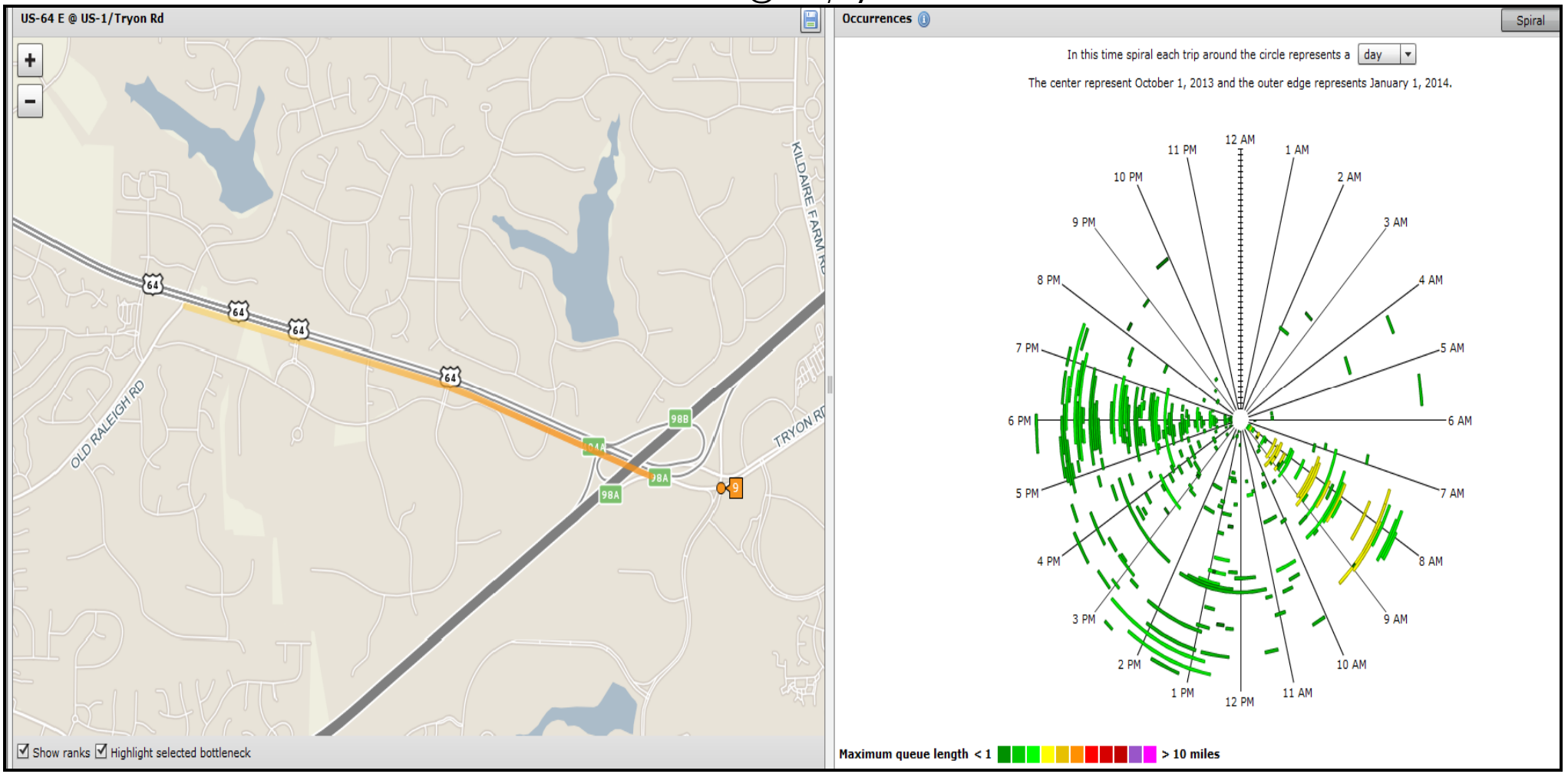
8 US-70 W @ Lynn Rd



APPENDIX B

Fourth Quarter

9 US-64 E @ US-1/Tryon Rd



APPENDIX B

Fourth Quarter

10 I-440 W @ Melbourne Rd/Exit 1