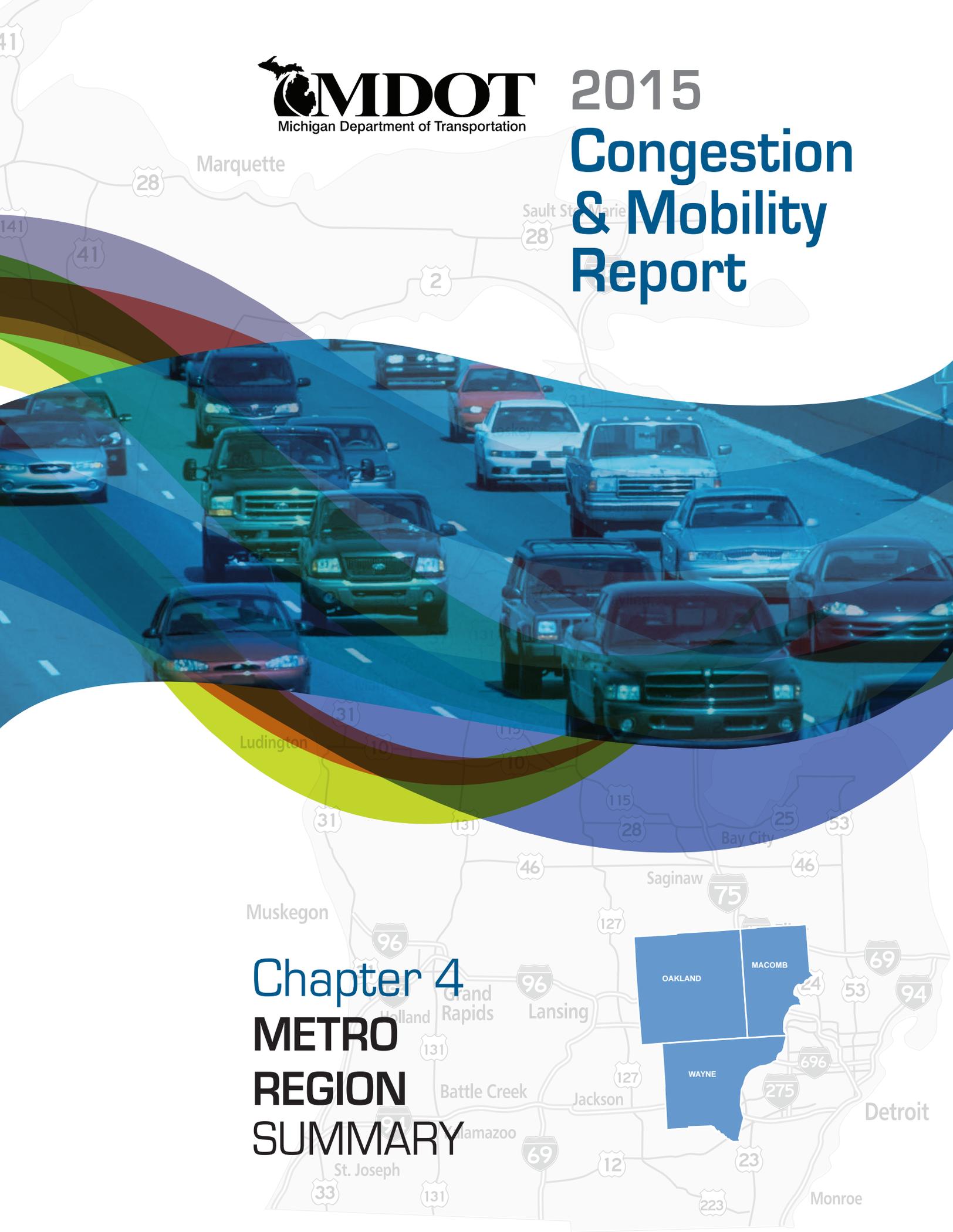
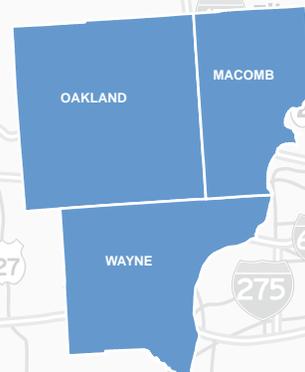


# Congestion & Mobility Report



## Chapter 4 METRO REGION SUMMARY





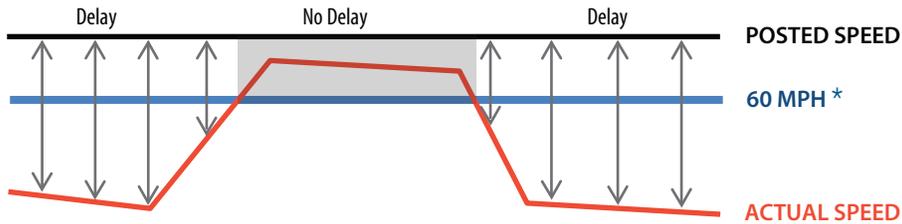
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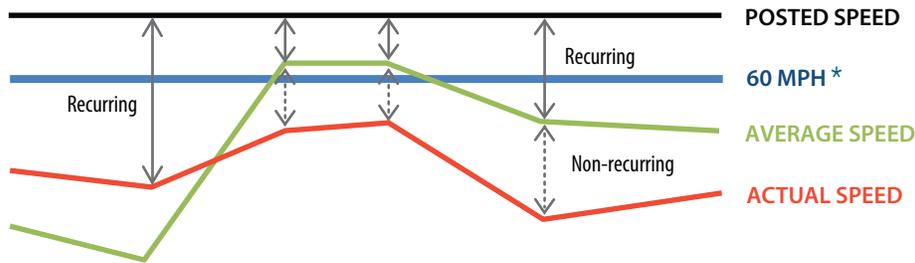
# Performance Measures Definitions



**Total delay** > Delay is calculated by taking the difference between actual speeds when they fall below 60 mph and the posted speed limit for freeways posted at 70 mph. This is to take out the delay caused by the lower average speeds from commercial vehicles.

**Total delay per mile** > Delay per mile is calculated by taking the total delay and dividing it by the length of the freeway. This was performed for each route in each county.

**Non-recurring/recurring delay** > Non-recurring delay is calculated by taking the difference between the actual speed (any time the speed falls below 60 mph) and the average speed. Recurring is measured by taking the difference of the total delay and non-recurring delay.

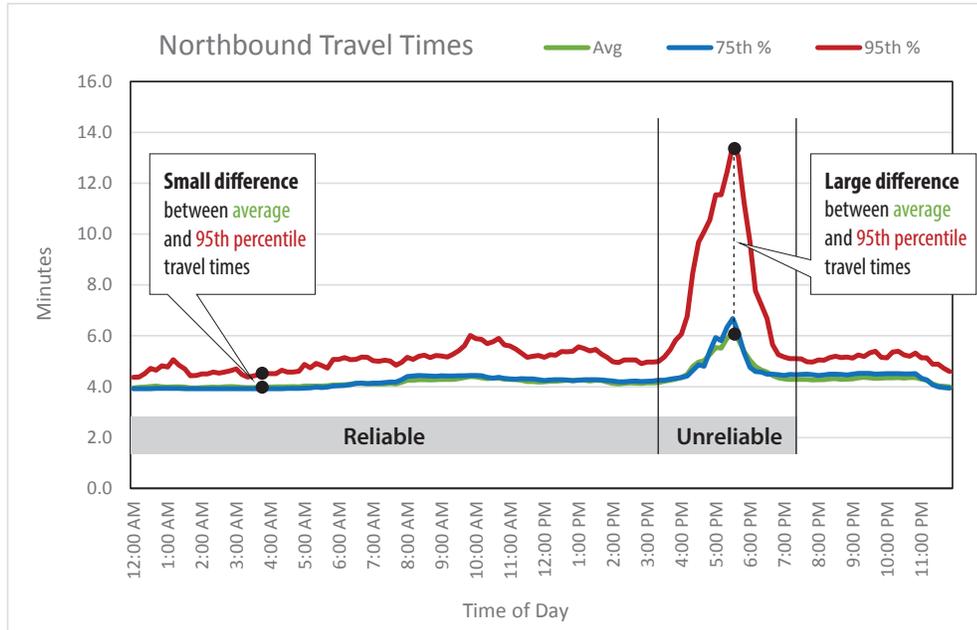


**User Delay Cost** > User Delay Costs (UDC) is calculated by multiplying delay x hourly volume per hourly user cost. Delay is calculated by taking the difference between actual speeds when they fall below 60 mph and the posted speed limit. Hourly volumes are derived from Average Daily Traffic (ADT) and Commercial Average Daily Traffic (CADT). Hourly user costs are based on Federal Highway Administration (FHWA) publication number FHWA-SA-98-079, "Life-Cycle Cost Analysis in Pavement Design."

**Congestion** > Congestion is calculated as the number of hours below 45 mph per Traffic Message Channel (TMC) segment. A TMC segment is a standard for delivering real-time traffic information. They vary from tenths of a mile long to several miles long.

\* On segments with a speed limit of 55 mph, delay is calculated when speeds fall below 55 mph.

# Performance Measures Definitions



**Travel Time Reliability** > A measure of travel time consistency over a period of time. When travel times are unreliable, customers are more likely to experience unexpected delays. Travel times are shown to be reliable when the 95th percentile travel time remains close to the average travel time.

**75th Percentile Travel Time** > The amount of time a customer should budget to be on-time three out of four days (75% of the time).

**95th Percentile Travel Time** > The amount of time a customer should budget to be on-time nineteen out of twenty days (95% of the time). The 95th percentile travel time is also known as the planning time.

Figure 1. 2015 Metro Region user delay cost per mile



## 2015 Metro Region User Delay Cost per Mile

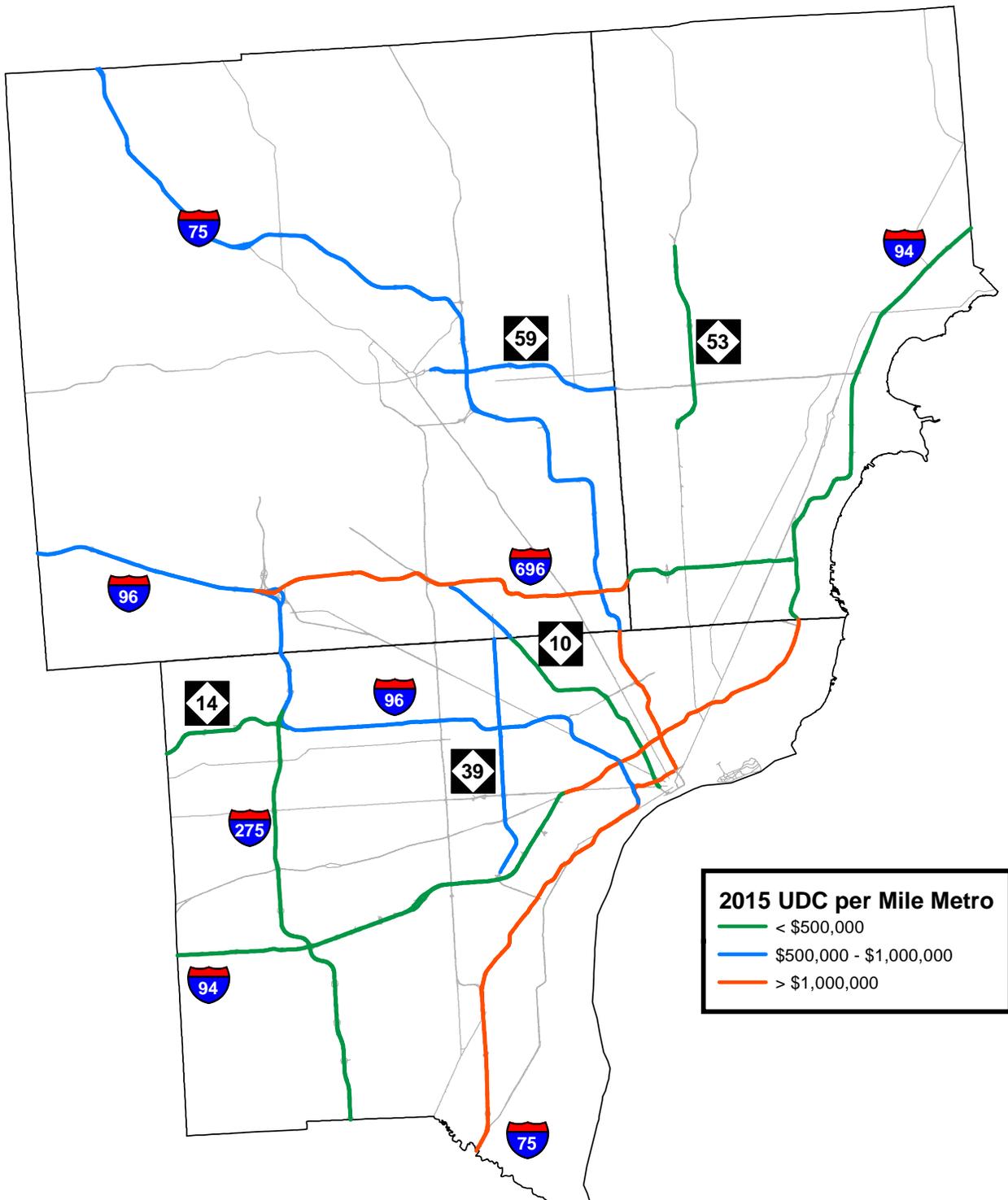
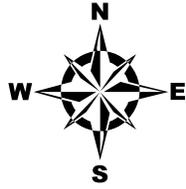


Figure 2. 2015 Metro Region congestion hours northbound



## 2015 Metro Region Congestion Hours Northbound/Eastbound

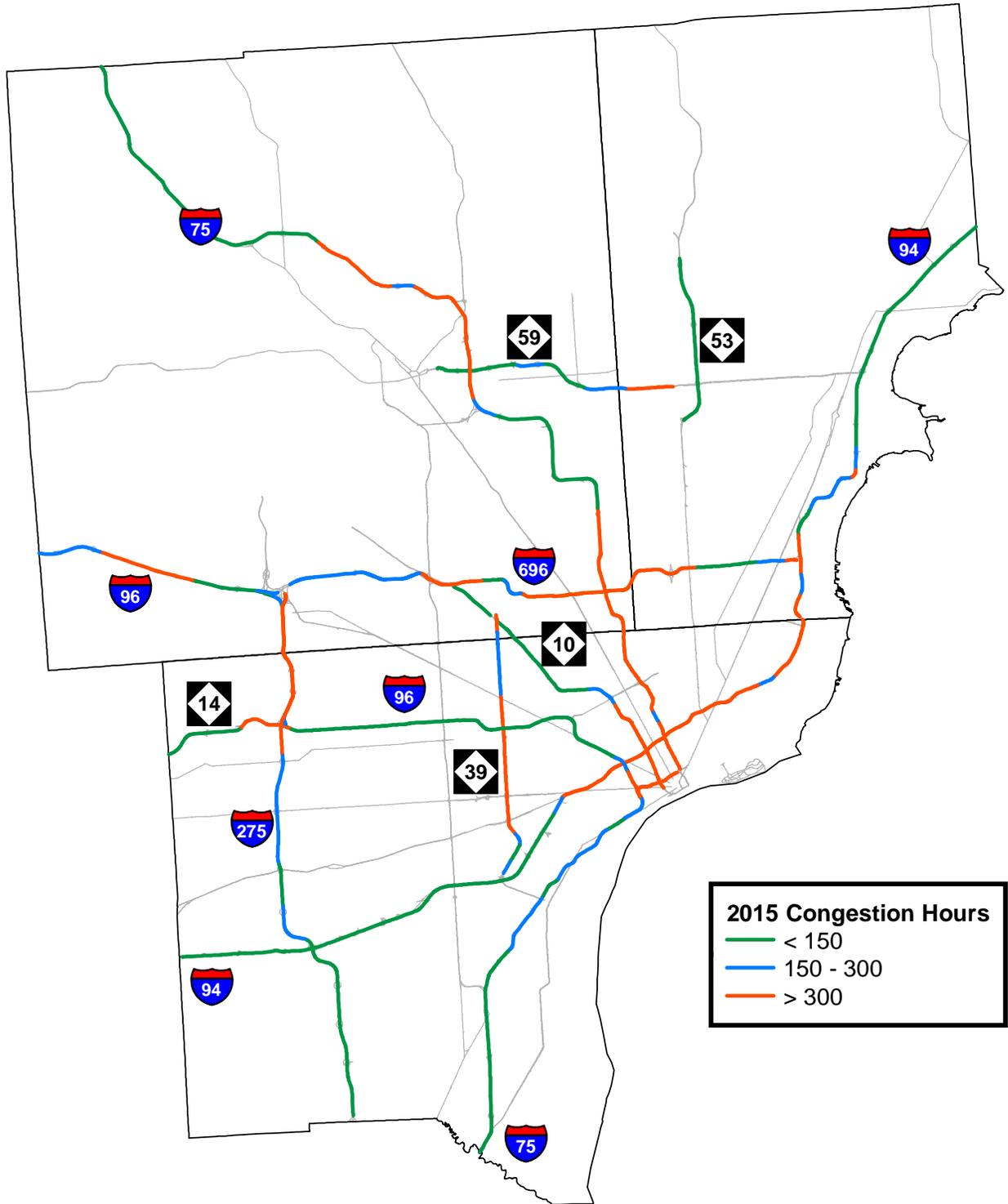


Figure 3. 2015 Metro Region congestion hours southbound



## 2015 Metro Region Congestion Hours Southbound/Westbound

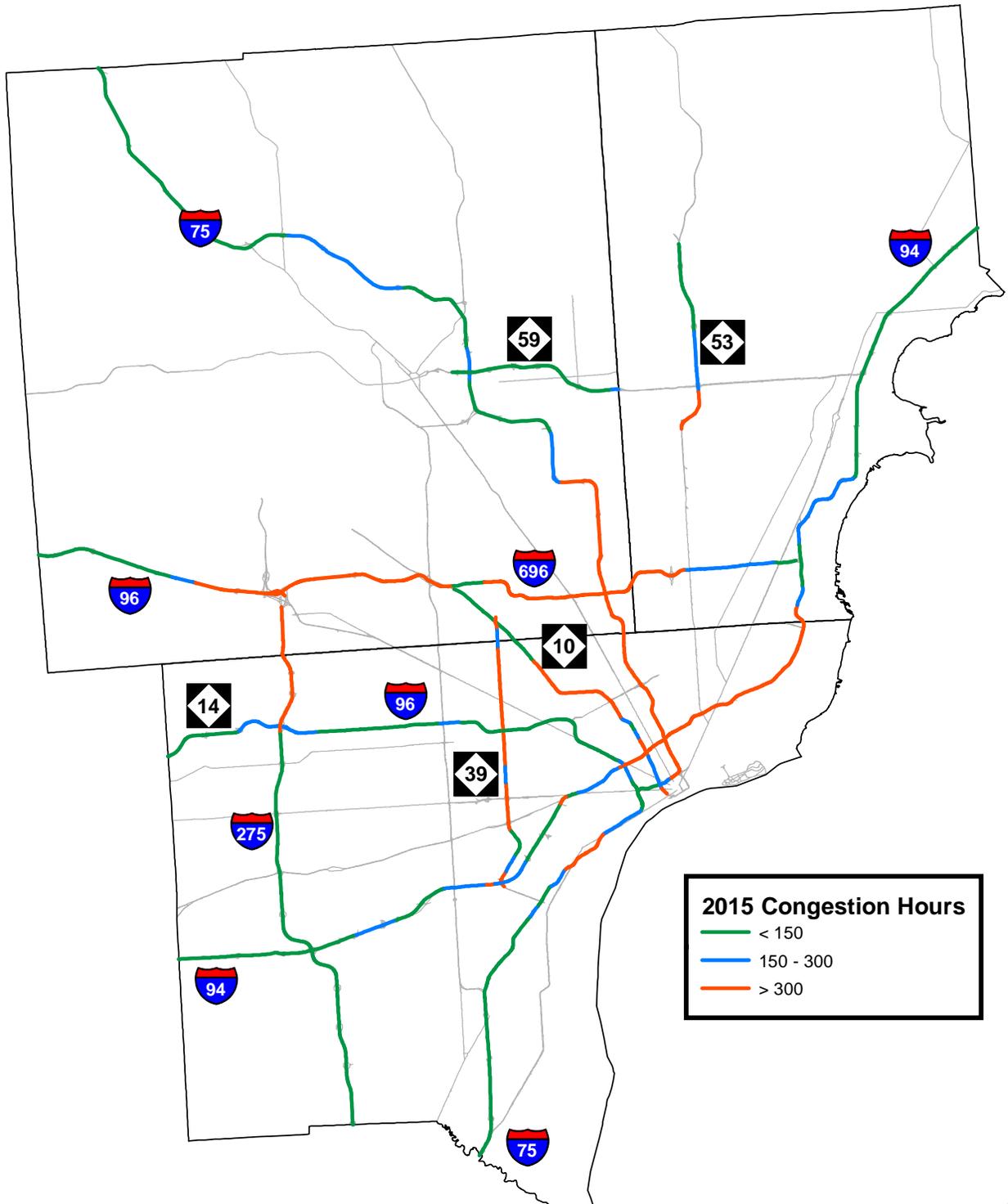


Figure 4. 2015 Metro Region UDC Data

2012-2014 Average		
Rank	UDC Per Mile	Location (Route, County)
1	\$1,851,888	I-696 Oakland Co.
2	\$848,185	I-94 (55mph) Detroit TSC
3	\$834,794	I-75 (55mph) Detroit TSC
4	\$808,519	M-10 Oakland Co. (70 mph section)
5	\$775,408	I-96 plus Local Detroit TSC
6	\$630,863	M-39 (55mph) Detroit TSC
7	\$602,946	I-96 Taylor TSC
8	\$582,459	I-96 Oakland Co.
9	\$524,721	M-59 Oakland Co. (70 mph section)
10	\$506,288	I-75 Oakland Co.
11	\$485,962	M-10 (55mph) Detroit TSC
12	\$403,978	I-94 Taylor TSC
13	\$355,466	M-14 Taylor TSC
14	\$334,467	I-75 Taylor TSC
15	\$326,272	M-53 Macomb Co. (70 mph section)
16	\$309,262	I-275 Wayne Co.
17	\$303,670	I-696 Macomb Co.
18	\$282,907	I-94 Macomb Co.

2015		
Rank	UDC Per Mile	Location (Route, County)
1	\$2,119,765	I-696 Oakland Co.
2	\$1,305,740	I-94 (55mph) Detroit TSC
3	\$1,032,983	I-75 (55mph) Detroit TSC
4	\$758,946	I-96 Oakland Co.
5	\$714,199	M-39 (55mph) Detroit TSC
6	\$686,524	I-75 Oakland Co.
7	\$664,684	I-96 Taylor TSC
8	\$649,703	I-96 plus Local Detroit TSC
9	\$597,417	M-59 Oakland Co. (70 mph section)
10	\$559,615	M-10 Oakland Co. (70 mph section)
11	\$468,515	M-10 (55mph) Detroit TSC
12	\$305,269	I-94 Taylor TSC
13	\$286,510	M-14 Taylor TSC
14	\$285,114	I-696 Macomb Co.
15	\$226,259	I-94 Macomb Co.
16	\$223,048	I-275 Wayne Co.
17	\$194,924	I-75 Taylor TSC
18	\$191,768	M-53 Macomb Co. (70 mph section)

2012-2014 Average		
Rank	Total UDC	Location (Route, County)
1	\$46,578,475	I-75 Oakland Co.
2	\$37,037,751	I-696 Oakland Co.
3	\$30,240,926	I-96 plus Local Detroit TSC
4	\$27,765,239	I-75 (55mph) Detroit TSC
5	\$27,141,931	I-94 (55mph) Detroit TSC
6	\$19,890,982	I-96 Oakland Co.
7	\$18,179,028	I-94 Taylor TSC
8	\$17,664,177	M-39 (55mph) Detroit TSC
9	\$17,540,256	I-94 Macomb Co.
10	\$13,968,798	I-696 Macomb Co.
11	\$13,922,035	I-96 Taylor TSC
12	\$13,916,788	I-275 Wayne Co.
13	\$12,299,705	M-10 (55mph) Detroit TSC
14	\$10,702,935	I-75 Taylor TSC
15	\$9,969,690	M-59 Oakland Co. (70 mph section)
16	\$8,893,710	M-10 Oakland Co. (70 mph section)
17	\$6,199,160	M-53 Macomb Co. (70 mph section)
18	\$5,331,992	M-14 Taylor TSC
Total =		\$337,243,579

2015		
Rank	Total UDC	Location (Route, County)
1	\$63,160,199	I-75 Oakland Co.
2	\$42,395,294	I-696 Oakland Co.
3	\$41,783,684	I-94 (55mph) Detroit TSC
4	\$34,357,027	I-75 (55mph) Detroit TSC
5	\$25,918,006	I-96 Oakland Co.
6	\$25,338,420	I-96 plus Local Detroit TSC
7	\$19,997,563	M-39 (55mph) Detroit TSC
8	\$15,347,553	I-96 Taylor TSC
9	\$14,028,071	I-94 Macomb Co.
10	\$13,737,105	I-94 Taylor TSC
11	\$13,115,229	I-696 Macomb Co.
12	\$11,858,112	M-10 (55mph) Detroit TSC
13	\$11,350,921	M-59 Oakland Co. (70 mph section)
14	\$10,037,177	I-275 Wayne Co.
15	\$6,237,562	I-75 Taylor TSC
16	\$6,155,770	M-10 Oakland Co. (70 mph section)
17	\$4,297,644	M-14 Taylor TSC
18	\$3,643,597	M-53 Macomb Co. (70 mph section)
Total =		\$362,758,935



# Corridor



**Interstate 75: Taylor, Detroit 55mph, and Oakland**



**Interstate 94: Taylor, Detroit 55mph, and Macomb**



**Interstate 96: Oakland, Taylor, and Detroit Plus Local**



**Interstate 275: Wayne**



**Interstate 696: Oakland and Macomb**



**Michigan 10: Detroit 70mph and Oakland**



**Michigan 14: Taylor**



**Michigan 39: Detroit 55mph**

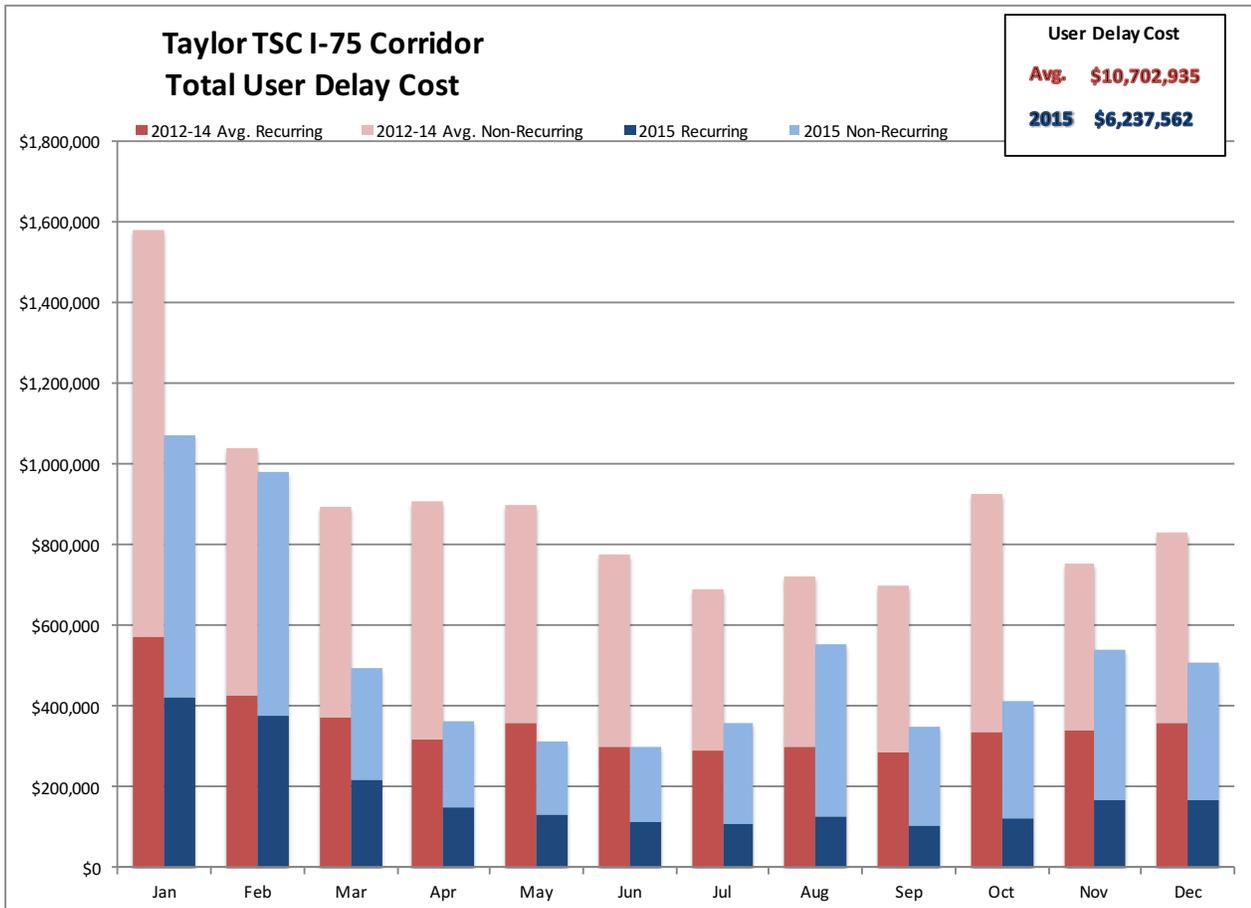
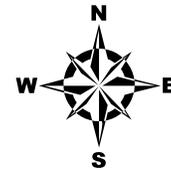


**Michigan 53: Macomb**



**Michigan 59: Oakland**

**Figure 5.** Taylor TSC I-75 Corridor total user delay cost



**Figure 6.** Detroit TSC I-75 Corridor (55mph section) total user delay cost

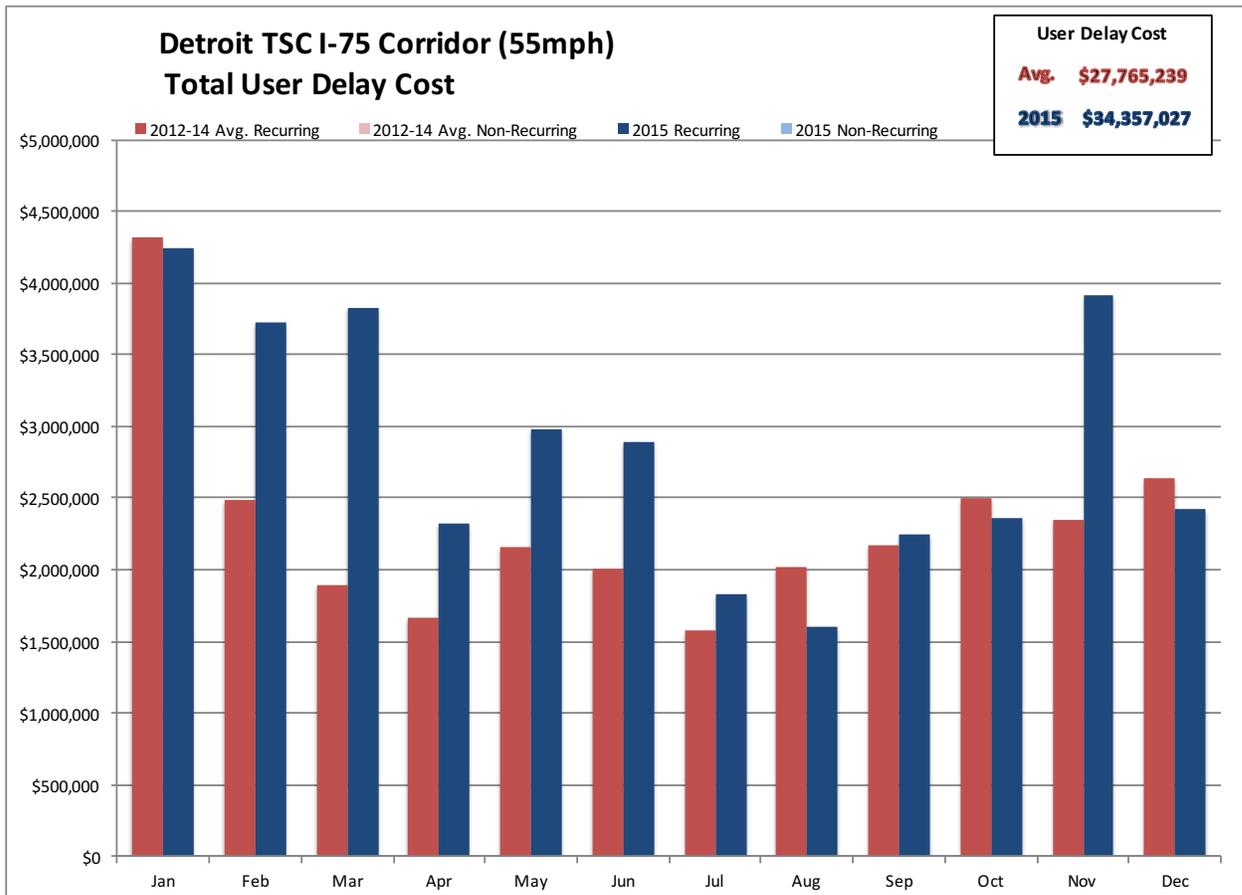


Figure 7. Oakland County I-75 Corridor total user delay cost

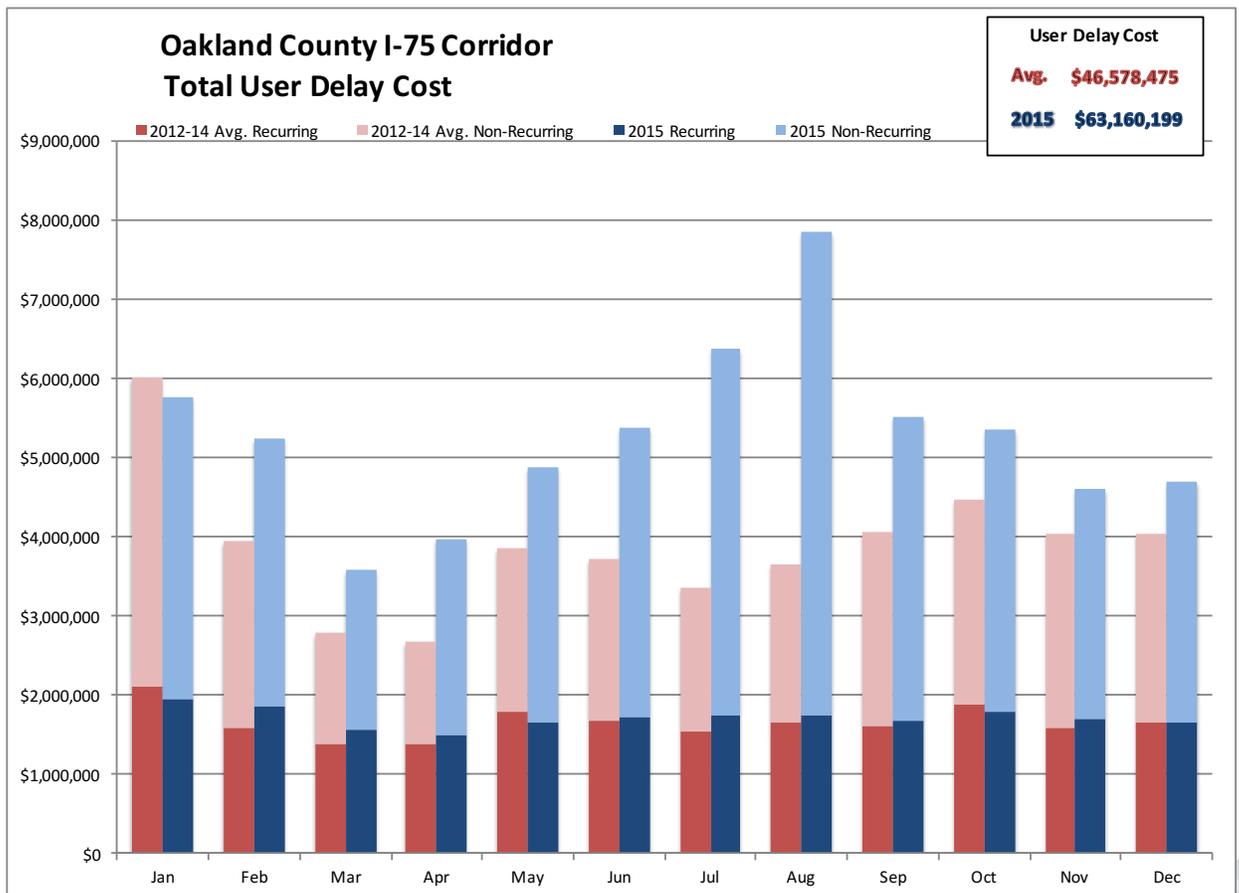
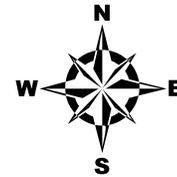


Figure 8. Metro Region I-75 northbound

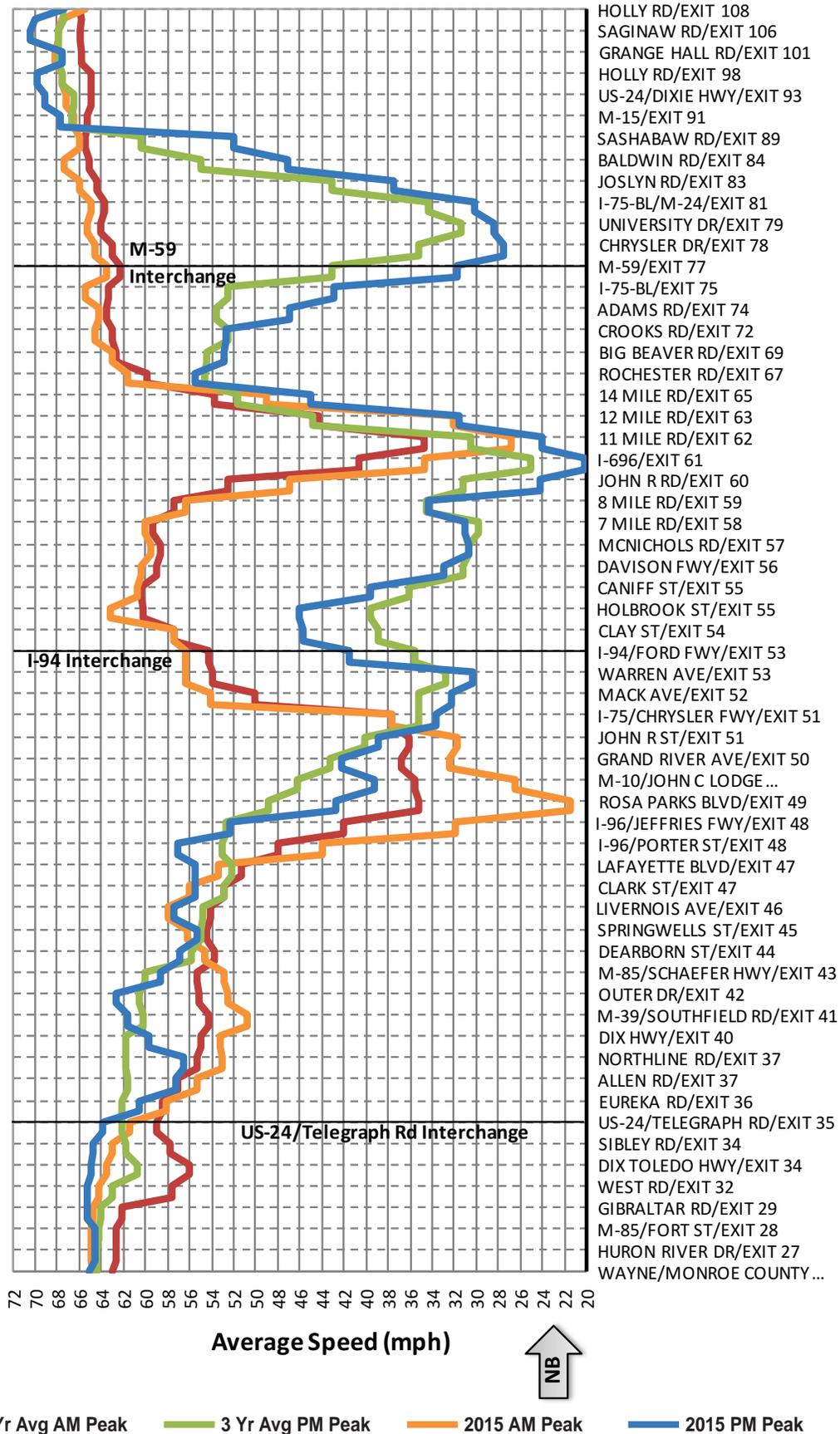
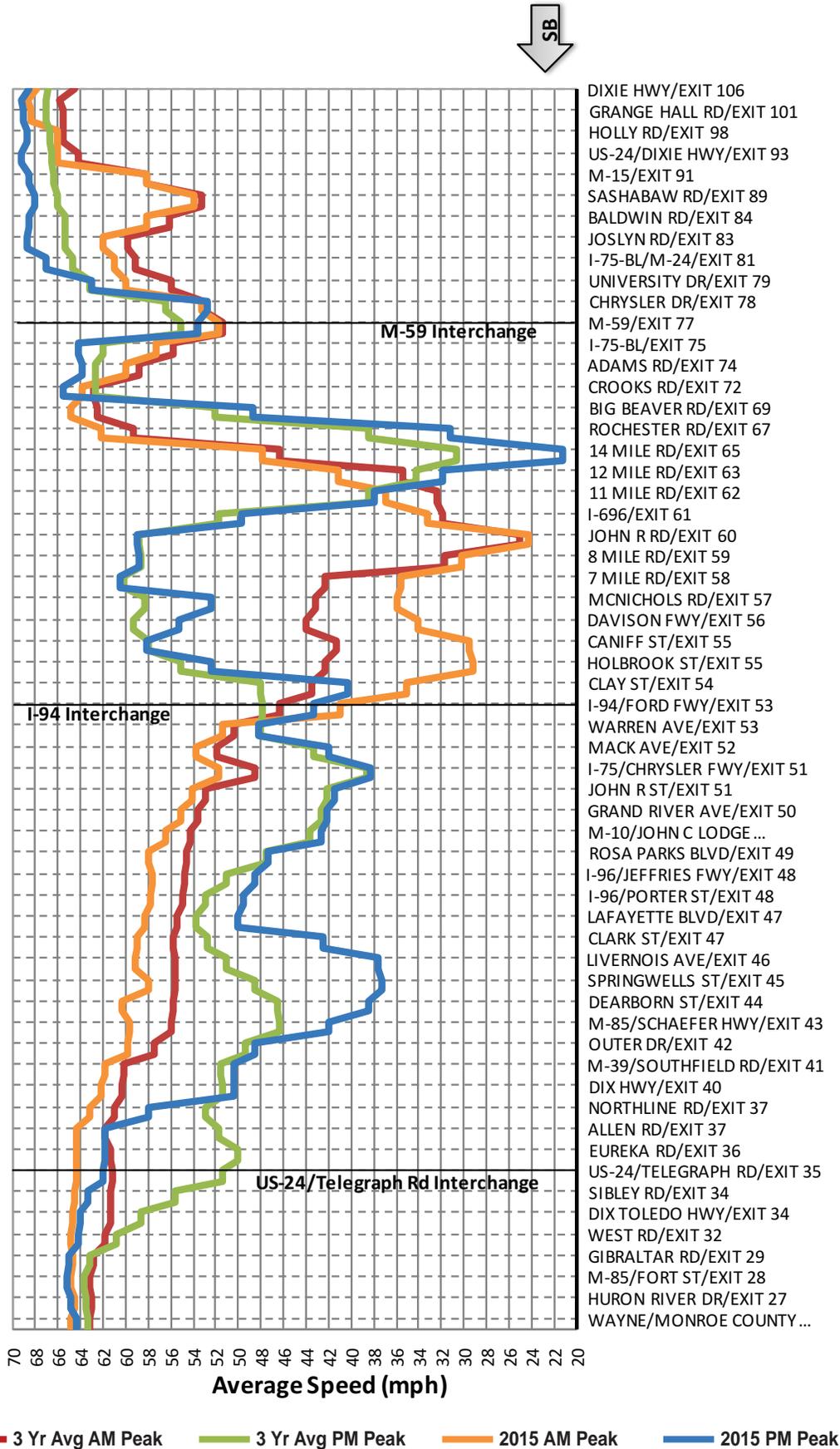


Figure 9. Metro Region I-75 southbound



# Travel Time Reliability

Figure 10. Travel time reliability: I-75

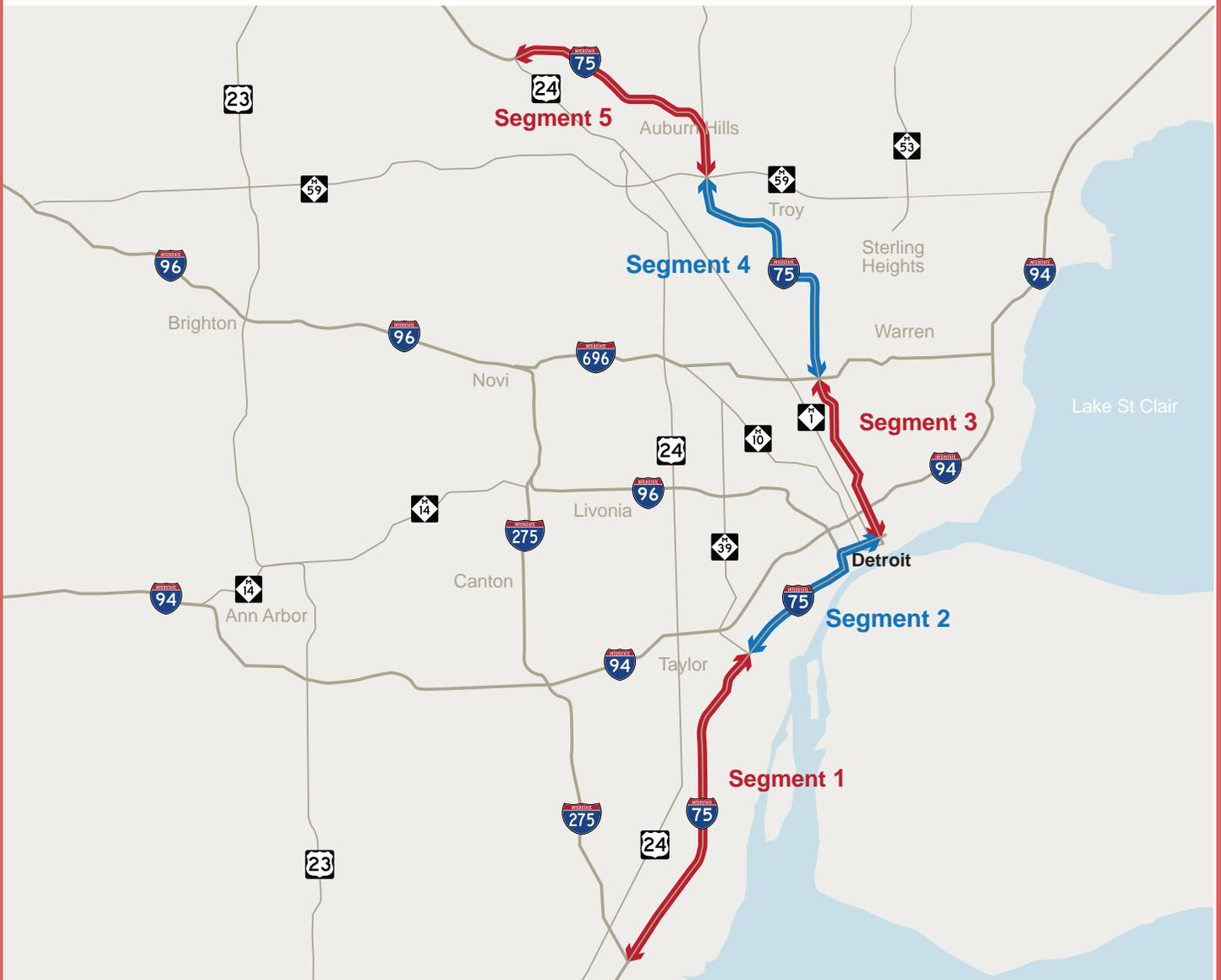
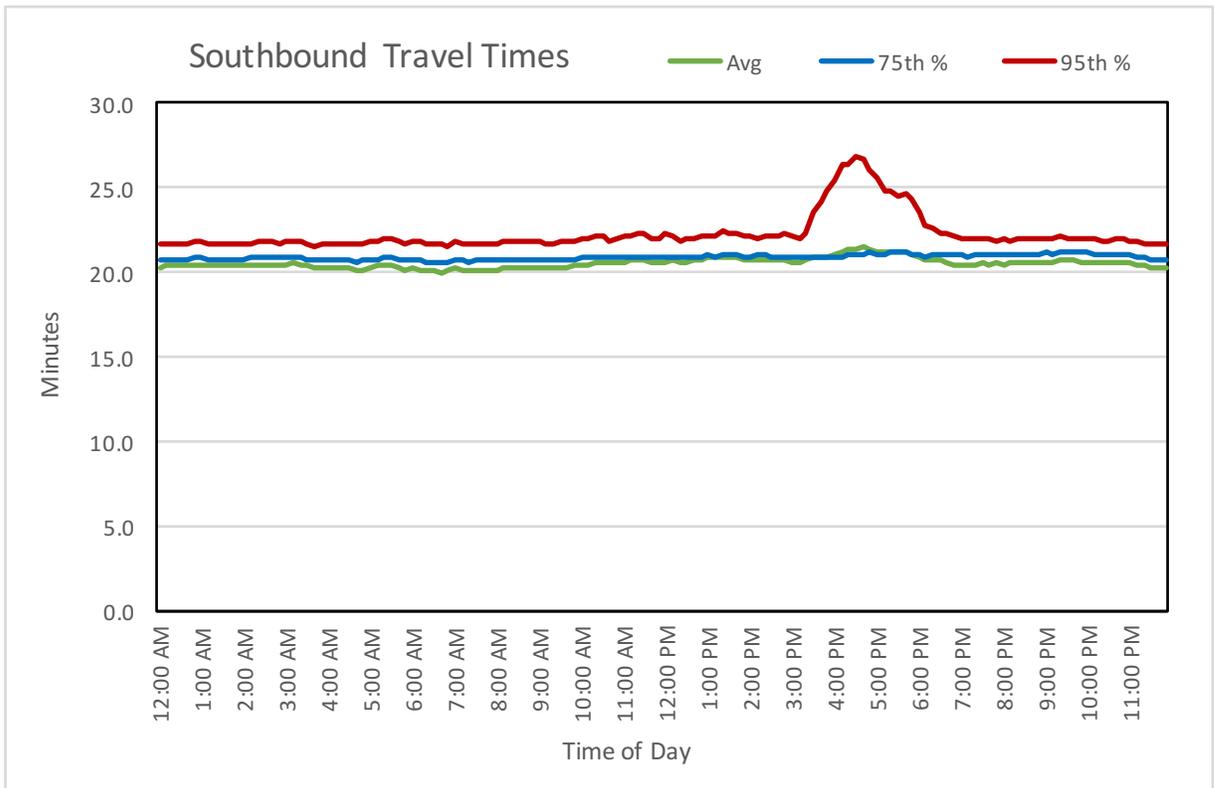
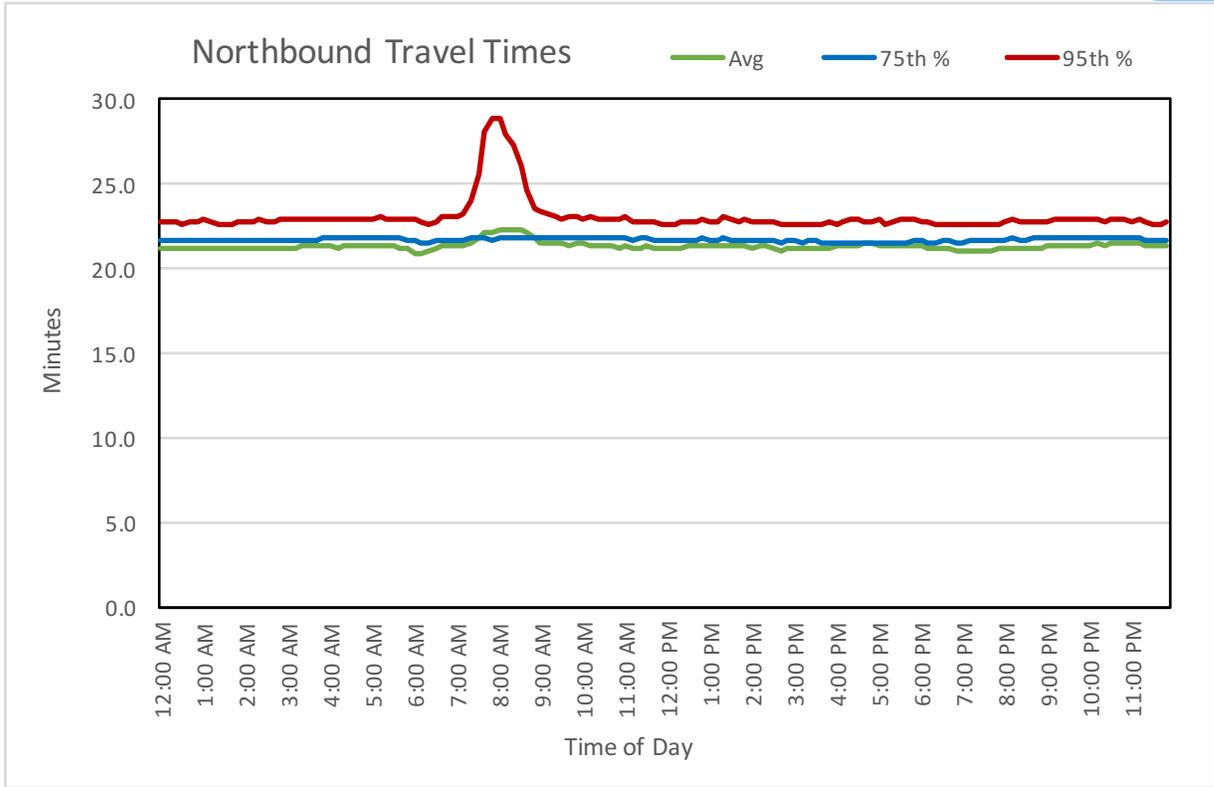


Figure 11. Segment 1- I-75 between I-275 and M-39/Southfield Rd



**Figure 12.** Segment 2- I-75 between M-39/Southfield Rd and I-75/Chrysler Fwy

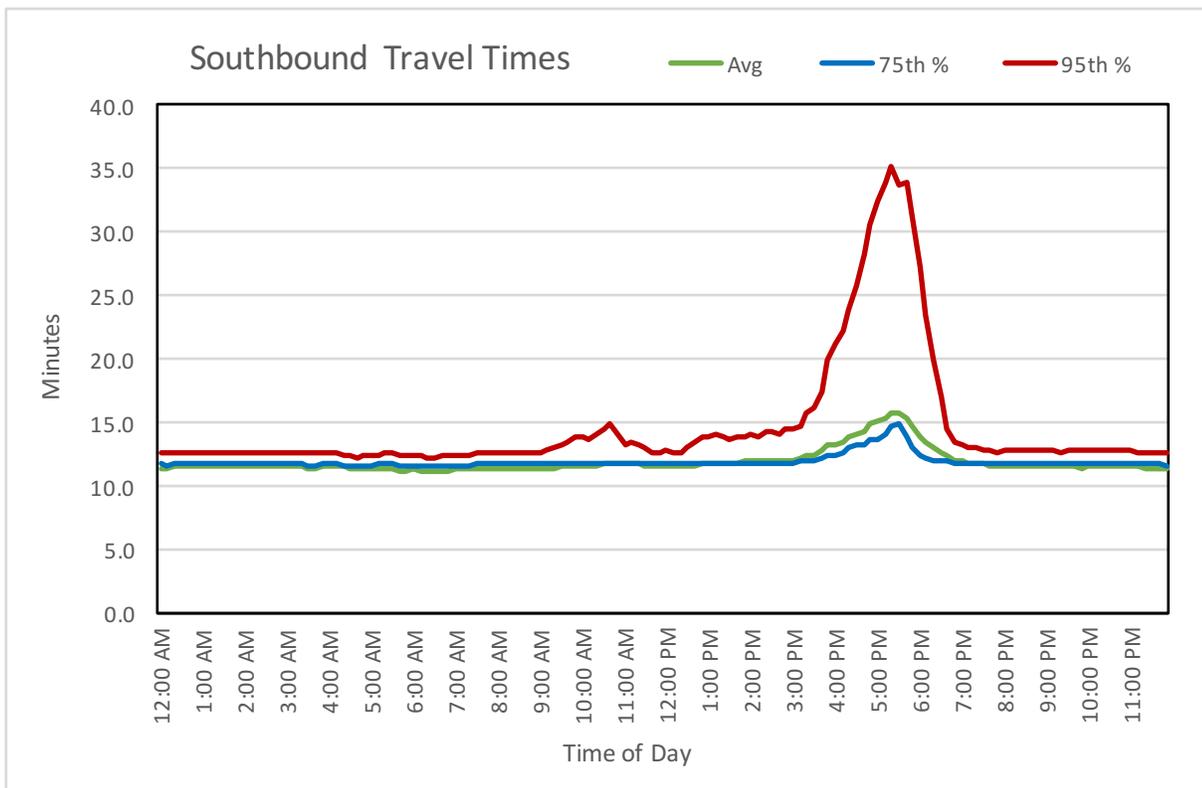
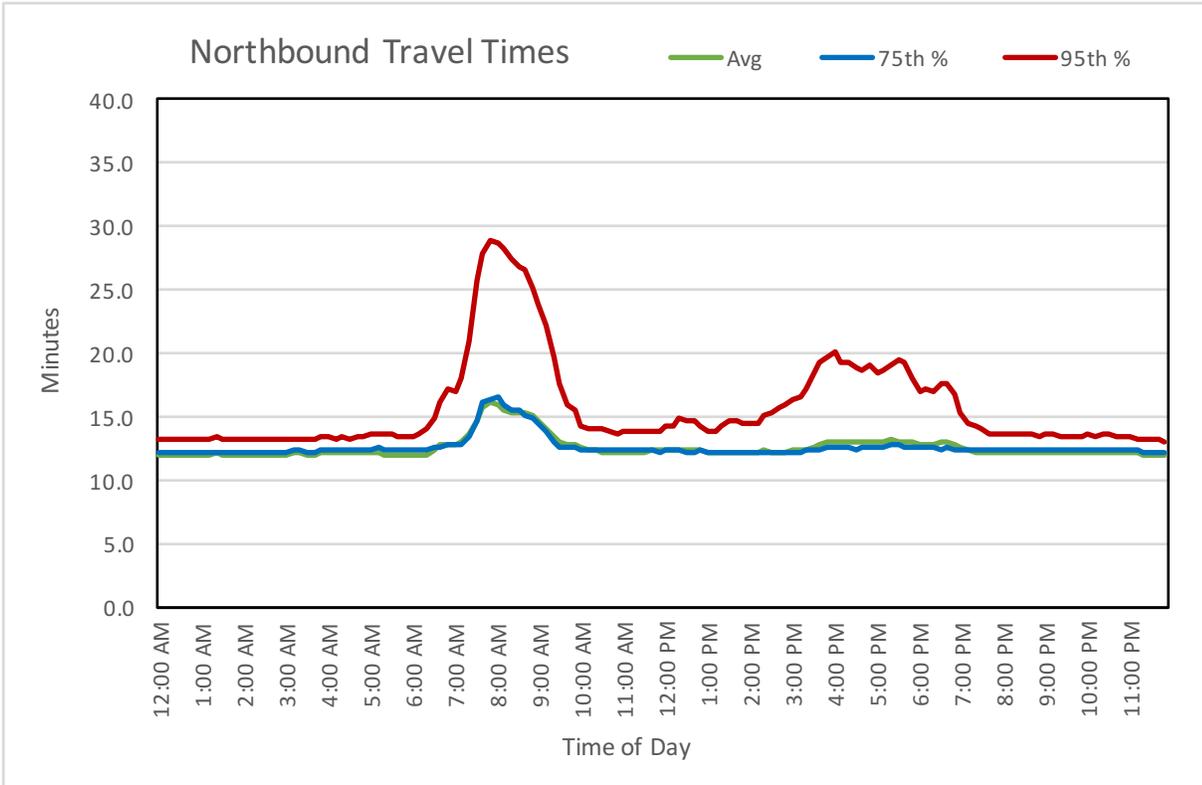


Figure 13. Segment 3- I-75 between I-696 and I-75/Chrysler Fwy

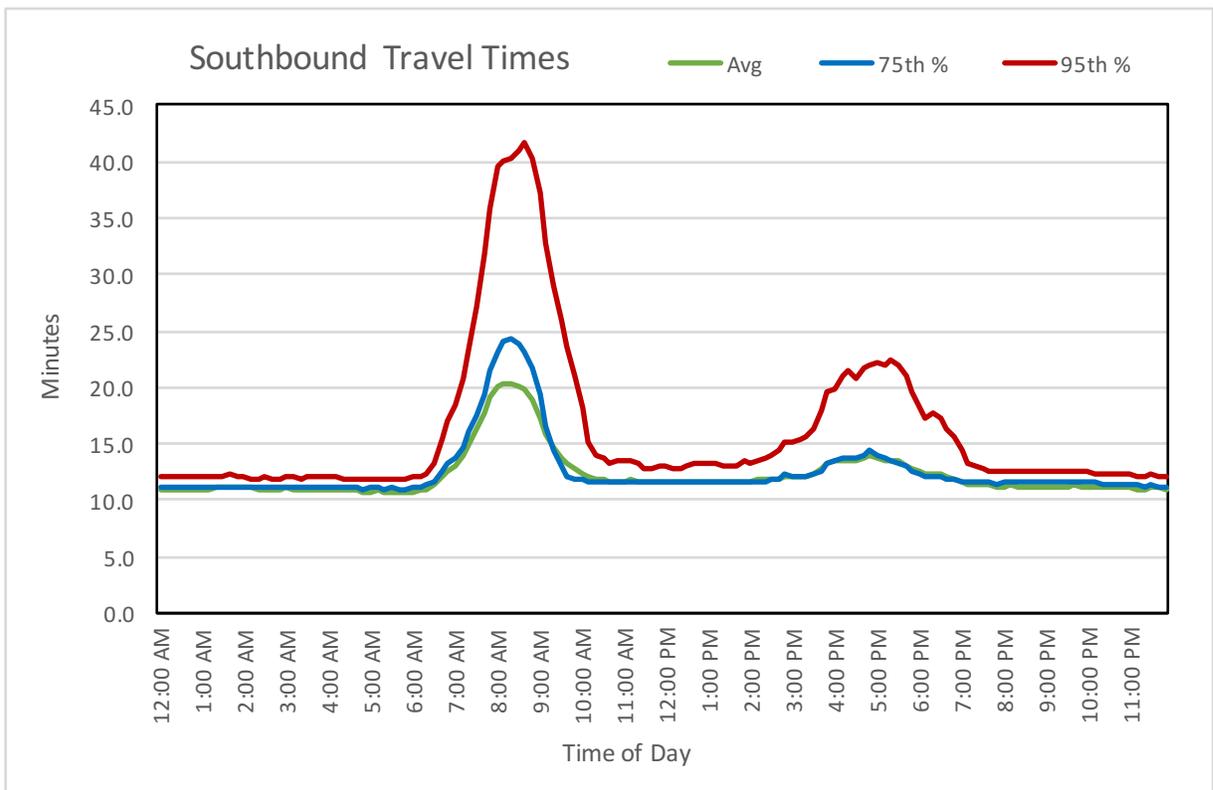
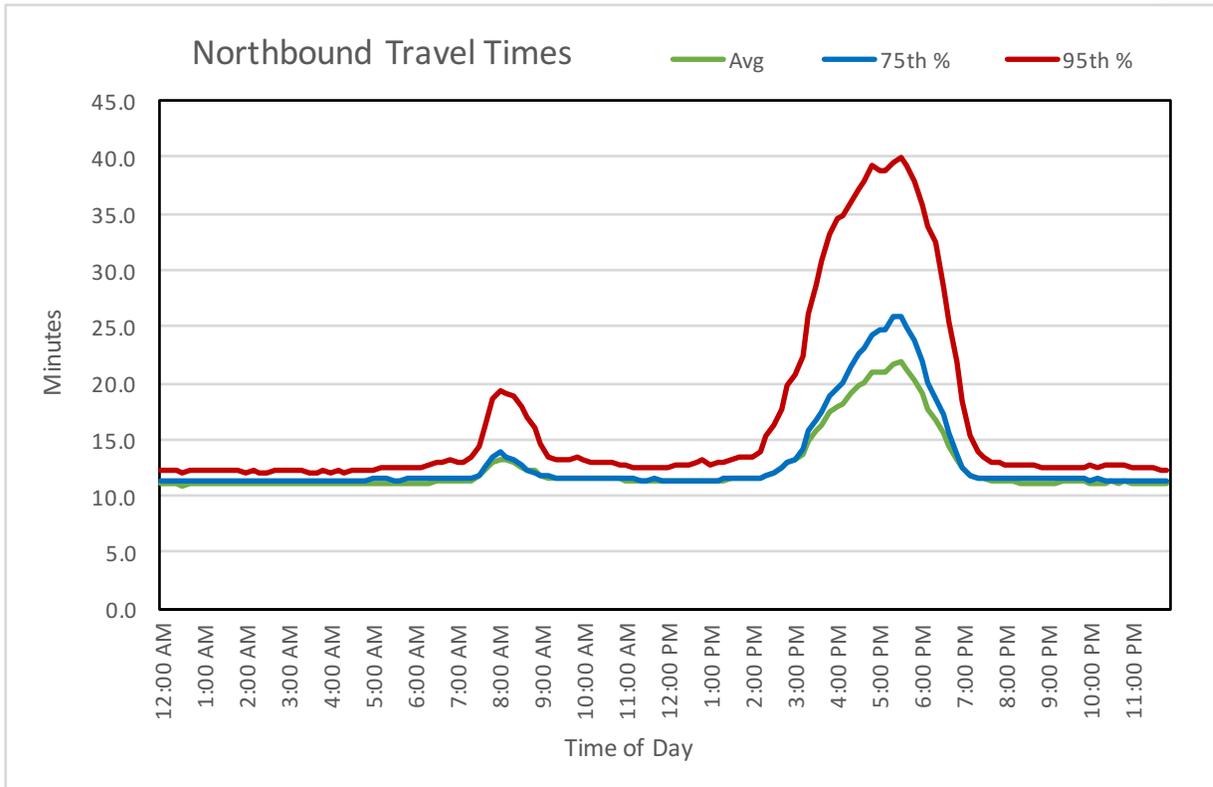


Figure 14. Segment 4- I-75 between I-696 and M-59

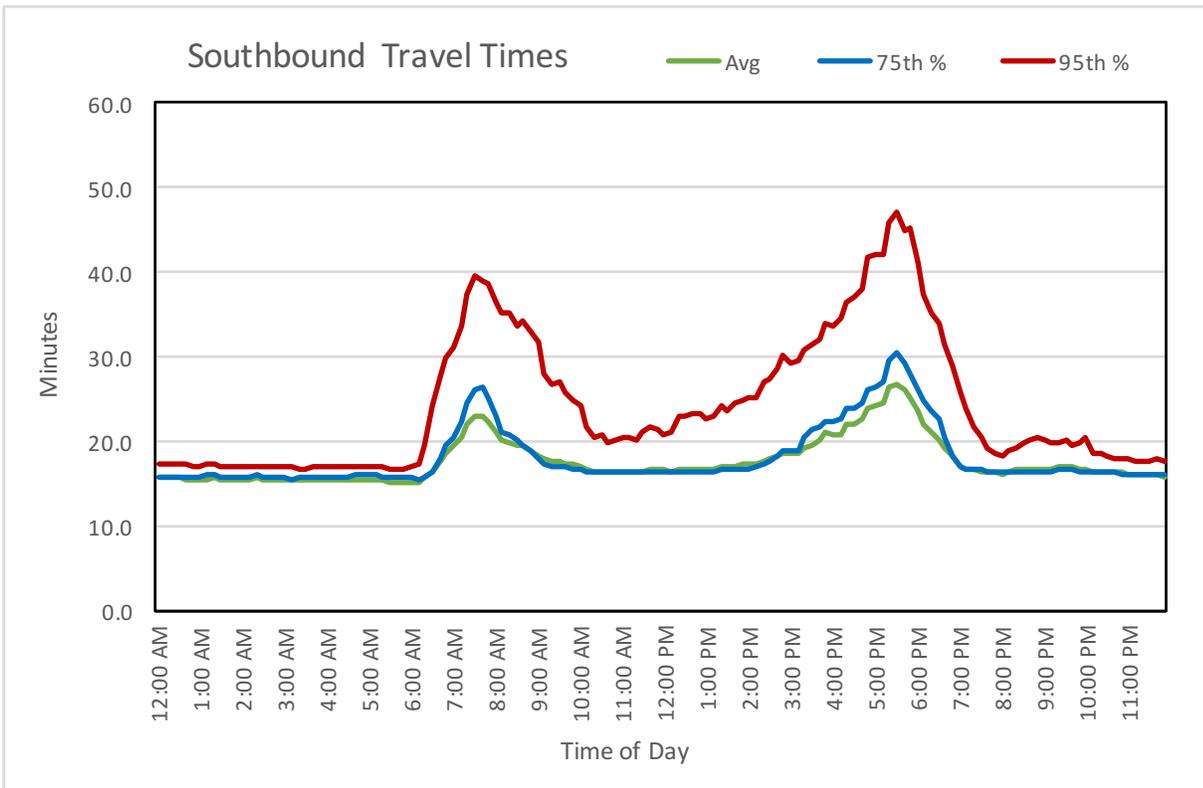
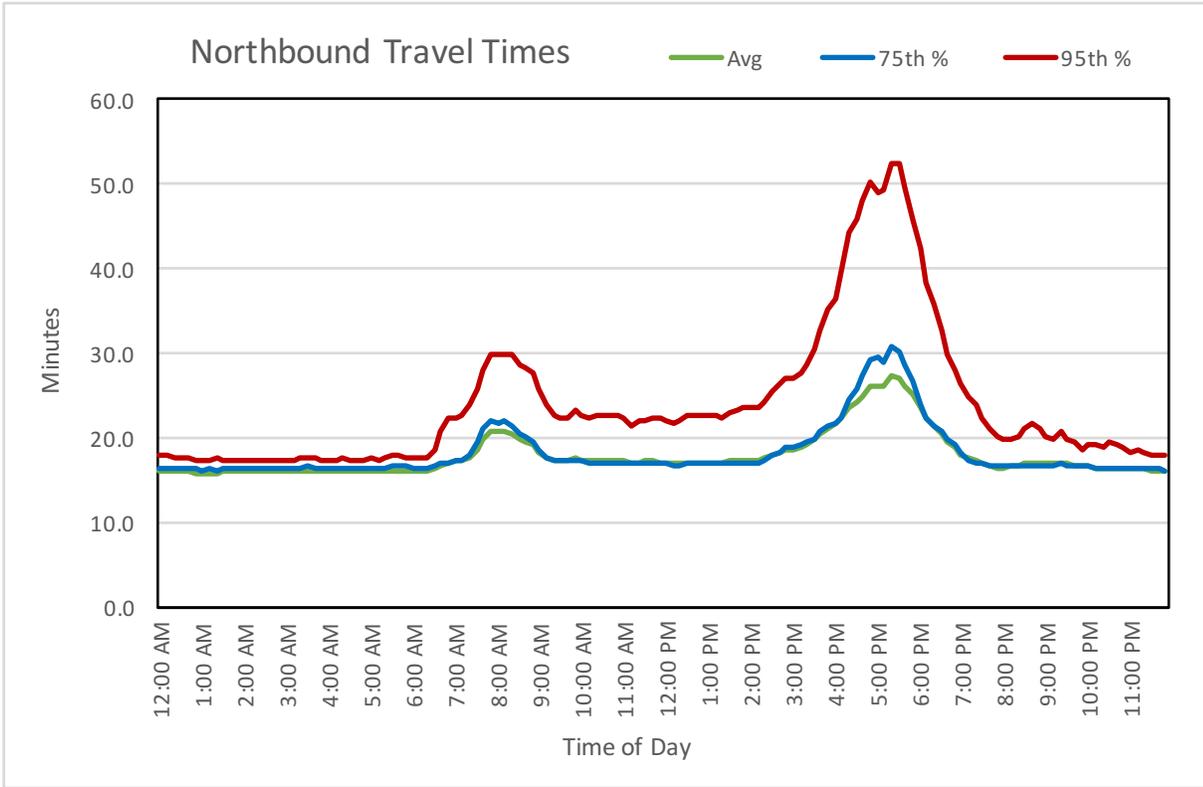
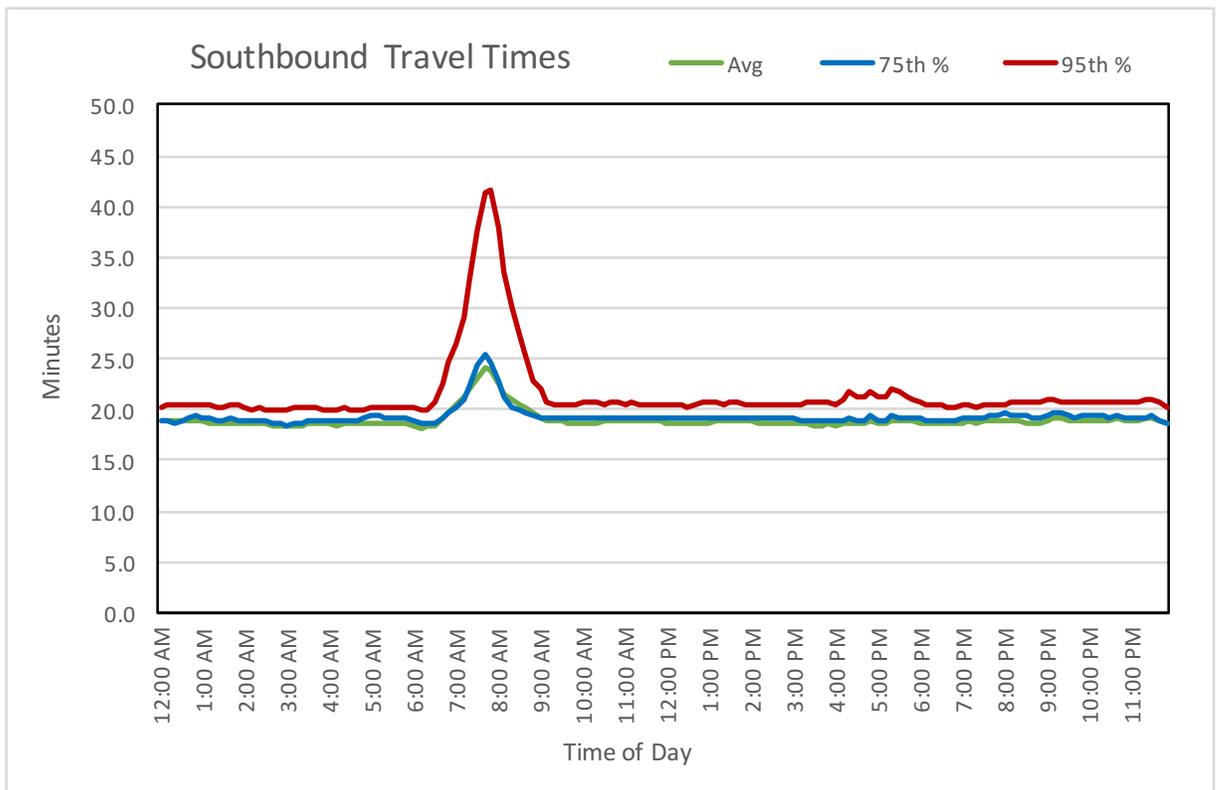
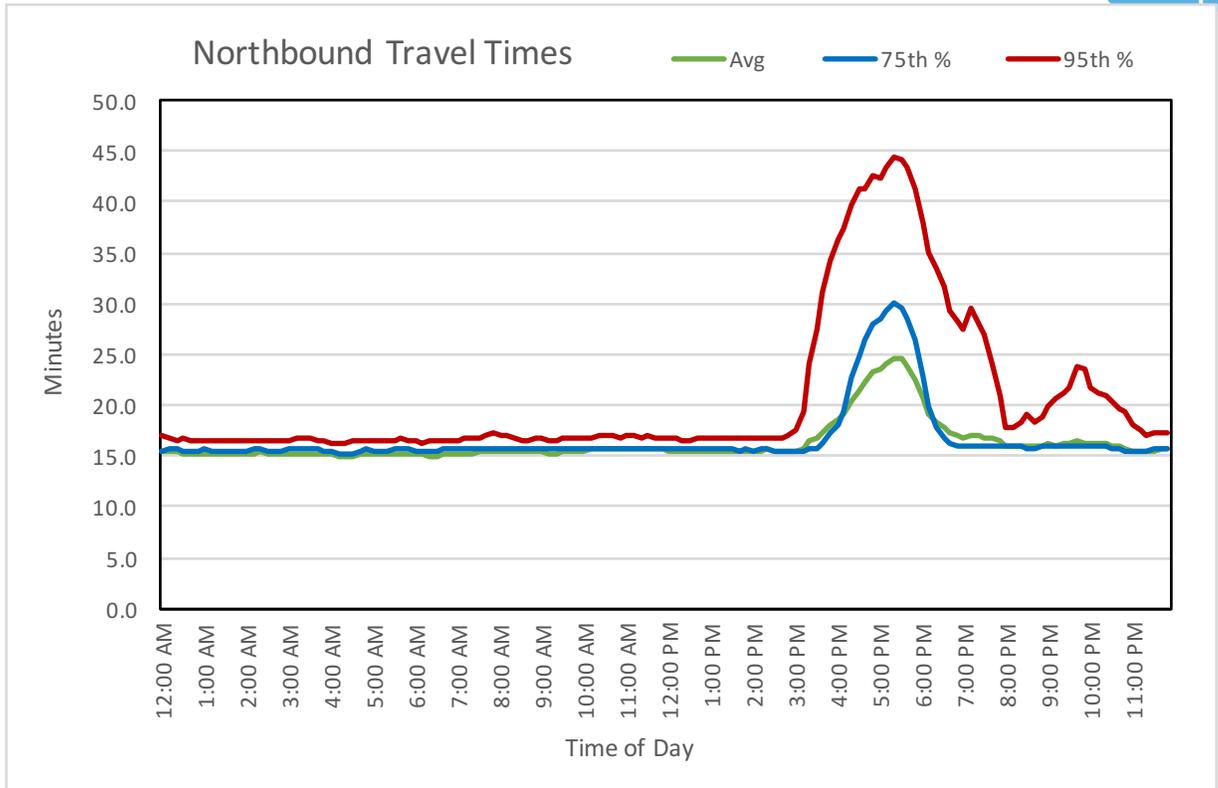


Figure 15. Segment 5- I-75 between US-24/Dixie Hwy and M-59



# Corridor



Interstate 75: Taylor, Detroit 55mph, and Oakland



Interstate 94: Taylor, Detroit 55mph, and Macomb



Interstate 96: Oakland, Taylor, and Detroit Plus Local



Interstate 275: Wayne



Interstate 696: Oakland and Macomb



Michigan 10: Detroit 70mph and Oakland



Michigan 14: Taylor



Michigan 39: Detroit 55mph

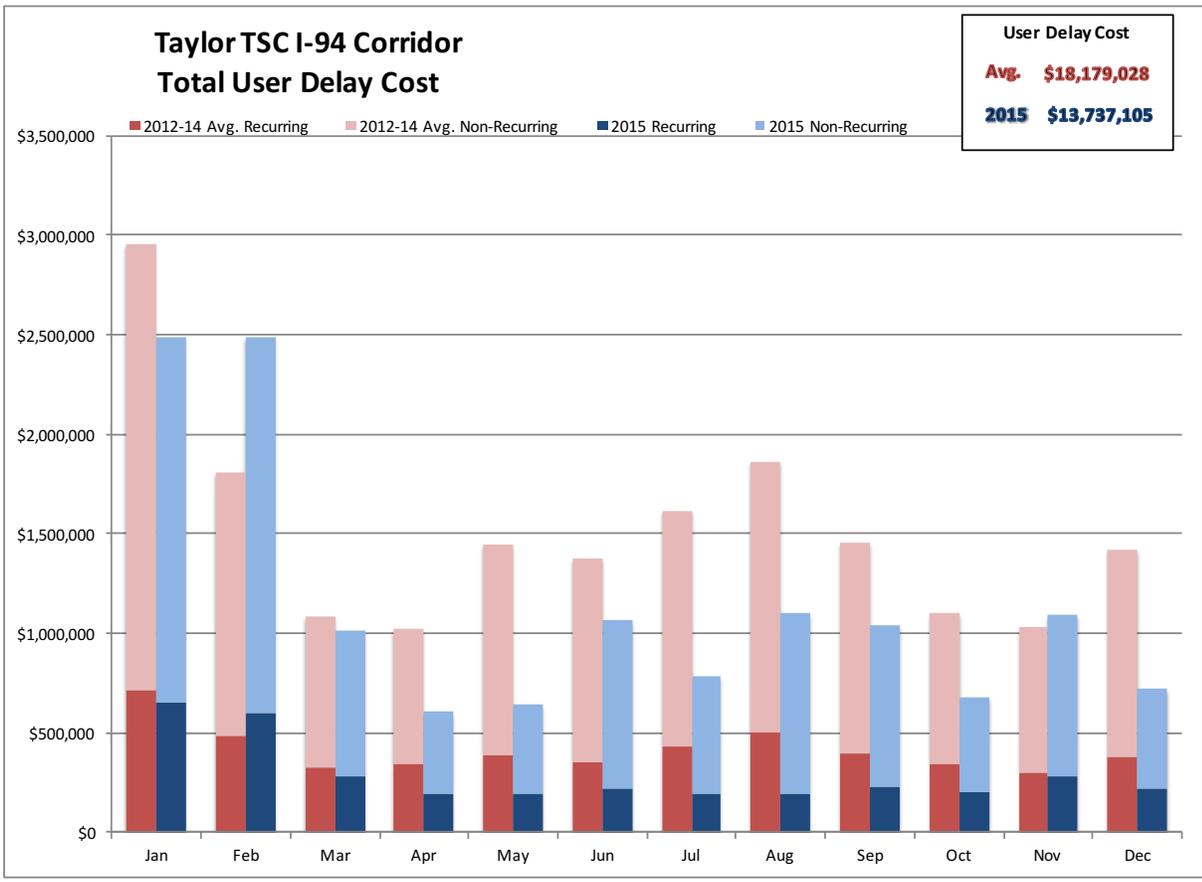
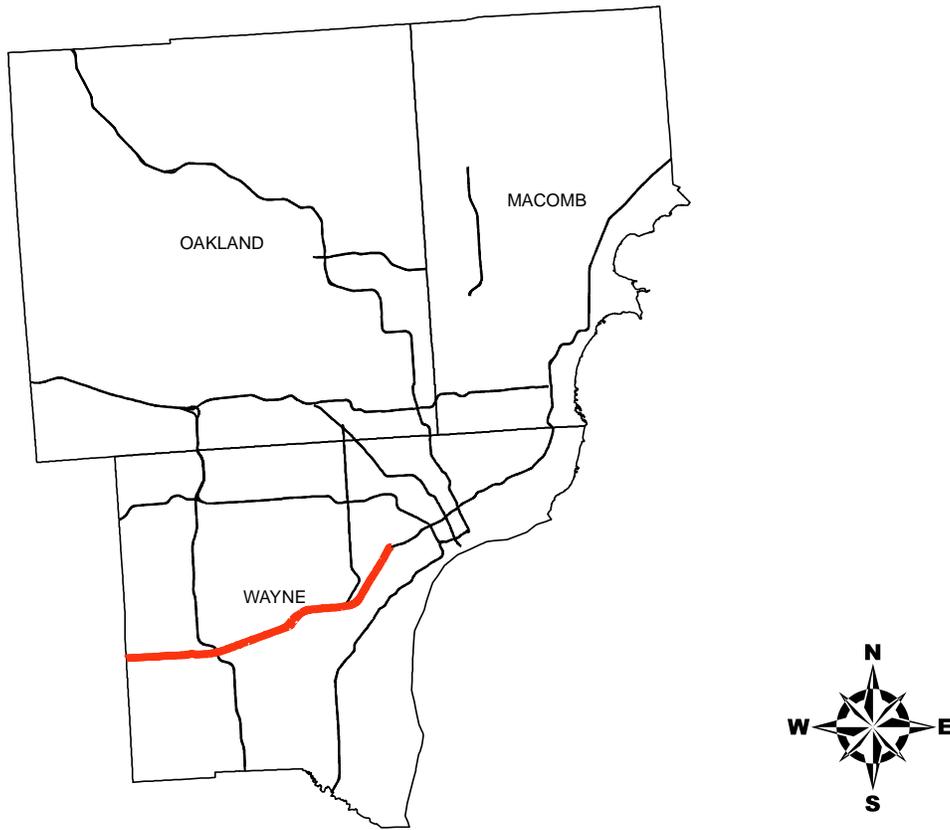


Michigan 53: Macomb

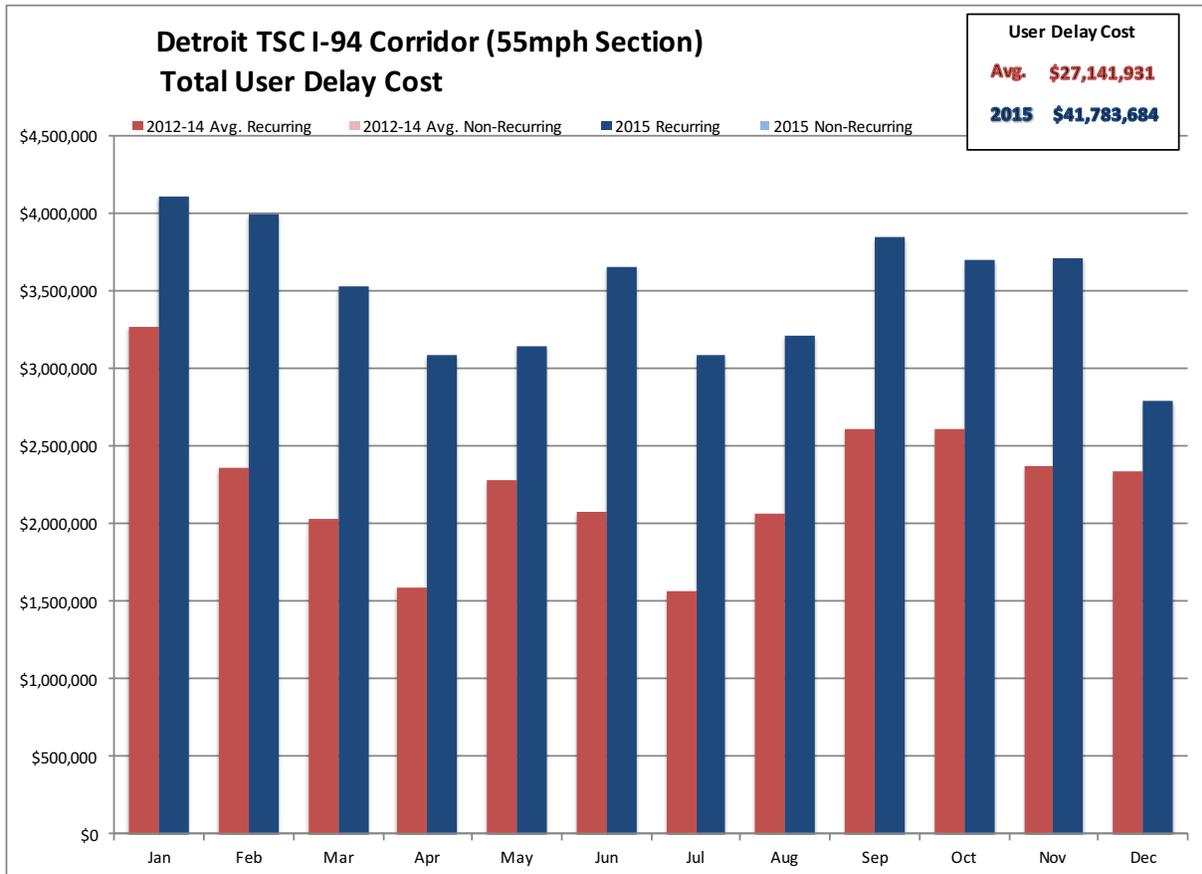
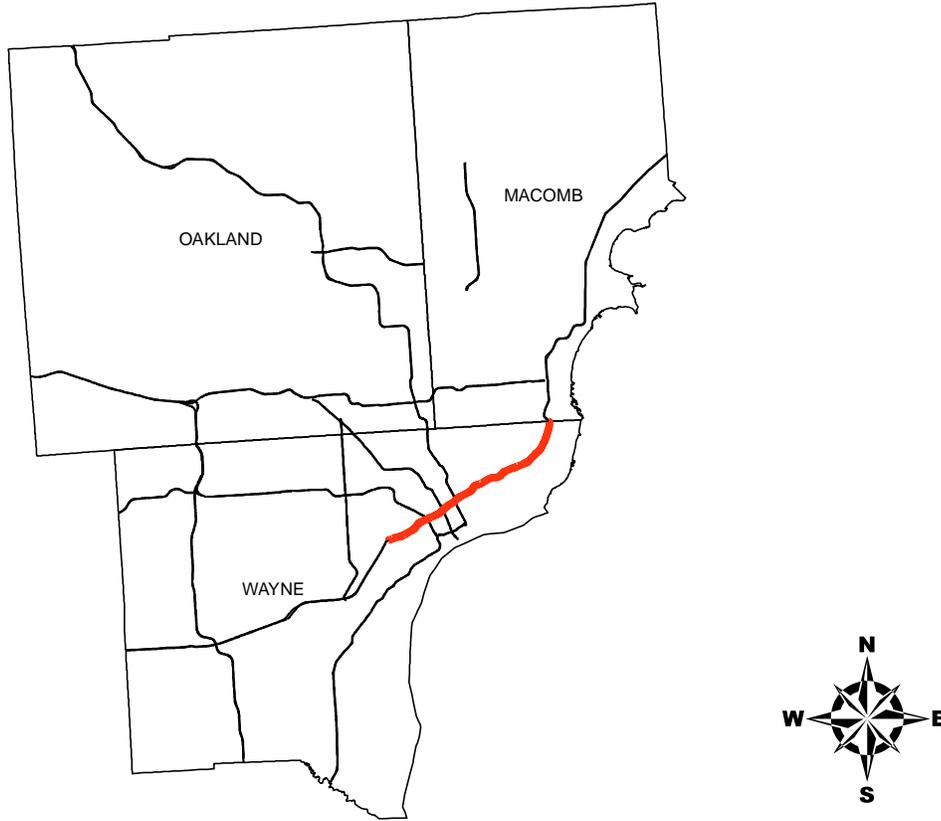


Michigan 59: Oakland

**Figure 16.** Taylor TSC I-94 Corridor total user delay cost



**Figure 17.** Detroit TSC I-94 Corridor (55mph section) total user delay cost



**Figure 18.** Macomb County I-94 Corridor total user delay cost

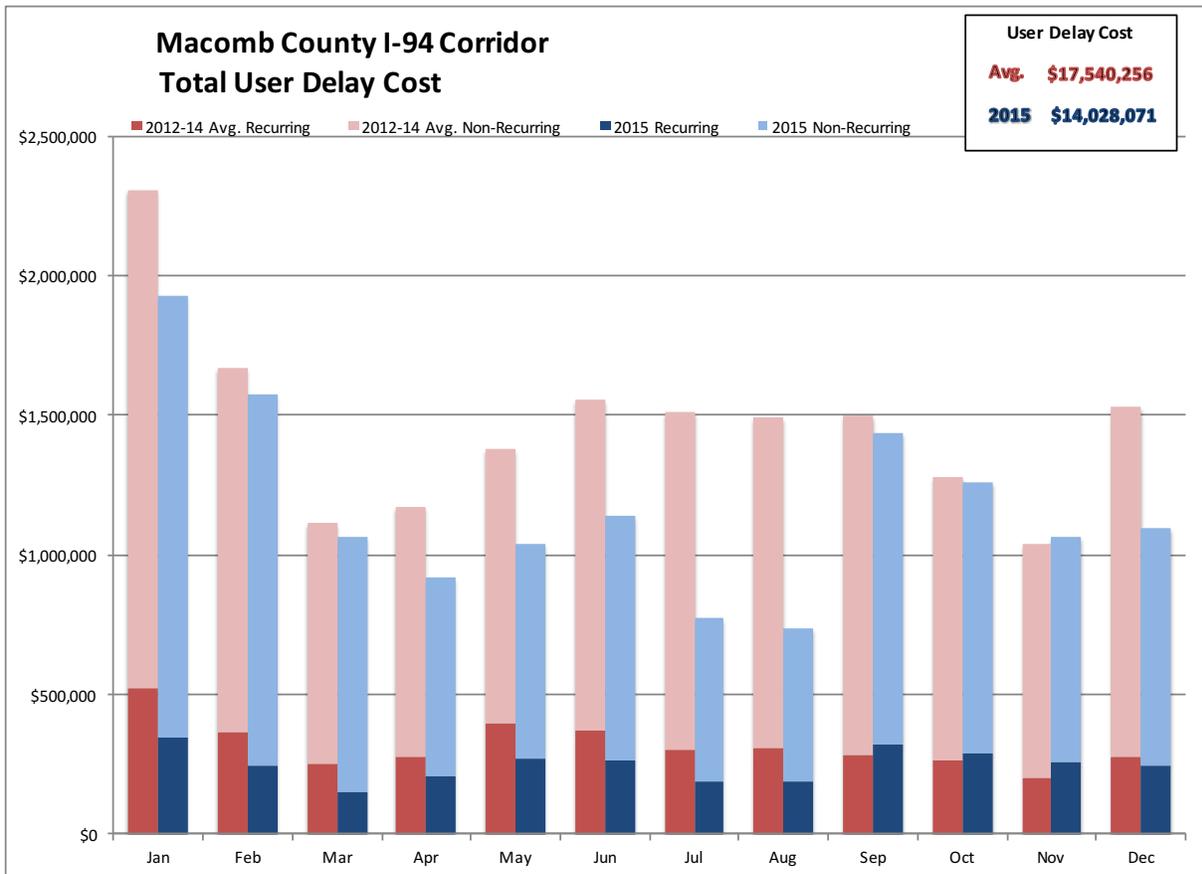
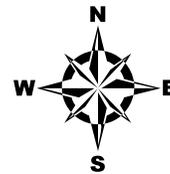


Figure 19. Metro Region I-94 eastbound

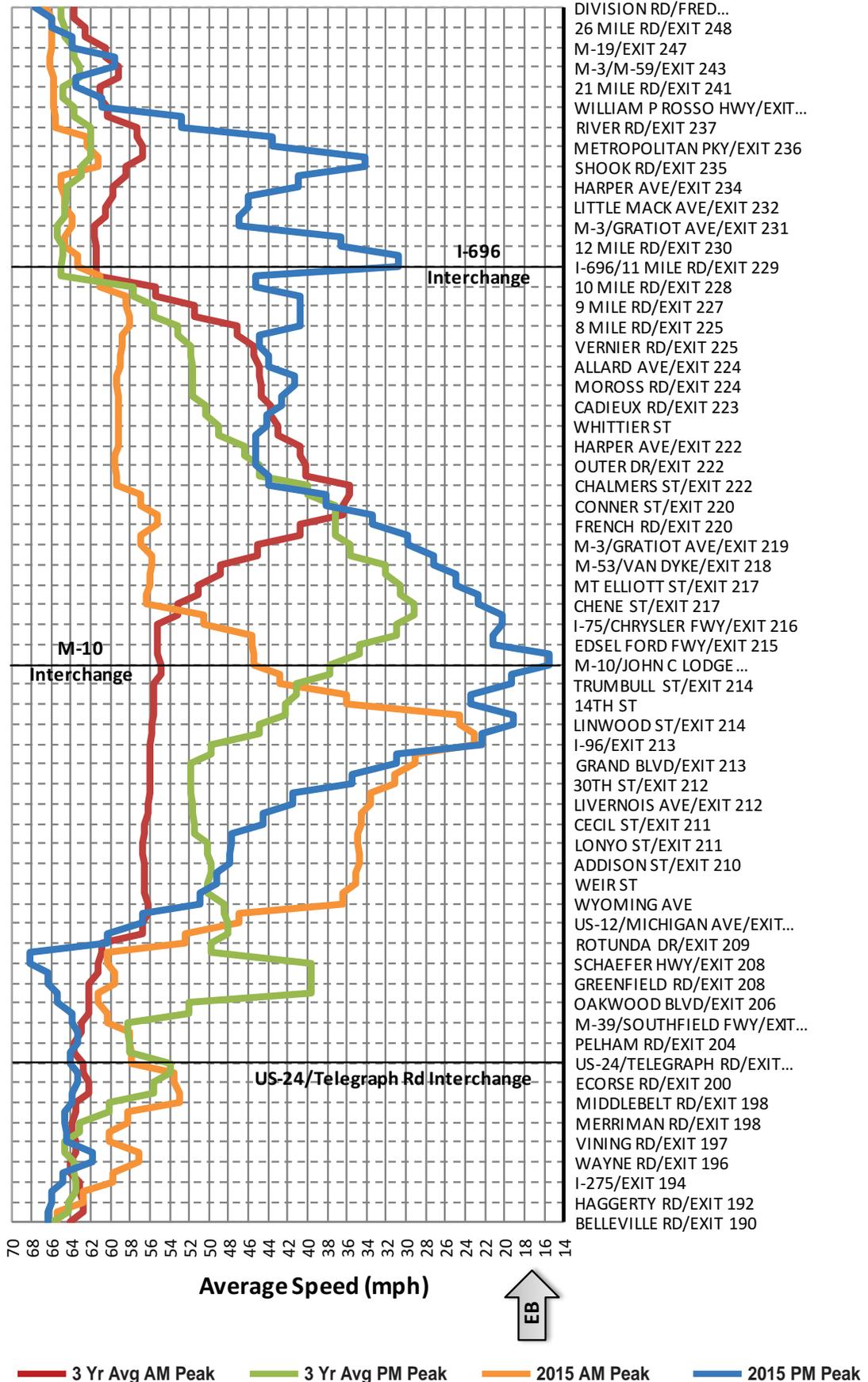
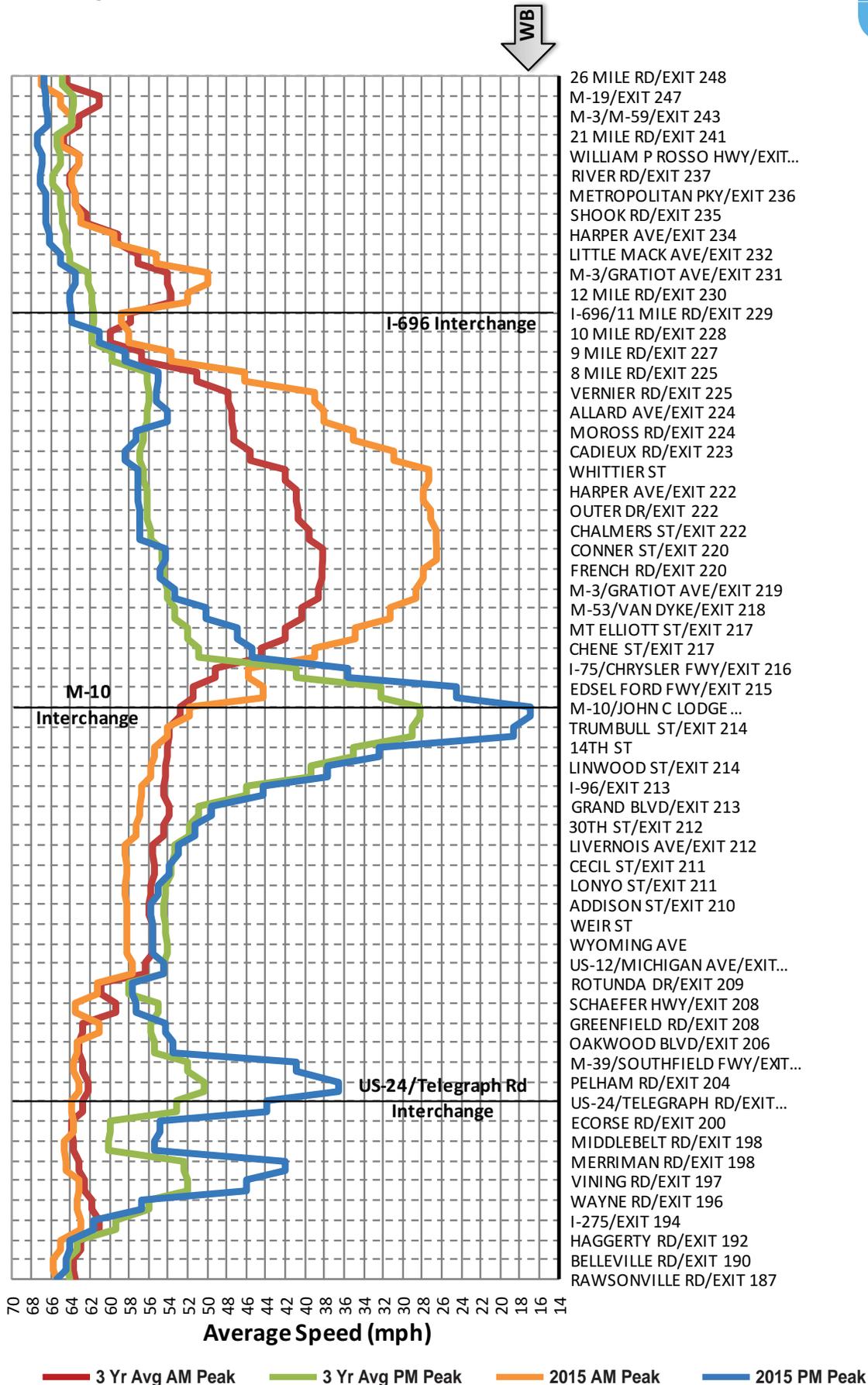


Figure 20. Metro Region I-94 westbound



# Travel Time Reliability

Figure 21. Travel time reliability: I-94



Figure 22. Segment 1- I-94 between I-275 and M-39/Southfield Fwy

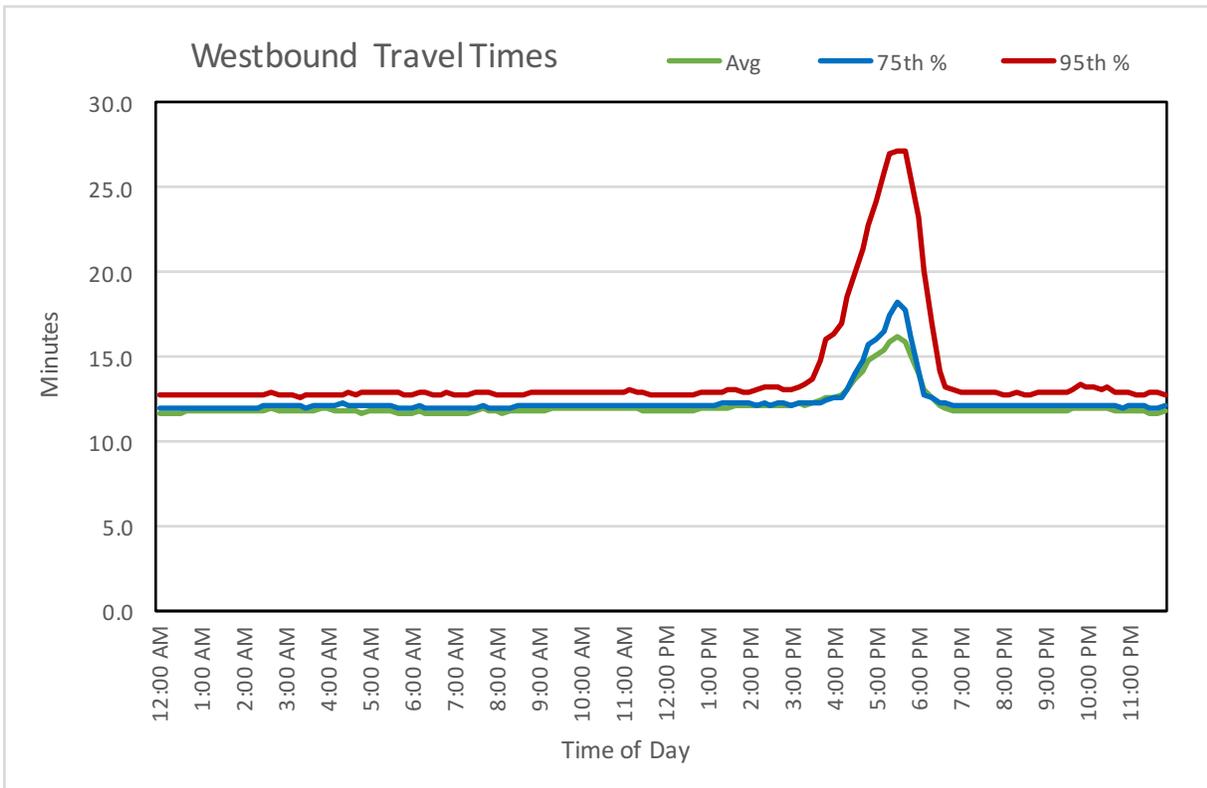
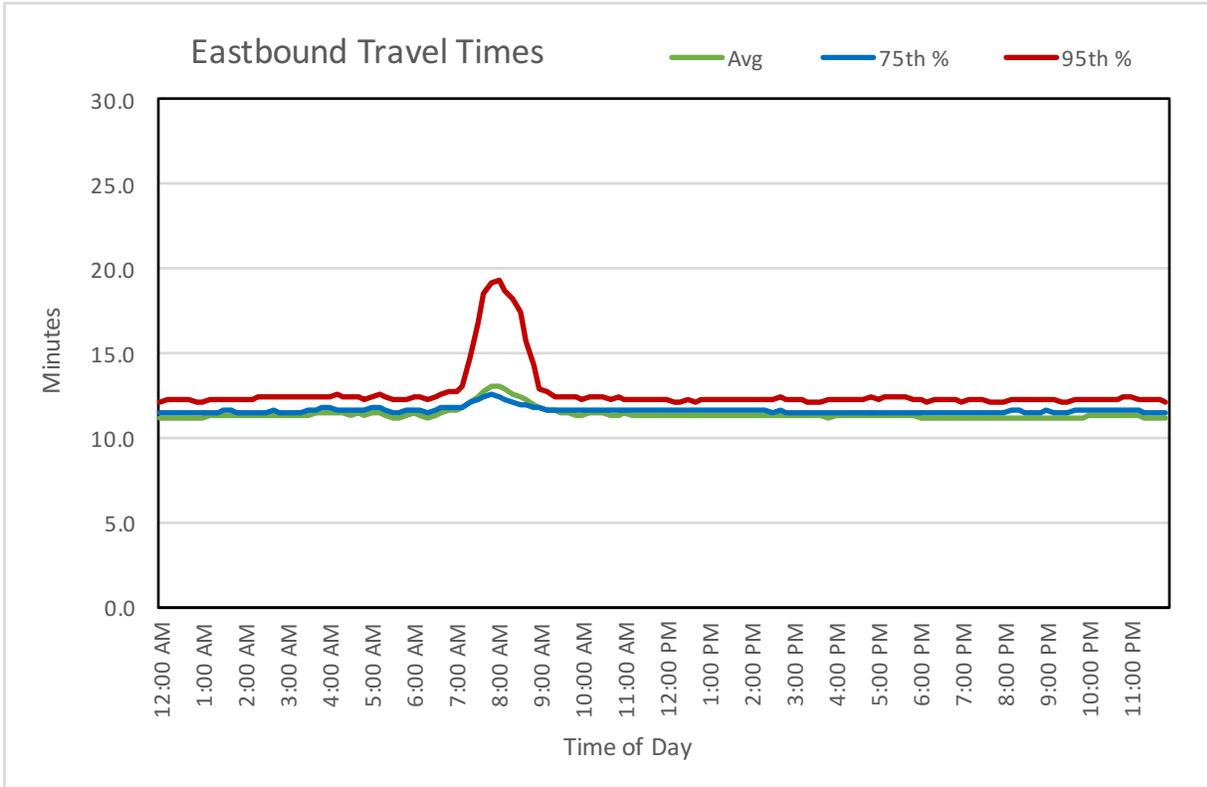


Figure 23. Segment 2- I-94 between M-39 and M-10/ John C Lodge Fwy

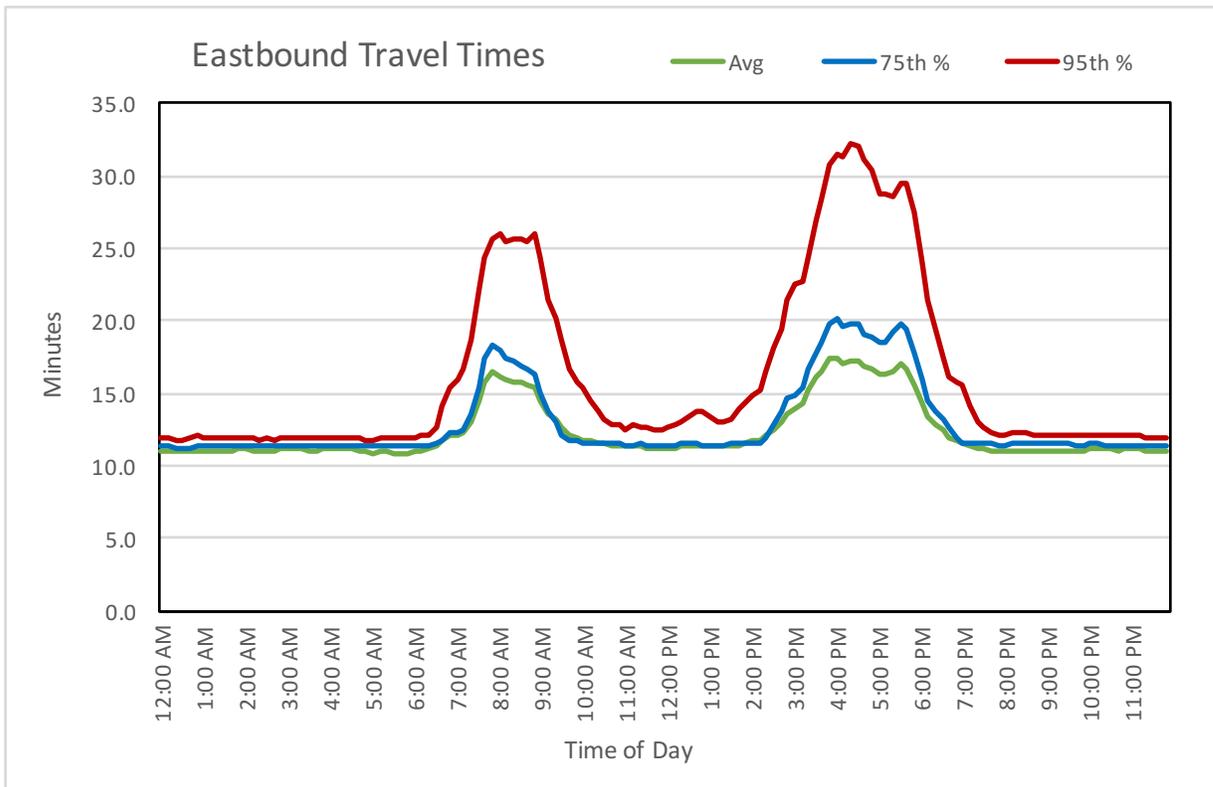
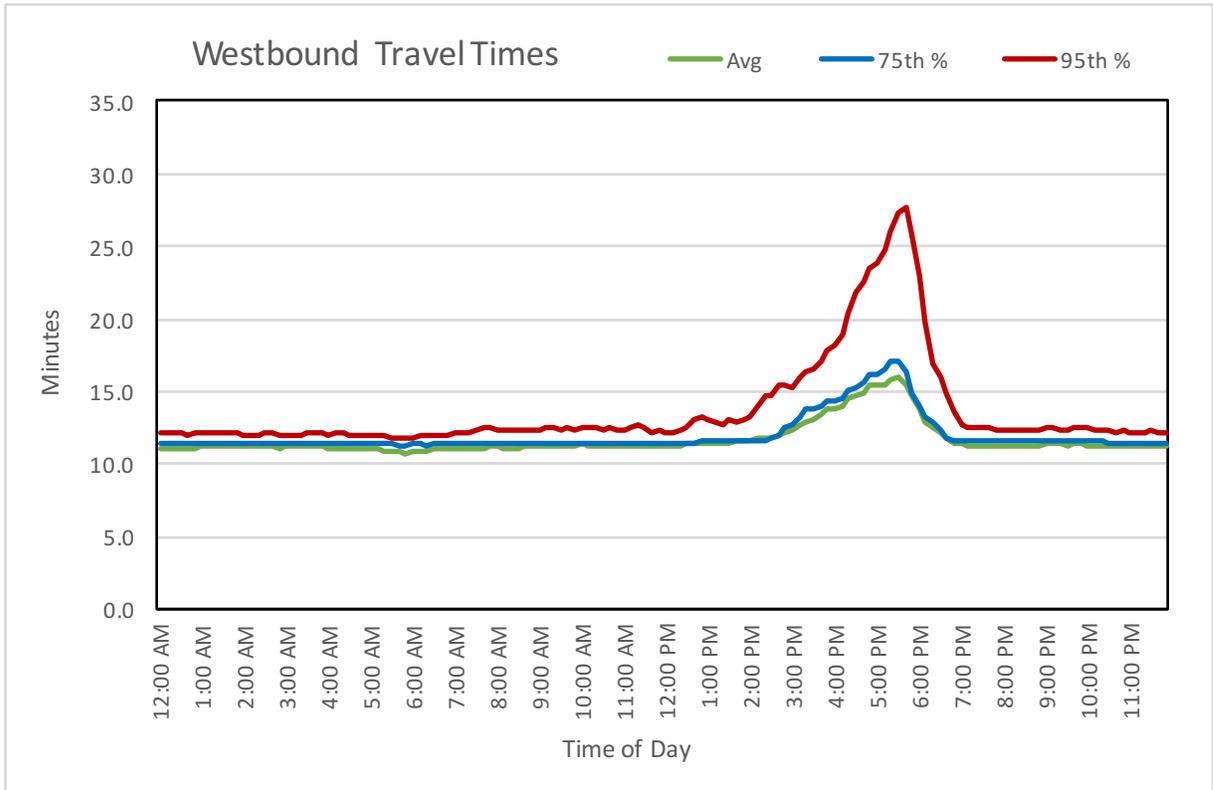


Figure 24. Segment 3- I-94 between M-10/ John C Lodge Fwy and I-696

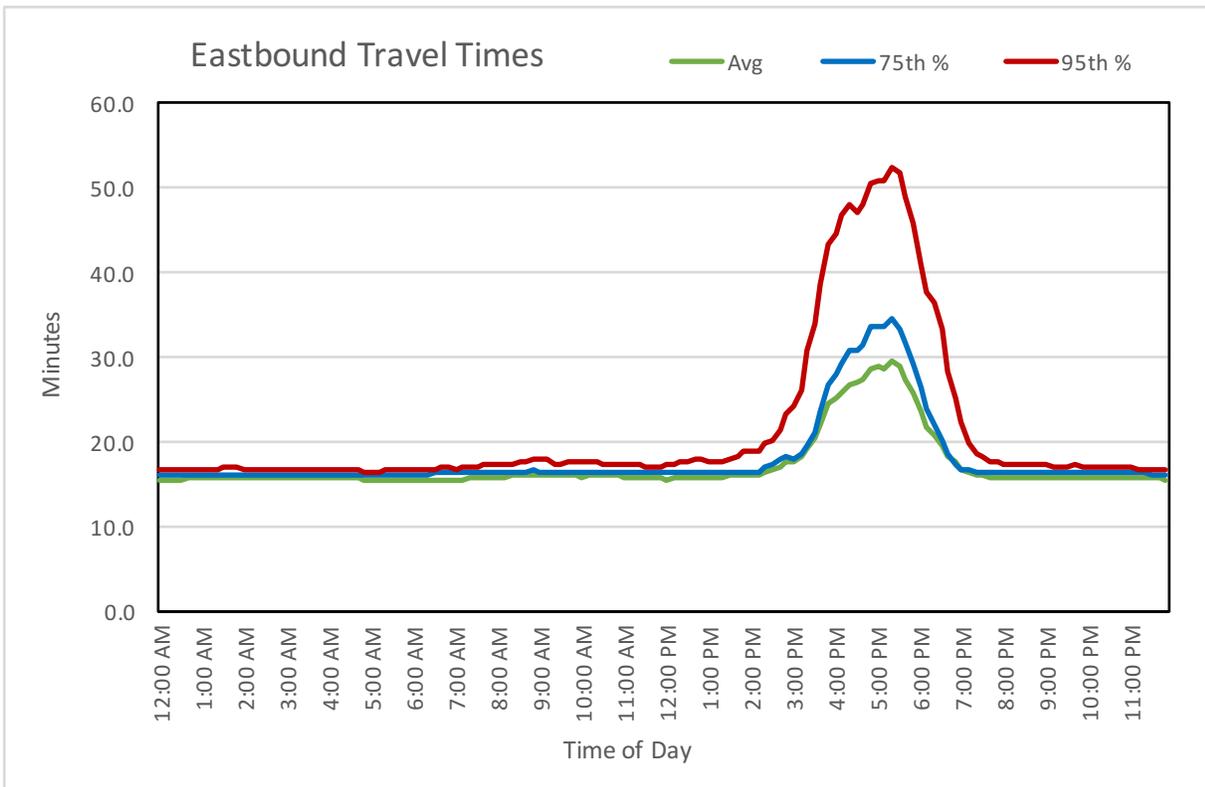
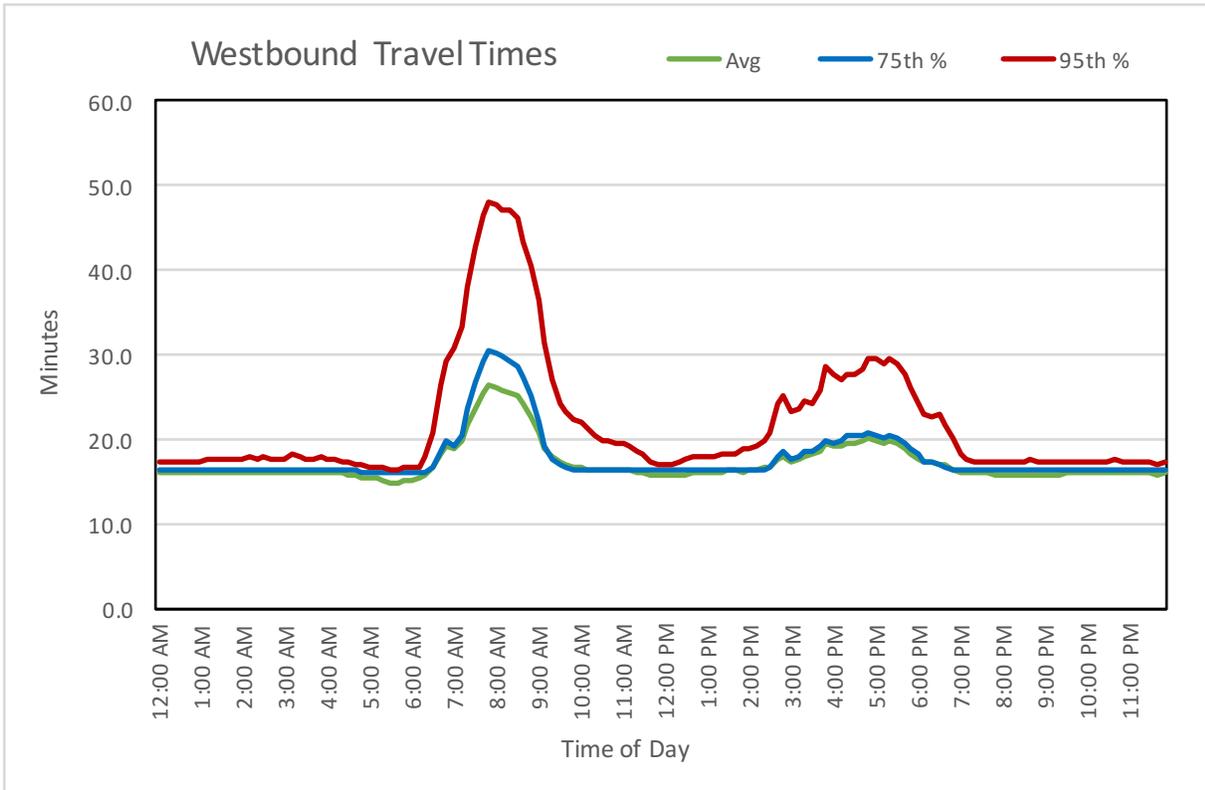
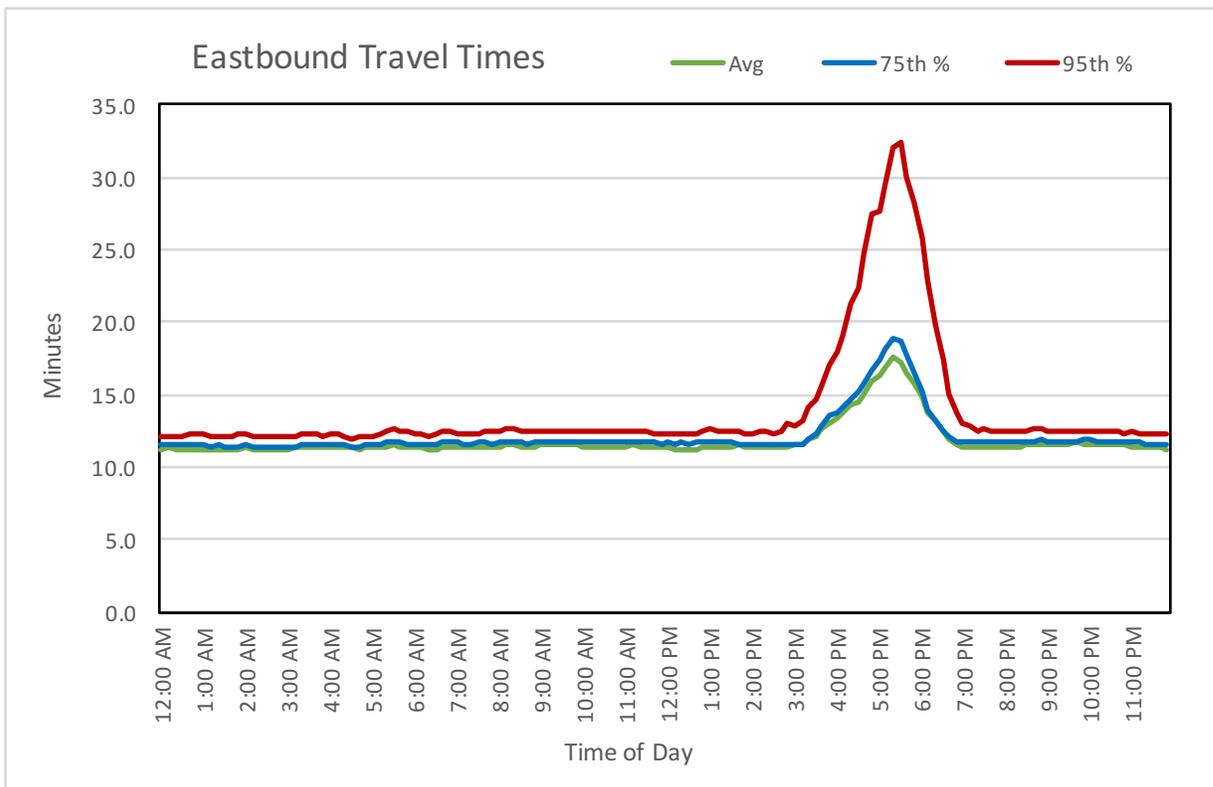
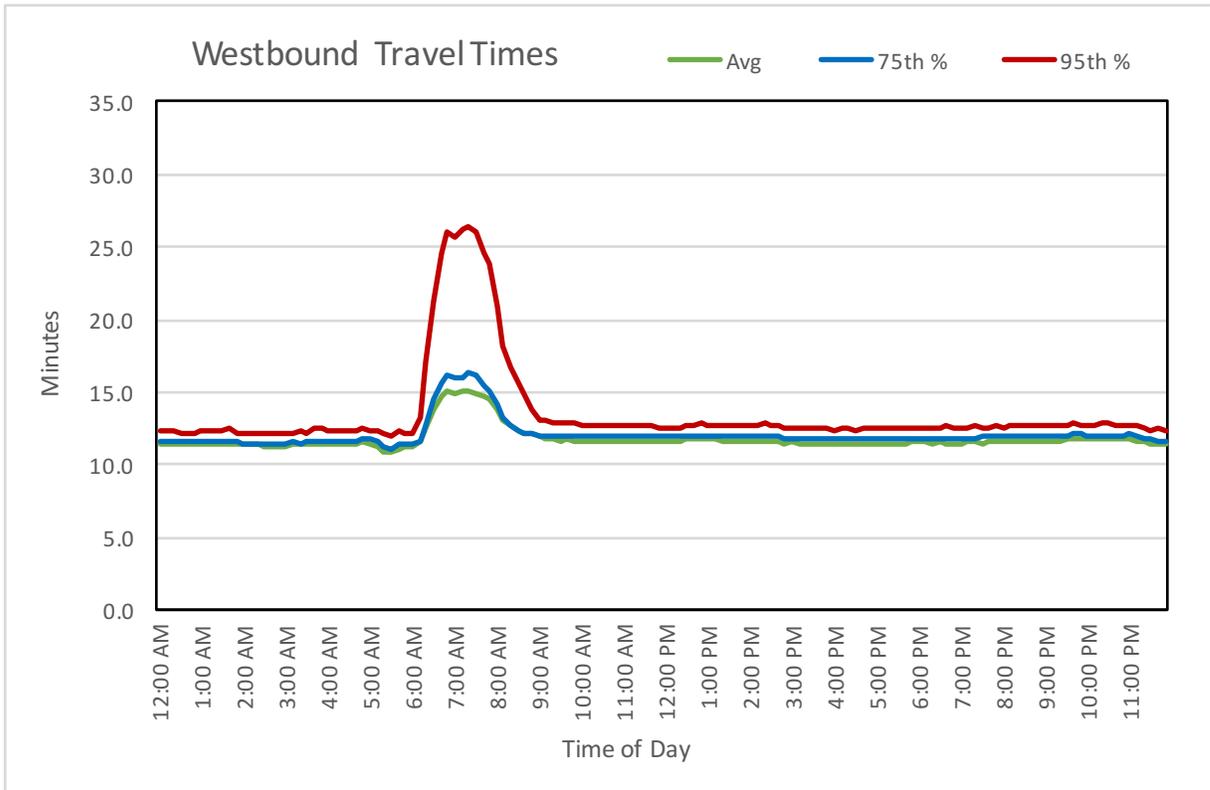


Figure 25. Segment 4- I-94 between I-696 and William P Rosso Hwy





# Corridor



Interstate 75: Taylor, Detroit 55mph, and Oakland



Interstate 94: Taylor, Detroit 55mph, and Macomb



Interstate 96: Oakland, Taylor, and Detroit Plus Local



Interstate 275: Wayne



Interstate 696: Oakland and Macomb



Michigan 10: Detroit 70mph and Oakland



Michigan 14: Taylor



Michigan 39: Detroit 55mph

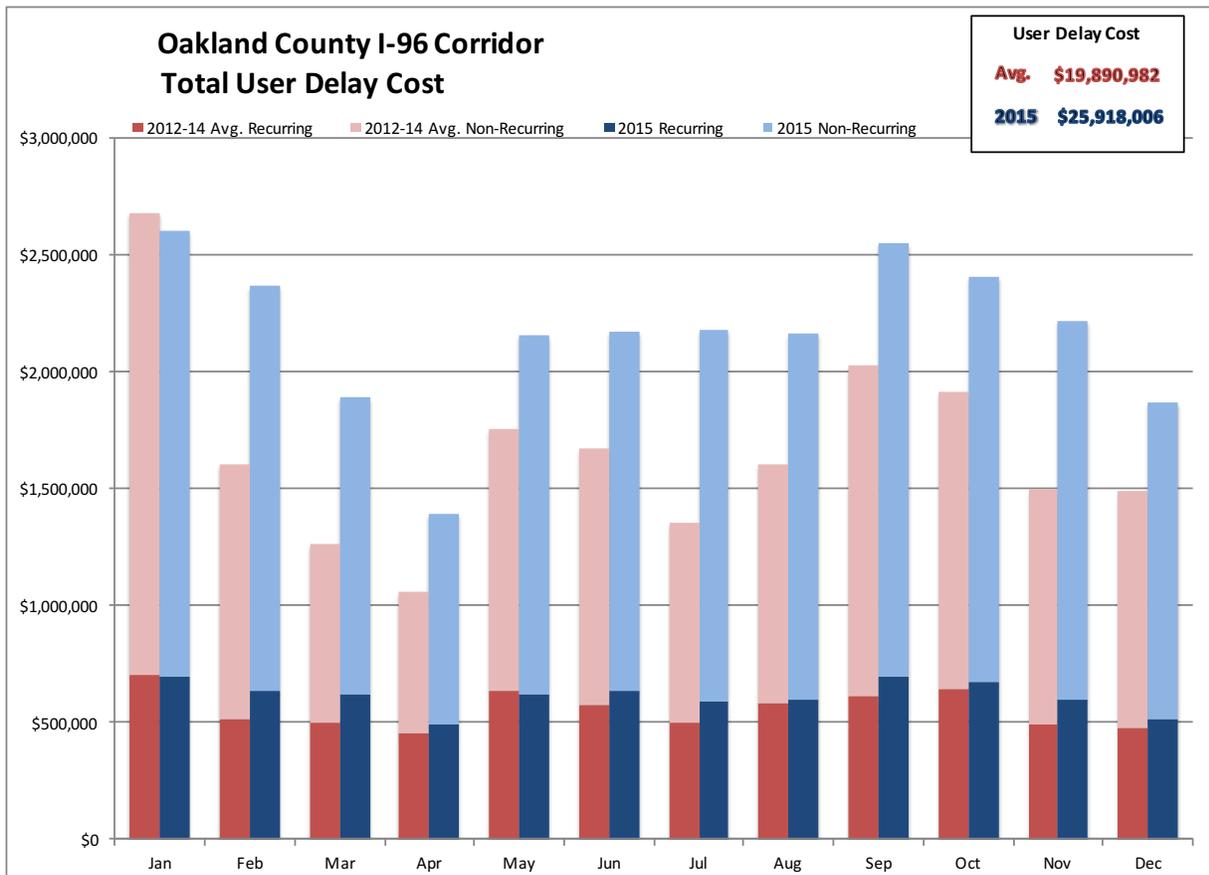
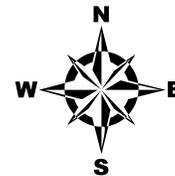


Michigan 53: Macomb



Michigan 59: Oakland

Figure 26. Oakland County I-96 Corridor total user delay cost



**Figure 27.** Taylor TSC I-96 Corridor total user delay cost

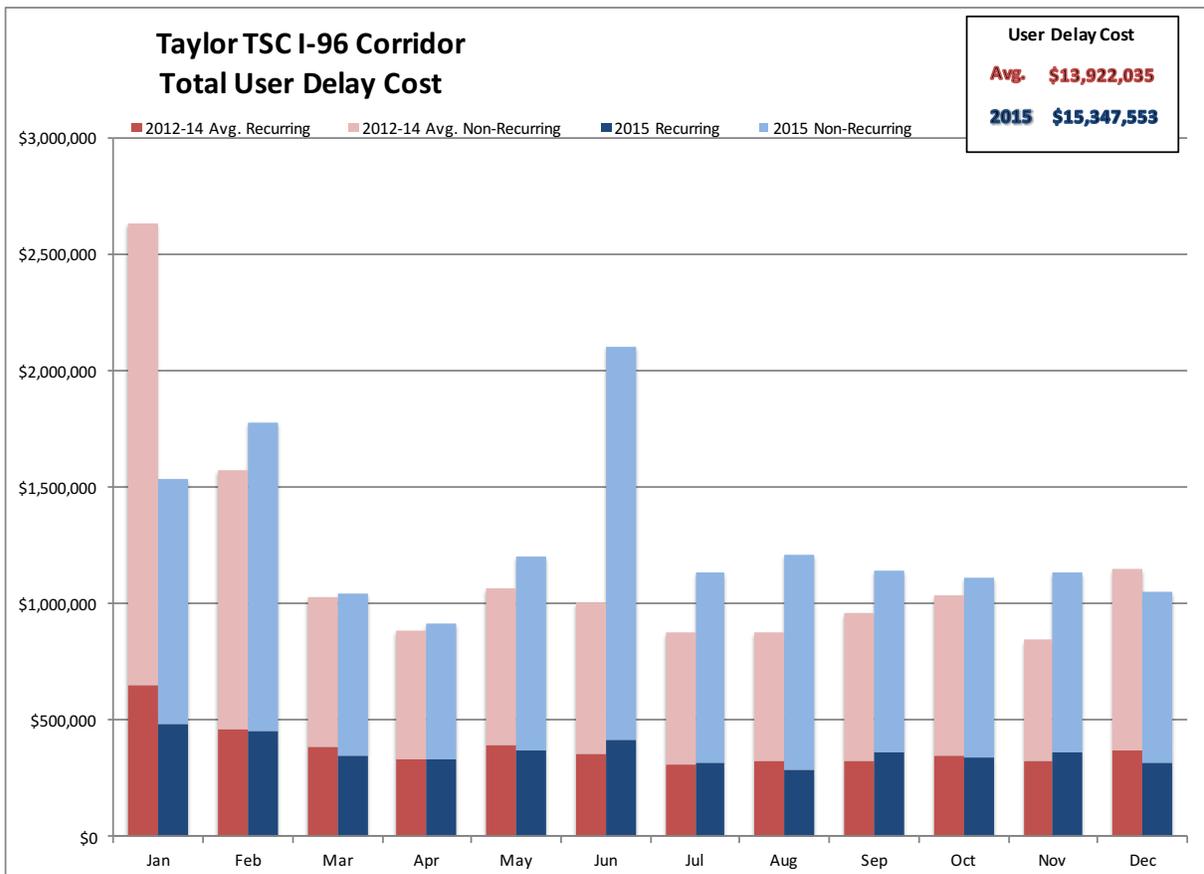
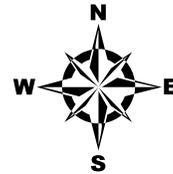


Figure 28. Detroit TSC I-96 Corridor total user delay cost

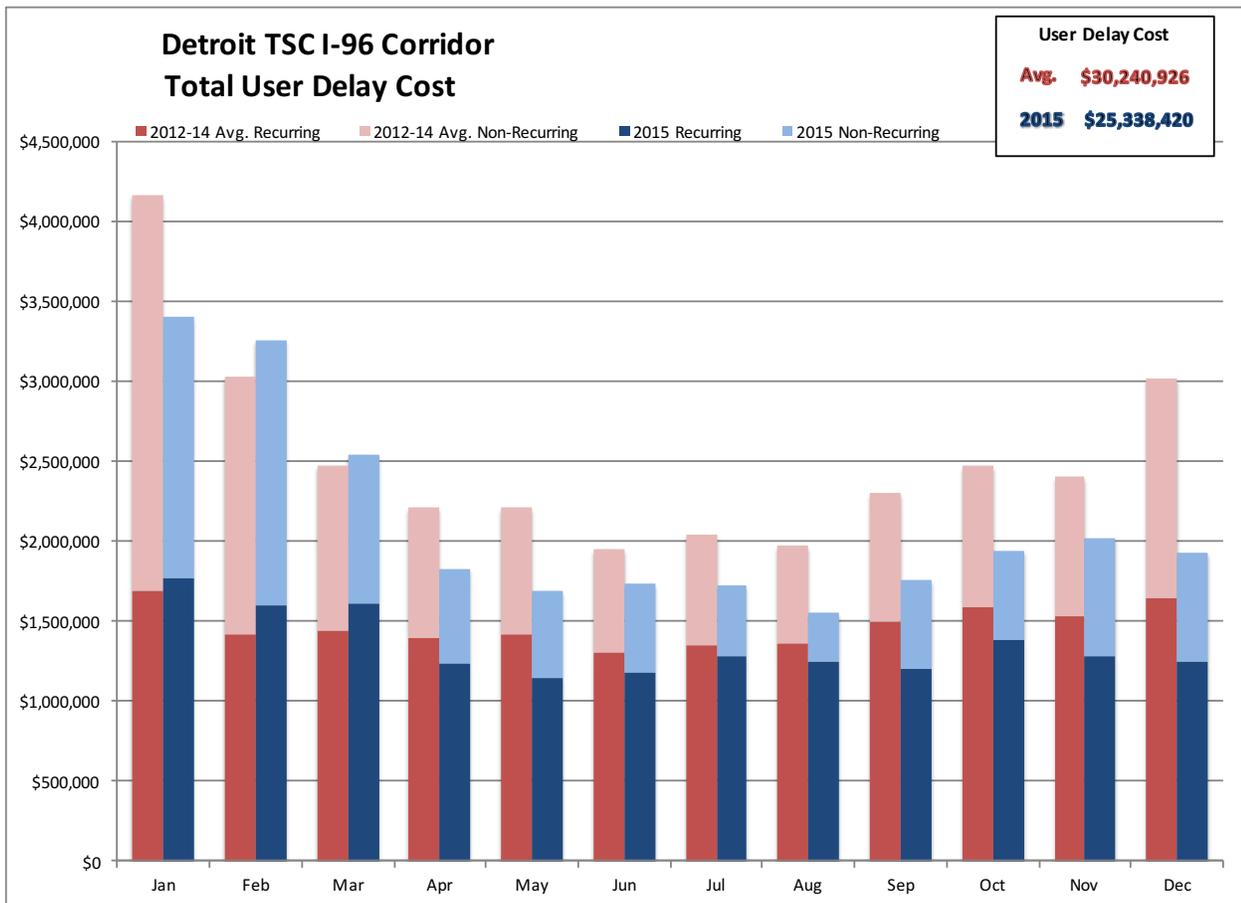
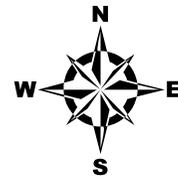


Figure 29. Metro Region I-96 eastbound

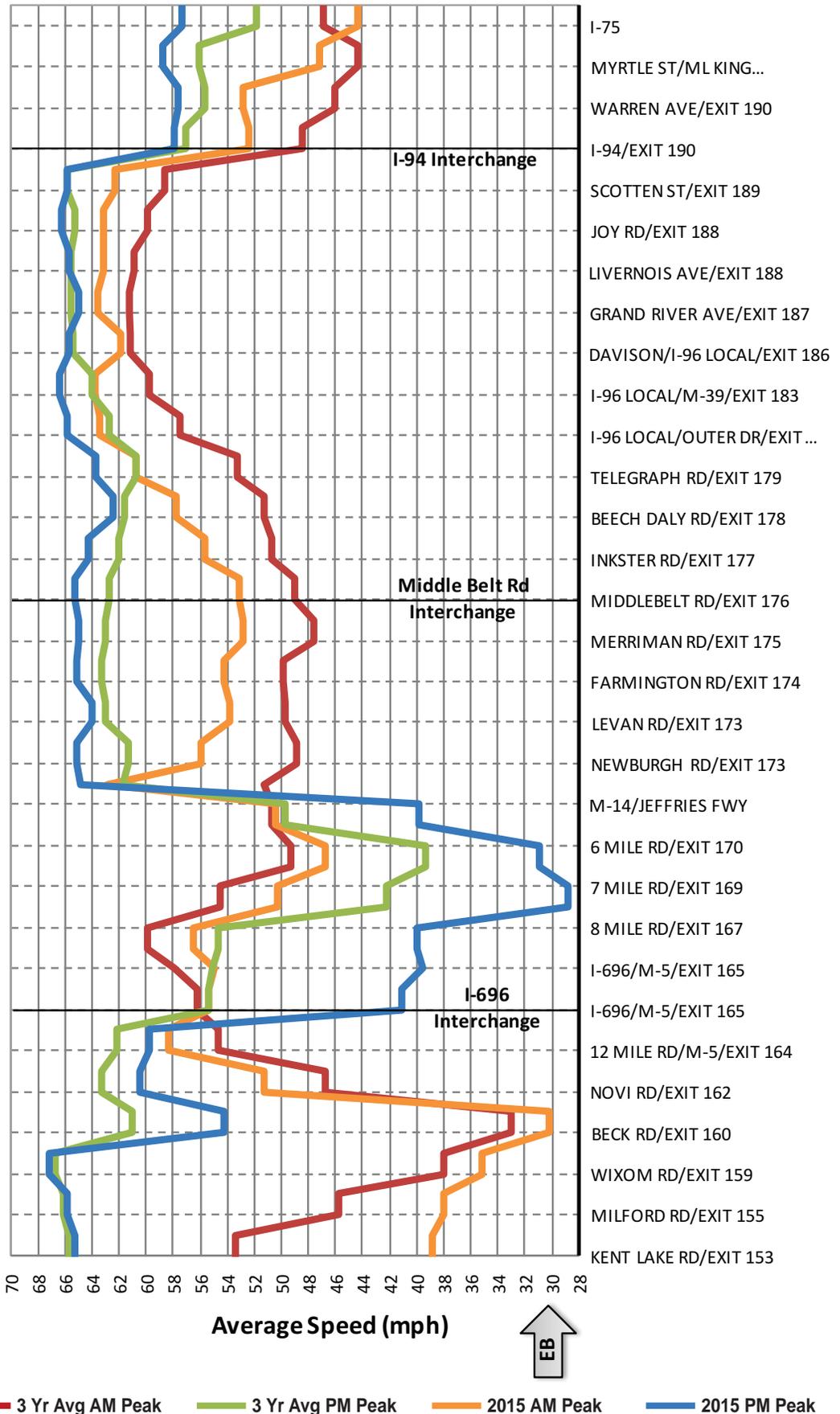
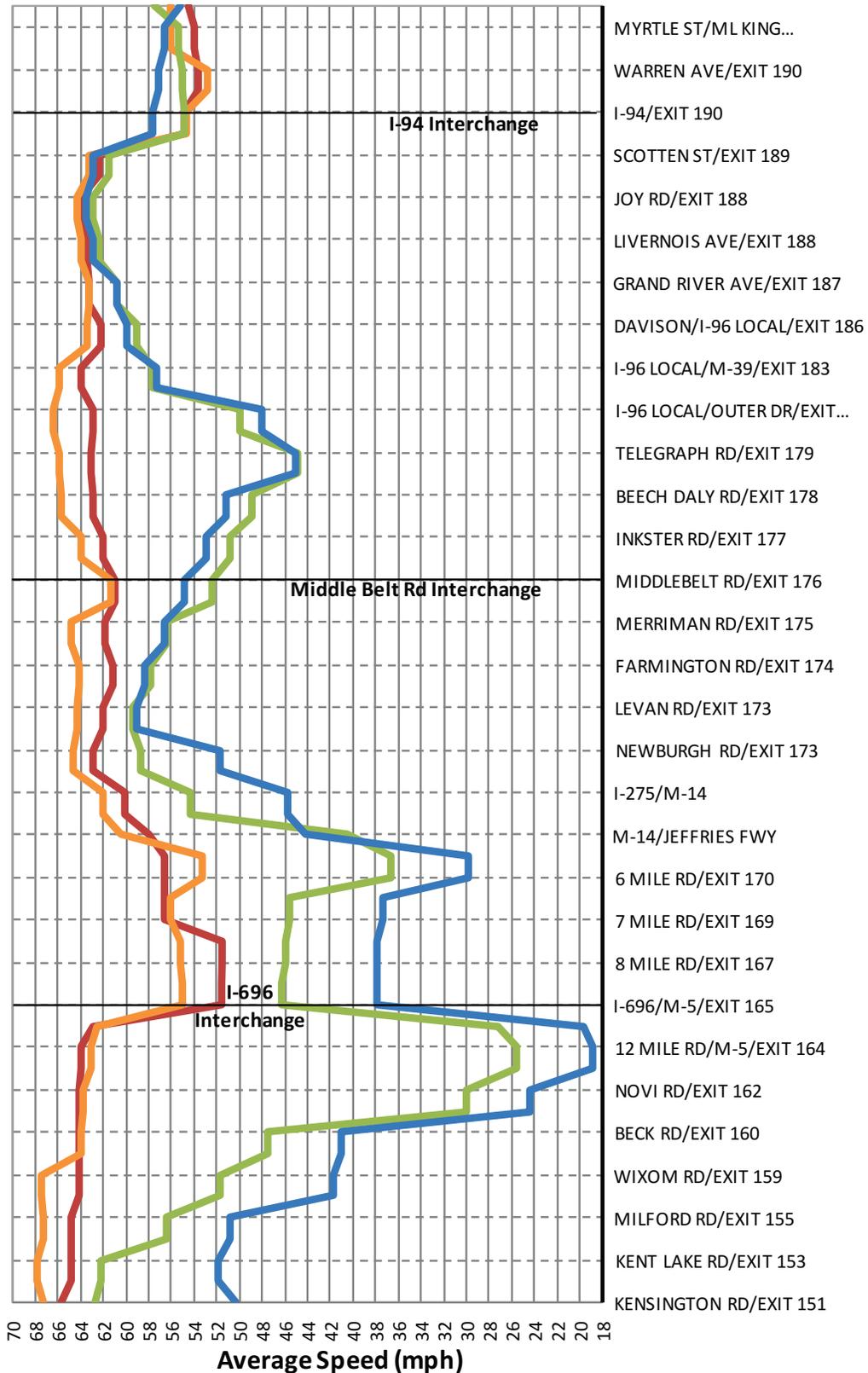


Figure 30. Metro Region I-96 westbound



— 3 Yr Avg AM Peak    
 — 3 Yr Avg PM Peak    
 — 2015 AM Peak    
 — 2015 PM Peak

Figure 31. Metro Region I-96 local eastbound

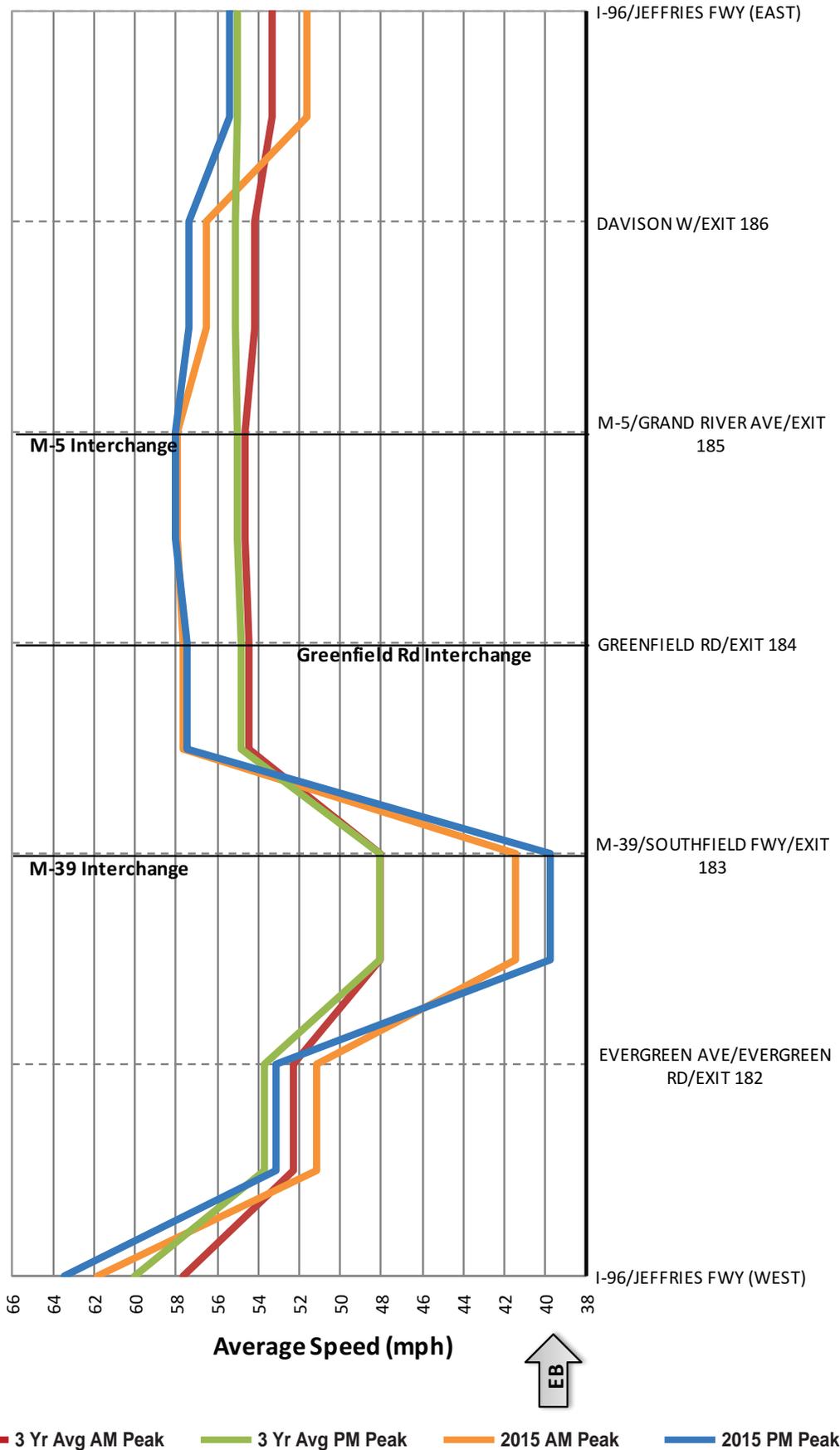
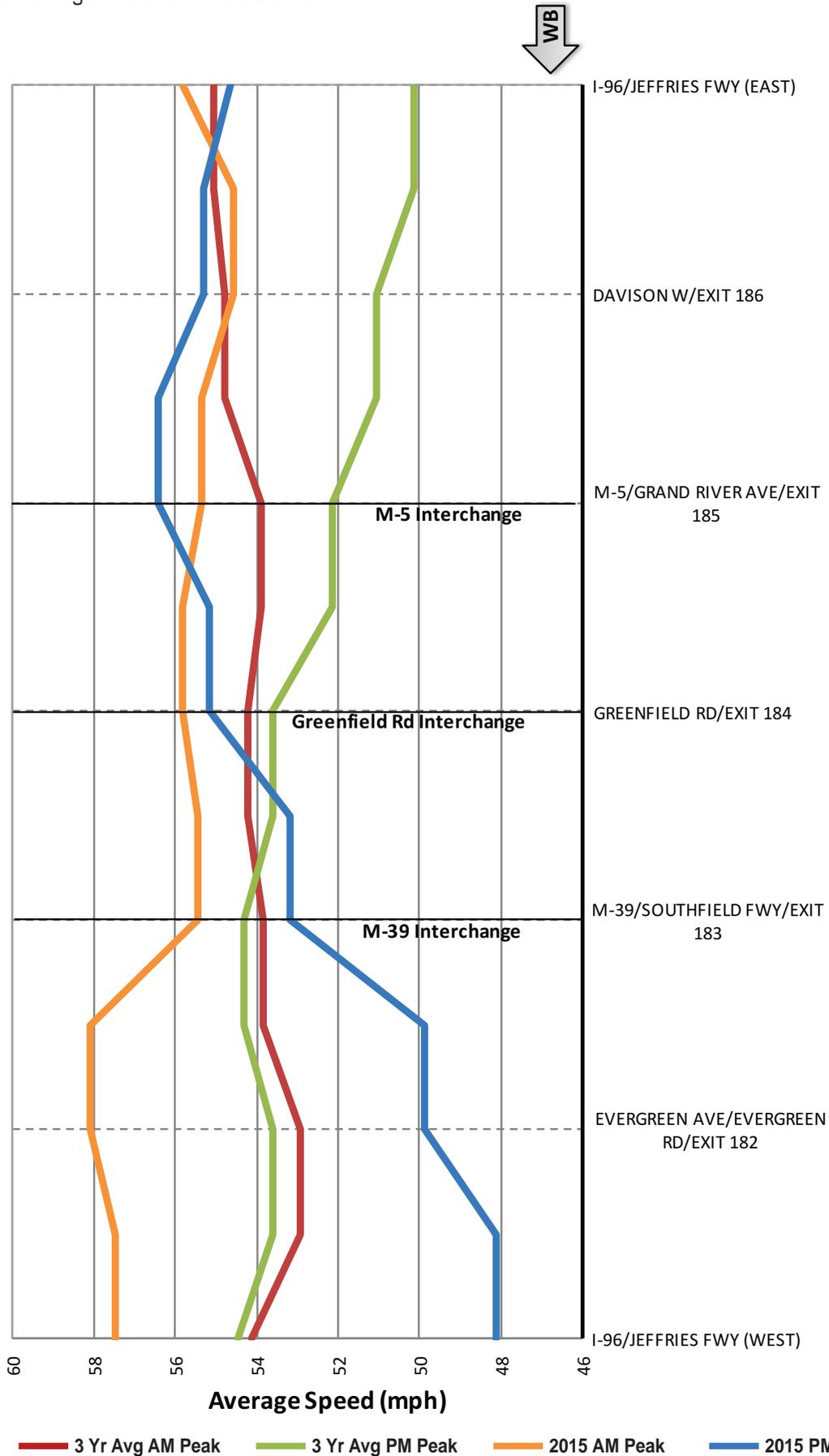


Figure 32. Metro Region I-96 local westbound



# Travel Time Reliability

Figure 33. Travel time reliability: I-96



Figure 34. Segment 1- I-96 between US-23 and I-696/M-5

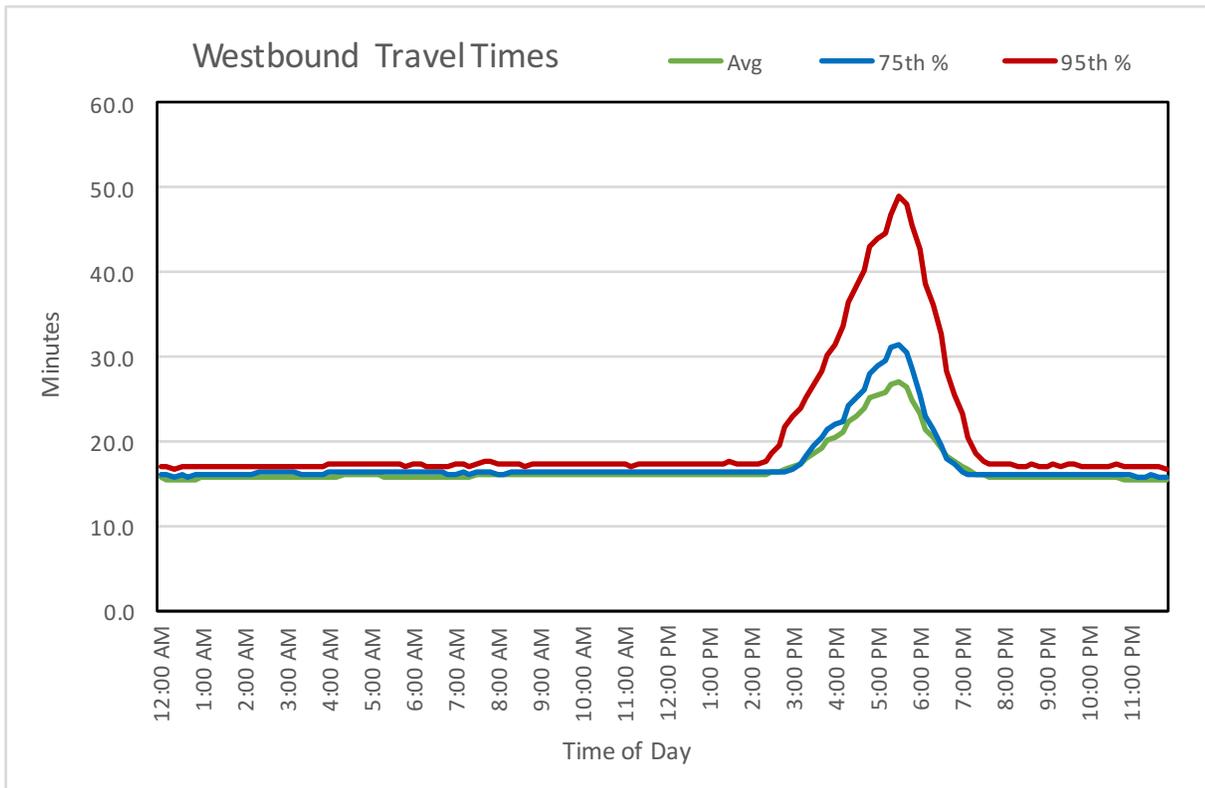
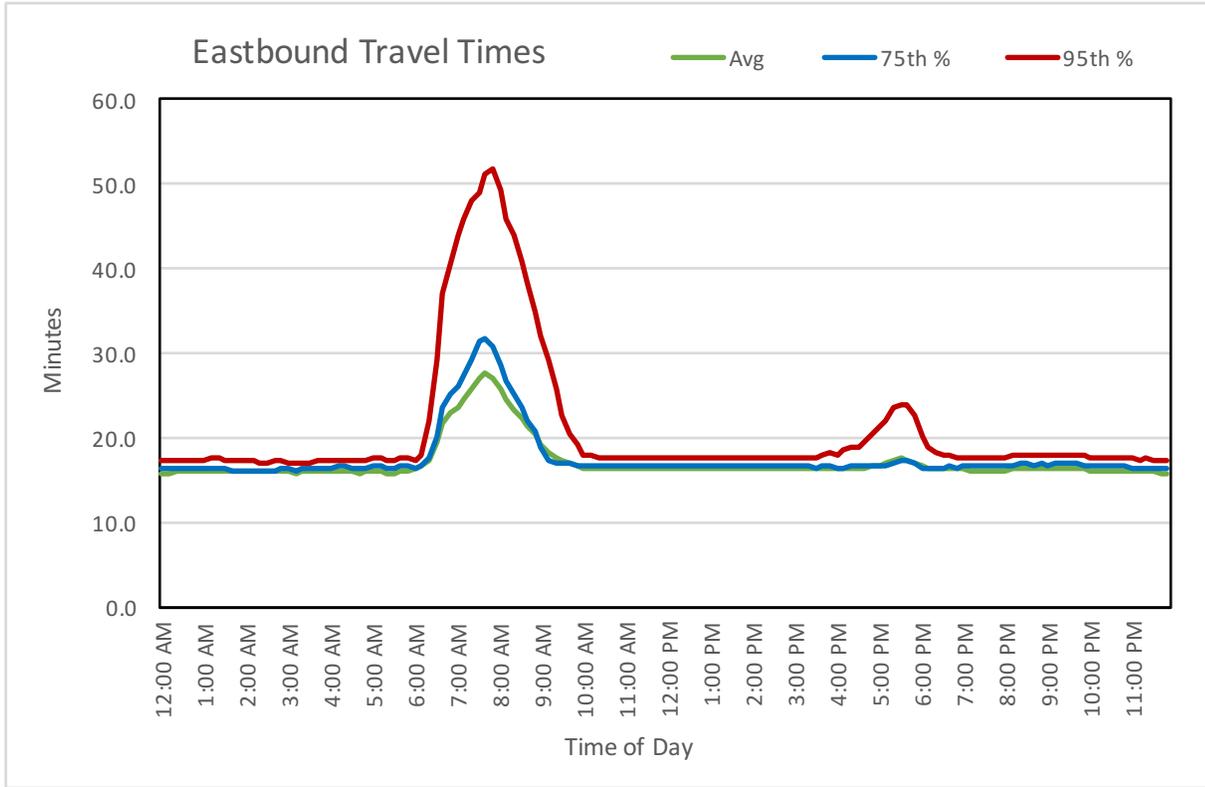


Figure 35. Segment 2- I-96/I-275

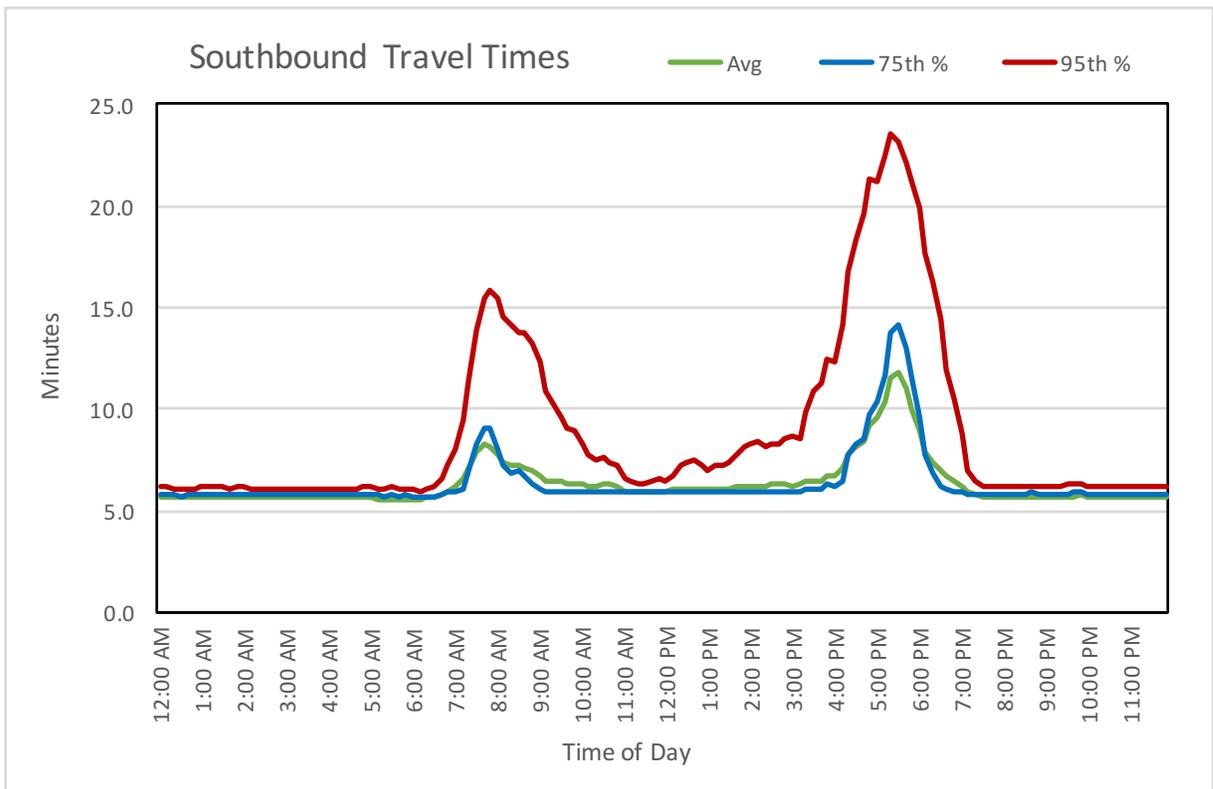
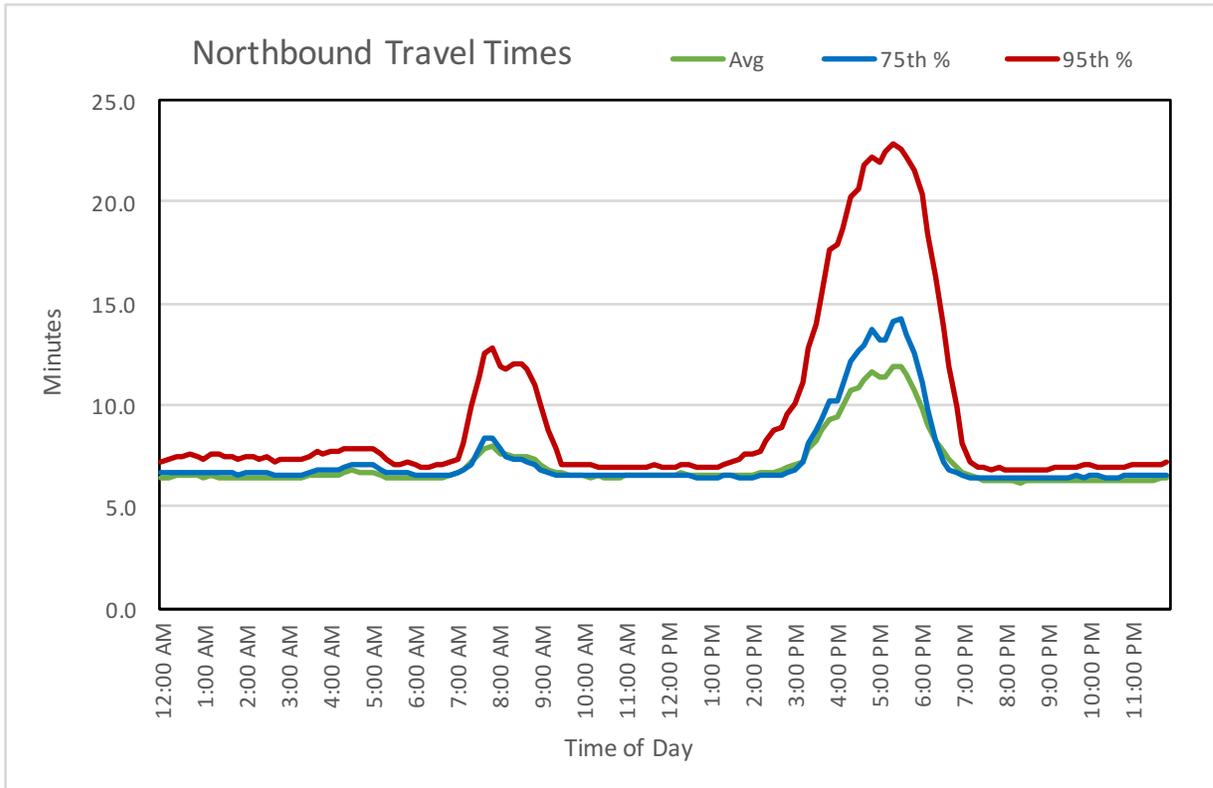


Figure 36. Segment 3- I96/Local/M-39 and I-275/M-14

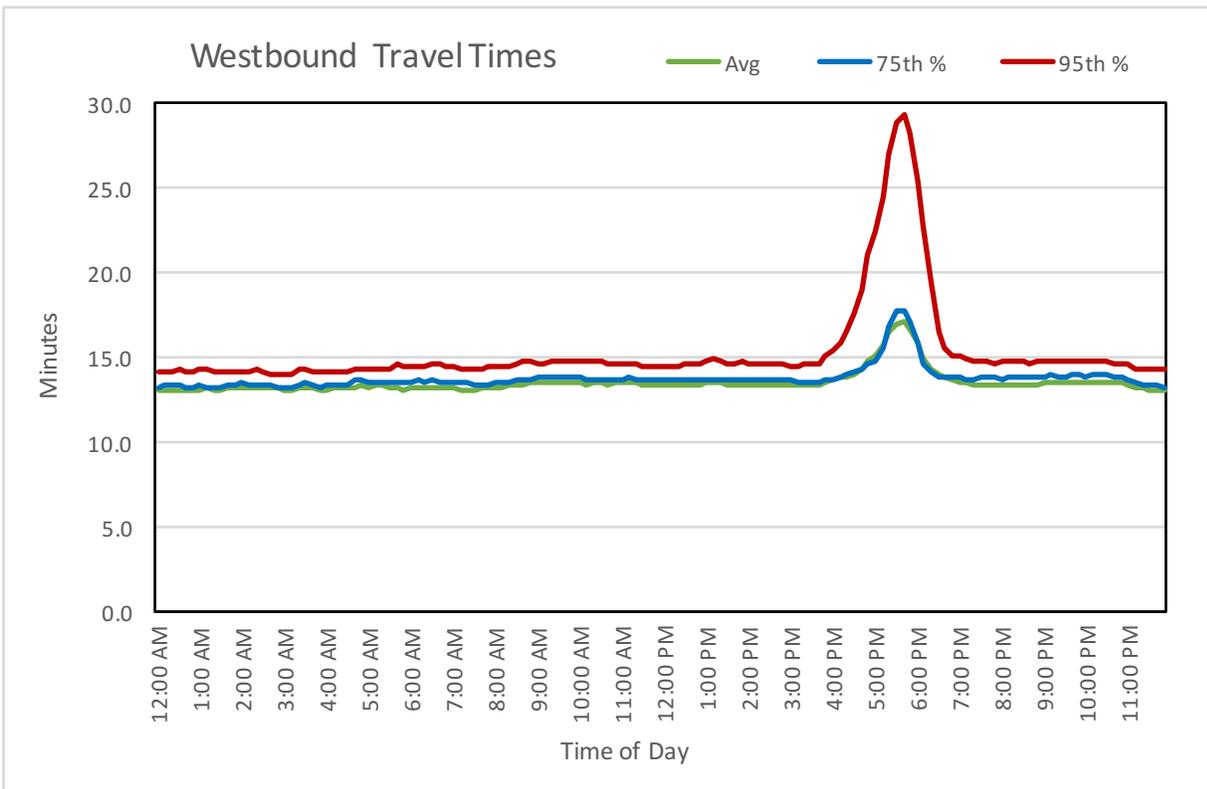
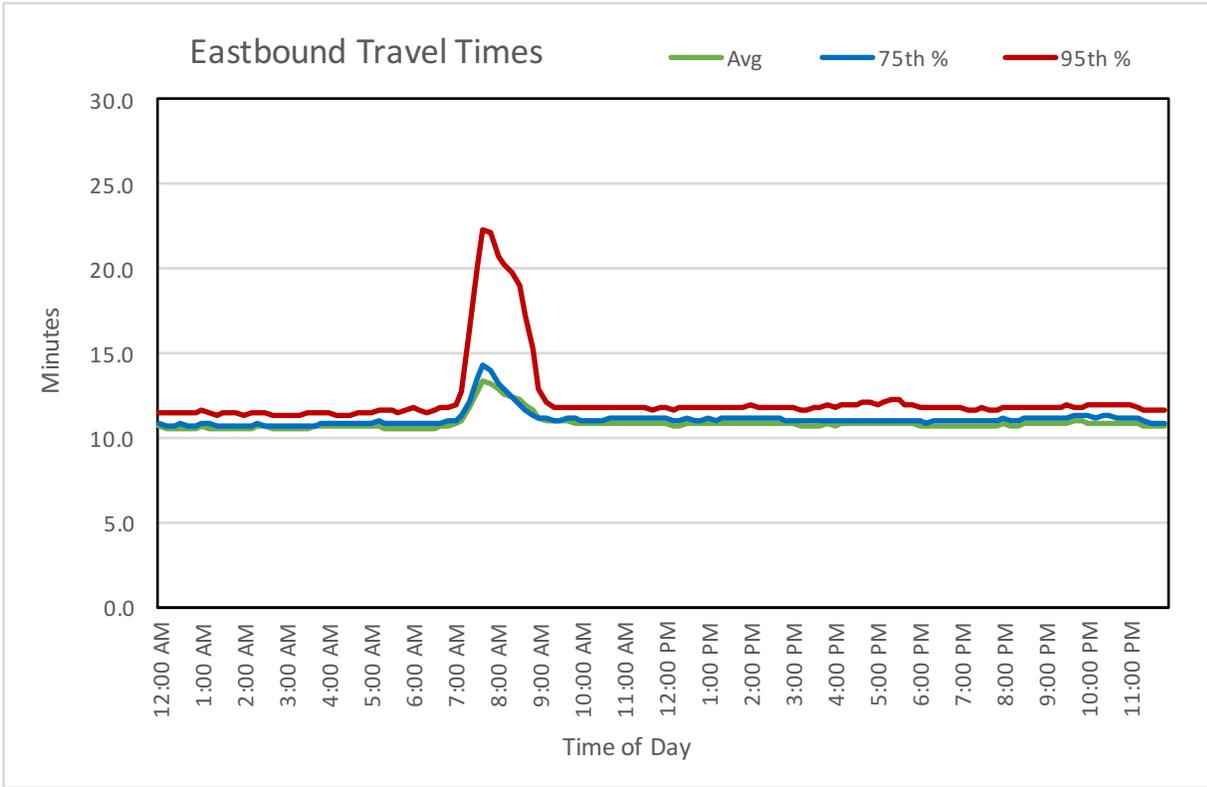
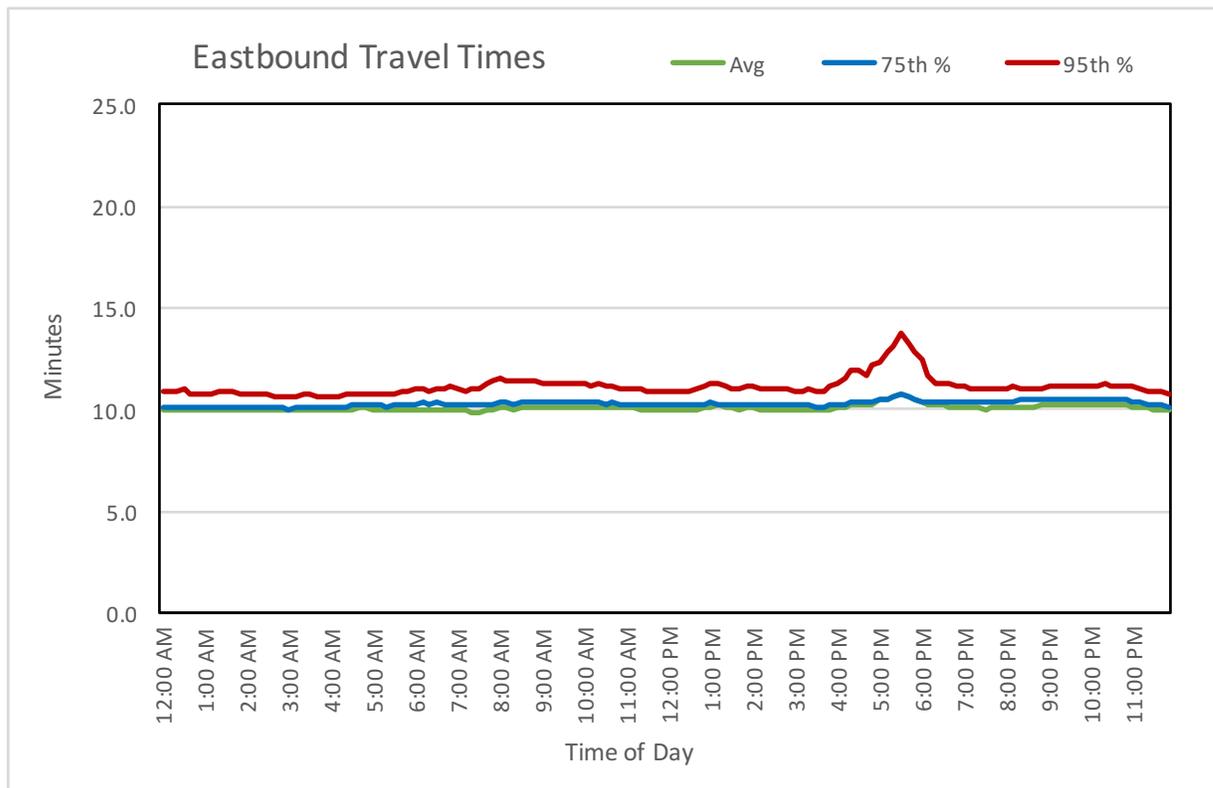
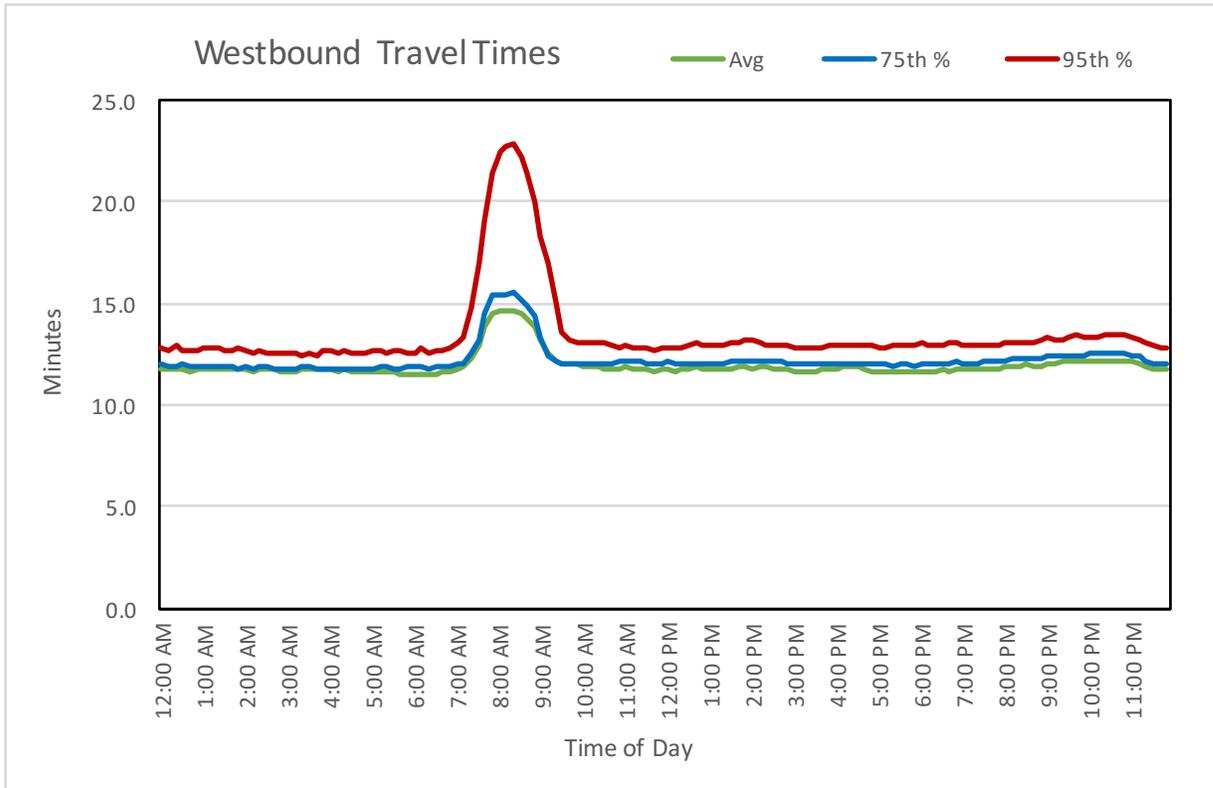


Figure 37. Segment 4- I-96 between I-75 and I-96/Local/M-39





# Corridor



Interstate 75: Taylor, Detroit 55mph, and Oakland



Interstate 94: Taylor, Detroit 55mph, and Macomb



Interstate 96: Oakland, Taylor, and Detroit Plus Local



**Interstate 275: Wayne**



Interstate 696: Oakland and Macomb



Michigan 10: Detroit 70mph and Oakland



Michigan 14: Taylor



Michigan 39: Detroit 55mph



Michigan 53: Macomb



Michigan 59: Oakland

**Figure 38.** Taylor TSC I-275 Corridor total user delay cost

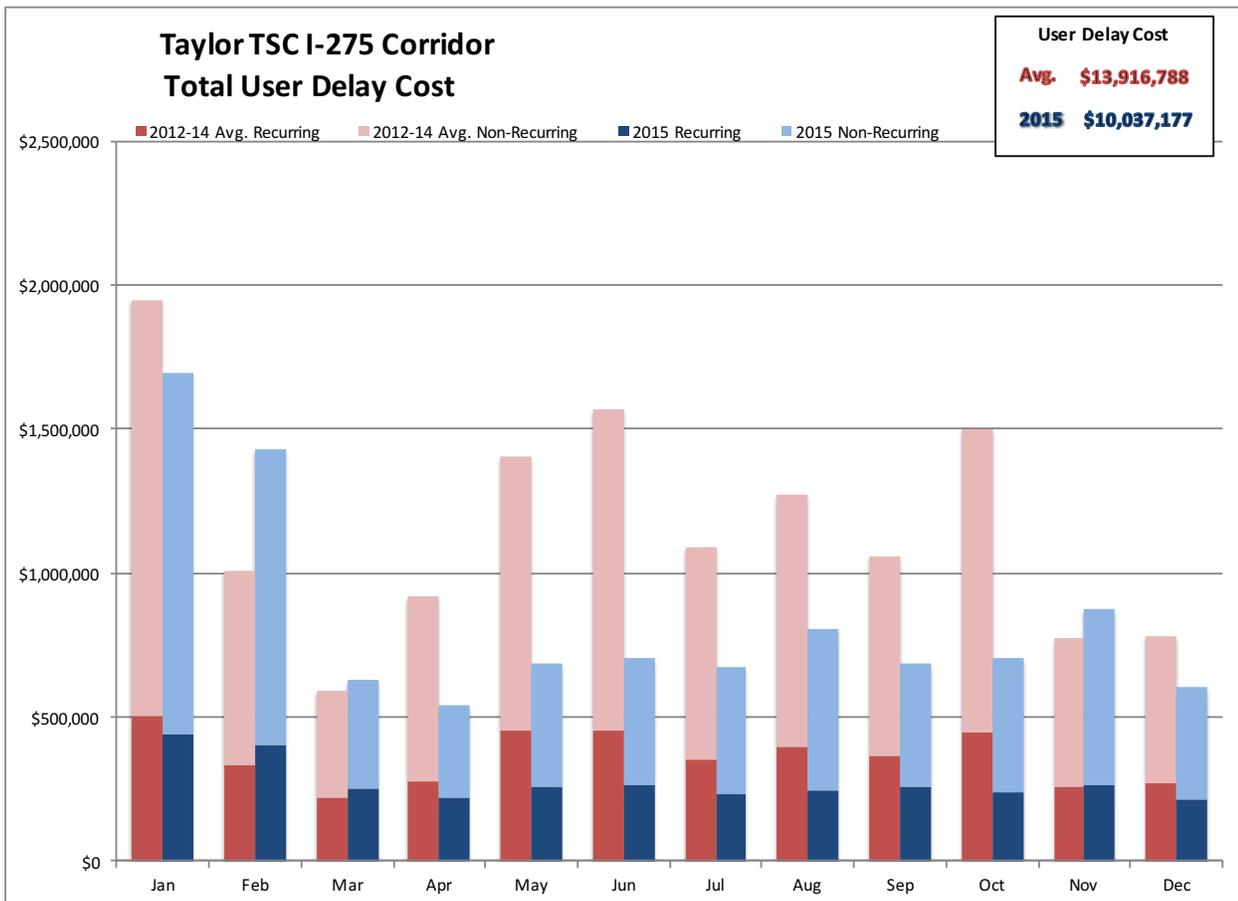
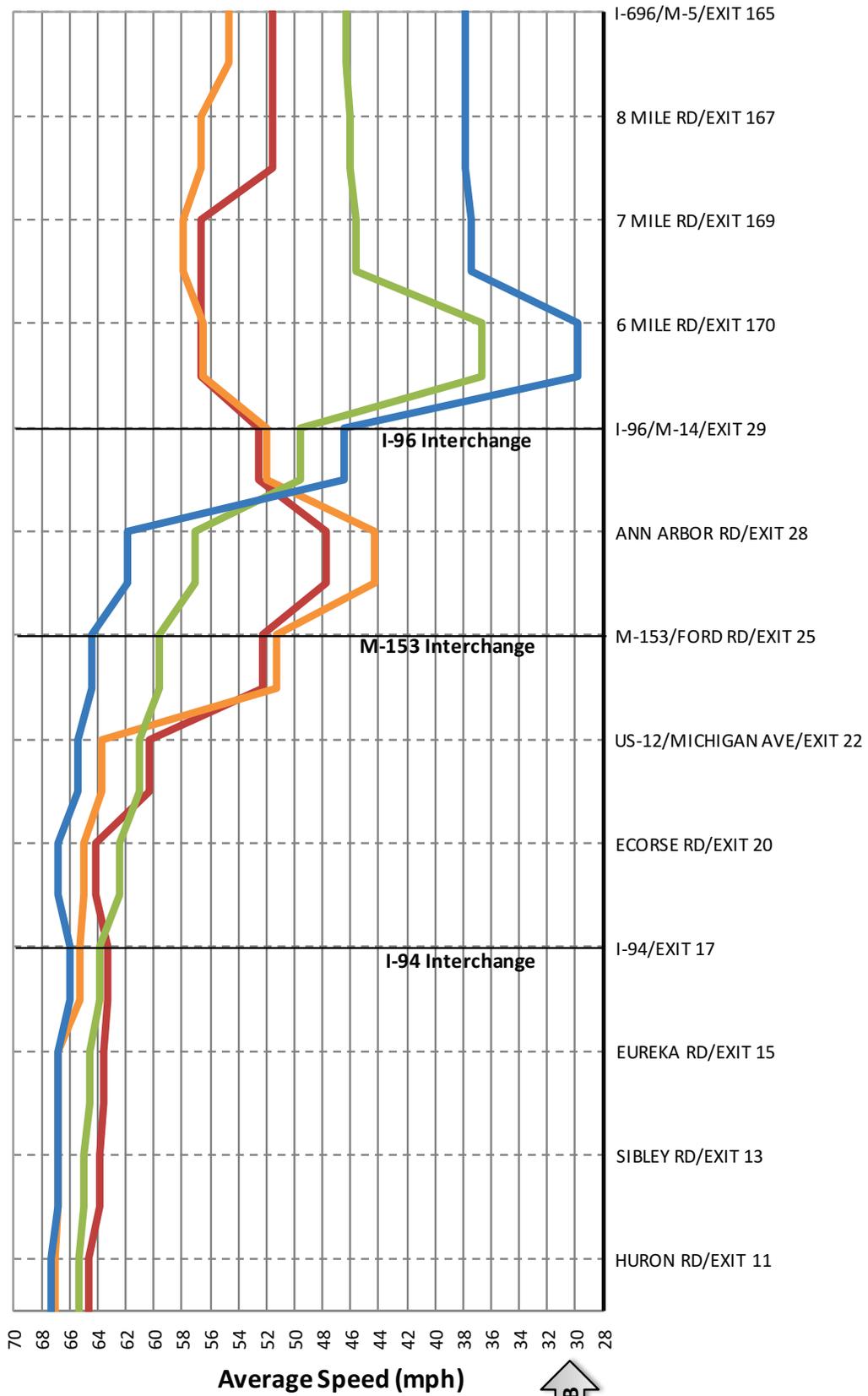


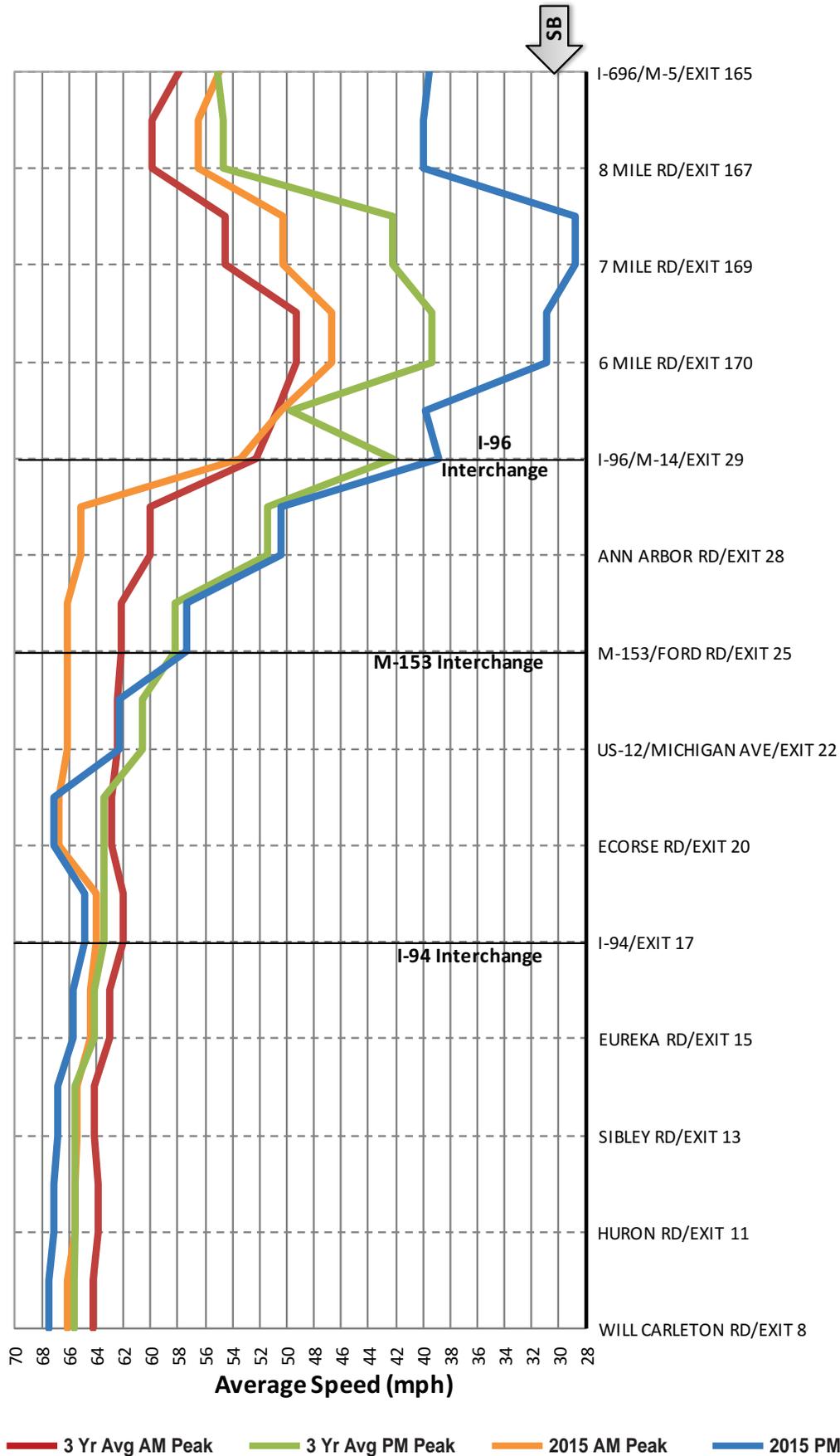
Figure 39. Metro Region I-275 northbound



— 3 Yr Avg AM Peak    
 — 3 Yr Avg PM Peak    
 — 2015 AM Peak    
 — 2015 PM Peak



Figure 40. Metro Region I-275 southbound



INTERSTATE

275

# Travel Time Reliability

Figure 41. Travel time reliability: I-275



Figure 42. Segment 1- I-275 between I-75 and I-94

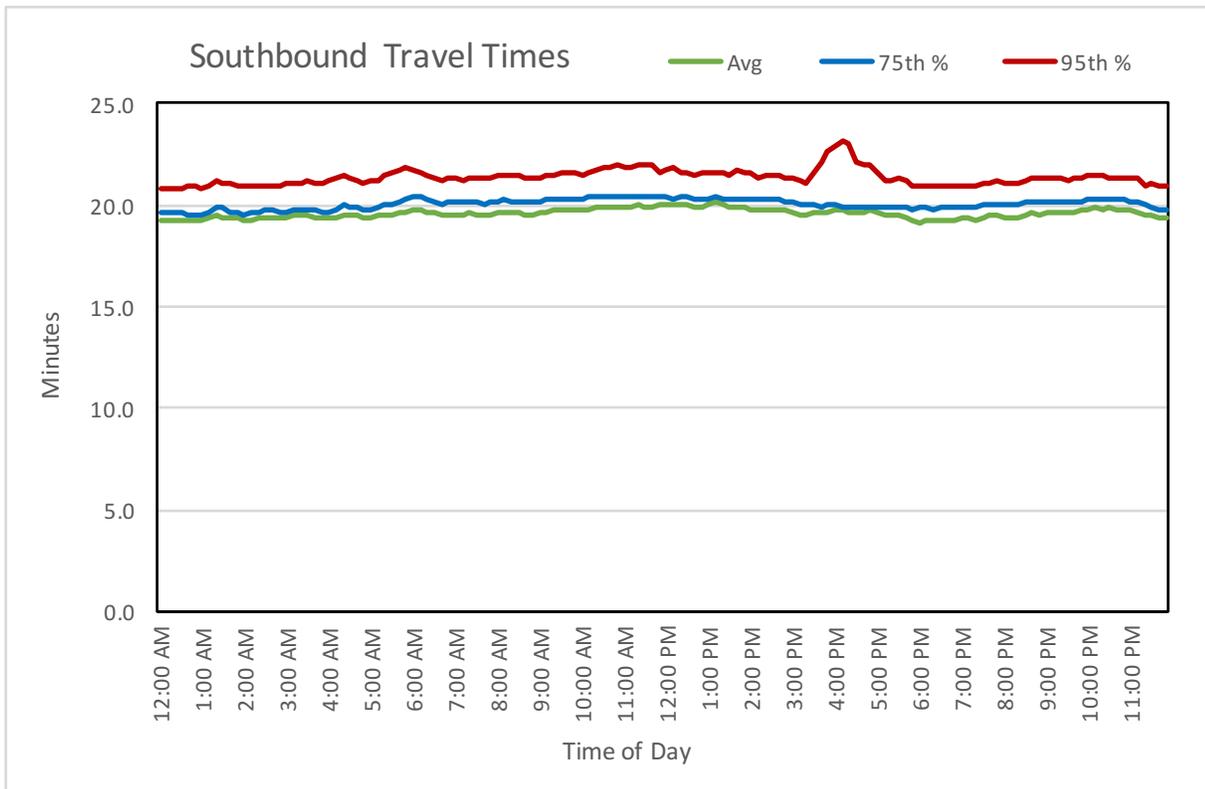
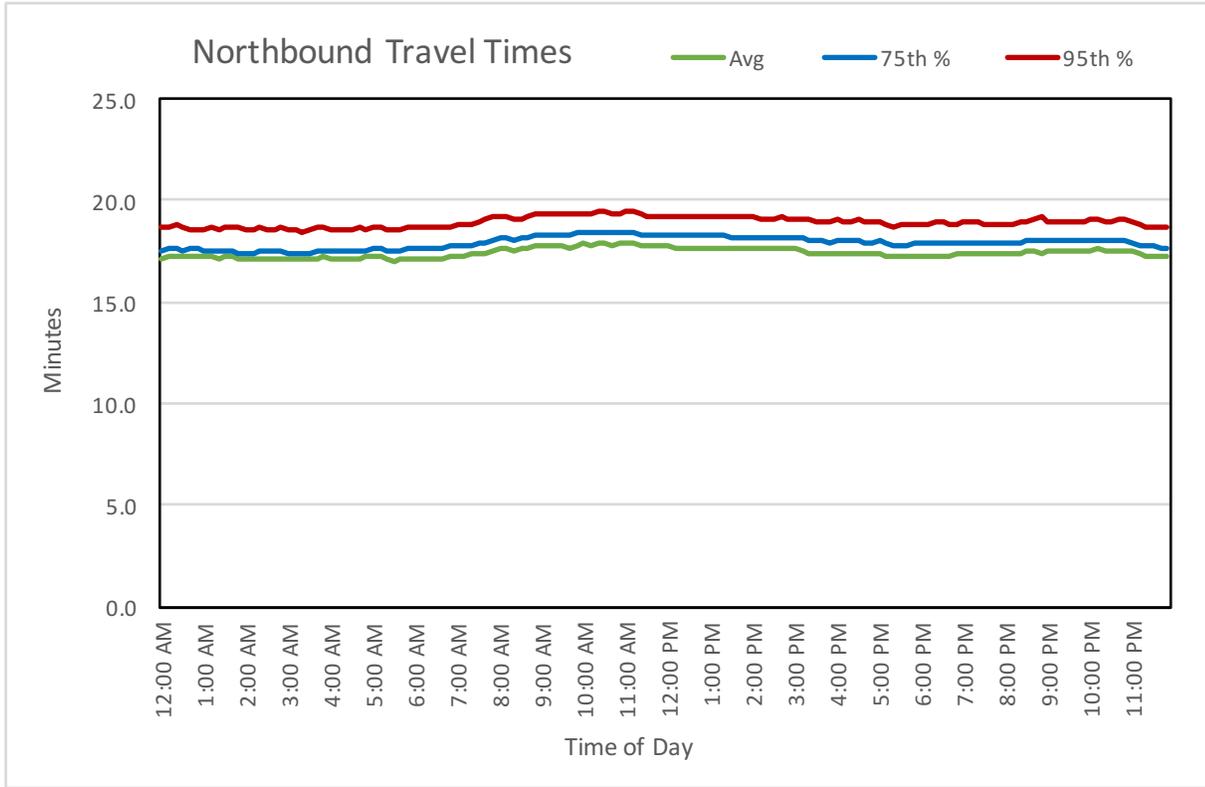
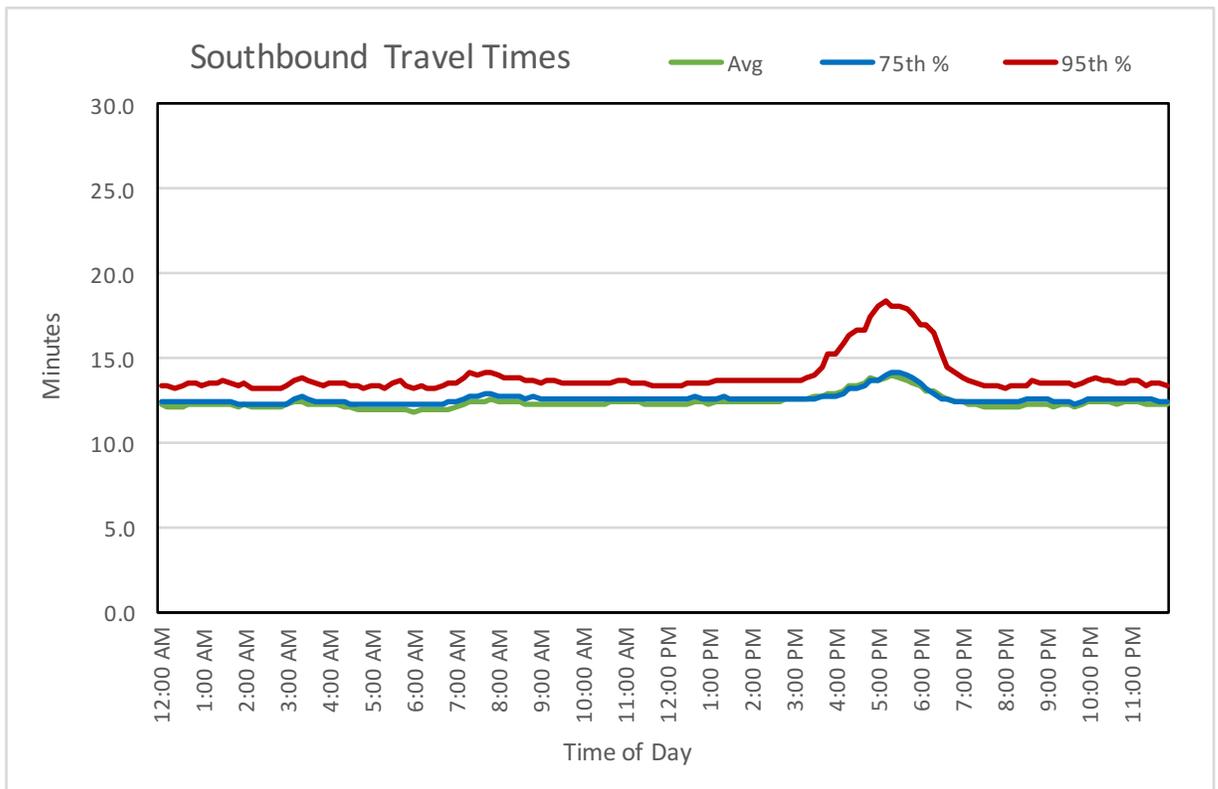
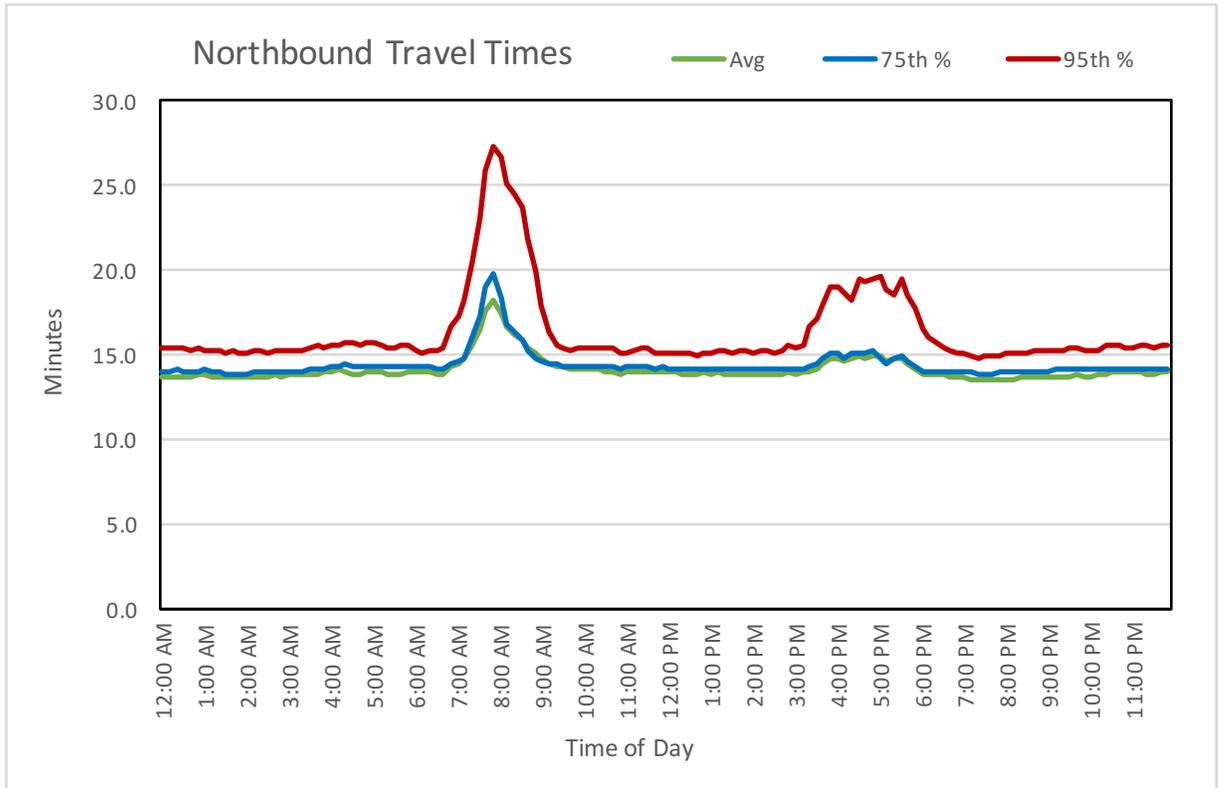


Figure 43. Segment 2- I-275 between I-94 and I-96/M-14





# Corridor



Interstate 75: Taylor, Detroit 55mph, and Oakland



Interstate 94: Taylor, Detroit 55mph, and Macomb



Interstate 96: Oakland, Taylor, and Detroit Plus Local



Interstate 275: Wayne



**Interstate 696: Oakland and Macomb**



Michigan 10: Detroit 70mph and Oakland



Michigan 14: Taylor



Michigan 39: Detroit 55mph



Michigan 53: Macomb



Michigan 59: Oakland

Figure 44. Oakland County I-696 Corridor total user delay cost

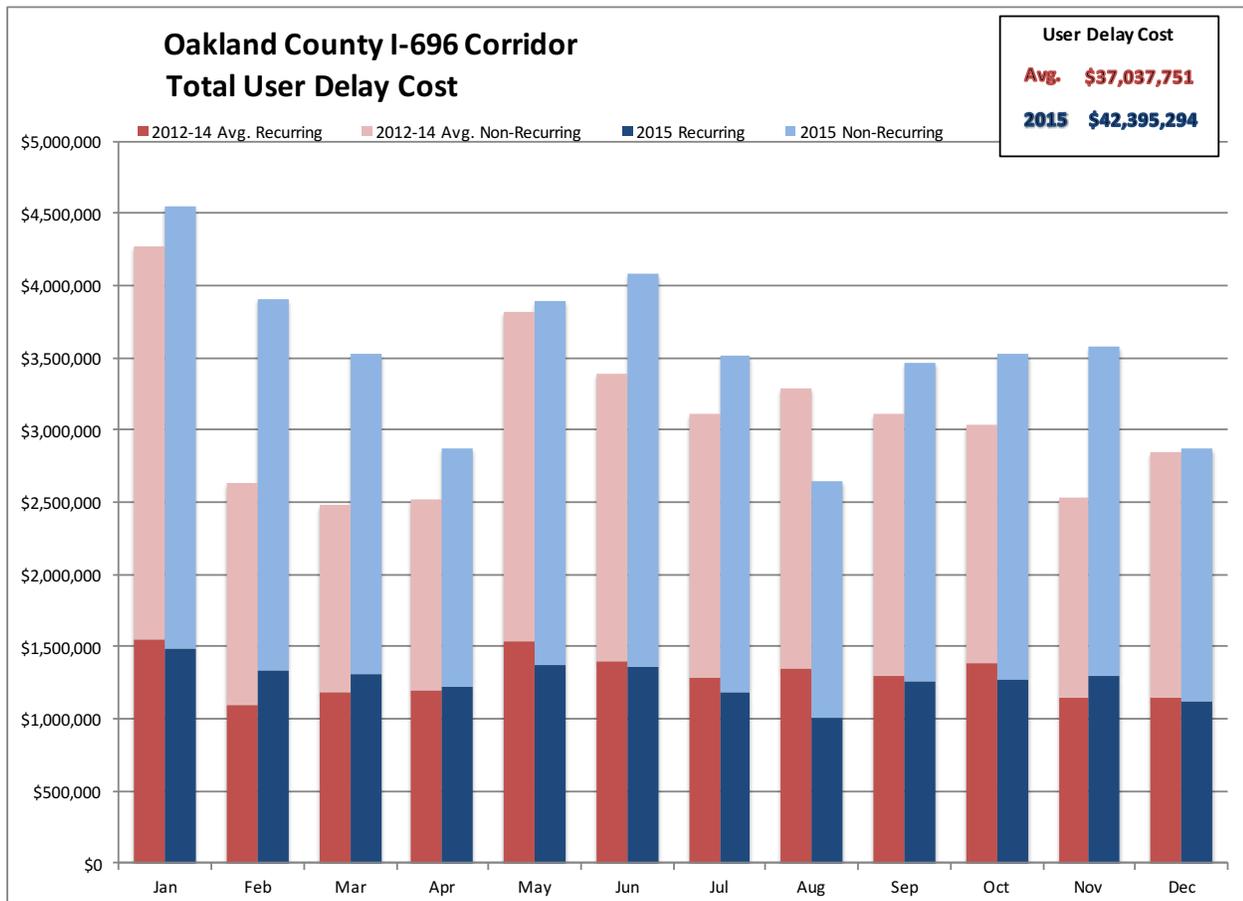


Figure 45. Macomb County I-696 Corridor total user delay cost

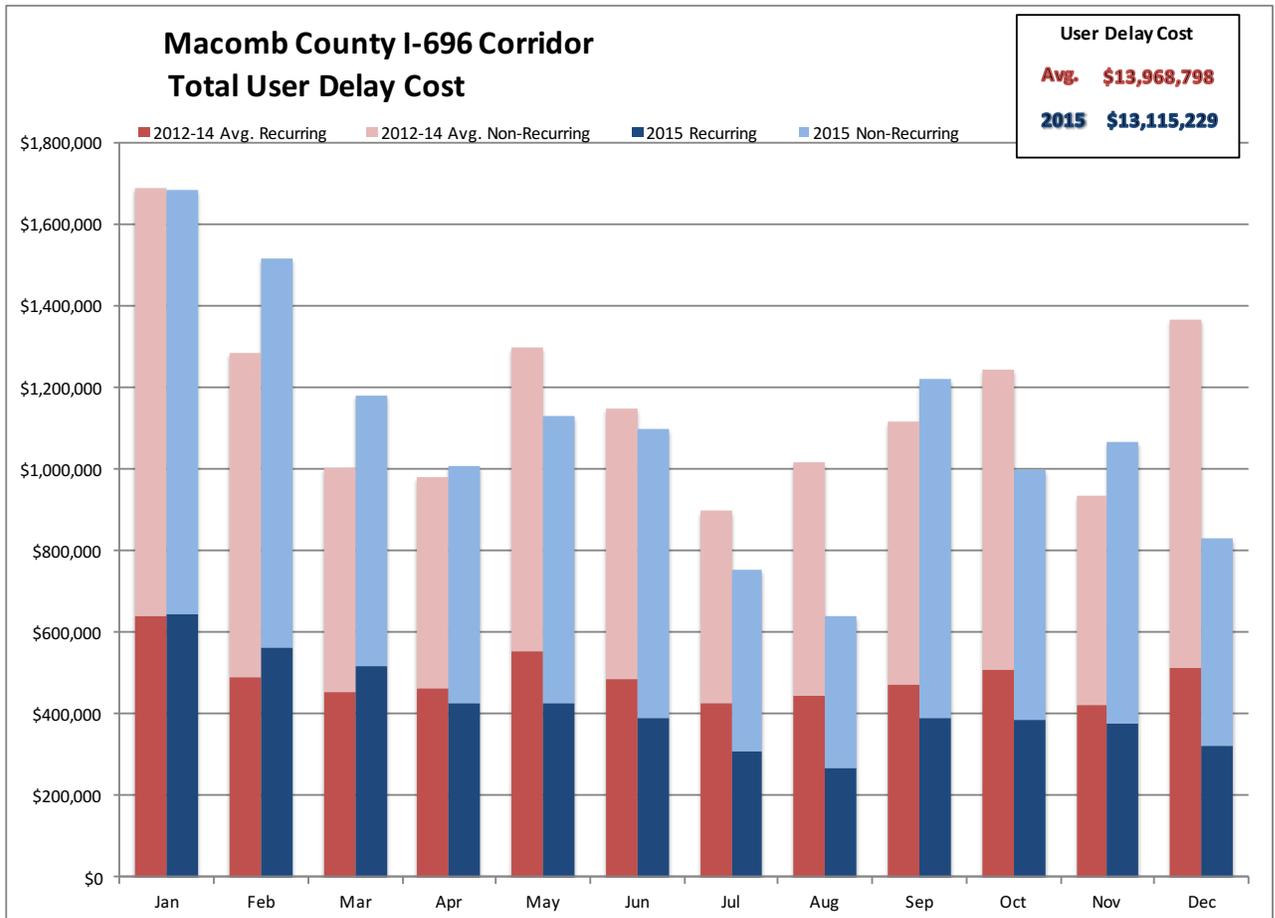


Figure 46. Metro Region I-696 eastbound

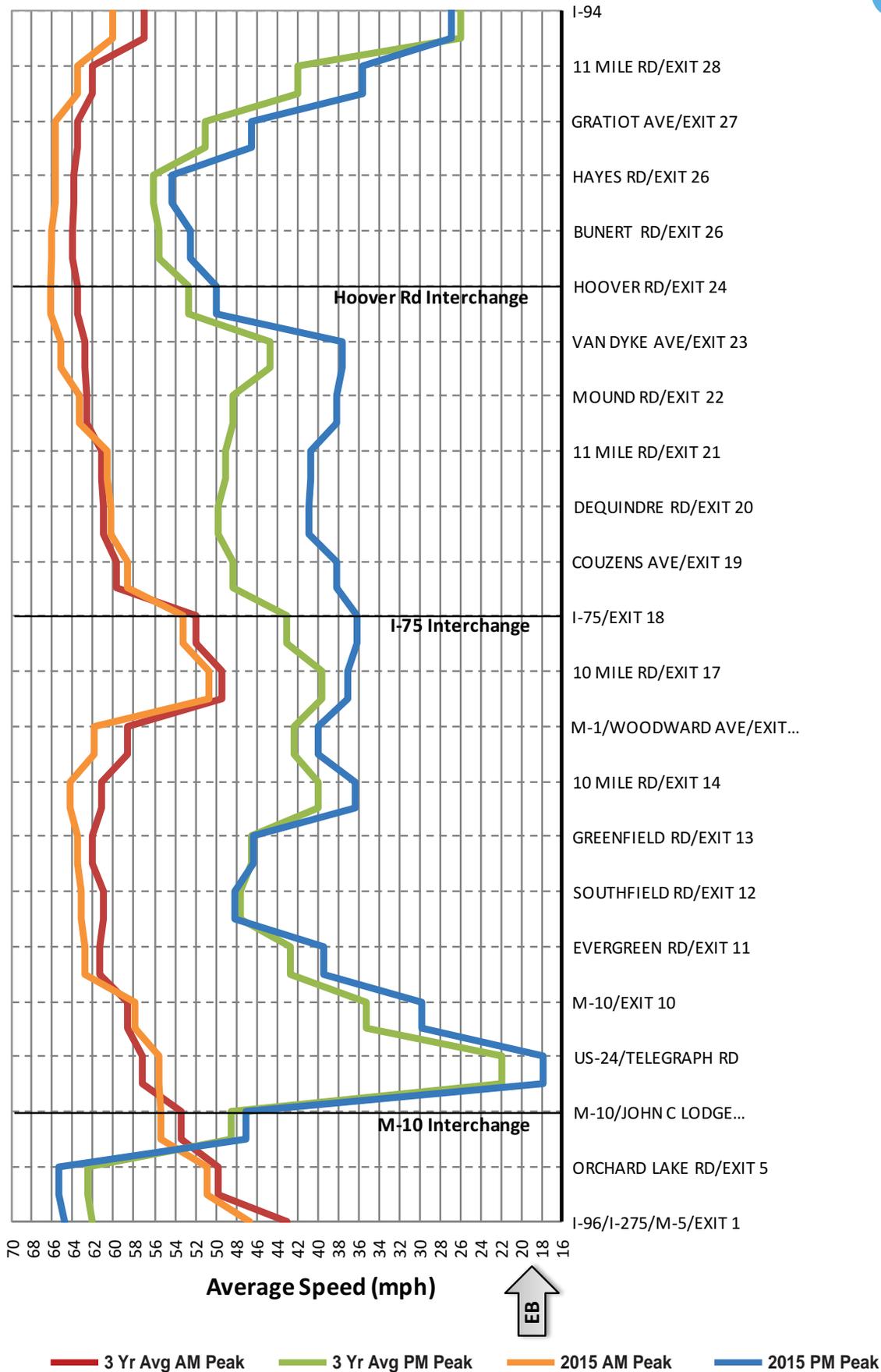
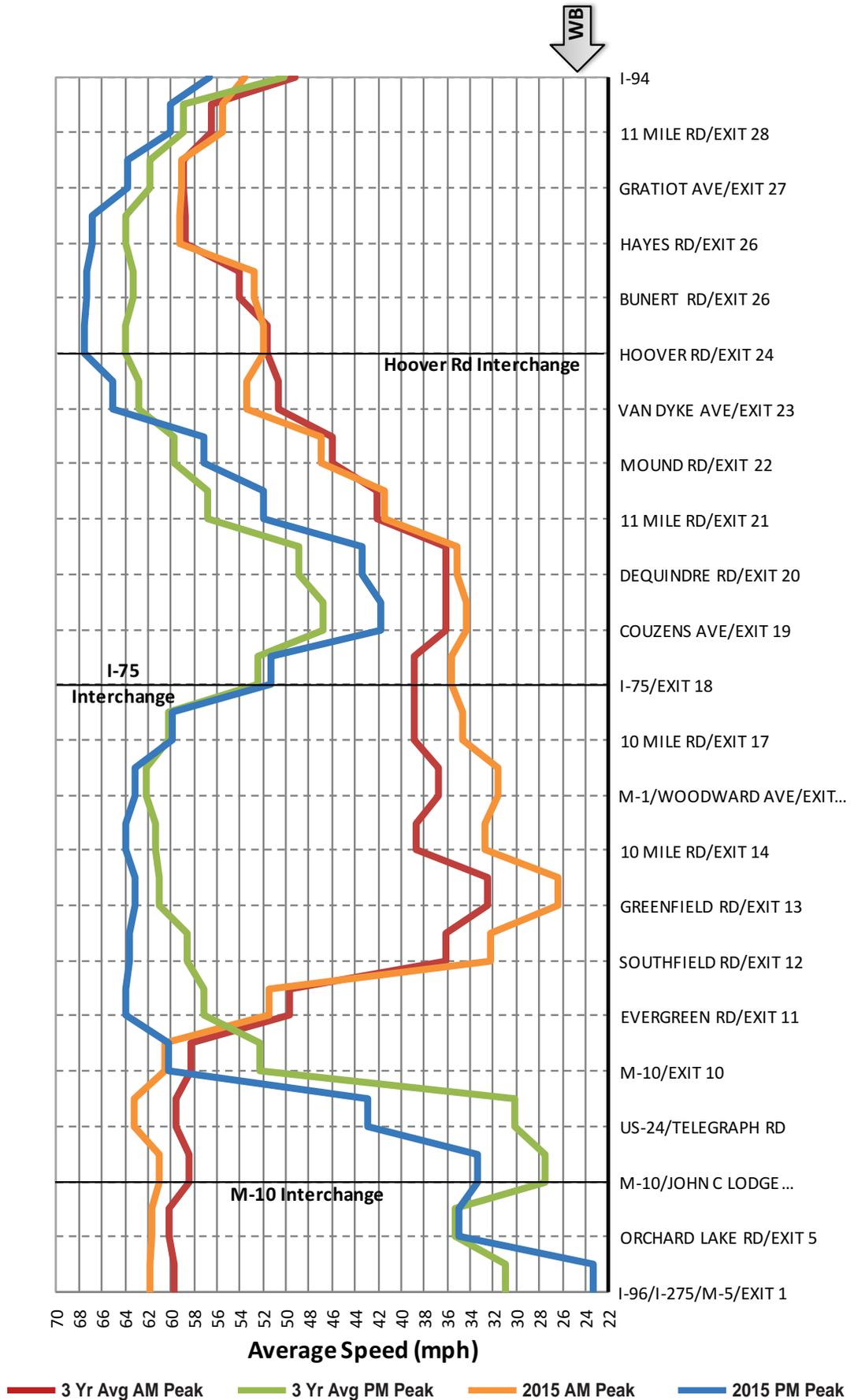
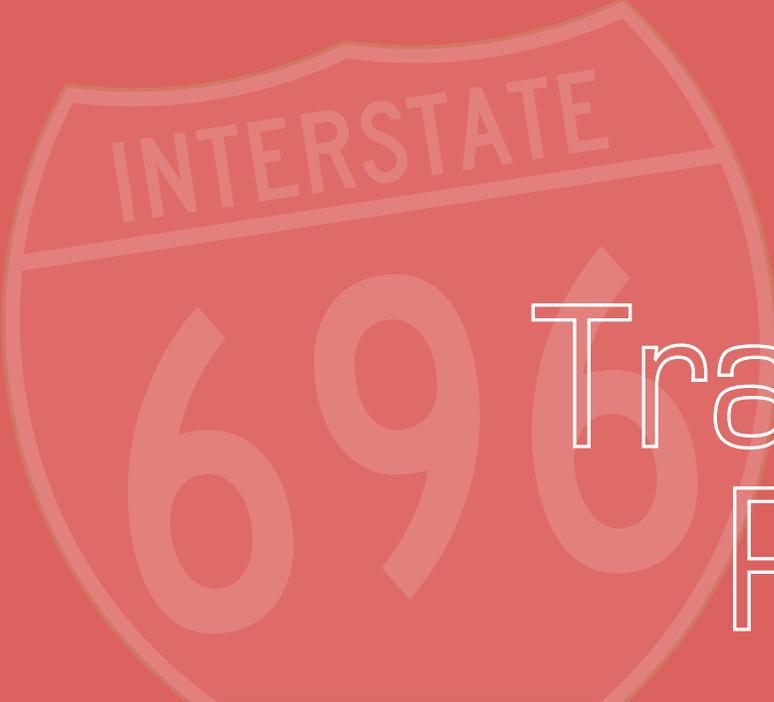


Figure 47. Metro Region I-696 westbound





# Travel Time Reliability

Figure 48. Travel time reliability: I-696

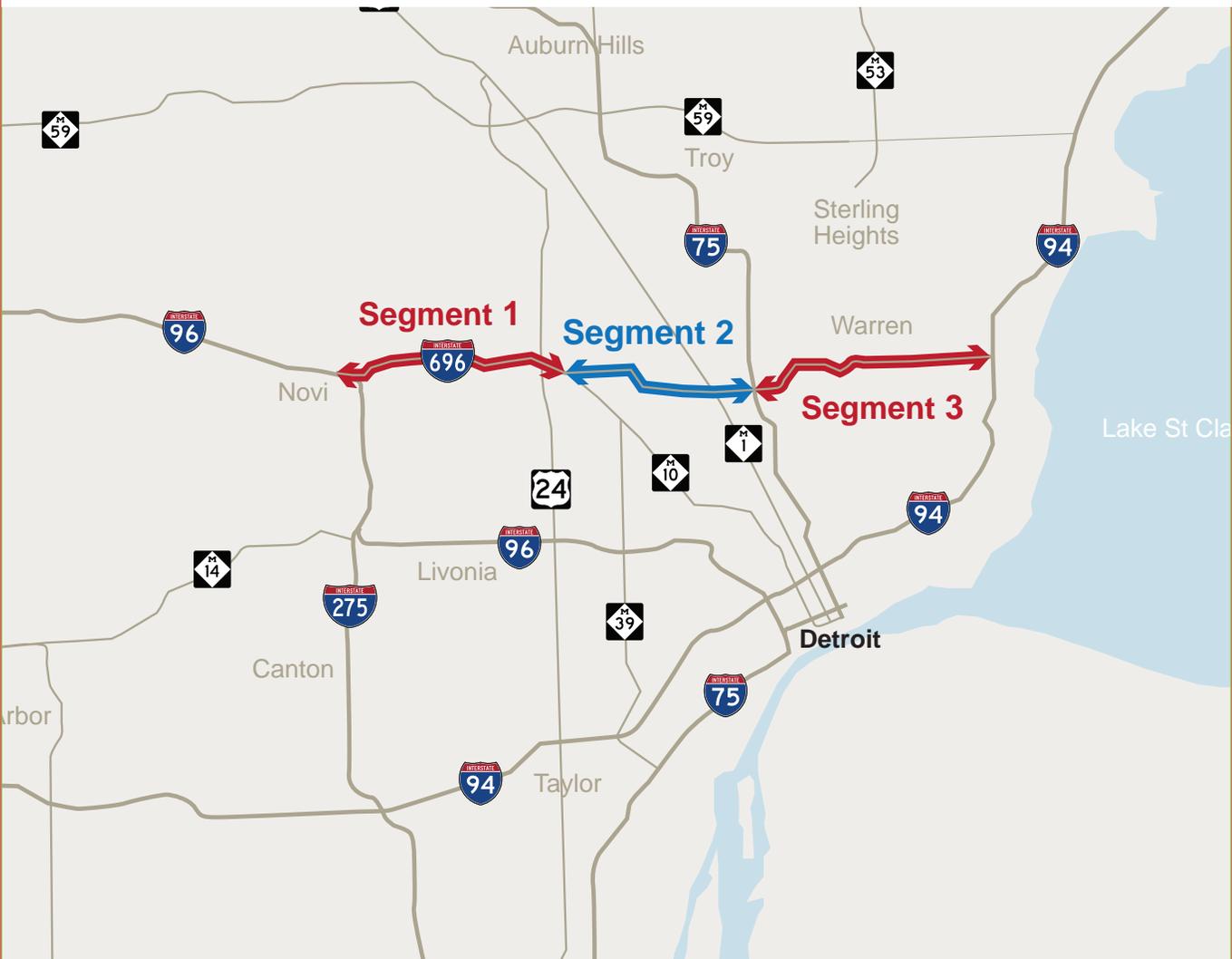
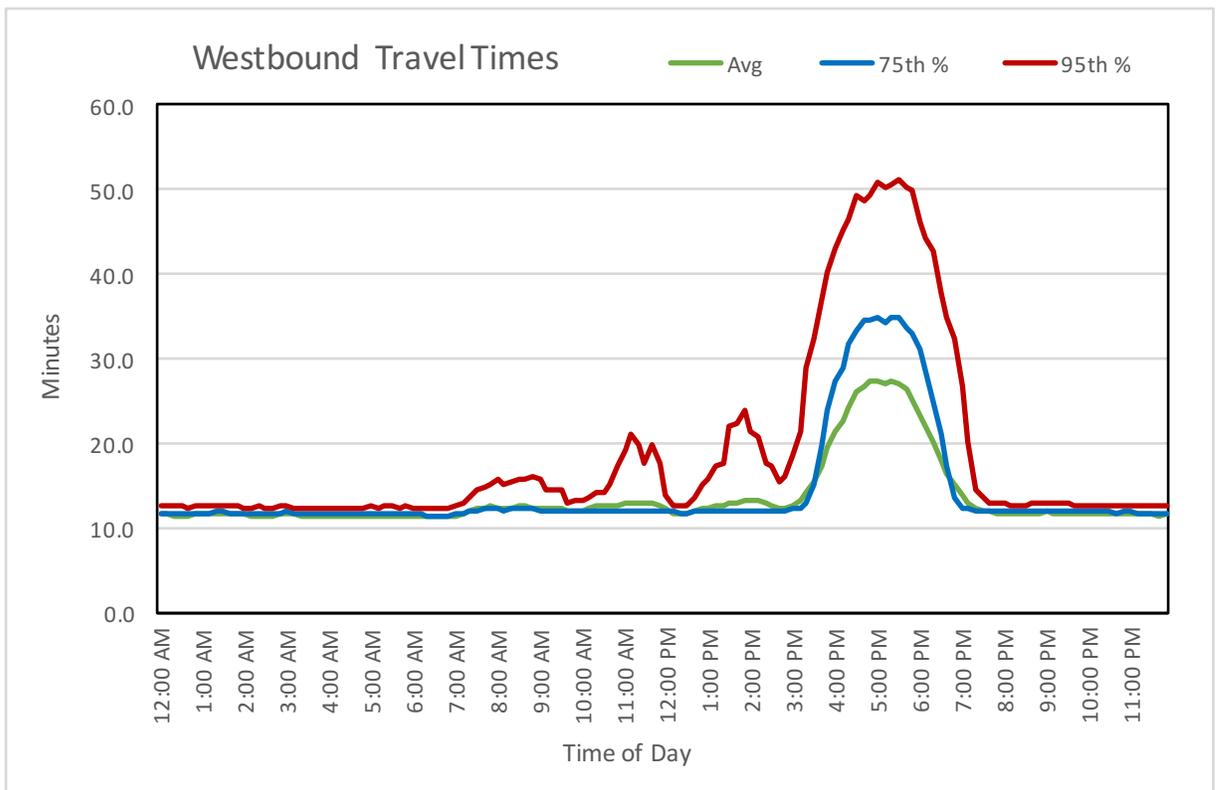
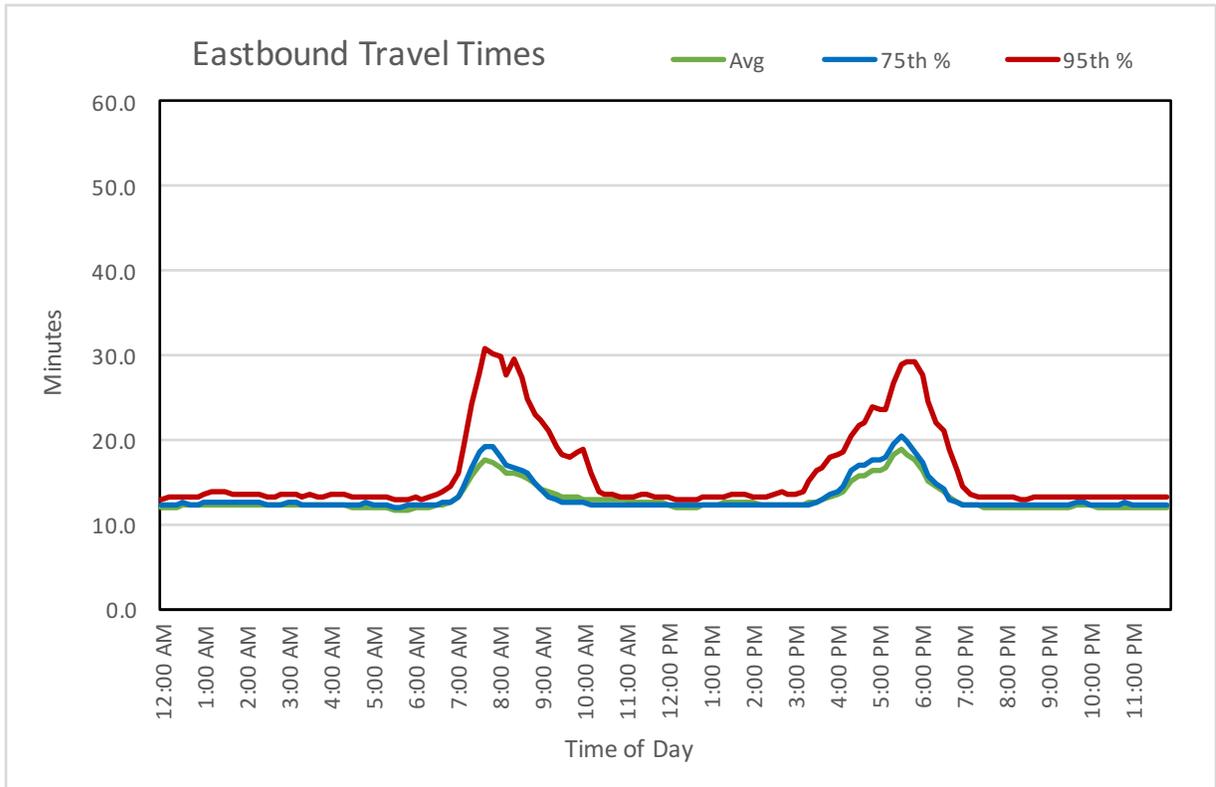


Figure 49. Segment 1- I-696 between M-10 and I-96/I-275/M-5



**Figure 50.** Segment 2- I-696 between M-10/ John C Lodge Fwy and I-75

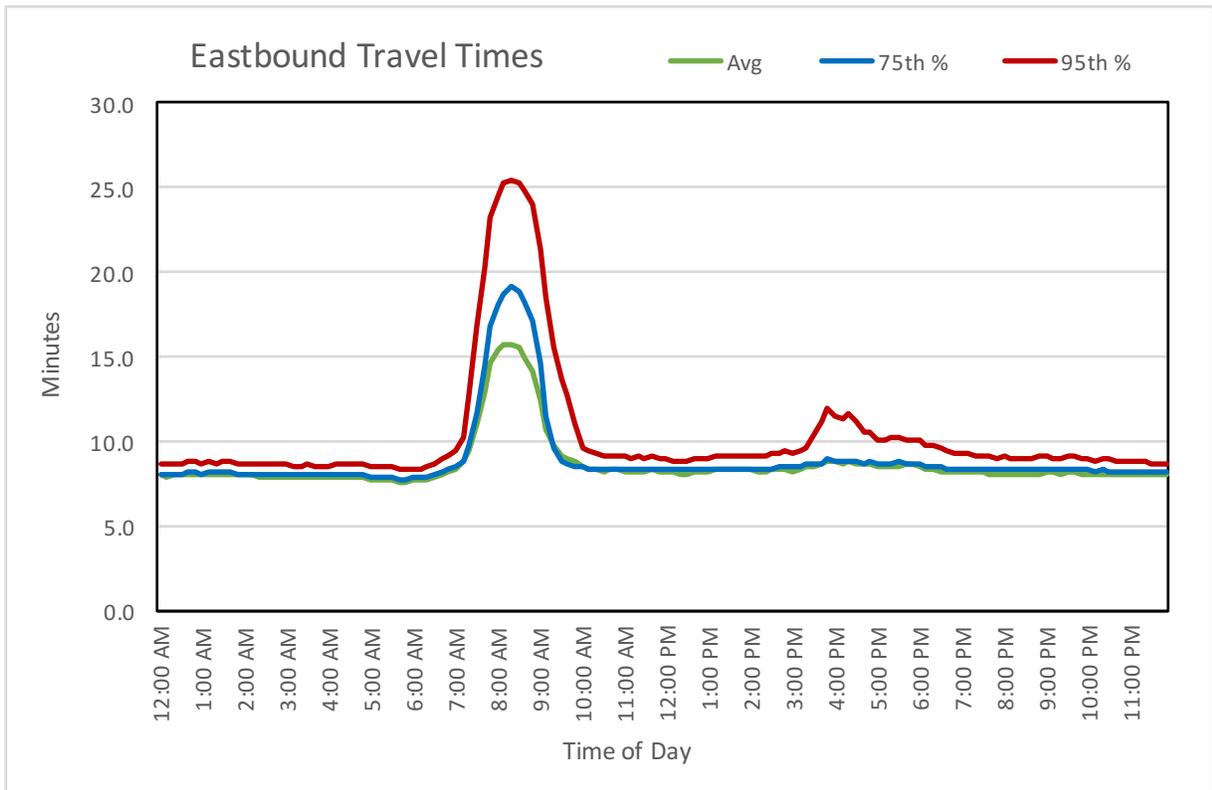
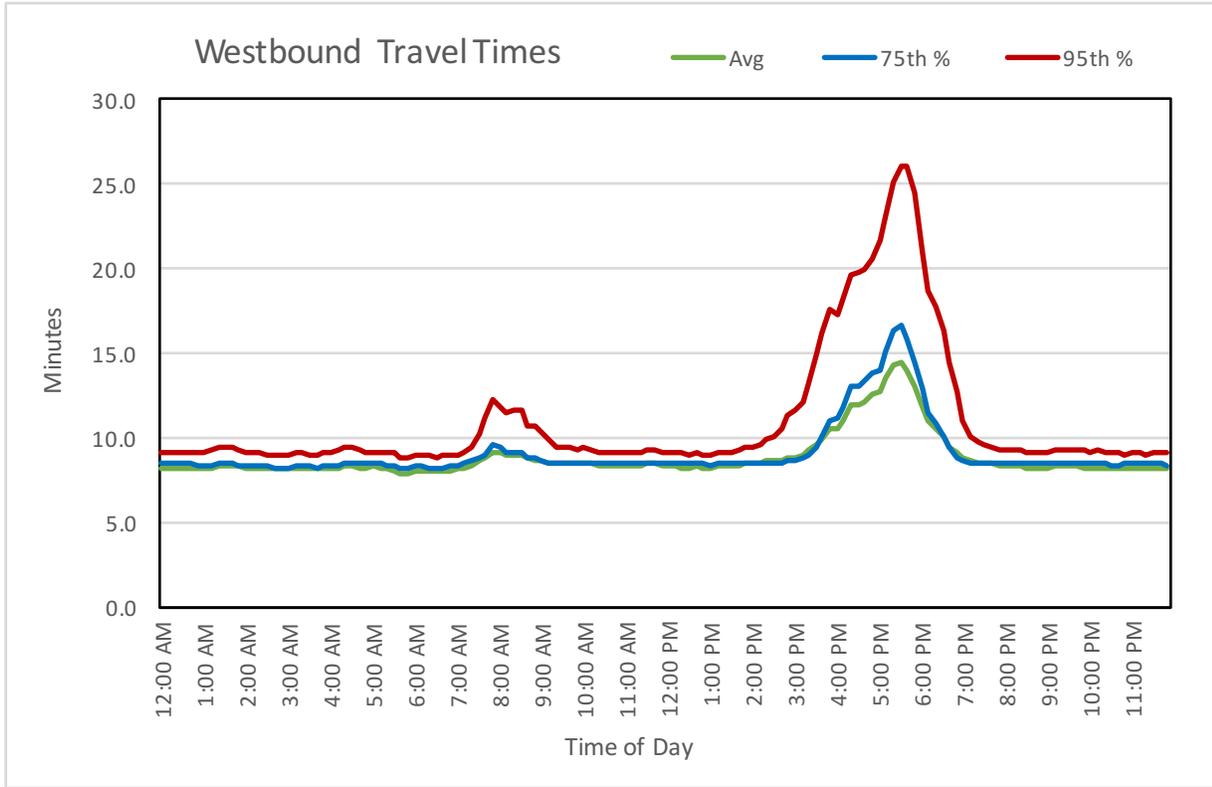
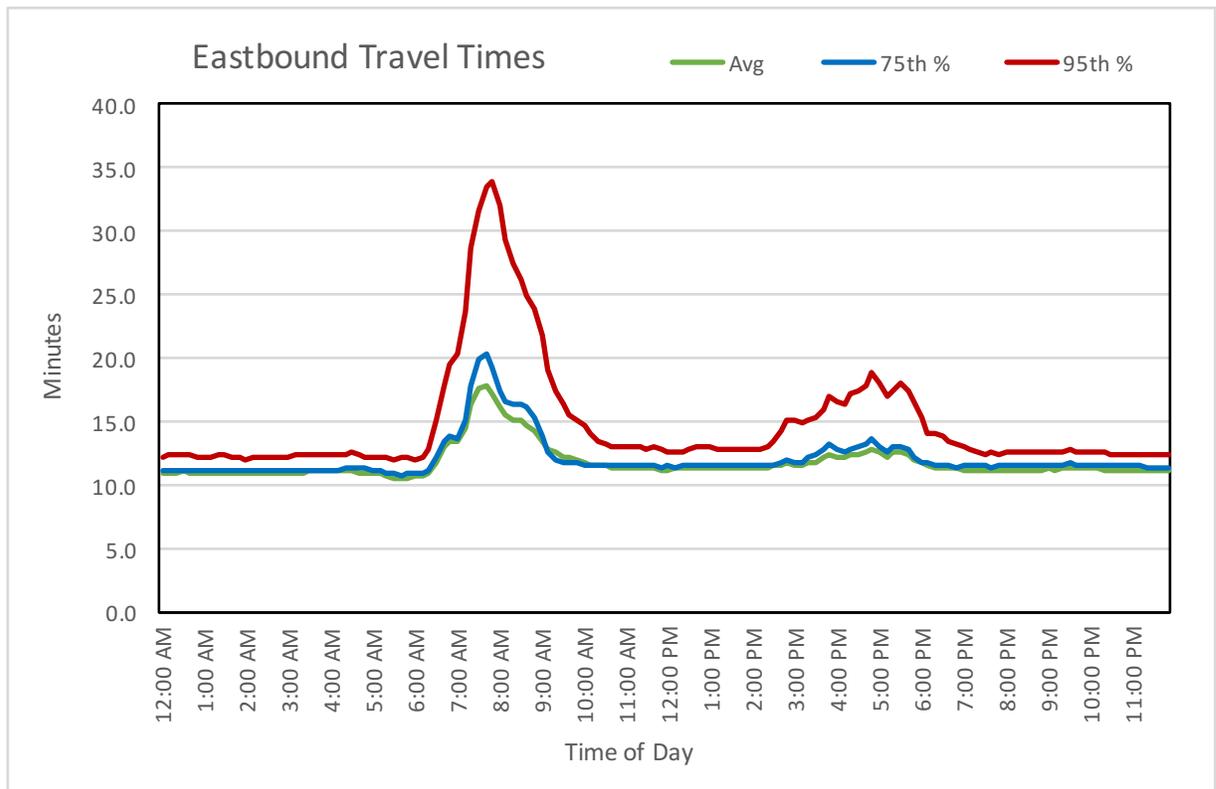
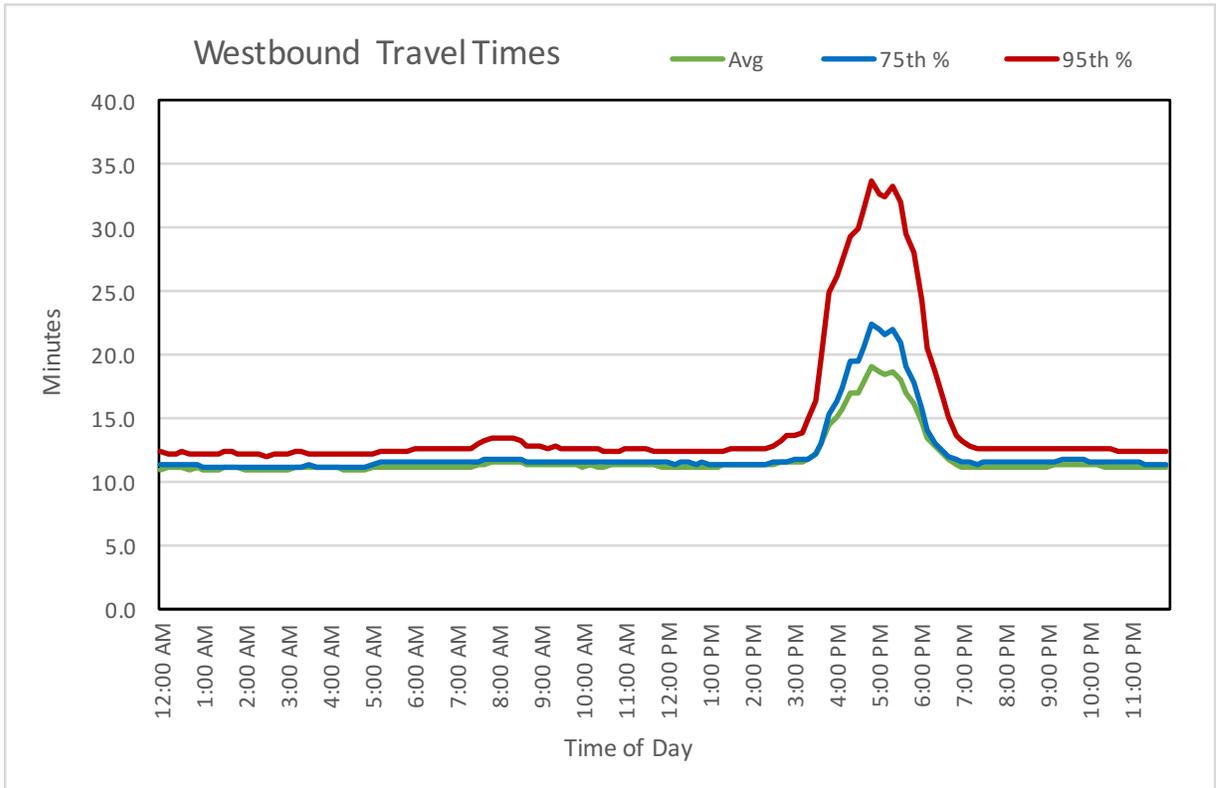


Figure 51. Segment 3- I-696 between I-94 and I-75





# Corridor



Interstate 75: Taylor, Detroit 55mph, and Oakland



Interstate 94: Taylor, Detroit 55mph, and Macomb



Interstate 96: Oakland, Taylor, and Detroit Plus Local



Interstate 275: Wayne



Interstate 696: Oakland and Macomb



Michigan 10: Detroit 70mph and Oakland



Michigan 14: Taylor



Michigan 39: Detroit 55mph

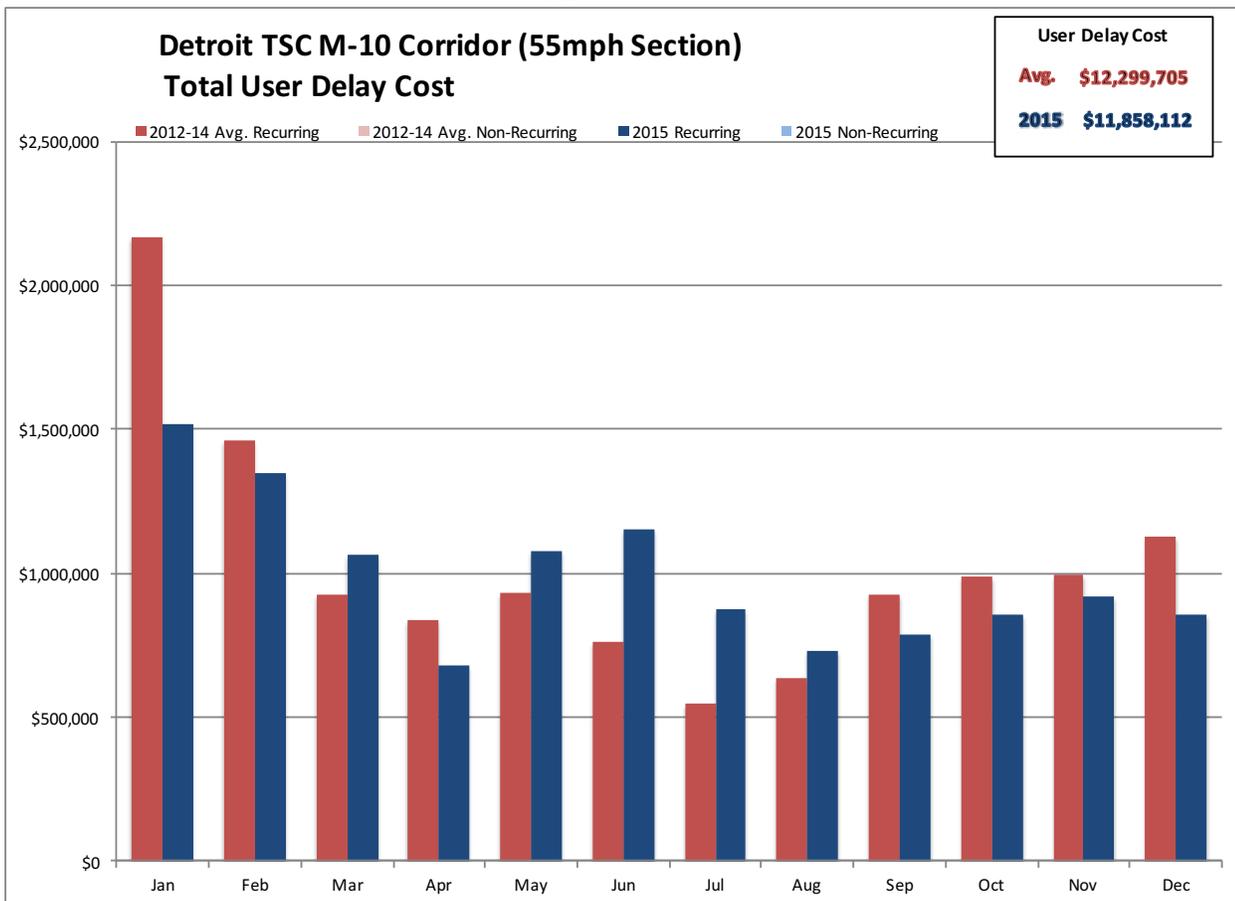
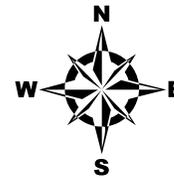


Michigan 53: Macomb



Michigan 59: Oakland

Figure 52. Detroit TSC M-10 Corridor (55mph Section) total user delay cost



**Figure 53.** Oakland County M-10 Corridor (70mph Section) total user delay cost

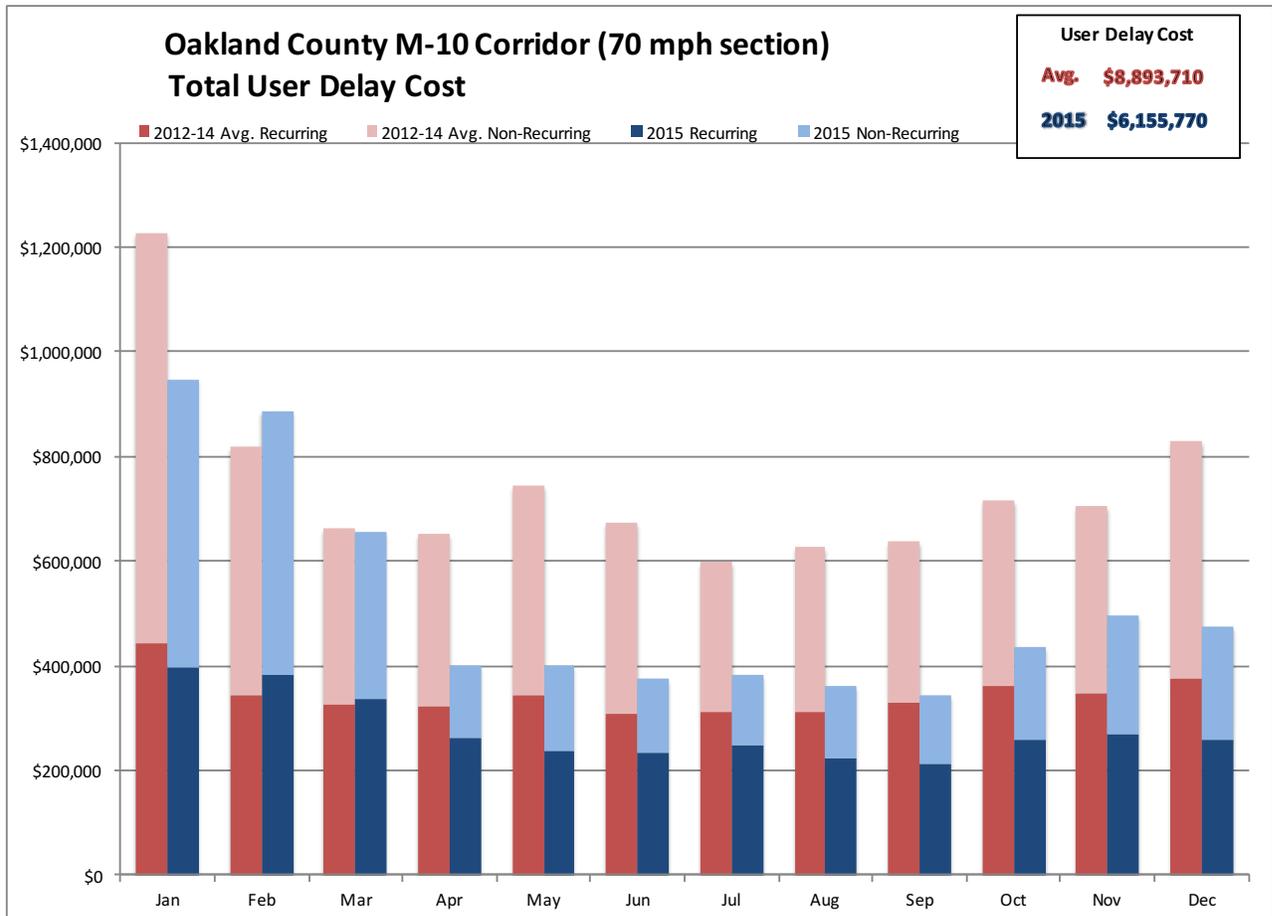
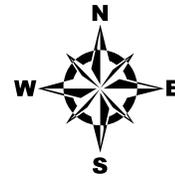
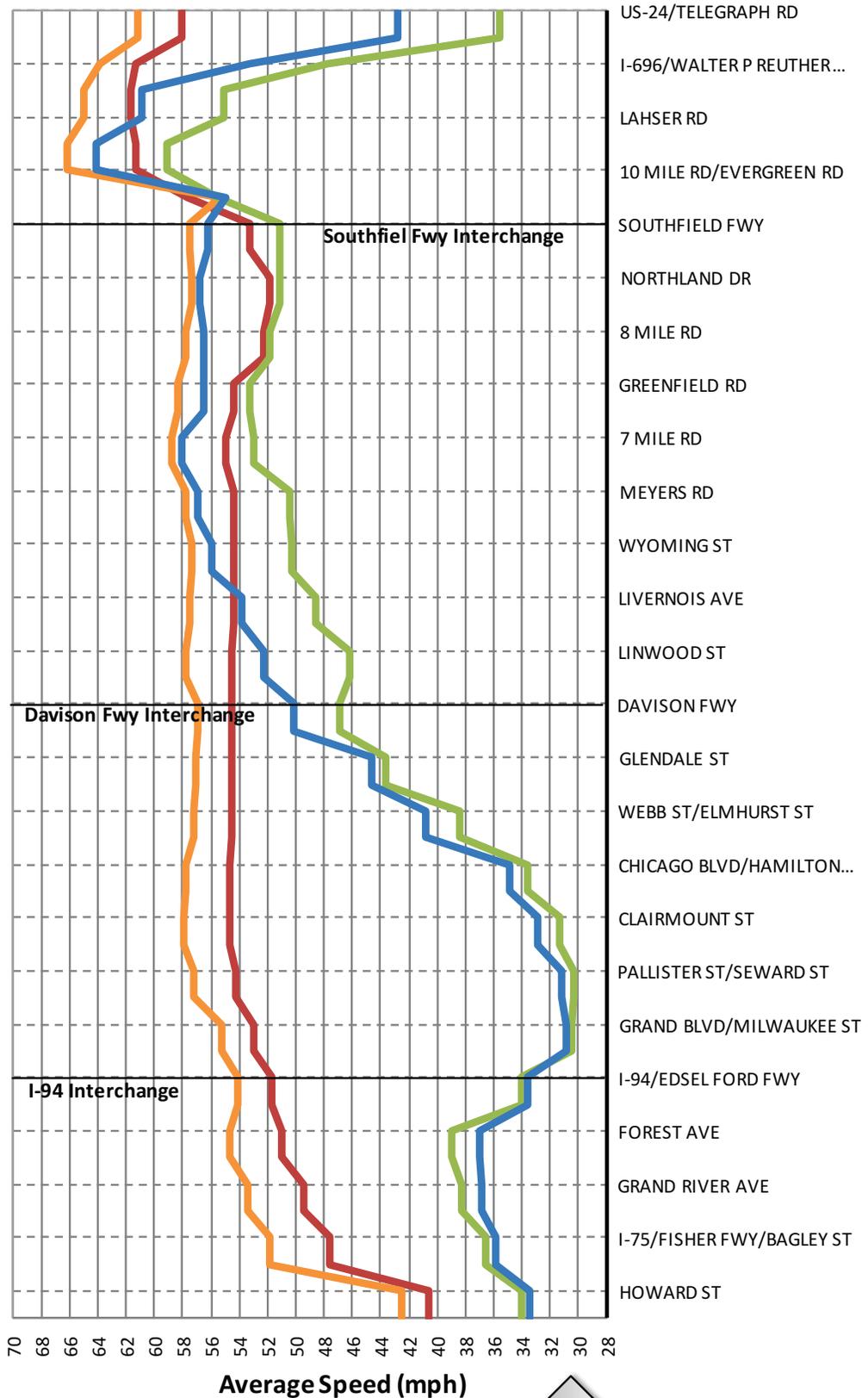
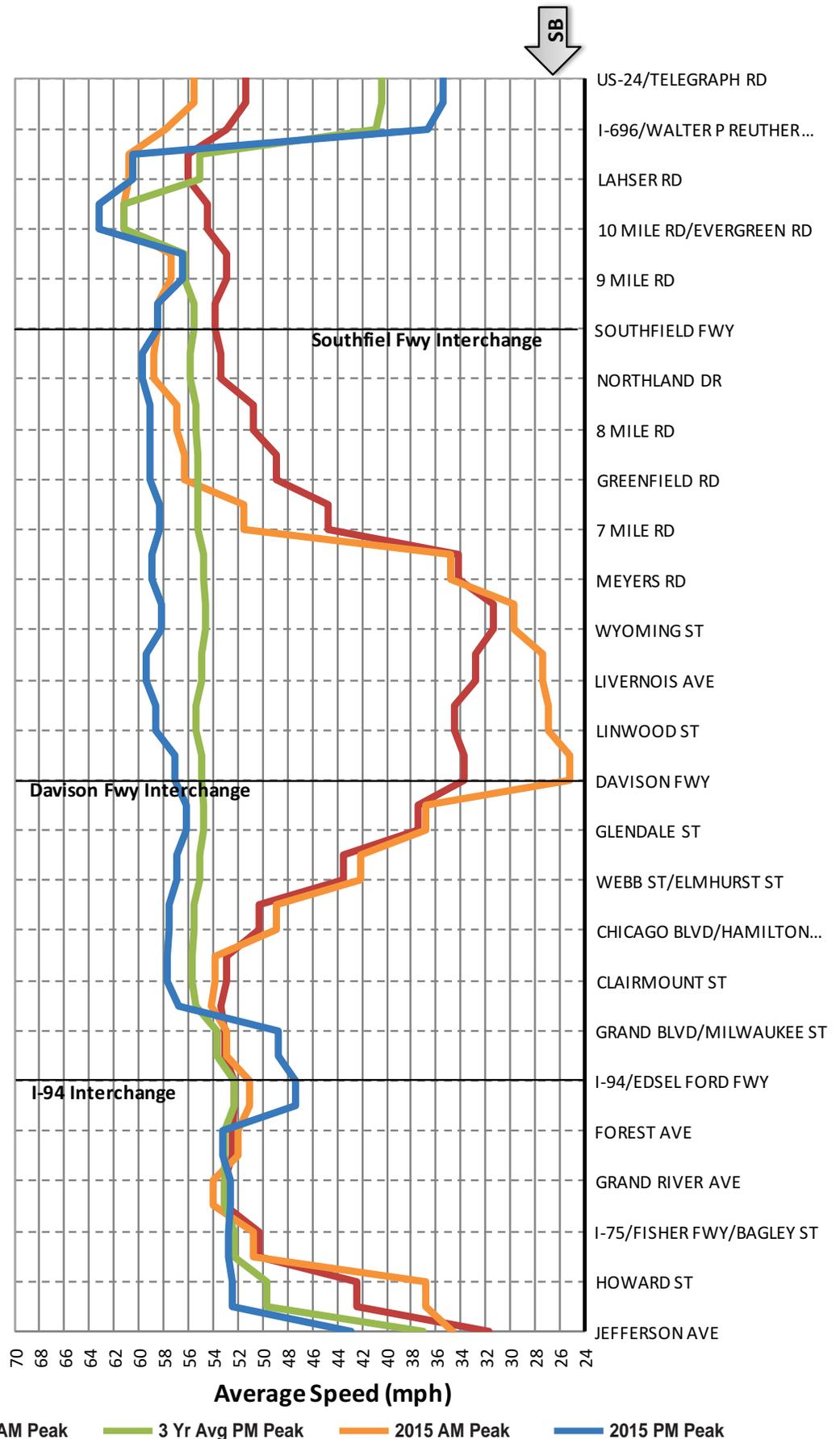


Figure 54. Metro Region M-10 northbound



— 3 Yr Avg AM Peak   
 — 3 Yr Avg PM Peak   
 — 2015 AM Peak   
 — 2015 PM Peak

Figure 55. Metro Region M-10 southbound



# Travel Time Reliability

Figure 56. Travel time reliability: M-10

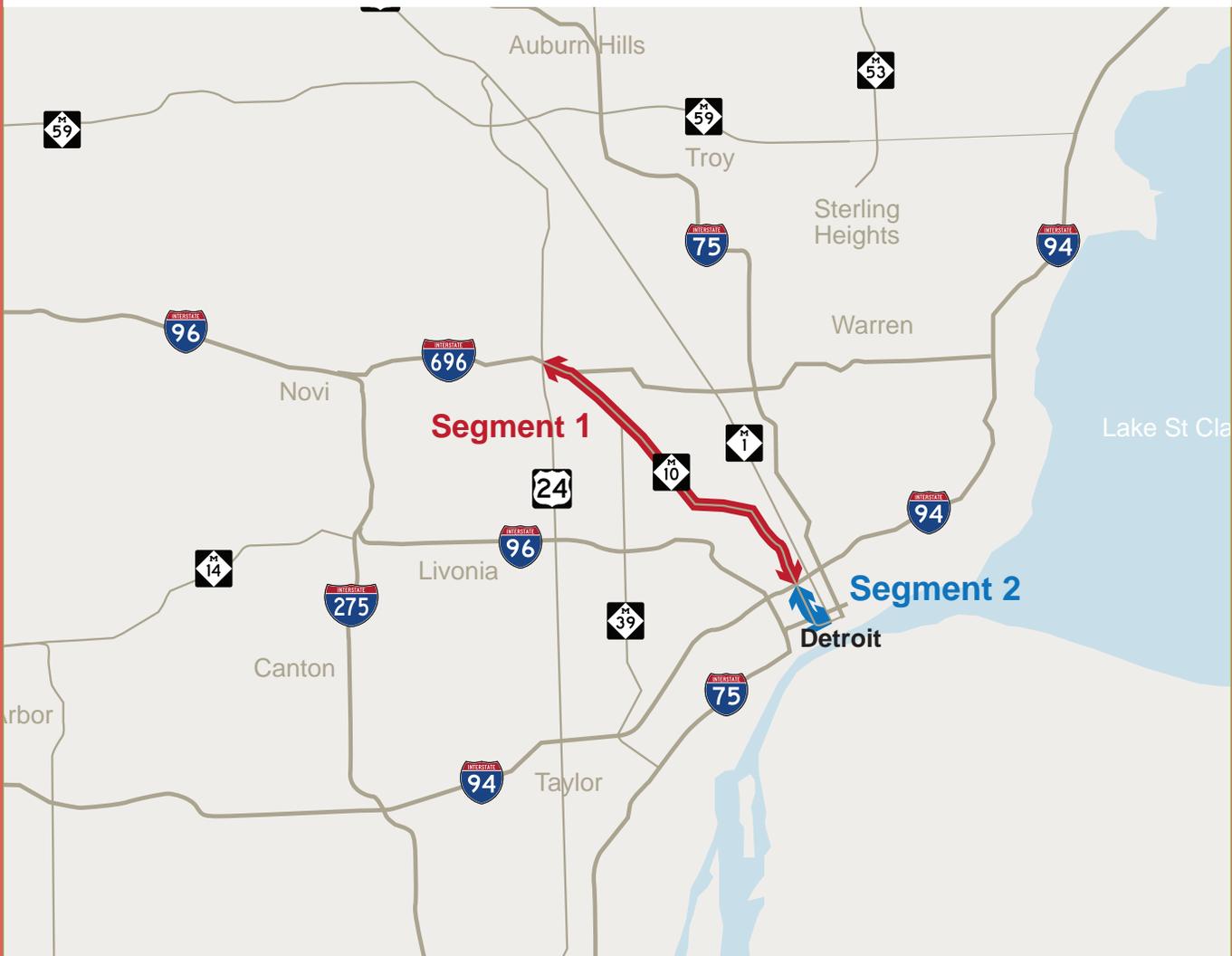


Figure 57. Segment 1- M-10 between I-94/Edsel Ford Fwy and US-24/Telegraph Rd

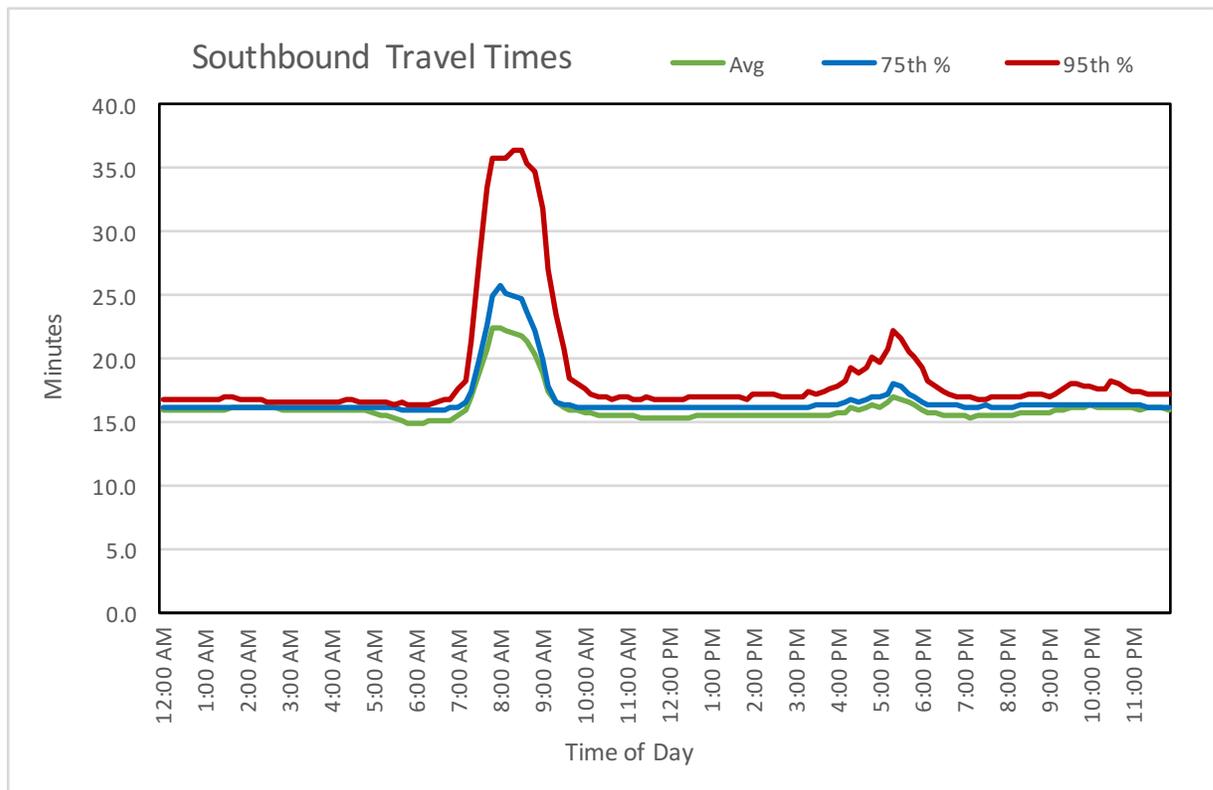
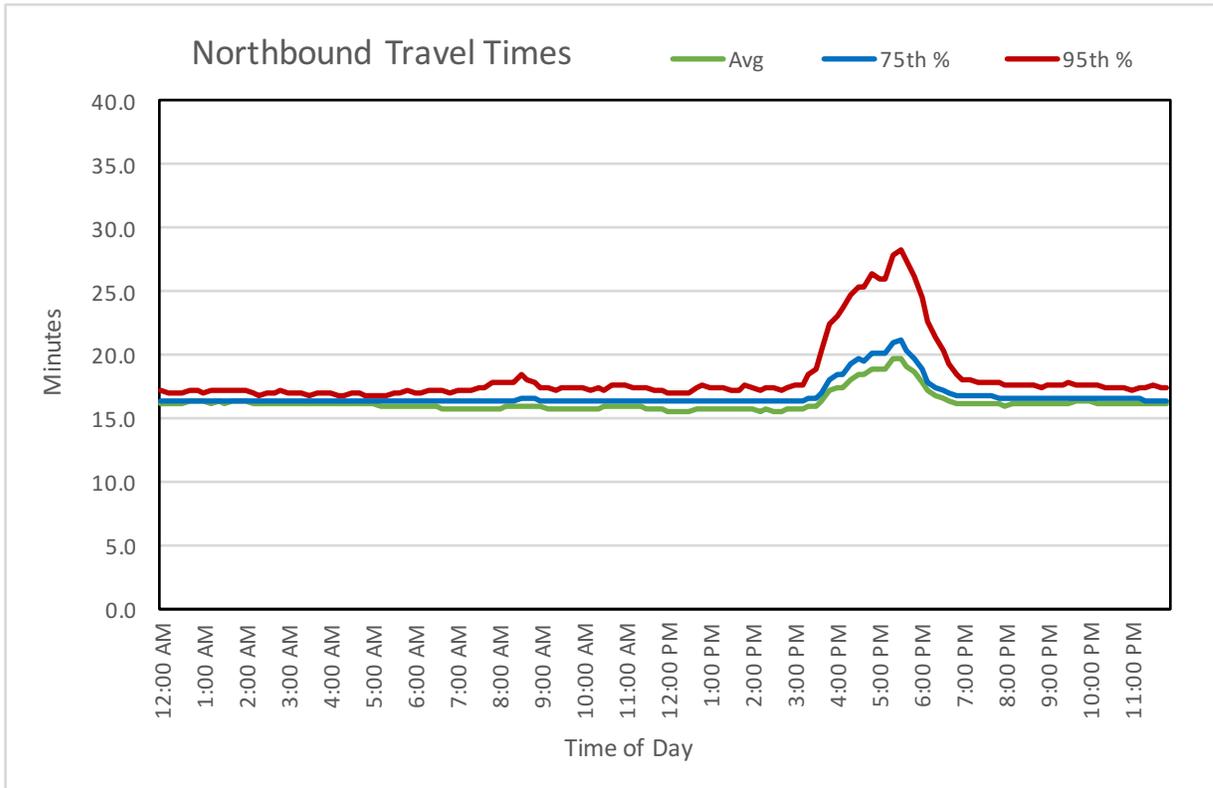
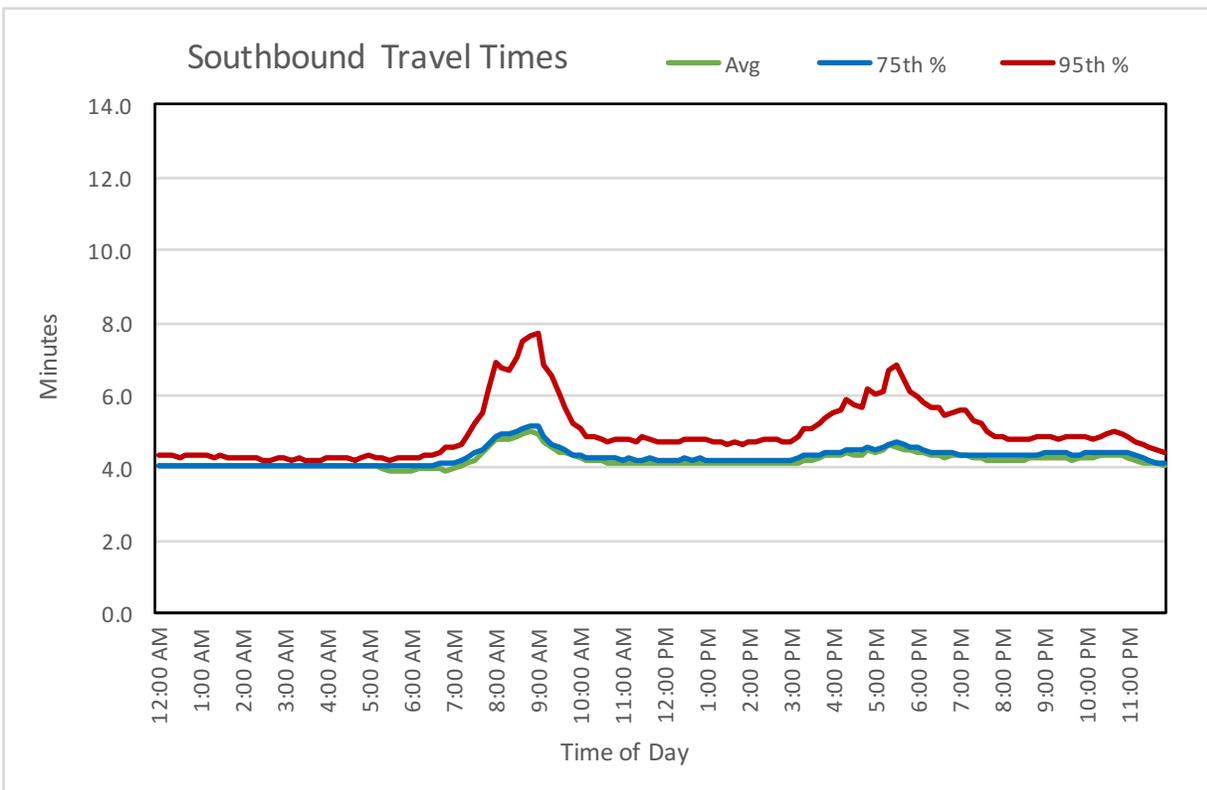
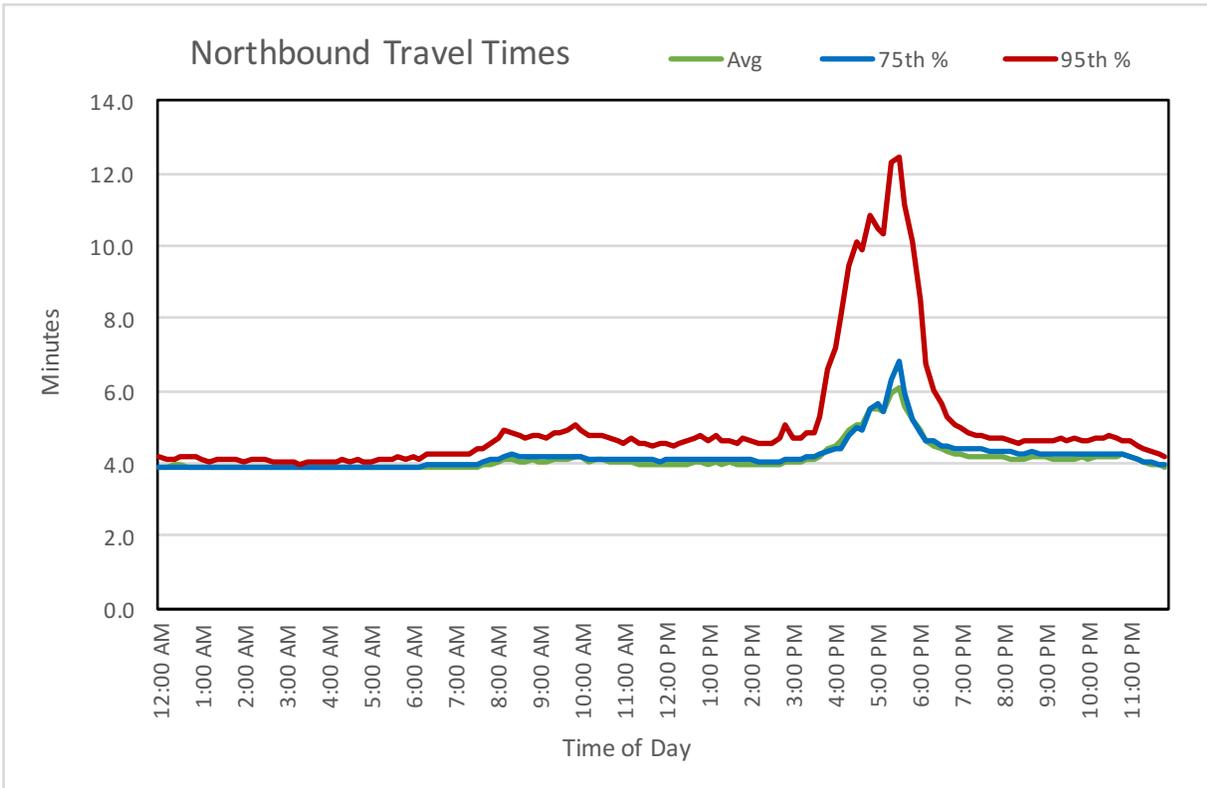


Figure 58. Segment 2- M-10 between M-1/Woodward Ave and I-94/Edsel Ford Fwy



# Corridor



Interstate 75: Taylor, Detroit 55mph, and Oakland



Interstate 94: Taylor, Detroit 55mph, and Macomb



Interstate 96: Oakland, Taylor, and Detroit Plus Local



Interstate 275: Wayne



Interstate 696: Oakland and Macomb



Michigan 10: Detroit 70mph and Oakland



Michigan 14: Taylor



Michigan 39: Detroit 55mph



Michigan 53: Macomb



Michigan 59: Oakland

**Figure 59.** Taylor TSC M-14 Corridor total user delay cost

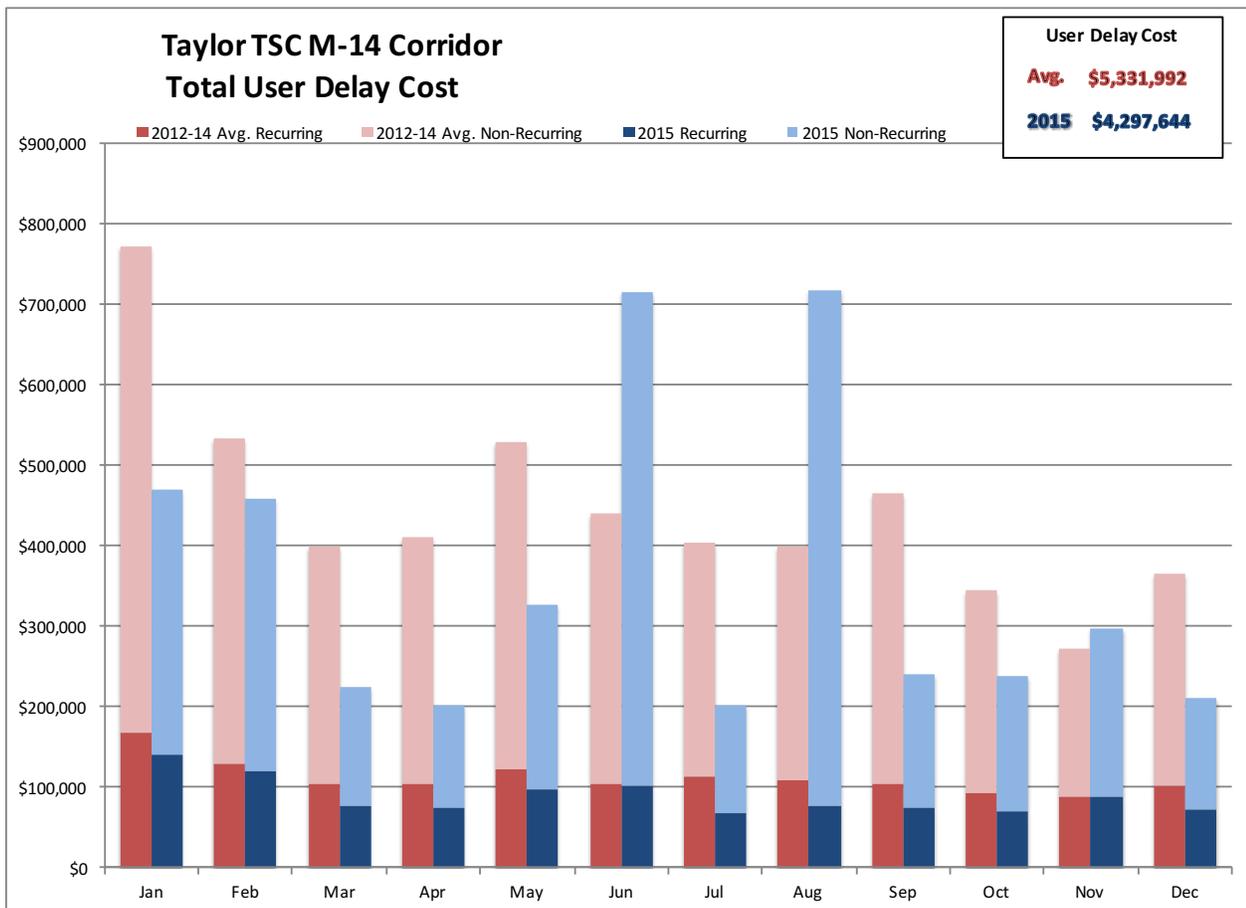
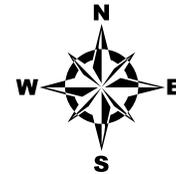
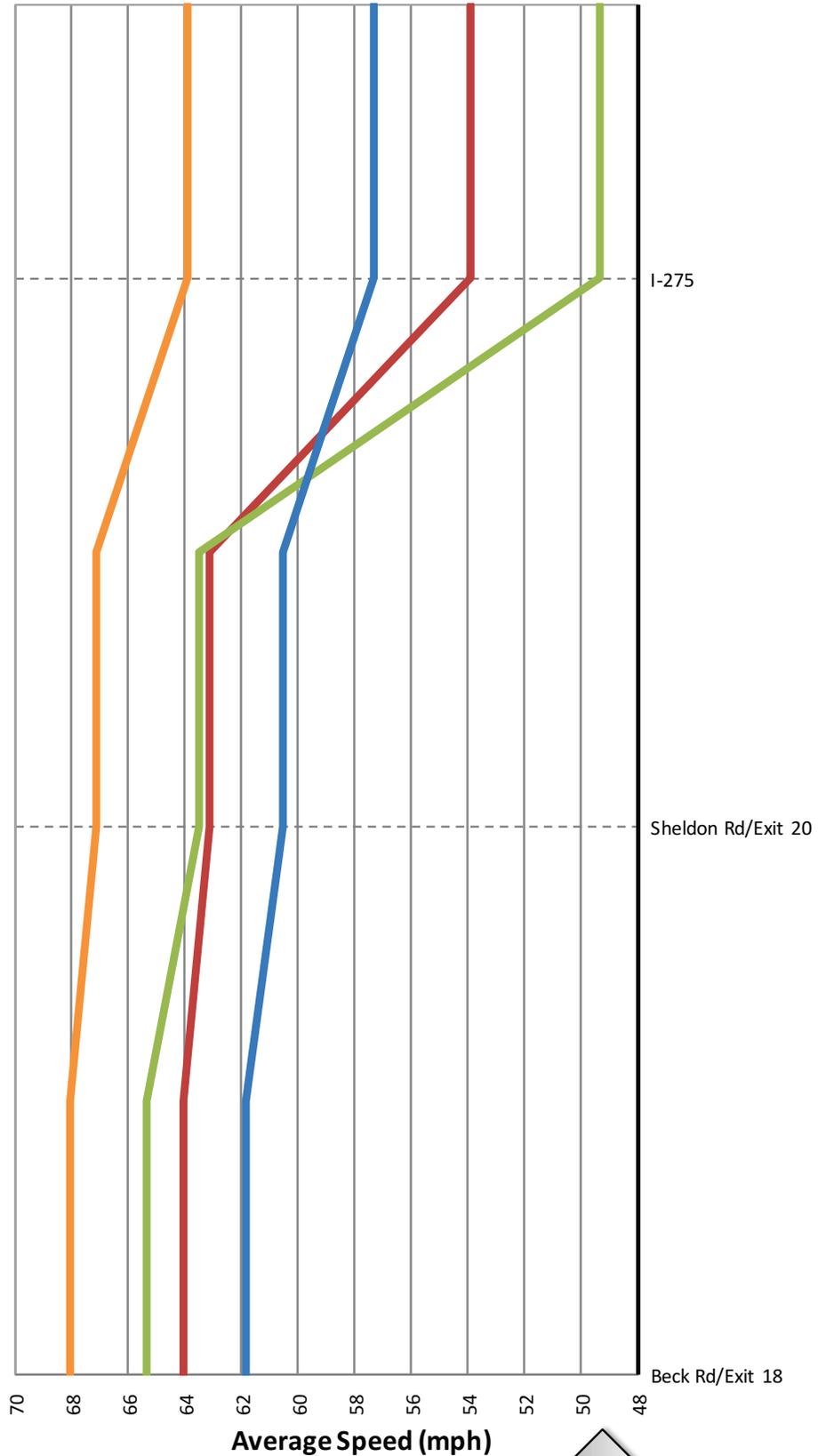


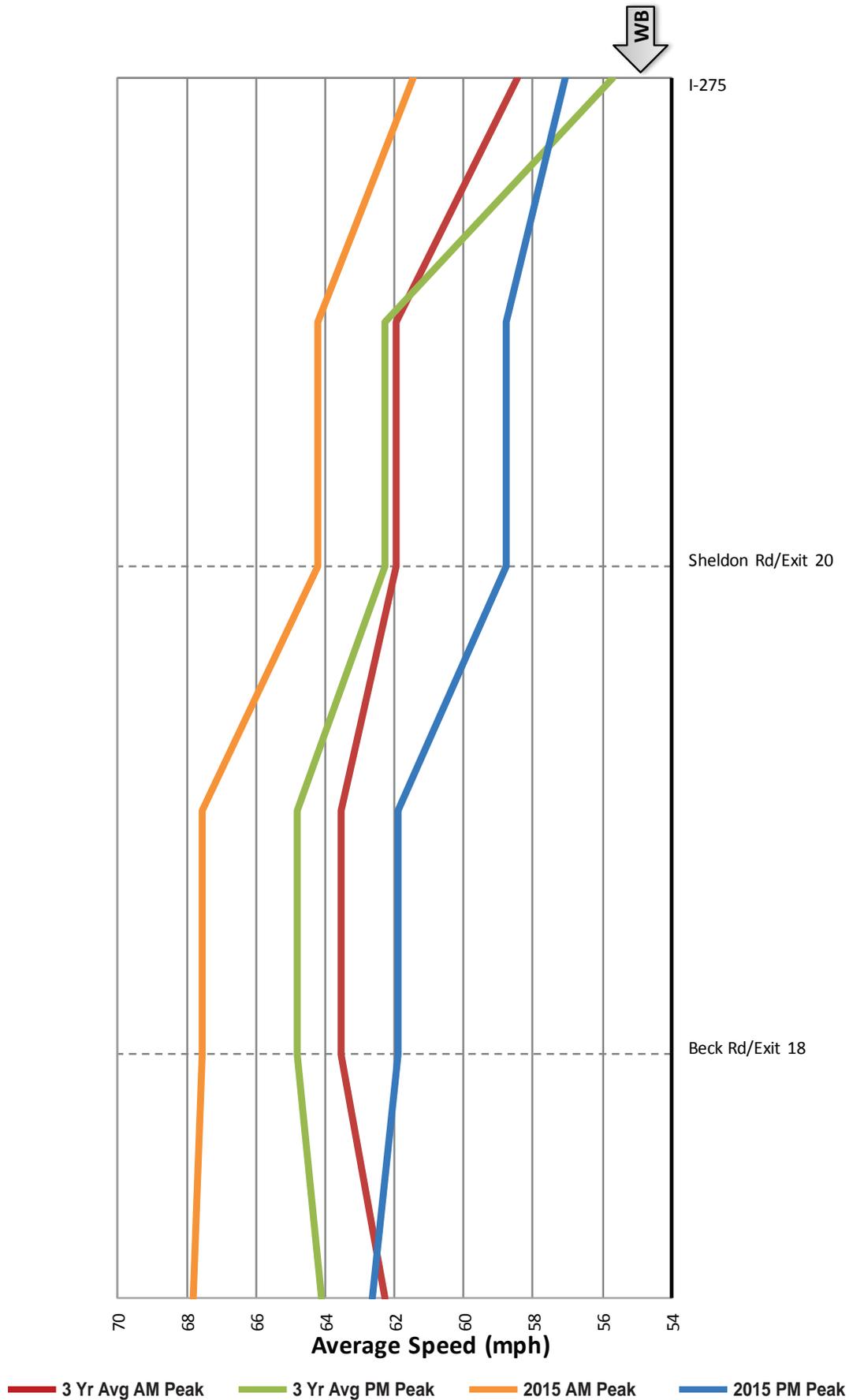
Figure 60. Metro Region M-14 eastbound



3 Yr Avg AM Peak    3 Yr Avg PM Peak    2015 AM Peak    2015 PM Peak



Figure 61. Metro Region M-14 westbound



# Corridor



Interstate 75: Taylor, Detroit 55mph, and Oakland



Interstate 94: Taylor, Detroit 55mph, and Macomb



Interstate 96: Oakland, Taylor, and Detroit Plus Local



Interstate 275: Wayne



Interstate 696: Oakland and Macomb



Michigan 10: Detroit 70mph and Oakland



Michigan 14: Taylor



**Michigan 39: Detroit 55mph**



Michigan 53: Macomb



Michigan 59: Oakland

**Figure 61.** Detroit TSC M-39 Corridor total user delay cost

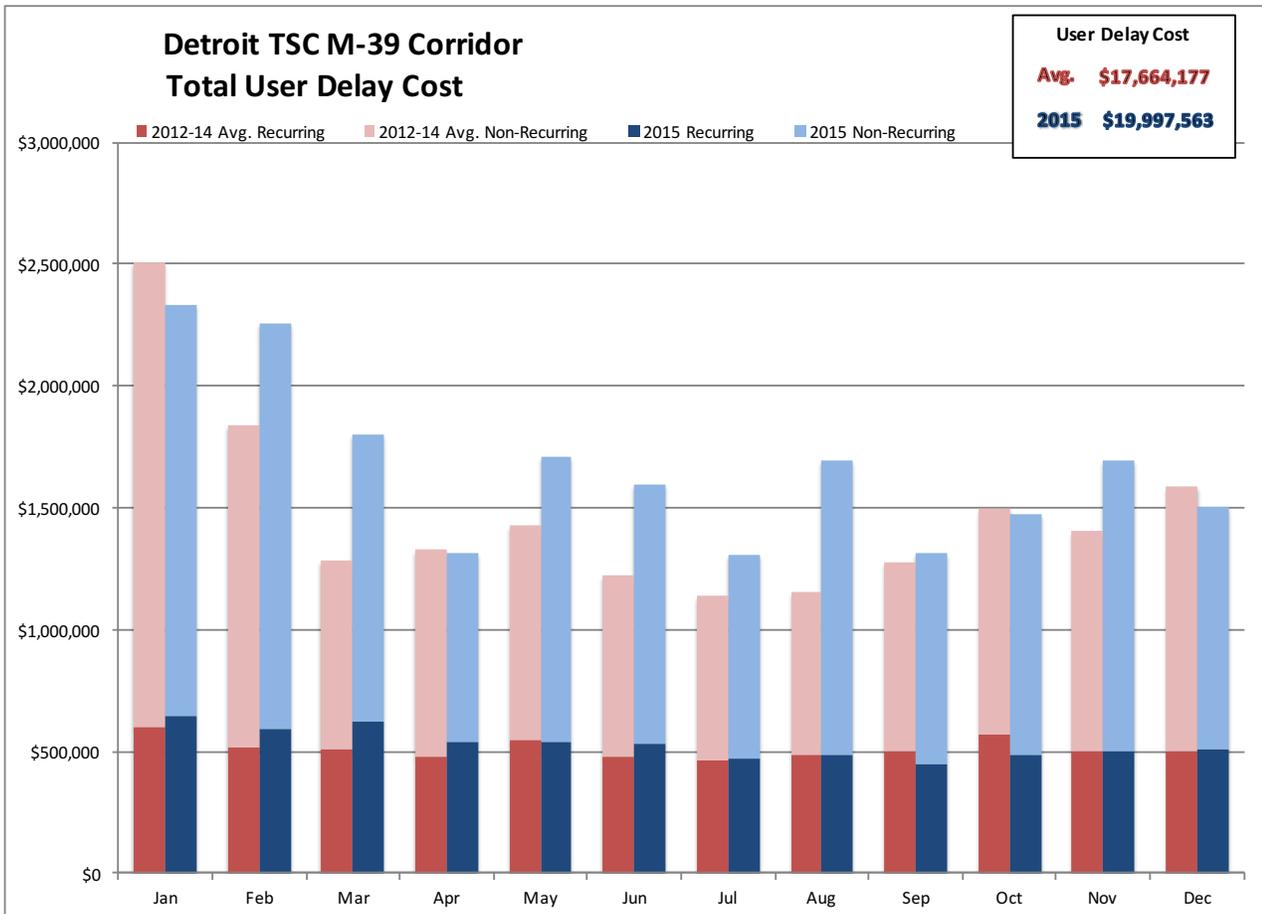
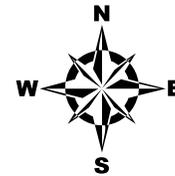




Figure 62. Metro Region M-39 northbound

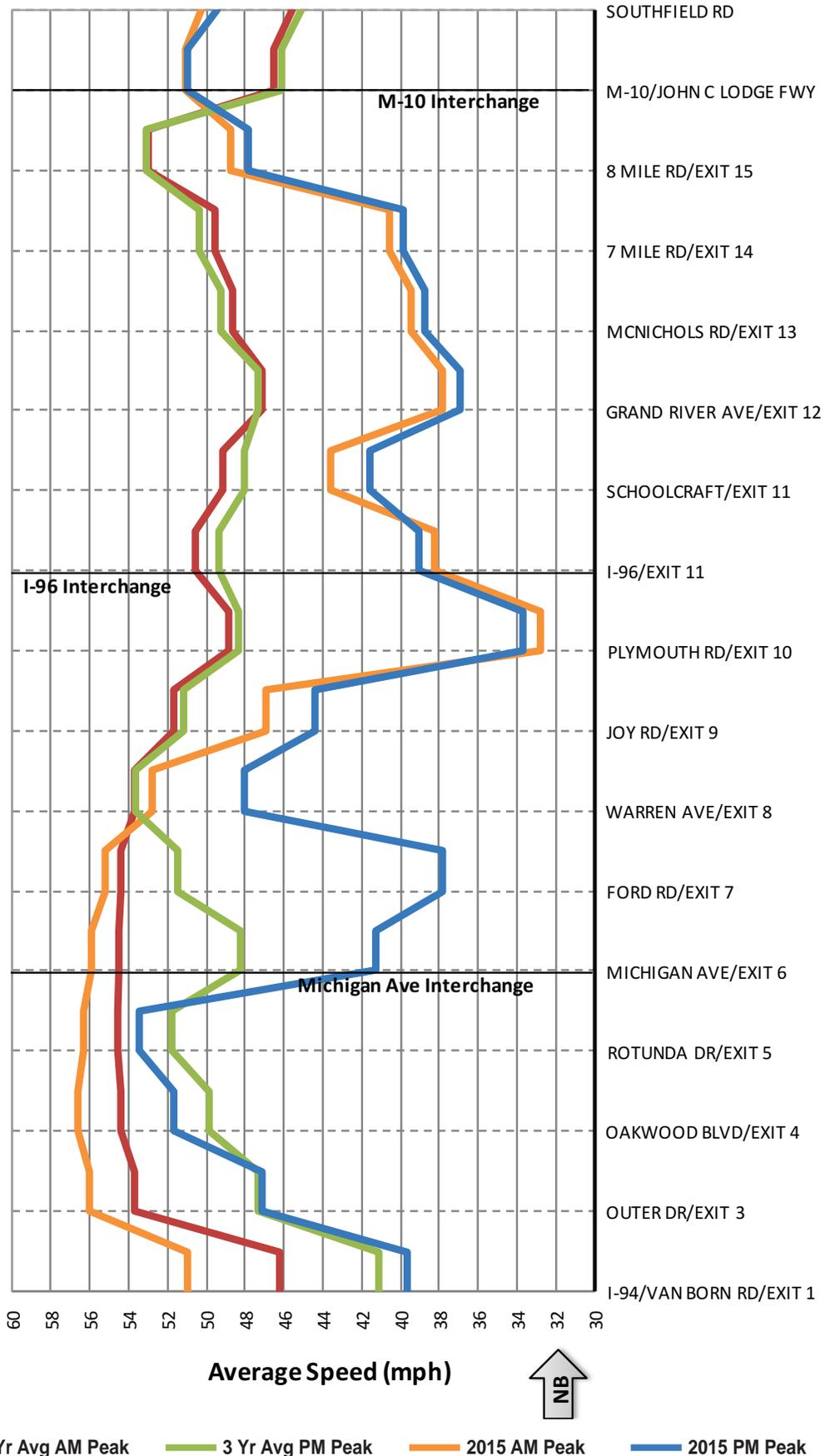
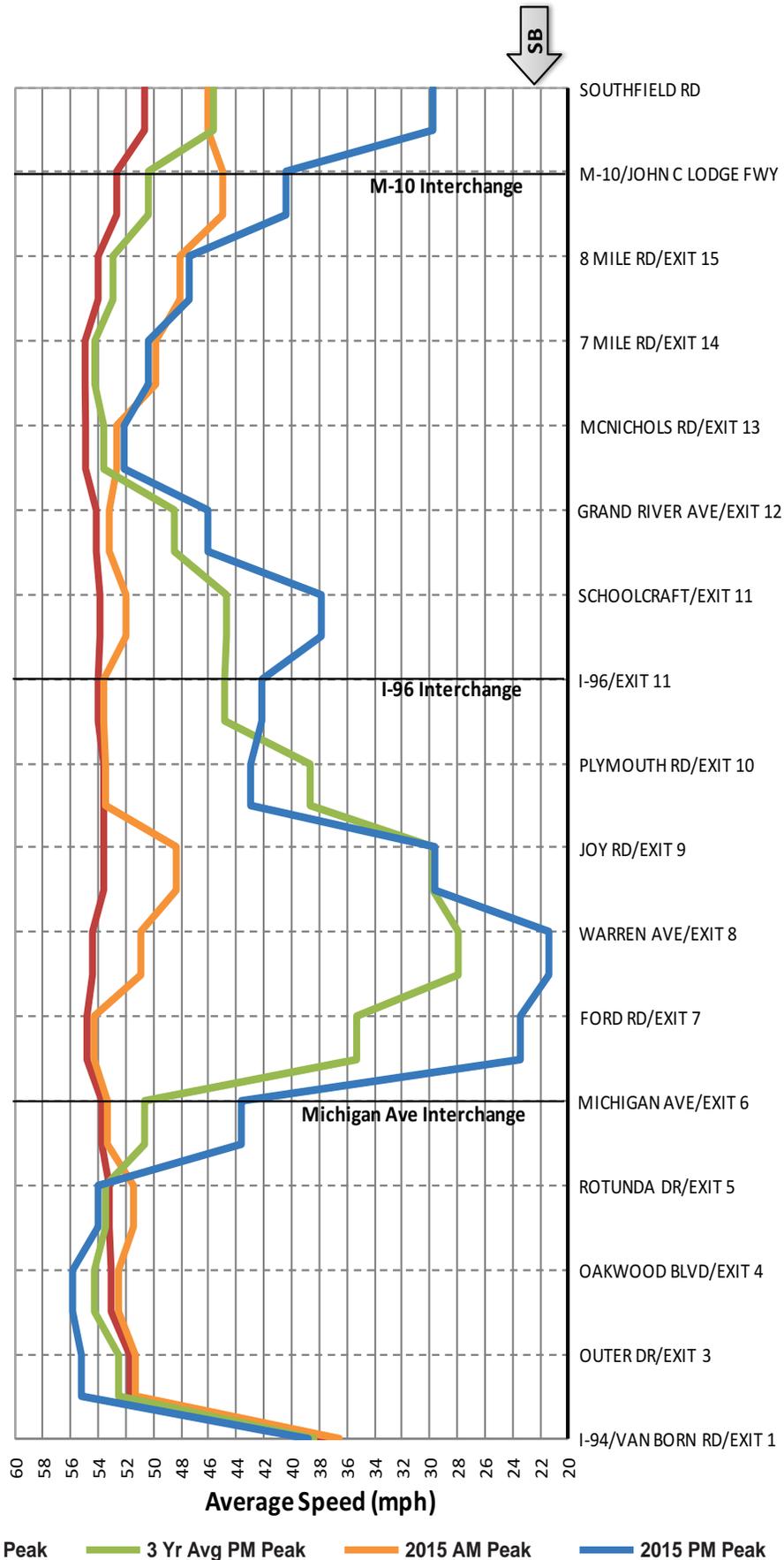


Figure 63. Metro Region M-39 southbound



# Travel Time Reliability

Figure 64. Travel time reliability: M-39

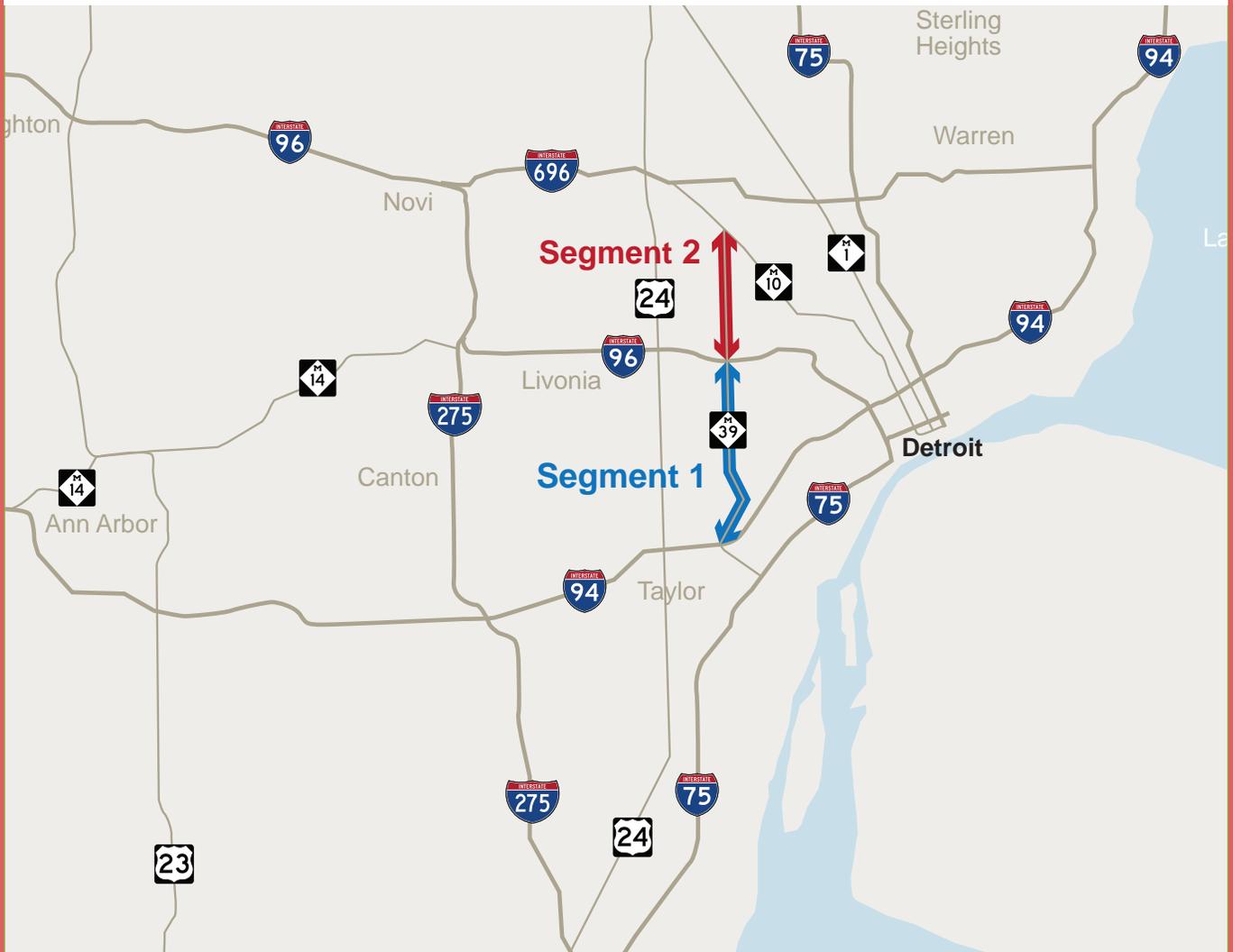


Figure 65. Segment 1- M-39 between I-94/Van Born Rd and I-96

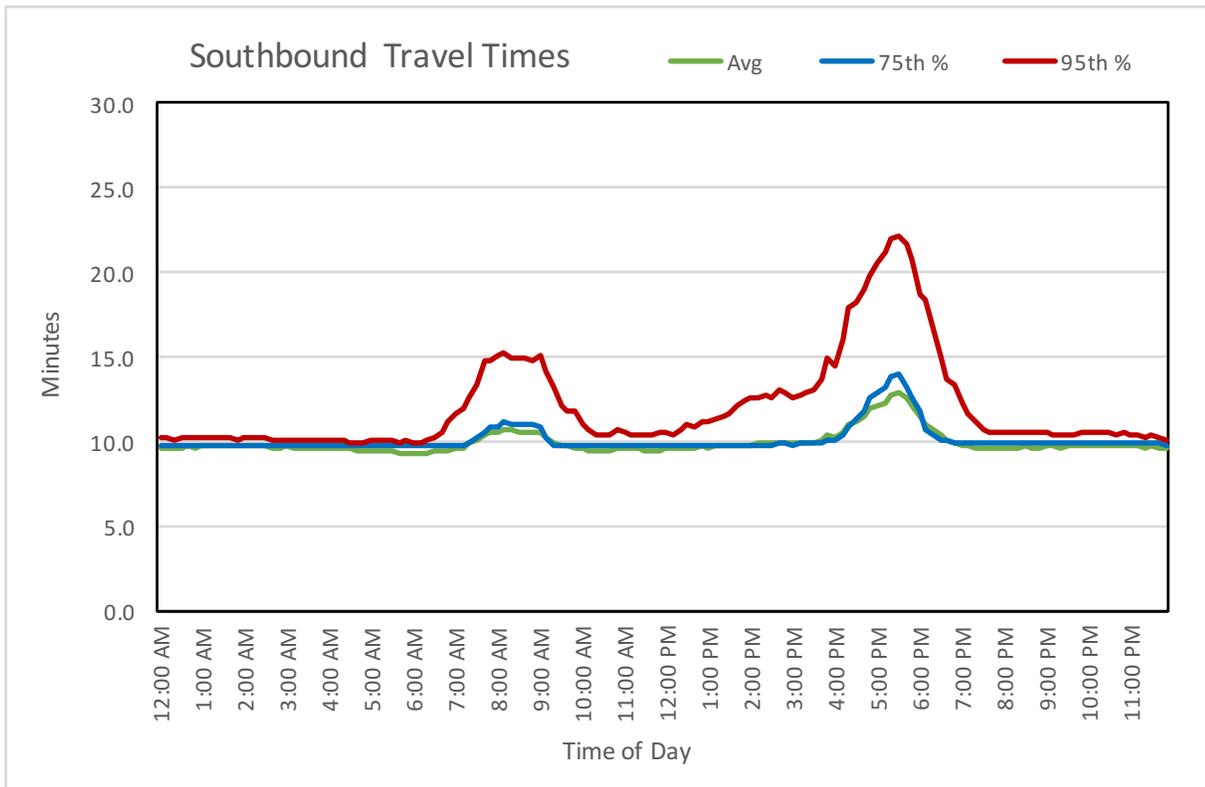
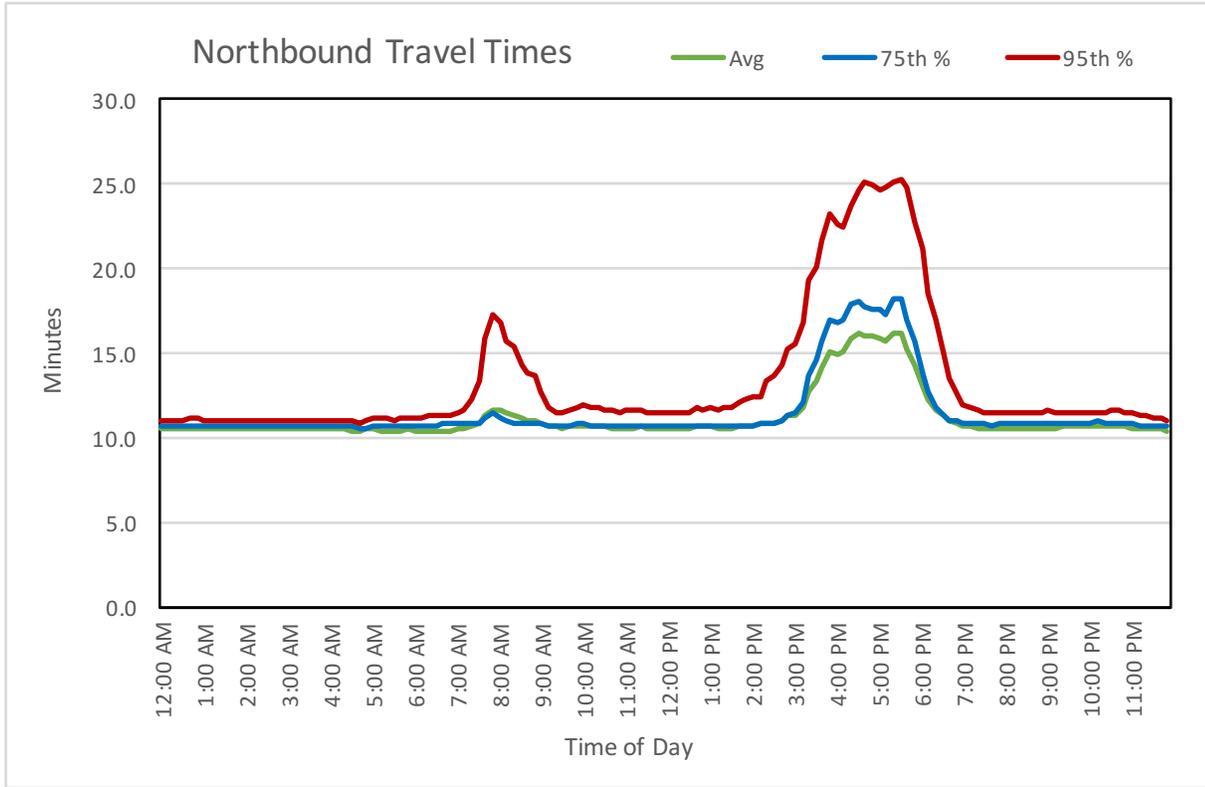
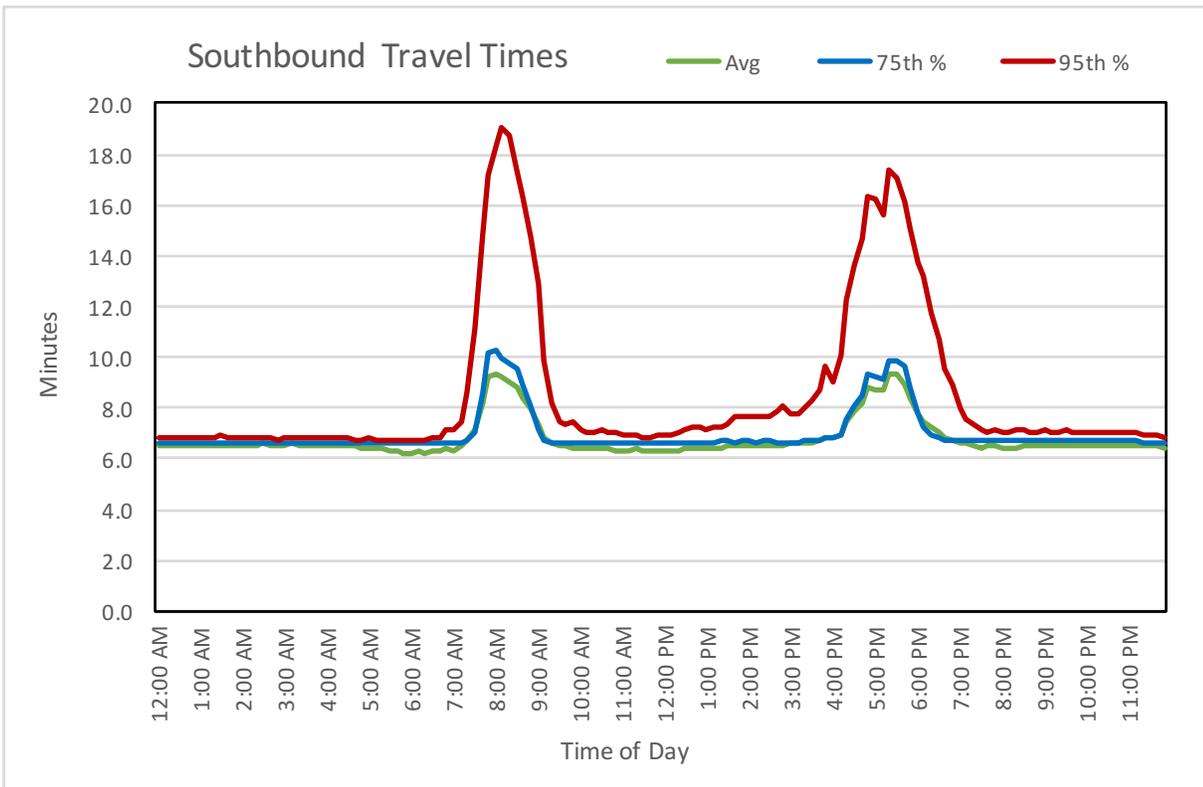
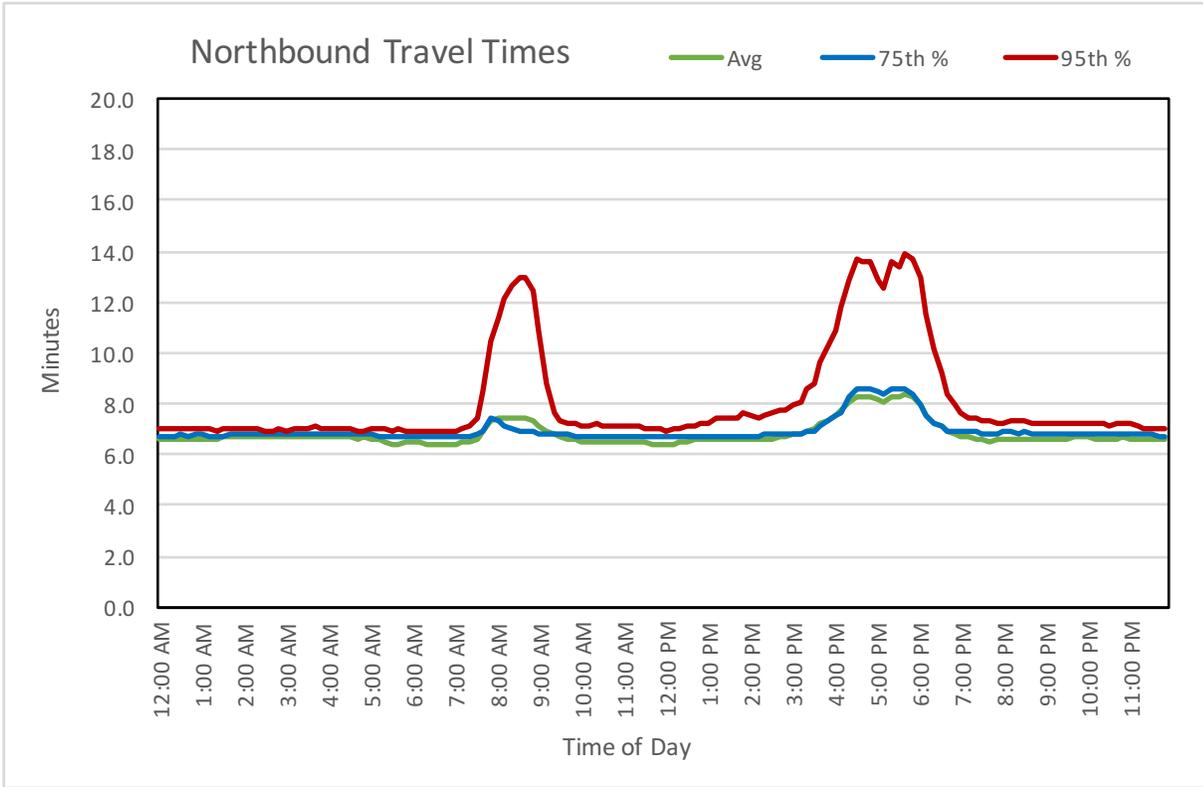


Figure 66. Segment 2- M-39 between I-96 and Southfield Rd





# Corridor



Interstate 75: Taylor, Detroit 55mph, and Oakland



Interstate 94: Taylor, Detroit 55mph, and Macomb



Interstate 96: Oakland, Taylor, and Detroit Plus Local



Interstate 275: Wayne



Interstate 696: Oakland and Macomb



Michigan 10: Detroit 70mph and Oakland



Michigan 14: Taylor



Michigan 39: Detroit 55mph



**Michigan 53: Macomb**



Michigan 59: Oakland

Figure 67. Macomb County M-53 Corridor total user delay cost

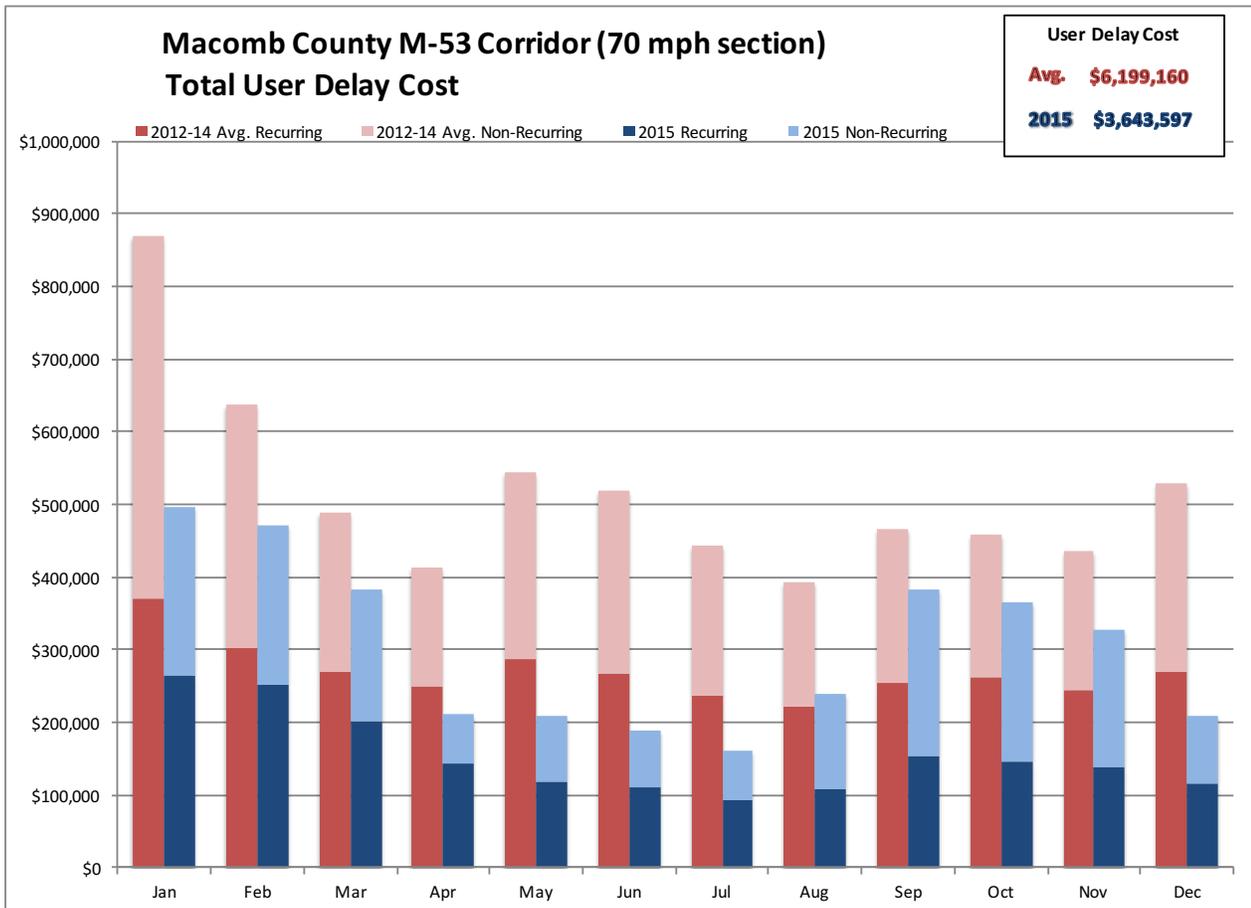
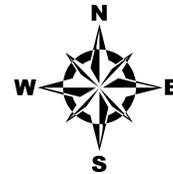
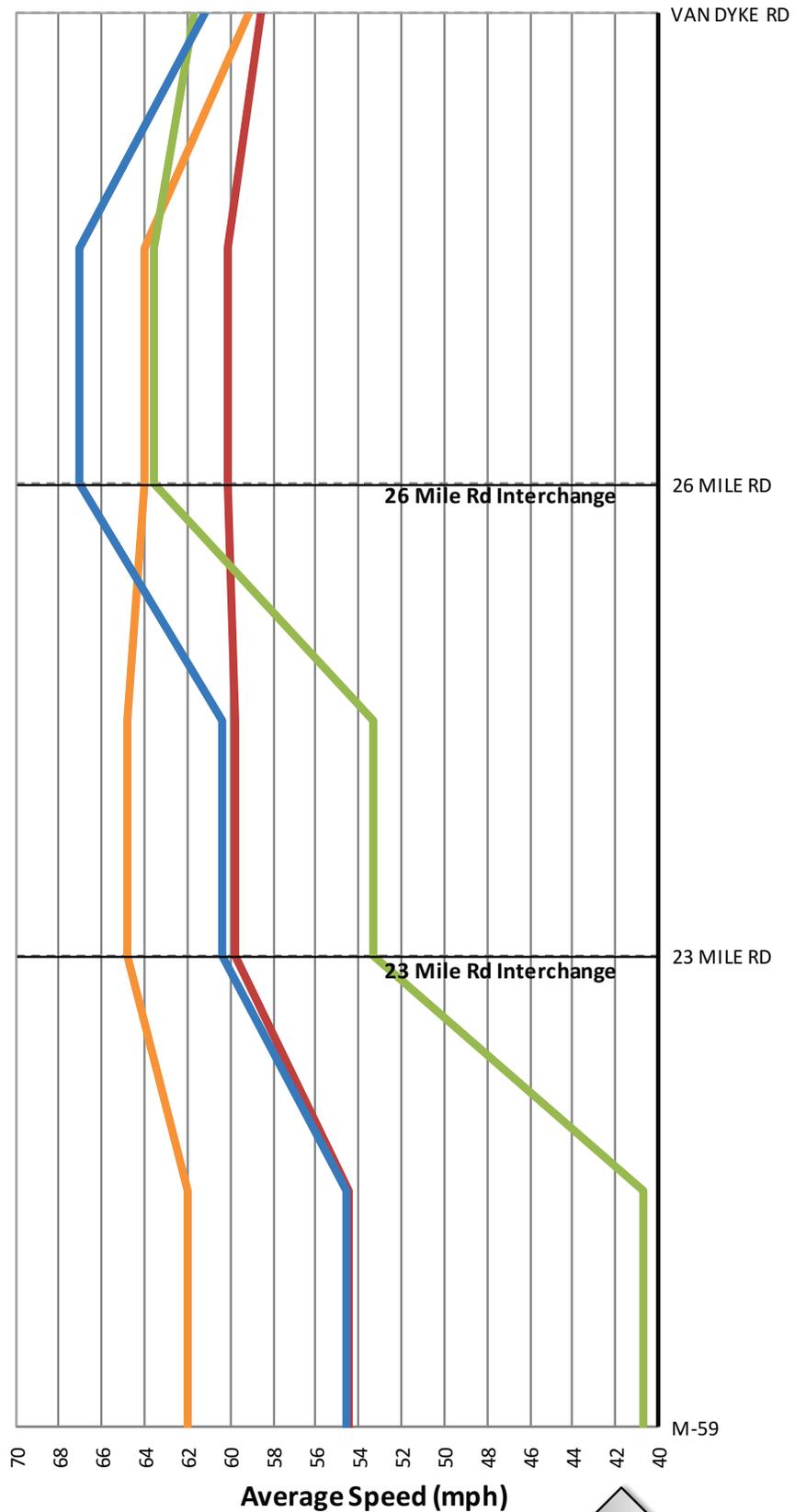


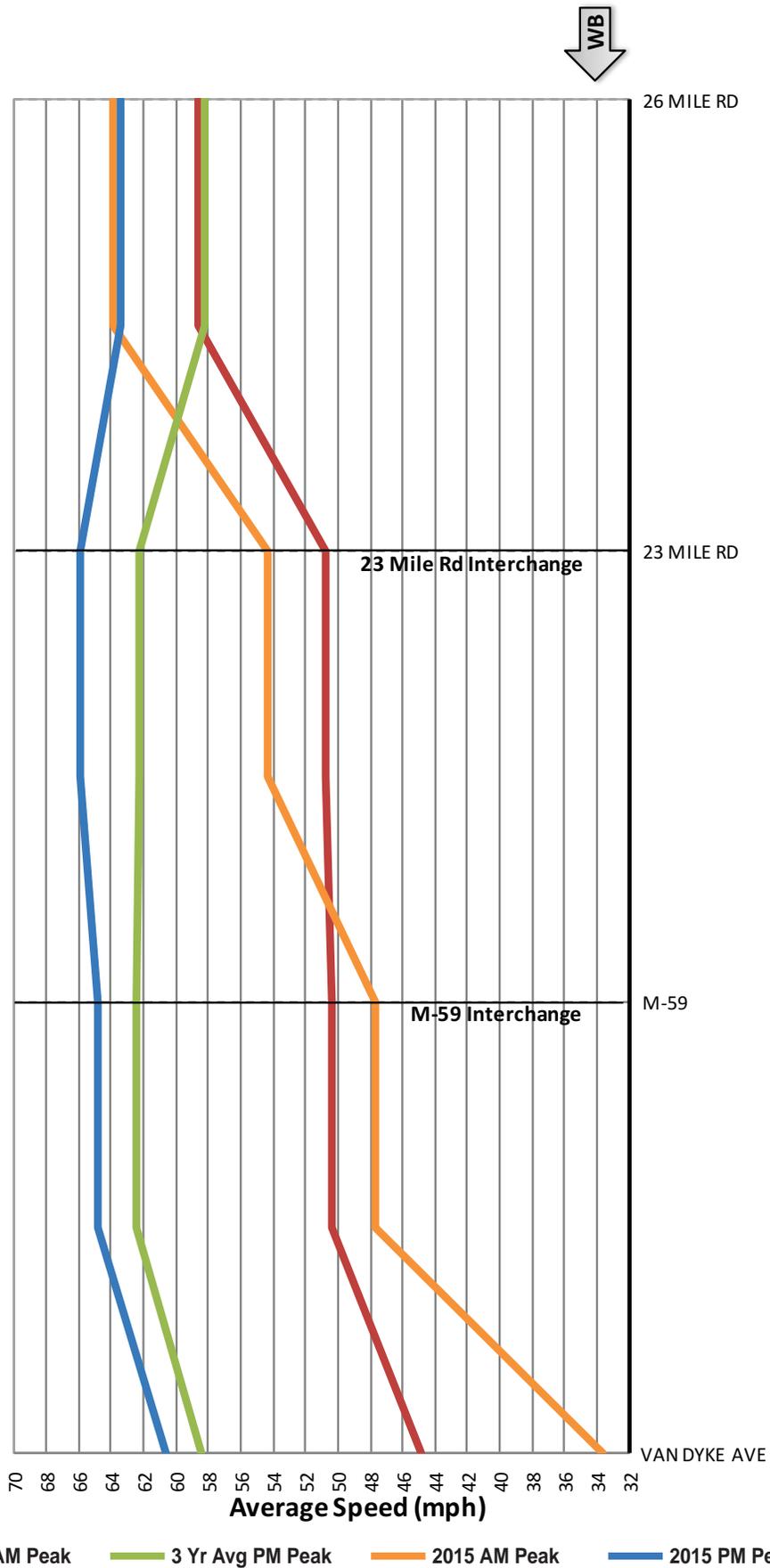
Figure 68. Metro Region M-53 eastbound



— 3 Yr Avg AM Peak   
 — 3 Yr Avg PM Peak   
 — 2015 AM Peak   
 — 2015 PM Peak



Figure 69. Metro Region M-53 westbound



# Travel Time Reliability

Figure 70. Travel time reliability: M-53

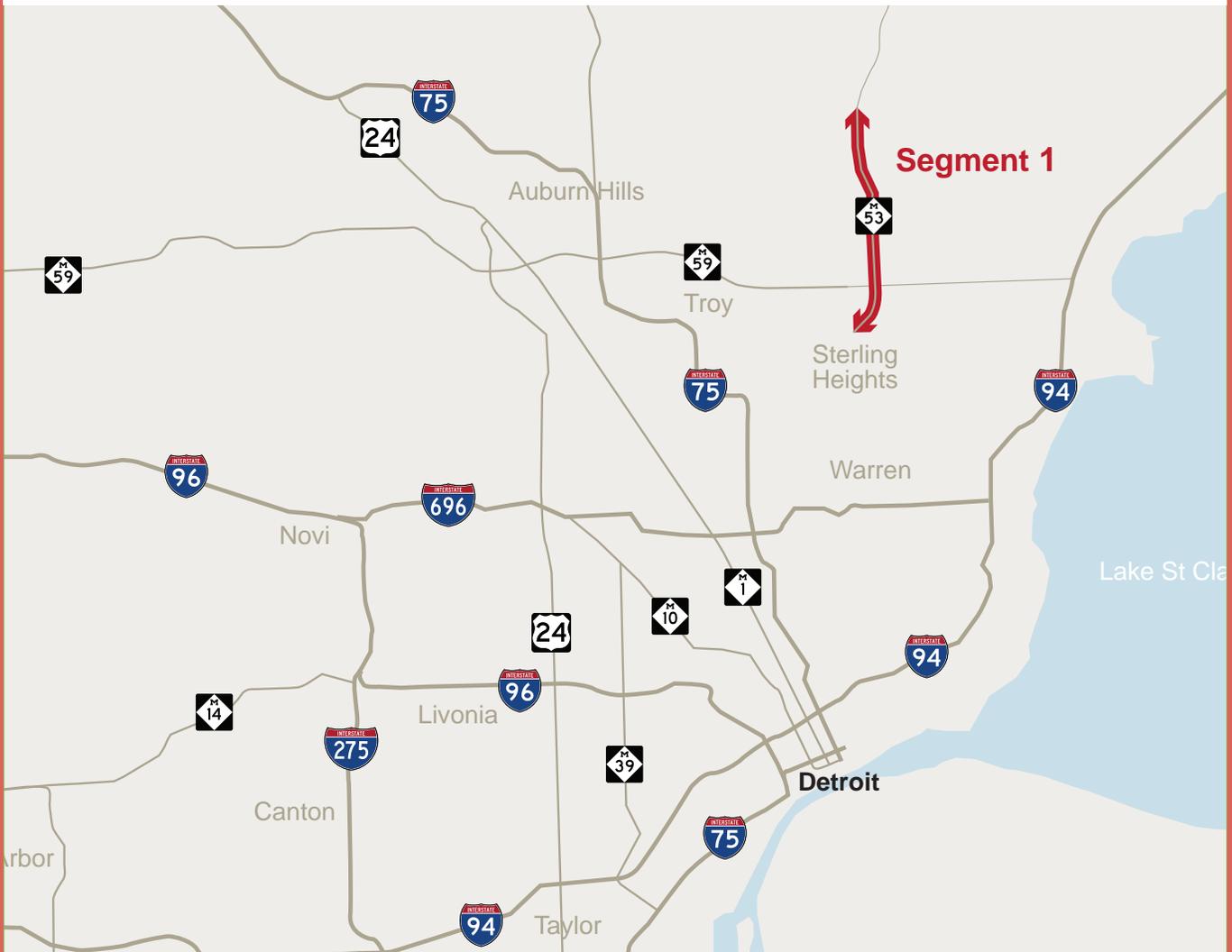
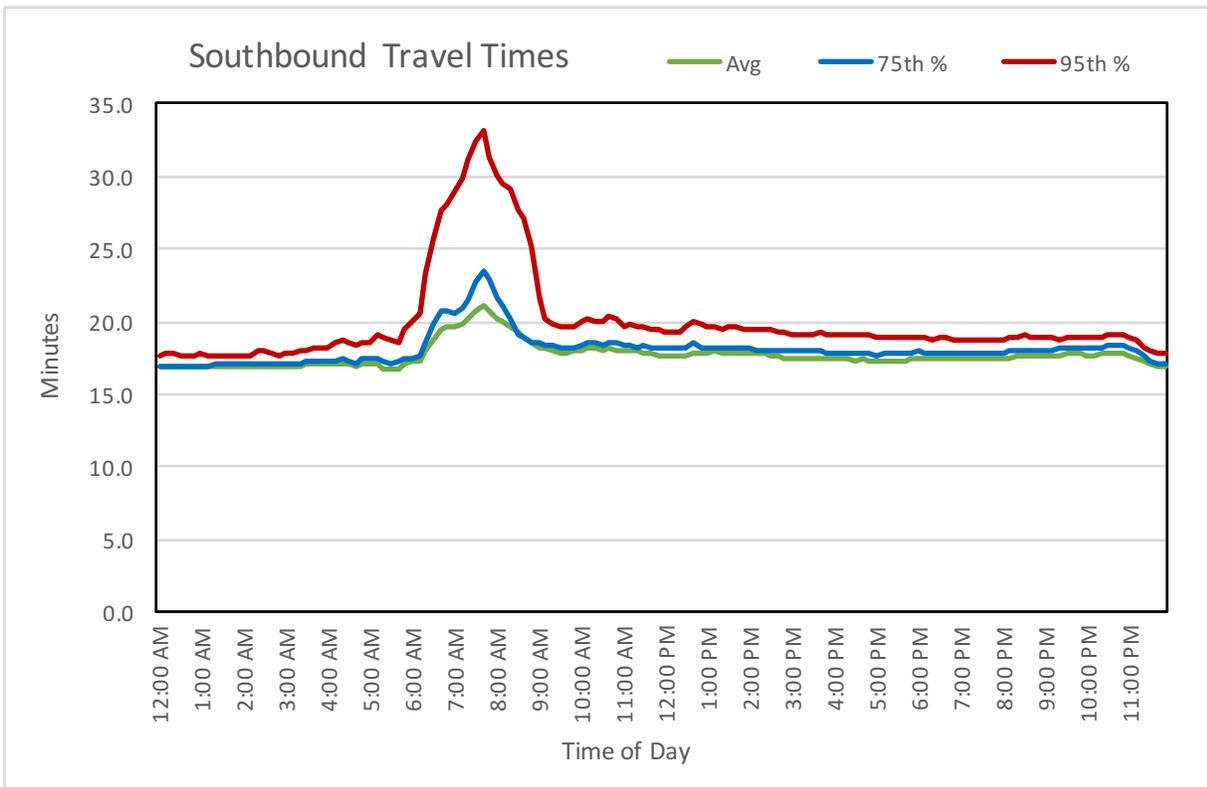
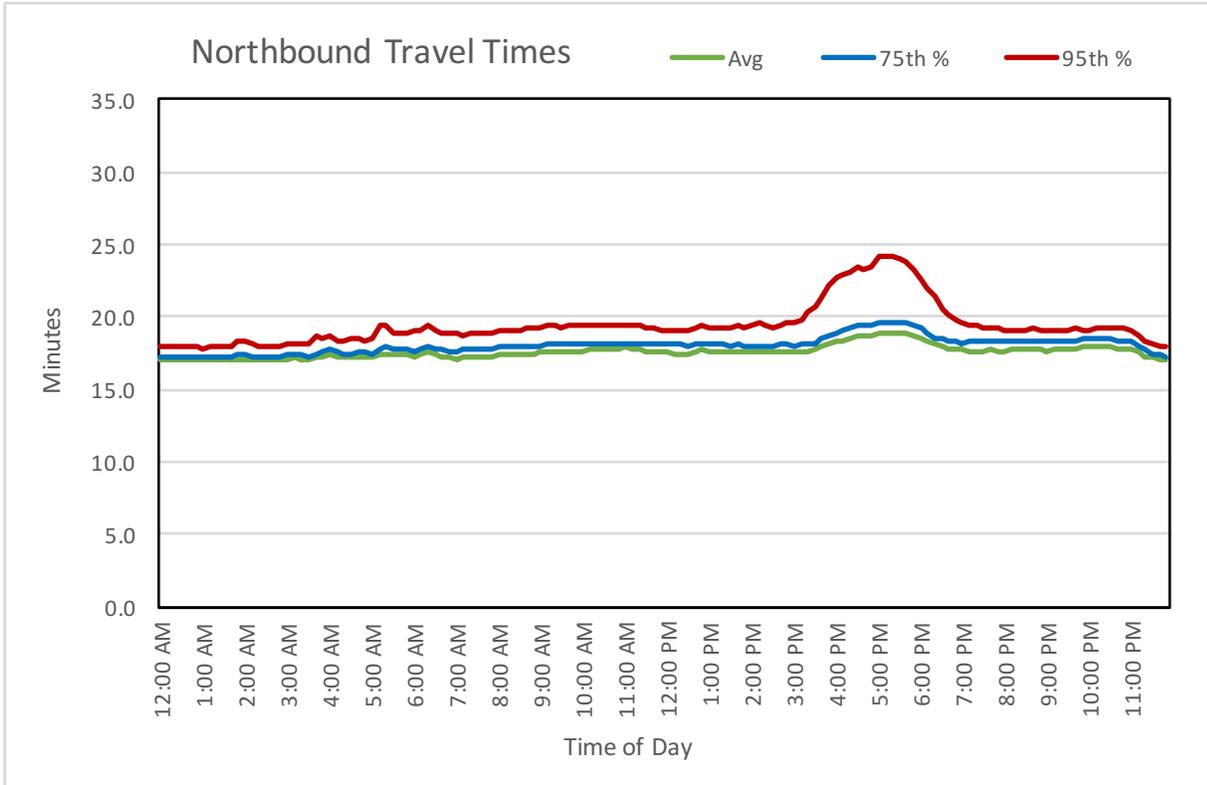


Figure 71. Segment 1- M-53



# Corridor



Interstate 75: Taylor, Detroit 55mph, and Oakland



Interstate 94: Taylor, Detroit 55mph, and Macomb



Interstate 96: Oakland, Taylor, and Detroit Plus Local



Interstate 275: Wayne



Interstate 696: Oakland and Macomb



Michigan 10: Detroit 70mph and Oakland



Michigan 14: Taylor



Michigan 39: Detroit 55mph



Michigan 53: Macomb



Michigan 59: Oakland

Figure 72. Oakland County M-59 Corridor total user delay cost

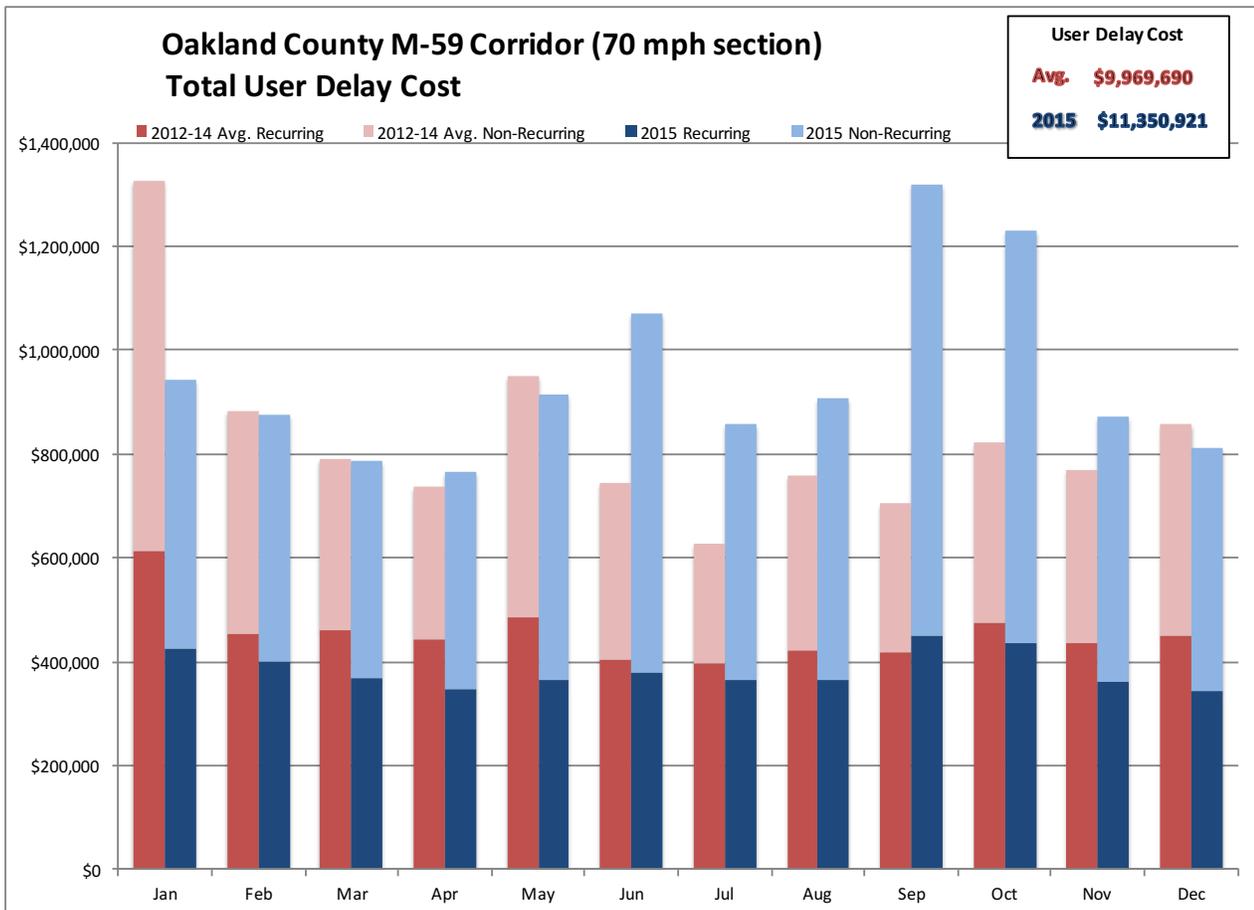
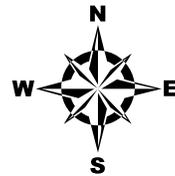


Figure 73. Metro Region M-59 eastbound

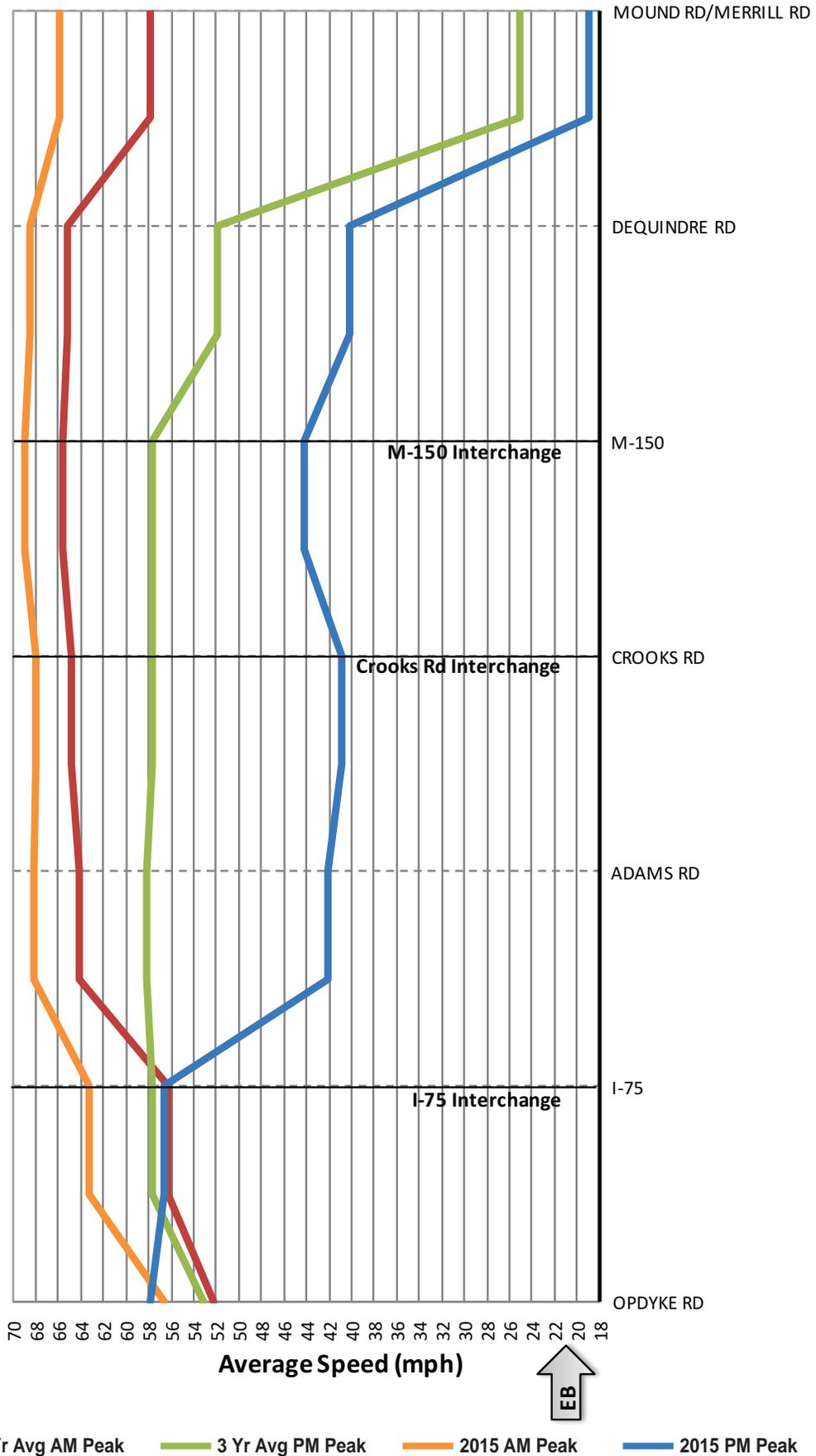
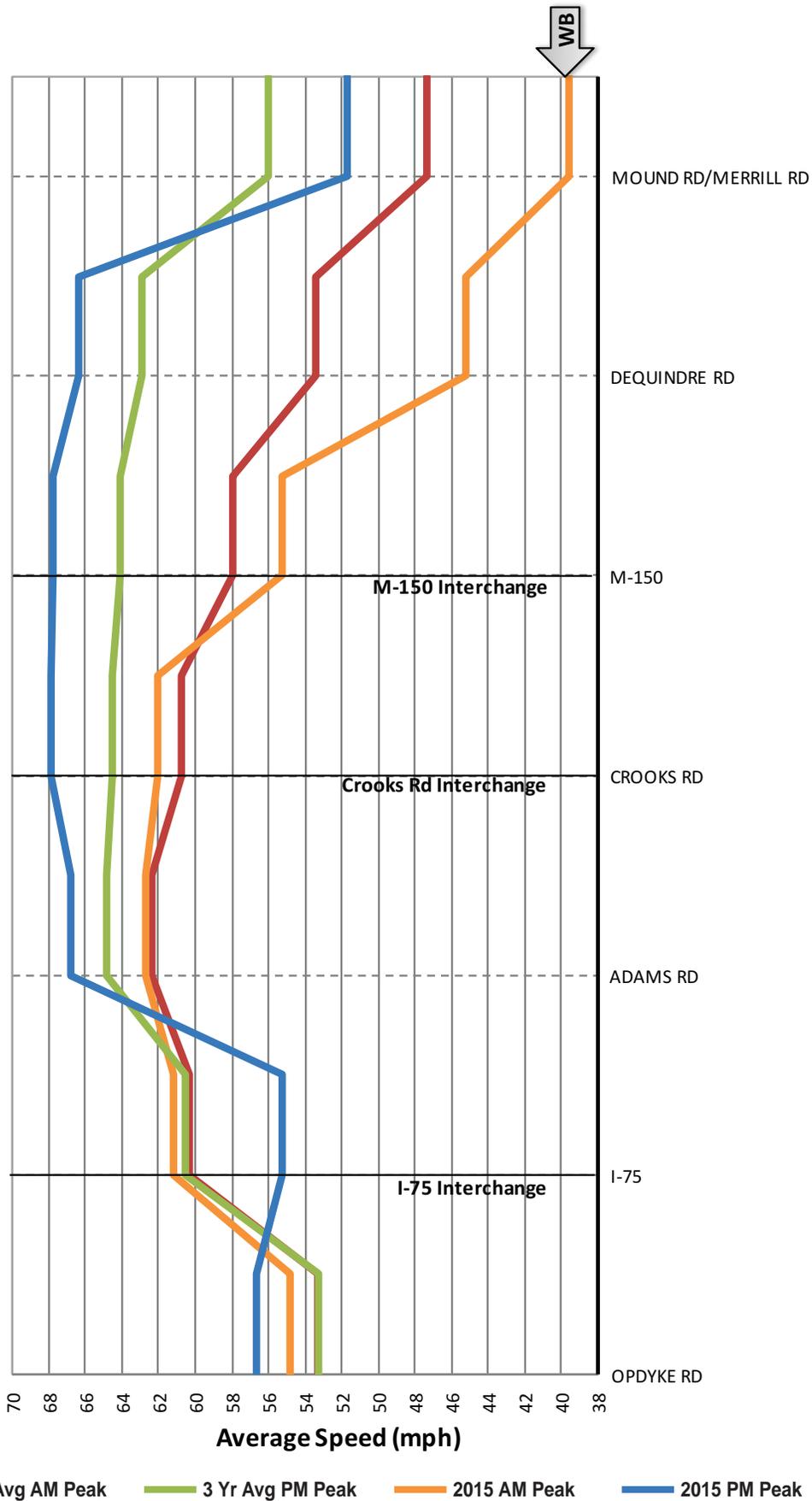


Figure 74. Metro Region M-59 westbound



# Travel Time Reliability

Figure 75. Travel time reliability: M-59



Figure 76. Segment 1- M-59 between Van Dyke Ave and MLK Jr Blvd

