

Freeway Performance Report 2015, 1st Quarter (15.01)



Highlights:

- Identifies performance thresholds for seven freeway locations in Las Vegas that experience recurring congestion.
- Future quarterly reports will compare corridor performance with the thresholds and provide commentary and recommendations.
- Thresholds are based on recent historical performance. Delay, duration of congested conditions, and crash frequency are considered in the performance thresholds. Secondary supporting data includes volume and speed.



Overview 15.01

- This quarterly report measures performance of freeway bottlenecks in the Las Vegas area. It compares a corridor's performance against customized thresholds based on historical performance.
- Performance reports are provided to NDOT on a quarterly basis, and their content and recommendations will continue to evolve. Each time we prepare a report we learn more about the complex interplay between traffic volumes, throughput, incidents, construction, and seasonal patterns.
- The 15.01 report establishes the initial set of thresholds.

This combination of information has led to, and will continue to lead towards, investing in and deploying strategies to enhance safety, reliability, and efficiency of our transportation system and measuring system effectiveness.

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Questions & Additional Details

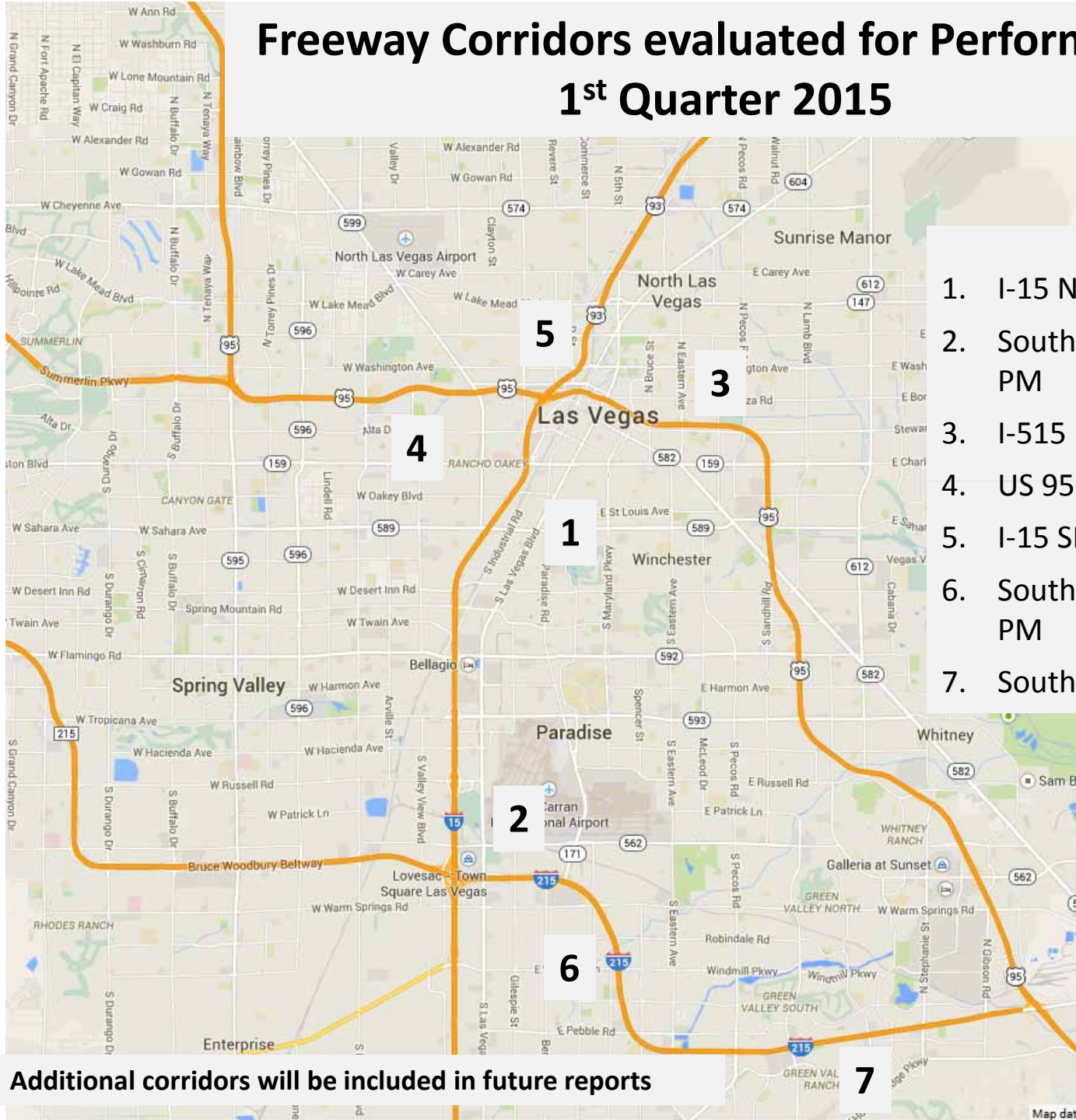
- The information presented in this report is supported by detailed tables with volumes, travel times, delay, crashes and other information.
- If you are interested in that data or have questions, please contact Brian Hoeft at hoeftb@rtcsnv.com

Corridors and Seasons

(spatial and temporal)

- Performance of congested corridors and time periods on the Southern Nevada freeway system are described.
- A display of the seven corridors and AM / PM peak periods used in this report is shown on page 6.
- The 15.01 report contains data through mid-March, which includes the Beginning of Year season for 2015.
- The use of 'Seasons' to temporally group performance is described on page 7.

Freeway Corridors evaluated for Performance 1st Quarter 2015



1. I-15 NB, PM
2. Southern Beltway, 215 WB, AM & PM
3. I-515 NB, AM & PM
4. US 95 SB to I-15 SB, AM & PM
5. I-15 SB, AM & PM
6. Southern Beltway EB to Windmill, PM
7. Southern Beltway EB to I-515, PM

Additional corridors will be included in future reports

Based on review of several years of traffic volumes and patterns from ITS data, FAST recommends the performance analysis be grouped temporally as shown below. There are six seasons per year; details on the most recent seasons are shown.

Season	Description	Most recent season dates		Days	Comment
		Begin	End		
Beginning of year	First day of CCSD school following holiday break through a Friday in mid-March	Monday, 01.05.15	Friday, 03.13.15	68	Traffic volumes and patterns pick up following holiday break and resemble Fall patterns
Holiday	Monday before Thanksgiving to day before CCSD school begins	Monday, 11.24.14	Sunday, 01.04.15	42	Although school is still in session during part of this season, traffic volumes and patterns begin to transition out of the fall travel mode. The three lowest volume travel days of the year occur during this season: Thanksgiving, Christmas, and New Year's Day. Traffic volumes to and from California are very high on several days during this season.
Fall	First day of CCSD school following summer vacation to Sunday before Thanksgiving	Monday, 08.25.14	Sunday, 11.23.14	91	By mid-September traffic volumes and patterns typically are built up to represent what will occur until the holidays. There is a distinct change from patterns and volumes experienced during the Summer season.
Summer	Final weekend of CCSD high school graduations through Sunday before the new school year begins	Saturday, 06.07.14	Sunday, 08.24.14	79	Recurring congestion and traffic volumes on the urbanized Las Vegas freeways are slightly reduced during the summer. There is an increase in travel between Las Vegas & California and towards Boulder City and Arizona.
Early Summer	A Monday in mid-April through the last weekend of CCSD school activity and graduation ceremonies	Monday, 04.21.14	Friday, 06.06.14	47	Patterns and volumes are typically similar to Fall and Beginning of Year
Spring	A Saturday in mid-March through a Sunday in mid-April	Saturday, 03.15.14	Sunday 04.20.14	37	Due to Spring Break, great weather, Easter, March Madness, conventions, and other events and activities, there is a noticeable increase in traffic volumes between mid-March and Mid-April. For the urbanized freeway corridors, the highest daily average traffic volumes of the year typically occur during this season; they are noticeably higher than the adjacent Beginning of Year and Early Summer seasons and, therefore, earn their own season. Most Sundays experience high volumes and long delays between Las Vegas and Southern California.

Performance Thresholds

(goal setting, targets)

- The concept of the corridor performance threshold is introduced in the 15.01 report and the initial thresholds are established.
- Thresholds will be used to address questions such as
 - Does corridor performance exceed, negatively, a threshold?
 - If so, why? What can be done to address?

Performance Thresholds (cont)

Establishment and use

- Each corridor's delay, congestion duration, crash rate and other data sets dating back to mid-2013 were reviewed.
- This review provided a sense of seasonal performance ranges of freeway corridors and bottlenecks.
- With this understanding, upper performance boundaries for the parameters were created. These are the performance thresholds
- How performance compares to these thresholds will be evaluated in future reports, and opportunities for projects, programs, and other activities to address performance will be introduced.
- The table on page 10 lists the thresholds for the seven bottleneck corridors. Page 11 describes threshold details. Pages 19 through 39 provide more extensive performance details for each bottleneck.

Temporal / Spatial description			How long does a congestion event last? How frequent are congestion events?		Maximum Delay (minutes)			Days per crash		How do changes in volume & speed relate?
Corridor	AM / PM	School in or out	duration	duration color	Average	95th percentile	95th color	crash	very bad crash	
15 NB	pm	na	2.5 to 3 hours	red	12	20	yellow	1.2	10	constr
515 NB	am	sch	30 to 45 mins	orange	8	14	green	3	15	v+ sp-
	am	summer	30 mins	green	8	14	green			
	pm	sch	lt 100 mins	maroon	12 to 14	20	yellow			
	pm	summer	lt 45 mins	green	8	12	green			
215 WB	am	sch	45 mins	orange	8	16	yellow	5	30	constr
	am	summer	30 mins	green	8	14	green			
	pm	sch	lt 75 mins	red	14	20	yellow			
	pm	summer	lt 60 mins	maroon	10	14	green			
95 to 15 SB	am	sch	lt 70 mins	maroon	10 to 12	16	yellow	2	20	v+ sp-
	am	summer	lt 70 mins	orange	10	12	green			
	pm	sch	lt 135 mins	red	10	14	yellow			
	pm	summer	lt 100 mins	red	8	12	yellow			
15 SB	am	sch	lt 60 mins	maroon	10	16	yellow	1.5	8	v+ sp-
	am	summer	lt 45 mins	orange	10	14	yellow			
	pm	sch	lt 75 mins	red	12	16	yellow			
	pm	summer	lt 75 mins	red	12	16	yellow			
215 EB to Eastern	pm	sch	lt 60 mins	maroon	6	10	yellow	8	30	constr
	pm	summer	lt 30 mins	orange	4	8	green			
215 EB to 515	pm	sch	lt 30 mins	green	6	10	green	8	30	v+ sp =
	pm	summer	lt 30 mins	green	4	8	green			

Performance Threshold details

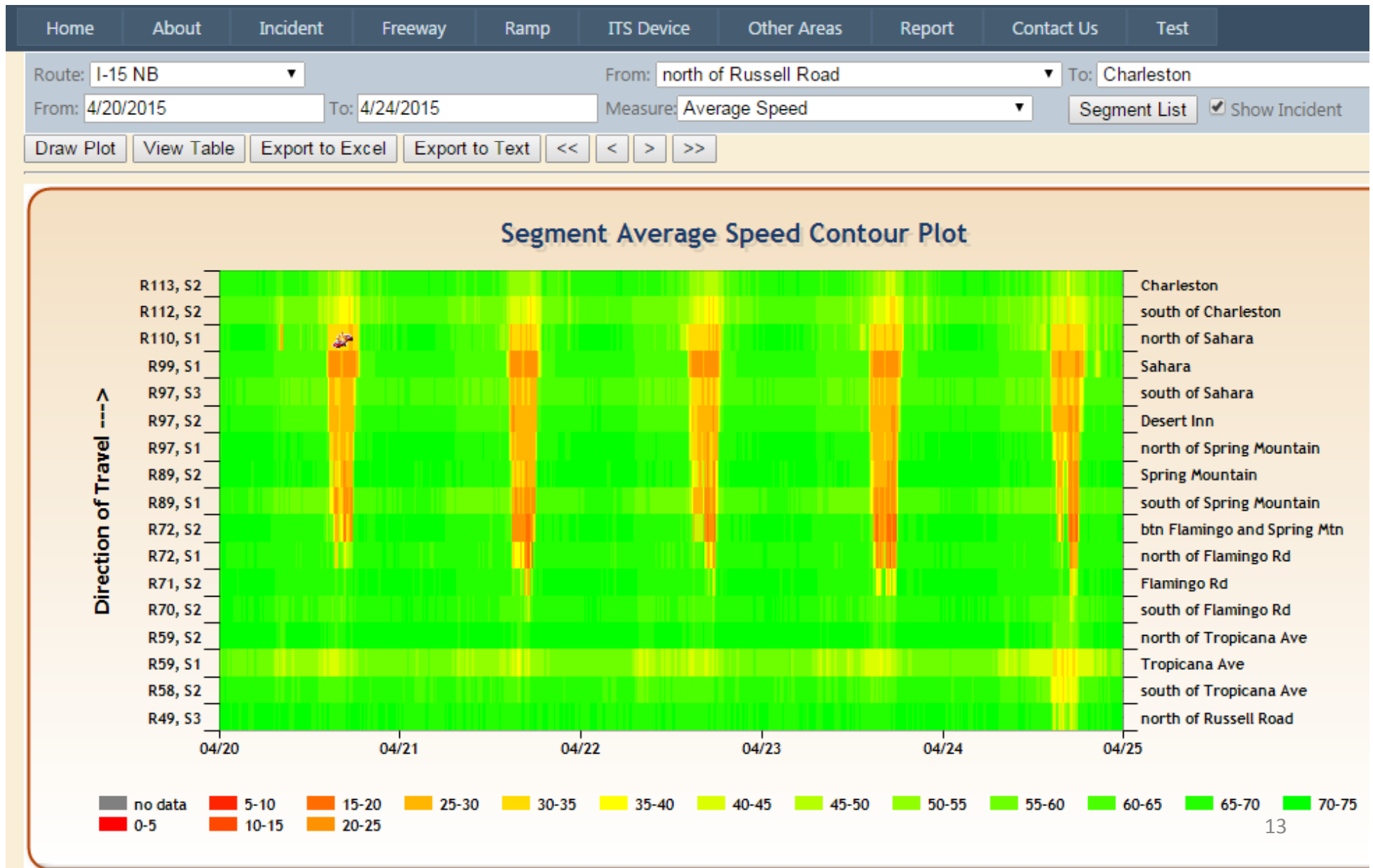
- **Corridor, AM-PM, School-Summer:** temporal and spatial information.
- **Duration and Duration color:** on average, how long does the congestion event last? The color corresponds to percentage of days that have a congestion event. More events means a redder color.
- **Max delay fields:** each congestion event will have a maximum delay over and above the free-flow travel time. The average and 95th percentile delay are shown.
- **Crashes:** how many days elapse between crashes and very bad crashes. Very bad crashes are not cleared from travel lanes in time to meet the 30 or 60 minute criteria.
- **Volume-Speed relationship:** the change in average daily volume and speed are compared over time. Does volume increase while speed decreases, or is there some other relationship? In some corridors, this cannot be determined because of construction during the previous season.

The Congestion Event

Used to monitor and quantify performance

- Evaluation of performance thresholds requires temporal and spatial measurements of congestion events.
- Congestion event examples displayed on slides 13 through 17 show
 - Frequency
 - Duration, and
 - Maximum delay
- Speed contour plots, obtained from the FAST dashboard at <http://bugatti.nvfast.org/CorridorContour.aspx> are used to visualize and evaluate congestion events. Congestion events for many corridors are available as far back as Fall 2009.

Plot 1 of 5: I-15 NB congestion events for Monday April 20 through Friday April 24 that are reliable in terms of duration and max delay.

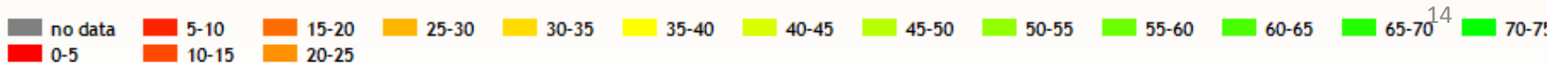
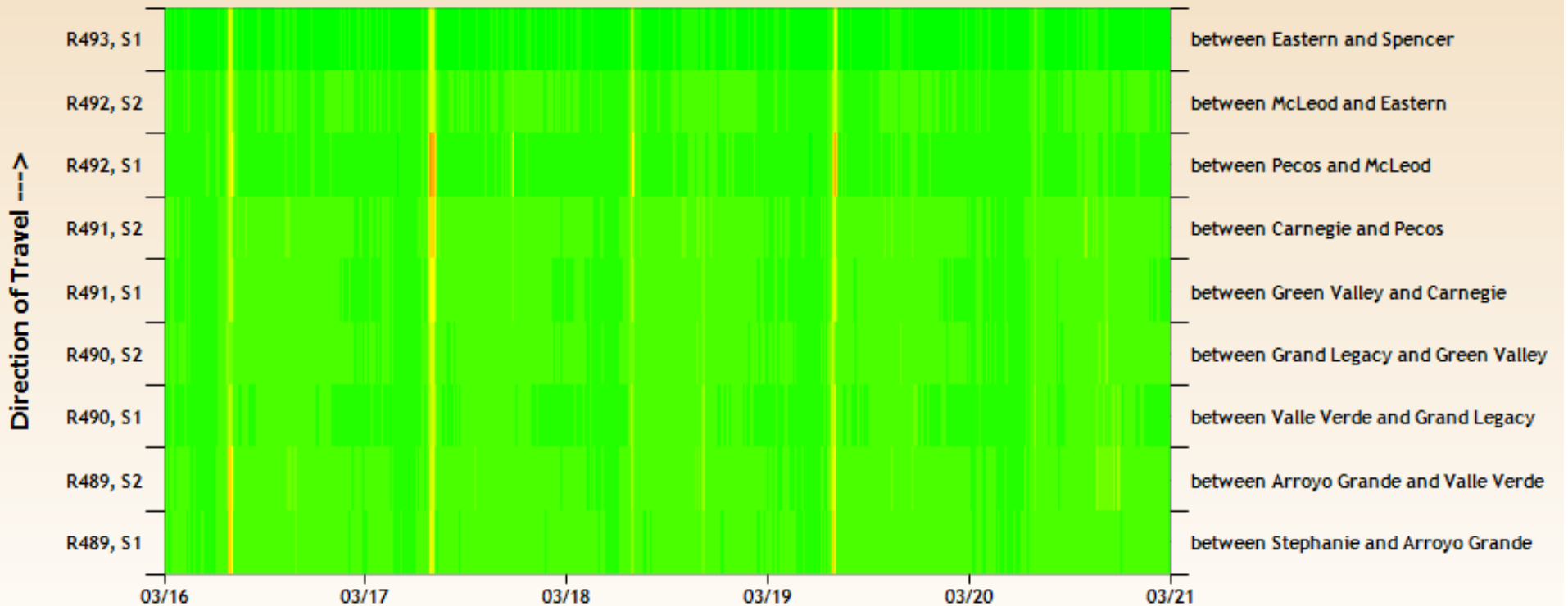


Plot 2 of 5 The 215 WB corridor has been experiencing congestion events only a few days per week. The number of events may increase in the future, but for now the duration color would be yellow or orange.

I-215 WB From: between Stephanie and Arroyo Grande To: between Eastern and Spencer
 3/16/2015 To: 3/20/2015 Measure: Average Speed Segment List Show Incident

Plot View Table Export to Excel Export to Text << < > >>

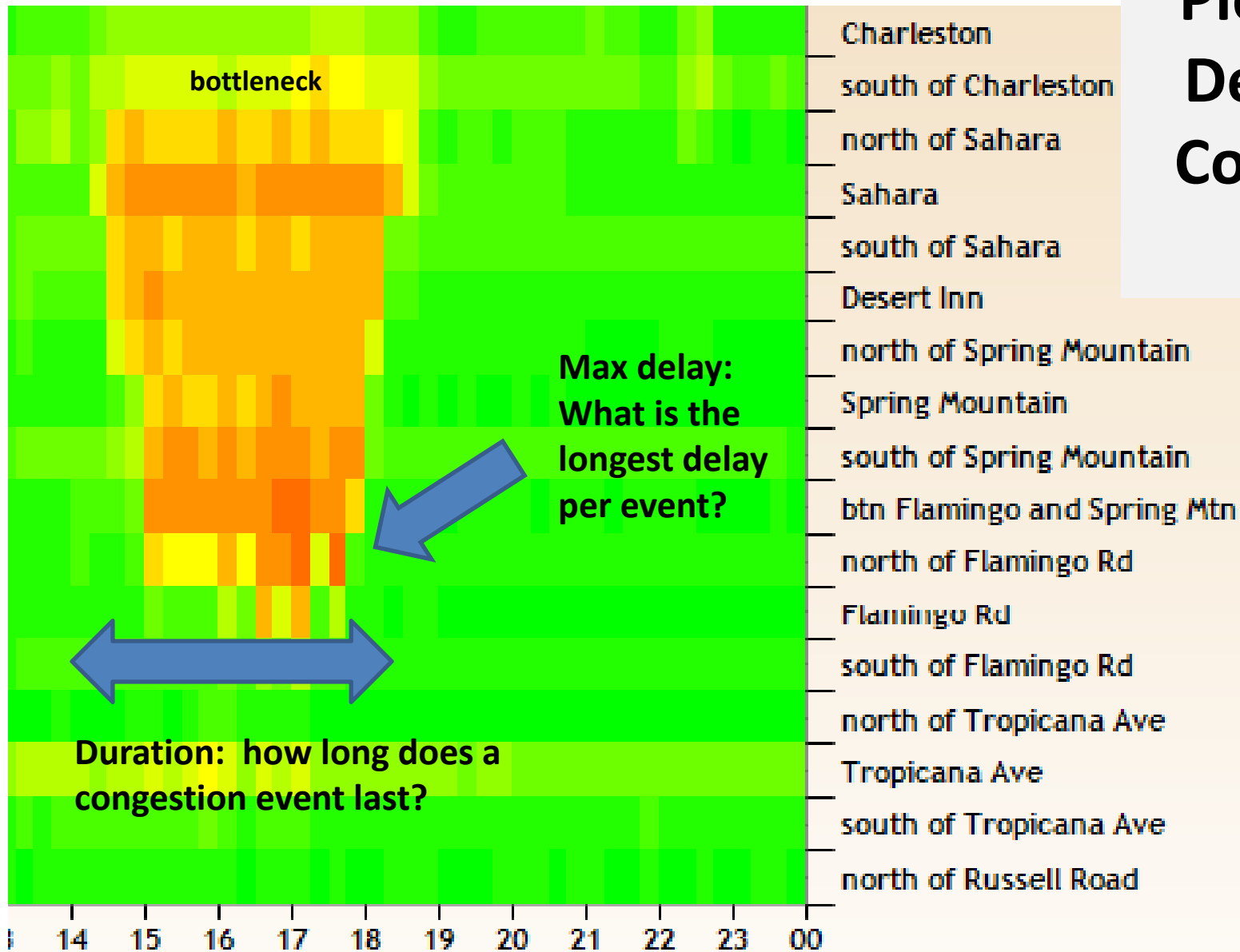
Segment Average Speed Contour Plot



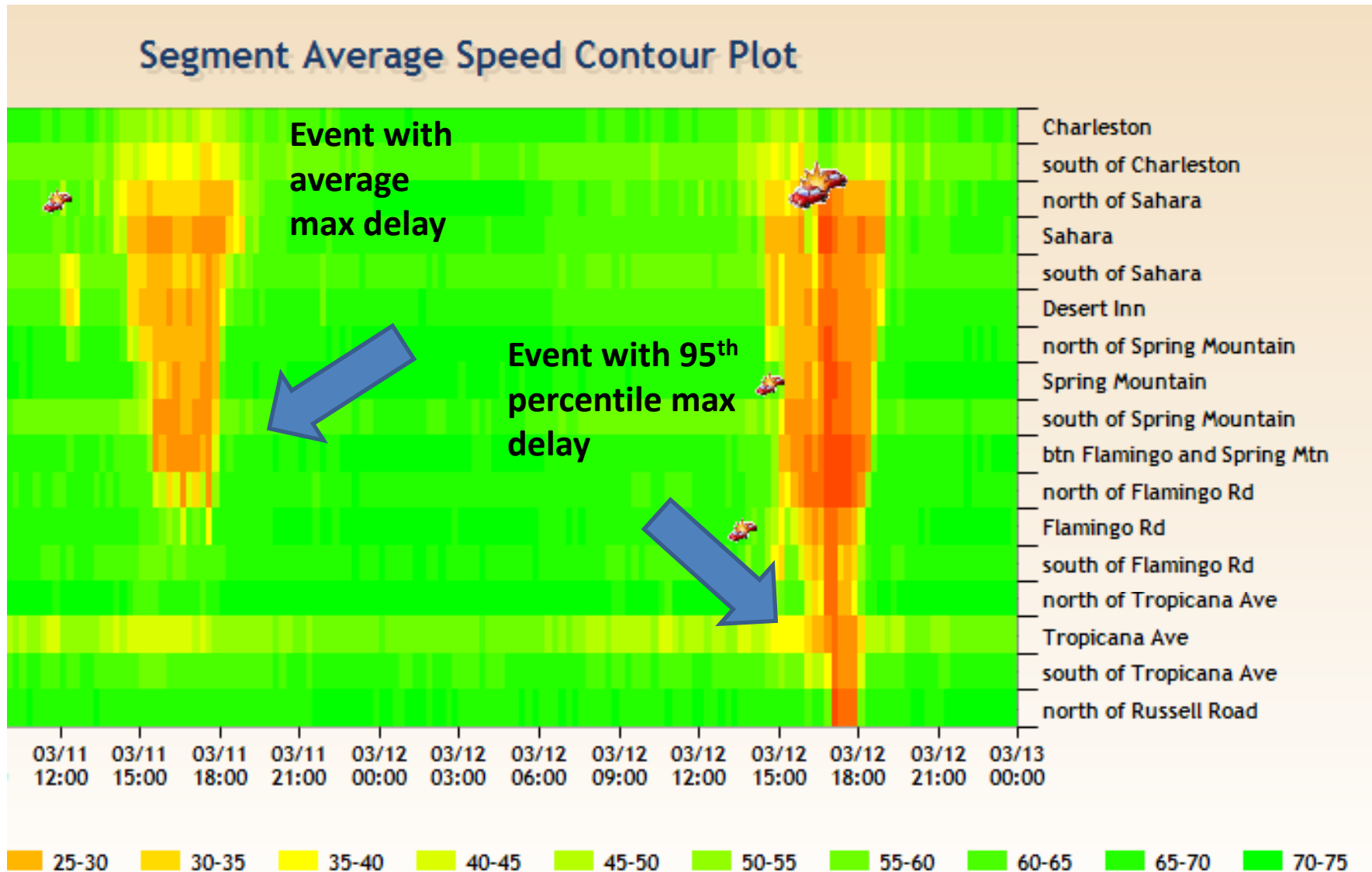
Plot 3 of 5: Here's a subsequent week of the same 215 corridor with congestion events that are unreliable in terms of location and extent; this is directly attributable to incidents.



Plot 4 of 5: Describing Congestion Events



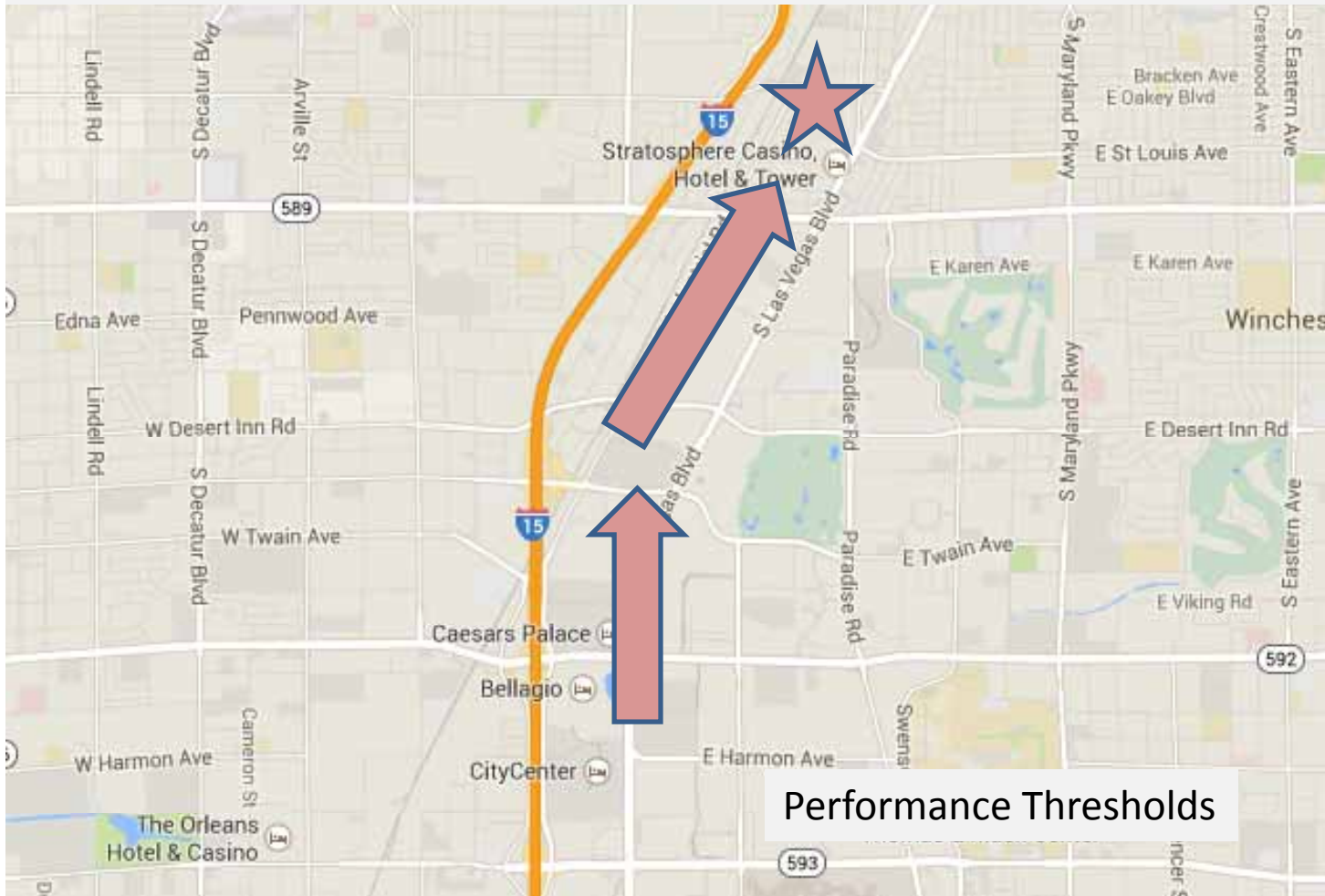
Plot 5 of 5: The left congestion event has average max delay; the right one has 95th percentile delay. As stated previously, traffic incidents are the main cause of unreliable congestion activity.



Corridor Performance

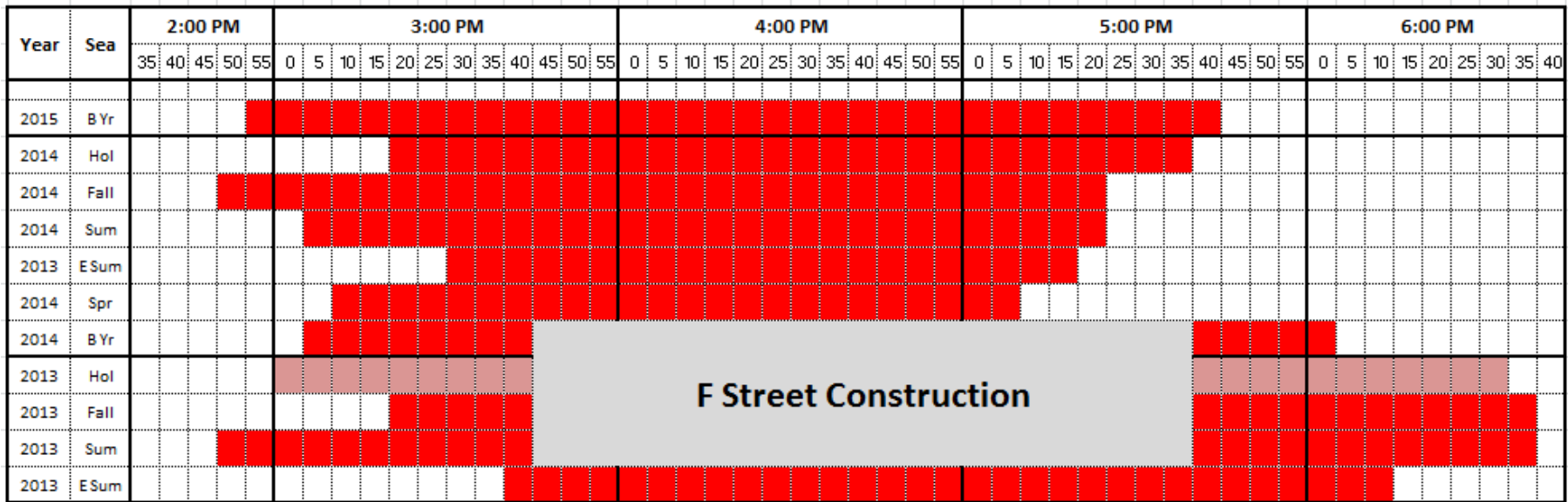
- Seven bottlenecks evaluated in 15.01
- For each bottleneck you will see
 - Map of location and performance thresholds
 - Duration, including start and end time of congestion event
 - Maximum delay during congestion event (average day, 95th percentile day)
 - Frequency of crashes and bad crashes
 - Percent increase in avg daily volume & pct decrease in avg daily speed

Bottleneck 1: I-15 NB between Charleston & Sahara, PM

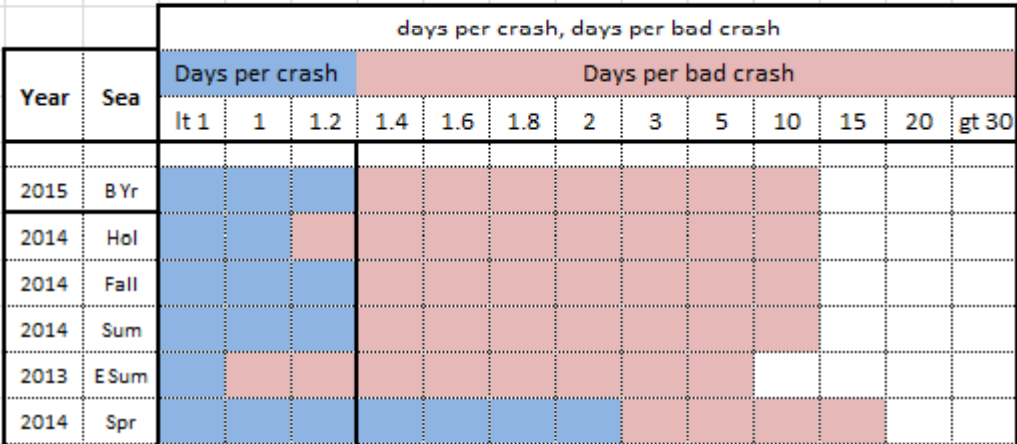
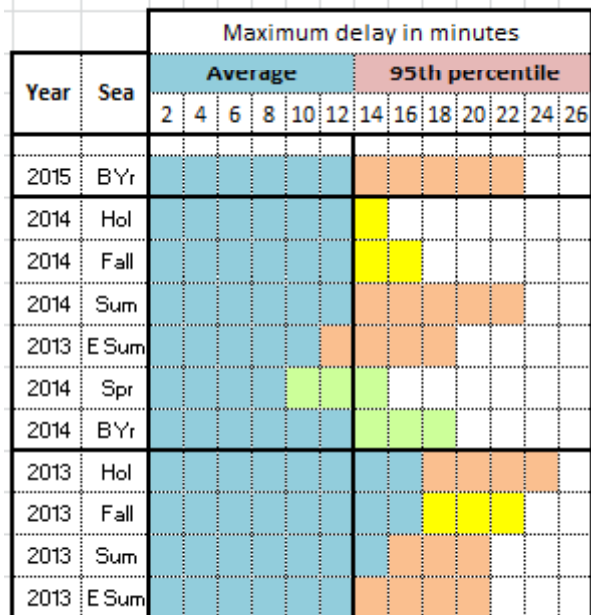


Temporal / Spatial description			How long does a congestion event last? How frequent are congestion events?		Maximum Delay (minutes)			Days per crash		How do changes in volume & speed relate?
Corridor	AM / PM	School in or out	duration	duration color	Average	95th percentile	95th color	crash	very bad crash	
15 NB	pm	na	2.5 to 3 hours	red	12	20	yellow	1.2	10	constr

Bottleneck 1 (cont): I-15 NB between Charleston & Sahara, PM



F Street Construction



Bottleneck 1 (cont): I-15 NB between Charleston & Sahara, PM

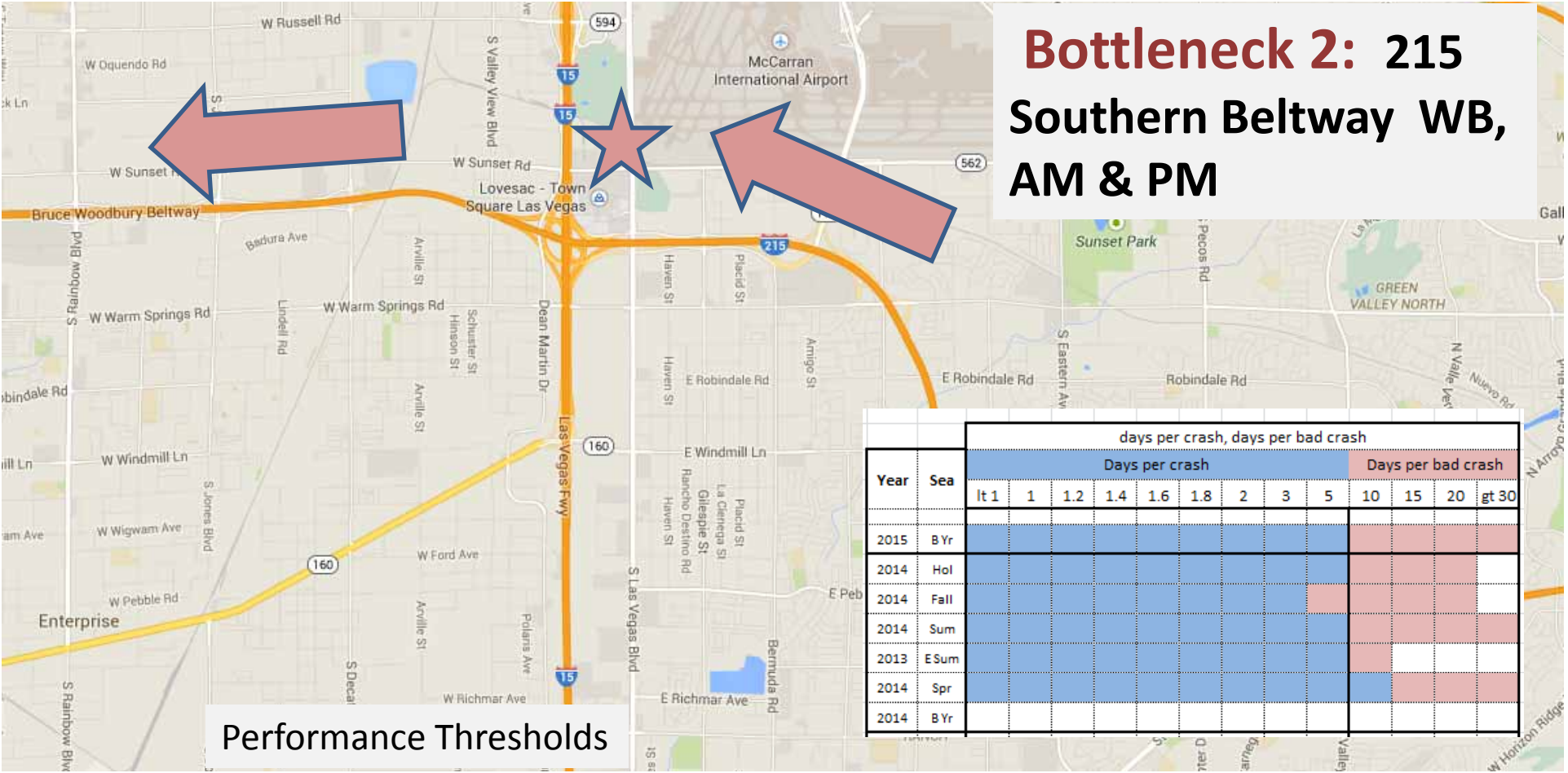
Percent increase in daily average volume at three locations in corridor

Year	Sea	between Tropicana & Flamingo												south of Sahara												between Sahara & Charleston											
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
2015	BYr	[Green]												[Green]												[Green]											
2014	Hol	[Green]												[Green]												[Green]											
2014	Fall	[Green]												[Green]												[Green]											
2014	Sum	[Green]												[Green]												[Green]											
2013	E Sum	[Green]												[Green]												[Green]											
2014	Spr	[Green]												[Green]												[Green]											
2014	BYr	[Green]												[Green]												[Green]											
2013	Hol	<i>F Street construction</i>												<i>F Street construction</i>												<i>F Street construction</i>											
2013	Fall	[Green]												[Green]												[Green]											
2013	Sum	[Green]												[Green]												[Green]											
2013	E Sum	[Green]												[Green]												[Green]											

Percent change in daily average speed at three locations in corridor

Year	Sea	between Tropicana & Flamingo											south of Sahara											between Sahara & Charleston												
		lt -2	-1.8	-1.6	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2	0.0	pos	lt -2	-1.8	-1.6	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2	0.0	pos	lt -2	-1.8	-1.6	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2	0.0
2015	BYr												<<	-3.4											<<	-2.2										
2014	Hol											0.2												0.5												1.9
2014	Fall																							0.5												2.3
2014	Sum											0.3												2.0												2.3
2013	E Sum																							2.5												3.1
2014	Spr											0.9												1.0												0.7
2014	BYr											0.8												1.0												
2013	Hol																								<<	-2.3										
2013	Fall											0.3													<<	-2.4										
2013	Sum												<<	-2.9																						15.0
2013	E Sum												<<	-3.4																						24.8

Bottleneck 2: 215 Southern Beltway WB, AM & PM



Year	Sea	days per crash, days per bad crash												
		Days per crash								Days per bad crash				
		lt 1	1	1.2	1.4	1.6	1.8	2	3	5	10	15	20	gt 30
2015	B Yr													
2014	Hol													
2014	Fall													
2014	Sum													
2013	E Sum													
2014	Spr													
2014	B Yr													

Temporal / Spatial description			How long does a congestion event last? How frequent are congestion events?		Maximum Delay (minutes)			Days per crash		How do changes in volume & speed relate?
Corridor	AM / PM	School in or out	duration	duration color	Average	95th percentile	95th color	crash	very bad crash	
215 WB	am	sch	45 mins	orange	8	16	yellow	5	30	constr
	am	summer	30 mins	green	8	14	green			
	pm	sch	lt 75 mins	red	14	20	yellow			
	pm	summer	lt 60 mins	maroon	10	14	green			

Year	Sea	7:00 AM						8:00 AM								
		25	30	35	40	45	50	55	0	5	10	15	20	25	30	35
2015	B Yr															
2014	Hol															
2014	Fall															
2014	Sum															
2013	E Sum															
2014	Spr															
2014	B Yr															
2013	Hol															
2013	Fall															
2013	Sum															
2013	E Sum															

Year	Sea	Maximum delay in minutes														
		Average							95th percentile							
		2	4	6	8	10	12	14	16	18	20	22	24	26		
2015	B Yr															
2014	Hol															
2014	Fall															
2014	Sum															
2013	E Sum															
2014	Spr															
2014	B Yr															
2013	Hol															
2013	Fall															
2013	Sum															
2013	E Sum															

Bottleneck 2
(cont): 215
Southern Beltway
WB, AM & PM

Year	Sea	4:00 PM						5:00 PM						6:00 PM											
		30	35	40	45	50	55	0	5	10	15	20	25	30	35	40	45	50	55	0	5	10	15	20	25
2015	B Yr																								
2014	Hol																								
2014	Fall																								
2014	Sum																								
2013	E Sum																								
2014	Spr																								
2014	B Yr																								
2013	Hol																								
2013	Fall																								
2013	Sum																								
2013	E Sum																								

Year	Sea	Maximum delay in minutes																							
		Average							95th percentile																
		2	4	6	8	10	12	14	16	18	20	22	24	26											
2015	B Yr																								
2014	Hol																								
2014	Fall																								
2014	Sum																								
2013	E Sum																								
2014	Spr																								
2014	B Yr																								
2013	Hol																								
2013	Fall																								
2013	Sum																								
2013	E Sum																								

Bottleneck 2 (cont): 215 Southern Beltway WB, AM & PM

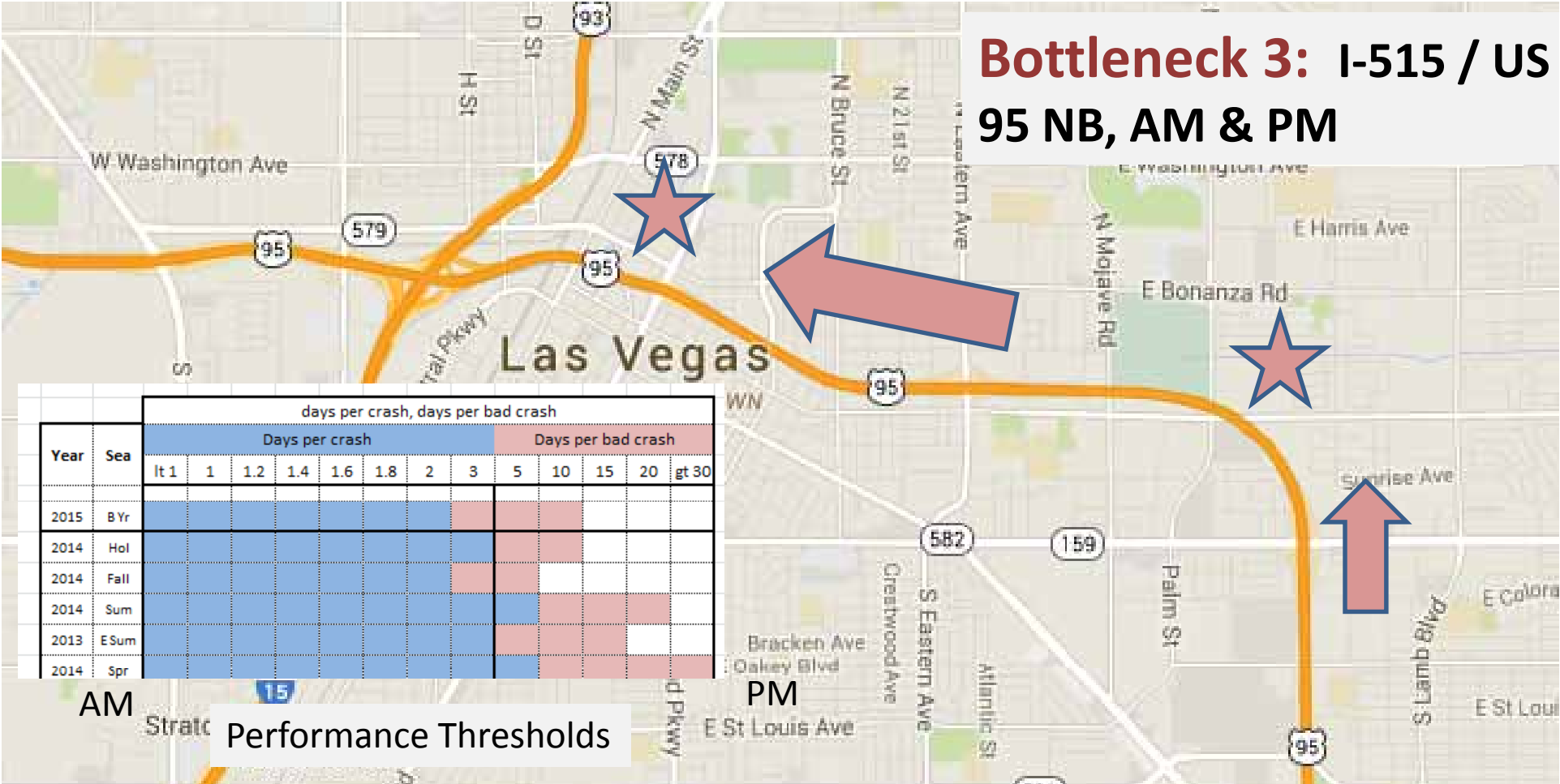
Percent increase in daily average volume at three locations in corridor

Year	Sea	east of Eastern												west of Eastern												at Decatur											
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
2015	B'Yr																																				
2014	Hol																																				
2014	Fall																																				
2014	Sum																																				
2013	E Sum																																				
2014	Spr																																				
2014	B'Yr																																				
2013	Hol																																				
2013	Fall																																				
2013	Sum																																				
2013	E Sum																																				

Percent change in daily average speed at three locations in corridor

Year	Sea	east of Eastern												west of Eastern												at Decatur											
		lt -2	-1.8	-1.6	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2	0.0	pos	lt -2	-1.8	-1.6	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2	0.0	pos	lt -2	-1.8	-1.6	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2	0.0	pos
2015	B'Yr																																				
2014	Hol																																				
2014	Fall																																				
2014	Sum																																				
2013	E Sum																																				
2014	Spr																																				
2014	B'Yr																																				
2013	Hol																																				
2013	Fall																																				
2013	Sum																																				
2013	E Sum																																				

Bottleneck 3: I-515 / US 95 NB, AM & PM



Year	Sea	days per crash, days per bad crash												
		Days per crash						Days per bad crash						
		lt 1	1	1.2	1.4	1.6	1.8	2	3	5	10	15	20	gt 30
2015	B Yr													
2014	Hol													
2014	Fall													
2014	Sum													
2013	E Sum													
2014	Spr													

AM

PM

Performance Thresholds

Temporal / Spatial description			How long does a congestion event last? How frequent are congestion events?		Maximum Delay (minutes)			Days per crash		How do changes in volume & speed relate?
Corridor	AM / PM	School in or out	duration	duration color	Average	95th percentile	95th color	crash	very bad crash	
515 NB	am	sch	30 to 45 mins	orange	8	14	green	3	15	v+ sp-
	am	summer	30 mins	green	8	14	green			
	pm	sch	lt 100 mins	maroon	12 to 14	20	yellow			
	pm	summer	lt 45 mins	green	8	12	green			

Bottleneck 3 (cont): I-515 / US 95 NB, AM & PM

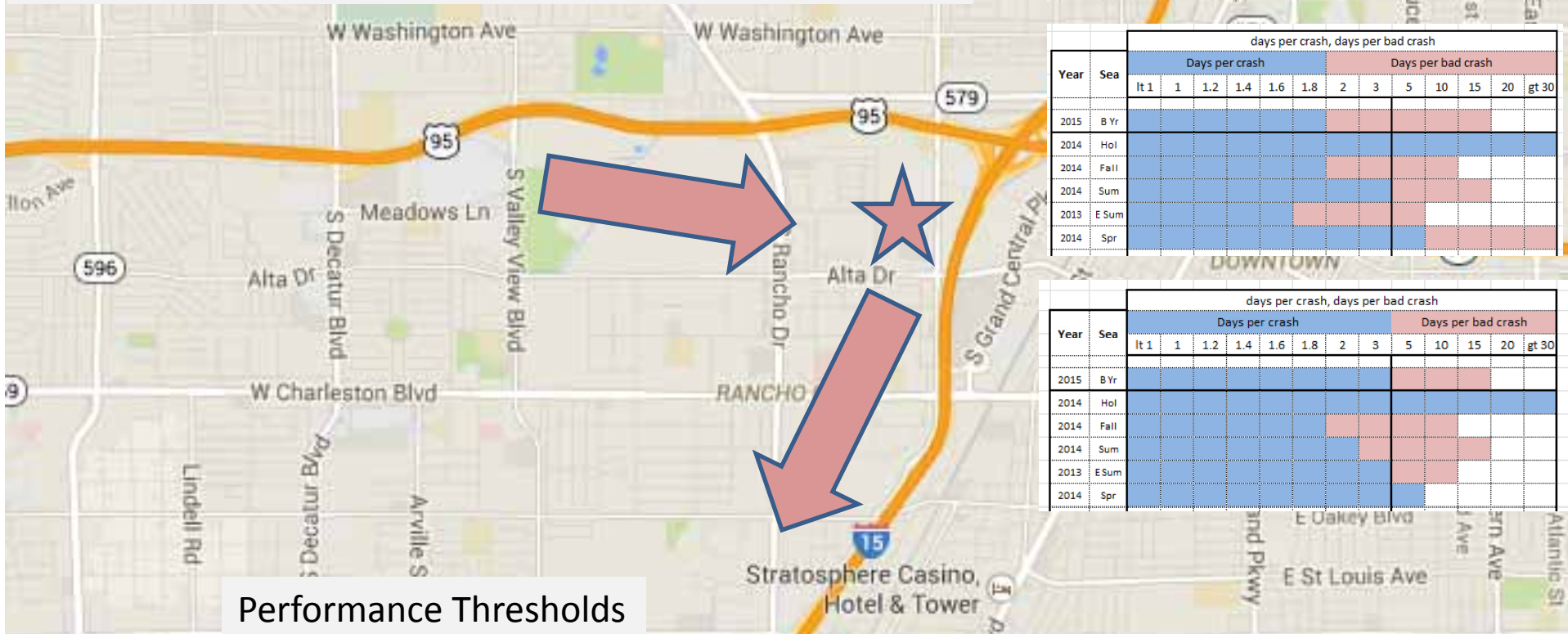
Percent increase in daily average volume at two locations in corridor

Year	Sea	between Charleston & Eastern												east of I-15											
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
2015	BYr	[Green]												[Green]											
2014	Hol	[Green]												[Green]											
2014	Fall	[Green]												[Green]											
2014	Sum	[Green]												[Green]											
2013	E Sum	[Green]												[Green]											
2014	Spr	[Green]												[Green]											
2014	BYr	[Green]												[Green]											
2013	Hol	[Green]												[Green]											
2013	Fall	[Green]												[Green]											
2013	Sum	[Green]												[Green]											
2013	E Sum	[Green]												[Green]											

Percent change in daily average speed at two locations in corridor

Year	Sea	between Charleston & Eastern												east of I-15											
		lt -2	-1.8	-1.6	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2	0.0	pos	lt -2	-1.8	-1.6	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2	0.0	pos
2015	BYr	[Red]												[Red]											
2014	Hol	[Red]												[Red]											
2014	Fall	[Red]												[Red]											
2014	Sum	[Red]												[Red]											
2013	E Sum	[Red]												[Red]											
2014	Spr	<<	-2.4	[Red]										[Red]											
2014	BYr	[Red]												[Red]											
2013	Hol	[Red]												[Red]											
2013	Fall	[Red]												[Red]											
2013	Sum	[Red]												[Red]											
2013	E Sum	[Red]												[Red]											

Bottleneck 4: US 95 SB to I-15 SB at Spaghetti Bowl, AM & PM



Performance Thresholds

Temporal / Spatial description			How long does a congestion event last? How frequent are congestion events?		Maximum Delay (minutes)			Days per crash		How do changes in volume & speed relate?
Corridor	AM / PM	School in or out	duration	duration color	Average	95th percentile	95th color	crash	very bad crash	
95 to 15 SB	am	sch	lt 70 mins	maroon	10 to 12	16	yellow	2	20	v+ sp-
	am	summer	lt 70 mins	orange	10	12	green			
	pm	sch	lt 135 mins	red	10	14	yellow			
	pm	summer	lt 100 mins	red	8	12	yellow			

Percent increase in daily average volume at two locations in corridor

Year	Sea	US 95 SB at Rancho											
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
2015	B Yr												
2014	Hol												
2014	Fall												
2014	Sum												
2013	E Sum												
2014	Spr												
2014	B Yr												
2013	Hol												
2013	Fall												
2013	Sum												
2013	E Sum												

Year	Sea	I-15 SB at Lake Mead Blvd											
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
2015	B Yr												6.2 >
2014	Hol												
2014	Fall												
2014	Sum												
2013	E Sum												
2014	Spr												
2014	B Yr												

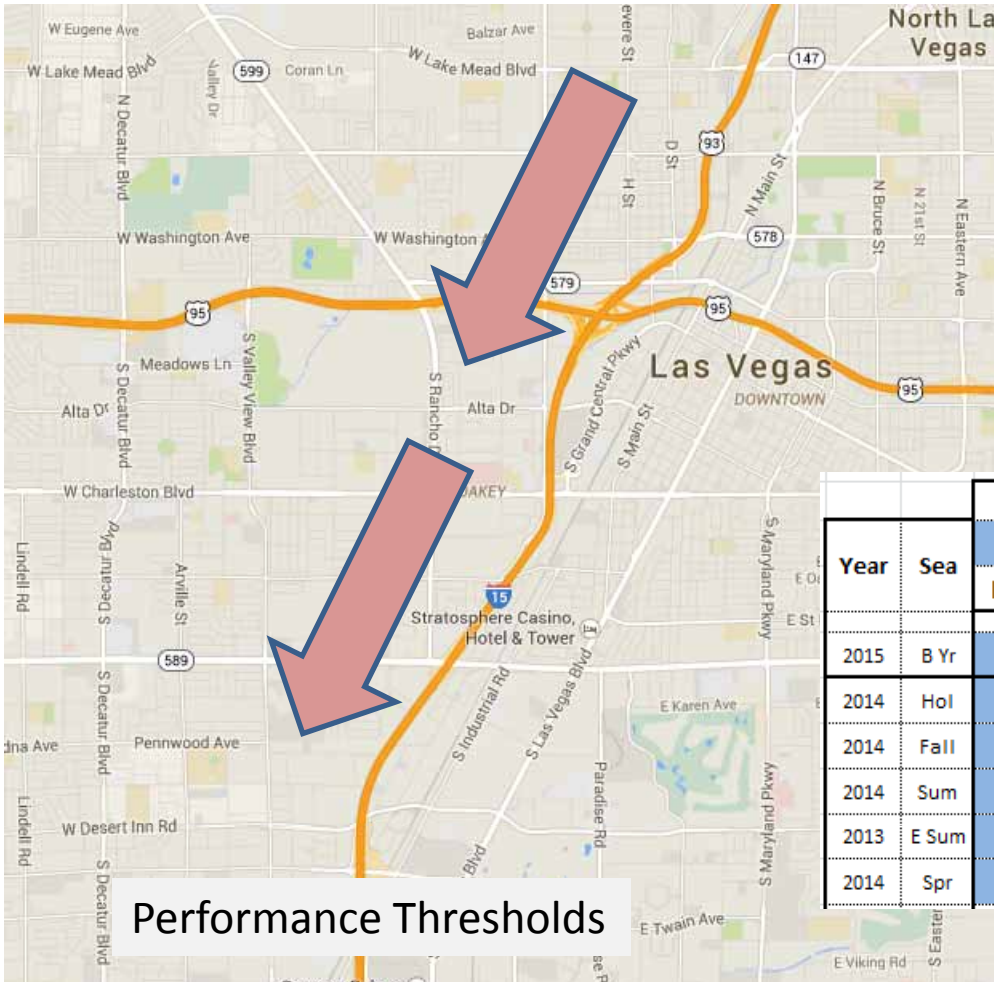
Bottleneck 4 (cont): US 95 SB to I-15 SB at Spaghetti Bowl, AM & PM

Percent change in daily average speed at two locations in corridor

Year	Sea	US 95 SB at Rancho											
		lt-2	-1.8	-1.6	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2	0.0	pos
2015	B Yr												
2014	Hol												
2014	Fall												
2014	Sum											0.1	
2013	E Sum											0.6	
2014	Spr												
2014	B Yr												
2013	Hol											0.3	
2013	Fall												
2013	Sum												
2013	E Sum												

Year	Sea	I-15 SB at Lake Mead Blvd											
		lt-2	-1.8	-1.6	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2	0.0	pos
2015	B Yr												2.2
2014	Hol												3.4
2014	Fall												1.1
2014	Sum												
2013	E Sum	<<	-3.2										
2014	Spr	<<	-4.0										
2014	B Yr	<<	-4.2										
2013	Hol	<<	-4.0										
2013	Fall	<<	-4.0										
2013	Sum	<<	-2.1										
2013	E Sum												

Bottleneck 5: I-15 SB, AM & PM



Performance Thresholds

Year	Sea	days per crash, days per bad crash												
		Days per crash				Days per bad crash								
		lt 1	1	1.2	1.4	1.6	1.8	2	3	5	10	15	20	gt 30
2015	B Yr													
2014	Hol													
2014	Fall													
2014	Sum													
2013	E Sum													
2014	Spr													

Temporal / Spatial description			How long does a congestion event last? How frequent are congestion events?		Maximum Delay (minutes)			Days per crash		How do changes in volume & speed relate?
Corridor	AM / PM	School in or out	duration	duration color	Average	95th percentile	95th color	crash	very bad crash	
15 SB	am	sch	lt 60 mins	maroon	10	16	yellow	1.5	8	vt sp-
	am	summer	lt 45 mins	orange	10	14	yellow			
	pm	sch	lt 75 mins	red	12	16	yellow			
	pm	summer	lt 75 mins	red	12	16	yellow			

Bottleneck 5: I-15 SB, AM & PM

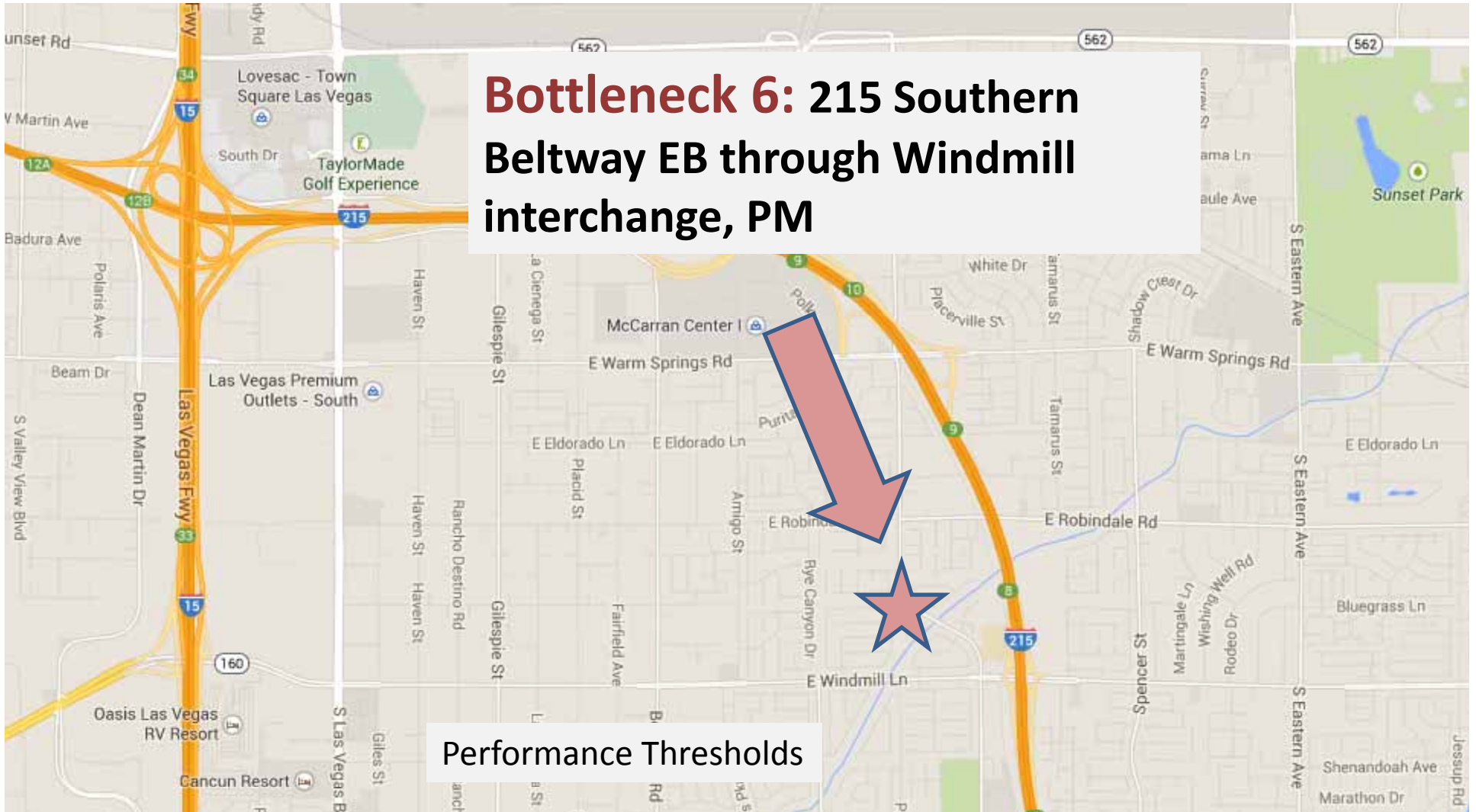
Percent increase in daily average volume at three locations in corridor

Year	Sea	at Lake Mead Blvd											at Charleston											between Flamingo & Tropicana											
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
2015	BYr	6.2 >																																	
2014	Hol																																		
2014	Fall																																		
2014	Sum																																		
2013	E Sum																																		
2014	Spr																																		
2014	BYr																																		
2013	Hol																																		
2013	Fall																																		
2013	Sum																							7.1 >>											
2013	E Sum																																		

Percent change in daily average speed at three locations in corridor

Year	Sea	at Lake Mead Blvd												at Charleston												between Flamingo & Tropicana											
		lt -2	-1.8	-1.6	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2	0.0	pos	lt -2	-1.8	-1.6	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2	0.0	pos	lt -2	-1.8	-1.6	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2	0.0	pos
2015	BYr	2.2												<< -4.0																							
2014	Hol	3.4																								1.0											
2014	Fall	1.1												<< -2.1																							
2014	Sum													<< -2.9												0.2											
2013	E Sum	<<	-3.2										<<												<<												
2014	Spr	<<	-4.0										<<												<<												
2014	BYr	<<	-4.2										<<												<<												
2013	Hol	<<	-4.0										<<												<<												
2013	Fall	<<	-4.0										<<											0.2	<<											0.2	
2013	Sum	<<	-2.1										<<												<<											3.4	
2013	E Sum													<< -3.6																							

Bottleneck 6: 215 Southern Beltway EB through Windmill interchange, PM



Performance Thresholds

Temporal / Spatial description			How long does a congestion event last? How frequent are congestion events?		Maximum Delay (minutes)			Days per crash		How do changes in volume & speed relate?
Corridor	AM / PM	School in or out	duration	duration color	Average	95th percentile	95th color	crash	very bad crash	
215 EB to Eastern	pm	sch	lt 60 mins	maroon	6	10	yellow	8	30	constr
	pm	summer	lt 30 mins	orange	4	8	green			

Bottleneck 6: 215 Southern Beltway EB through Windmill interchange, PM

Year	Sea	4:00 PM				5:00 PM										6:00 PM					
		40	45	50	55	0	5	10	15	20	25	30	35	40	45	50	55	0	5	10	15
2015	B Yr																				
2014	Hol																				
2014	Fall																				
2014	Sum					N O N E															
2013	E Sum																				
2014	Spr																				
2014	B Yr																				

Year	Sea	Maximum delay in minutes																								
		Average			95th percentile																					
		2	4	6	8	10	12	14	16	18	20	22	24	26												
2015	B Yr																									
2014	Hol																									
2014	Fall																									
2014	Sum																									
2013	E Sum																									
2014	Spr																									
2014	B Yr																									
2013	Hol																									

Year	Sea	days per crash, days per bad crash													
		Days per crash										Days per bad crash			
		lt 1	1	1.2	1.4	1.6	1.8	2	3	5	10	15	20	gt 30	
2015	B Yr														
2014	Hol														
2014	Fall														
2014	Sum														
2013	E Sum														
2014	Spr														

Bottleneck 6: 215 Southern Beltway EB through Windmill interchange, PM

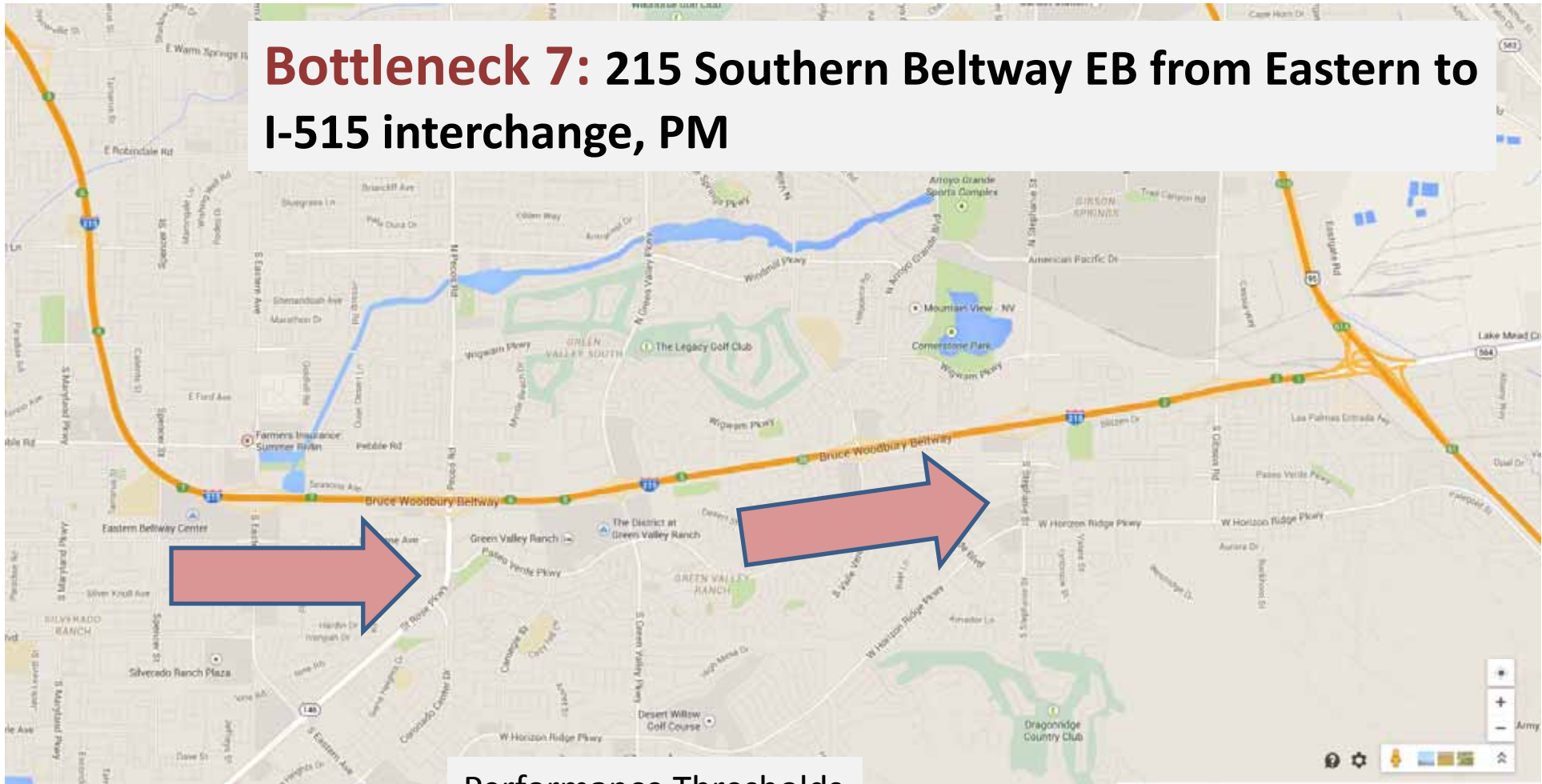
Percent increase in daily average volume at three locations in corridor

Year	Sea	between Durango & Buffalo												between LV Blvd & Airport ramps												west of Eastern											
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
2015	B Yr											9.1	>>>																							7.2	>>
2014	Hol											7.2	>>	na																						6.1	>
2014	Fall											7.9	>>																							13.6	>>>
2014	Sum											6.0	=																							6.3	>
2013	E Sum																																			9.2	>>>
2014	Spr											6.9	>																							7.2	>>
2014	B Yr																																			13.7	>>>
2013	Hol													na																							
2013	Fall																																				
2013	Sum																																				
2013	E Sum																																				

Percent change in daily average speed at three locations in corridor

Year	Sea	between Durango & Buffalo												between LV Blvd & Airport ramps												west of Eastern											
		lt -2	-1.8	-1.6	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2	0.0	pos	lt -2	-1.8	-1.6	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2	0.0	pos	lt -2	-1.8	-1.6	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2	0.0	pos
2015	B Yr	<<	-2.3																																	1.6	
2014	Hol																																			5.0	
2014	Fall	<<	-2.1																																	10.8	
2014	Sum	<<	-2.0																																	8.8	
2013	E Sum																																			10.2	
2014	Spr																																			9.6	
2014	B Yr											0.3																								7.5	
2013	Hol																																			4.8	
2013	Fall																																			1.5	
2013	Sum																																			4.1	
2013	E Sum																																			1.0	

Bottleneck 7: 215 Southern Beltway EB from Eastern to I-515 interchange, PM



Performance Thresholds

Temporal / Spatial description			How long does a congestion event last? How frequent are congestion events?		Maximum Delay (minutes)			Days per crash		How do changes in volume & speed relate?
Corridor	AM / PM	School in or out	duration	duration color	Average	95th percentile	95th color	crash	very bad crash	
215 EB to 515	pm	sch	lt 30 mins	green	6	10	green	8	30	v+ sp =
	pm	summer	lt 30 mins	green	4	8	green			

Bottleneck 7 (cont): 215 Southern Beltway EB from Eastern to I-515 interchange, PM

Year	Sea	4:00 PM						5:00 PM										6:00 PM									
		30	35	40	45	50	55	0	5	10	15	20	25	30	35	40	45	50	55	0	5	10	15				
2015	B Yr																										
2014	Hol																										
2014	Fall																										
2014	Sum																										
2013	E Sum																										
2014	Spr																										
2014	B Yr																										

Year	Sea	Maximum delay in minutes													
		Average			95th percentile										
		2	4	6	8	10	12	14	16	18	20	22	24	26	
2015	B Yr														
2014	Hol														
2014	Fall														
2014	Sum														
2013	E Sum														
2014	Spr														
2014	B Yr														
2013	Hol														

Year	Sea	days per crash, days per bad crash												
		Days per crash										Days per bad crash		
		lt 1	1	1.2	1.4	1.6	1.8	2	3	5	10	15	20	gt 30
2015	B Yr													
2014	Hol													
2014	Fall													
2014	Sum													
2013	E Sum													
2014	Spr													
2014	B Yr													

Bottleneck 7 (cont): 215 Southern Beltway EB from Eastern to I-515 interchange, PM

Percent increase in daily average volume at three locations in corridor

Year	Sea	east of Eastern												between Pecos & Green Valley											
		0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
2015	B Yr											7.3	>										6.1	>	
2014	Hol											6.4	>												
2014	Fall											8.4	>											6.6	>
2014	Sum																								
2013	E Sum																								
2014	Spr											6.0	=												
2014	B Yr											6.2	>												

Percent change in daily average speed at three locations in corridor

Year	Sea	east of Eastern												between Pecos & Green Valley											
		lt -2	-1.8	-1.6	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2	0.0	pos	lt -2	-1.8	-1.6	-1.4	-1.2	-1.0	-0.8	-0.6	-0.4	-0.2	0.0	pos
2015	B Yr											0.3											0.5		
2014	Hol											1.2											1.4		
2014	Fall											0.9											0.9		
2014	Sum											0.9											0.5		
2013	E Sum											0.9											1.7		
2014	Spr											0.5											0.3		
2014	B Yr											0.5											0.3		