

Model Validation Using “Novel” Big Data

ITM2018

Sunday Workshop

Projects with Static & Dynamic Models

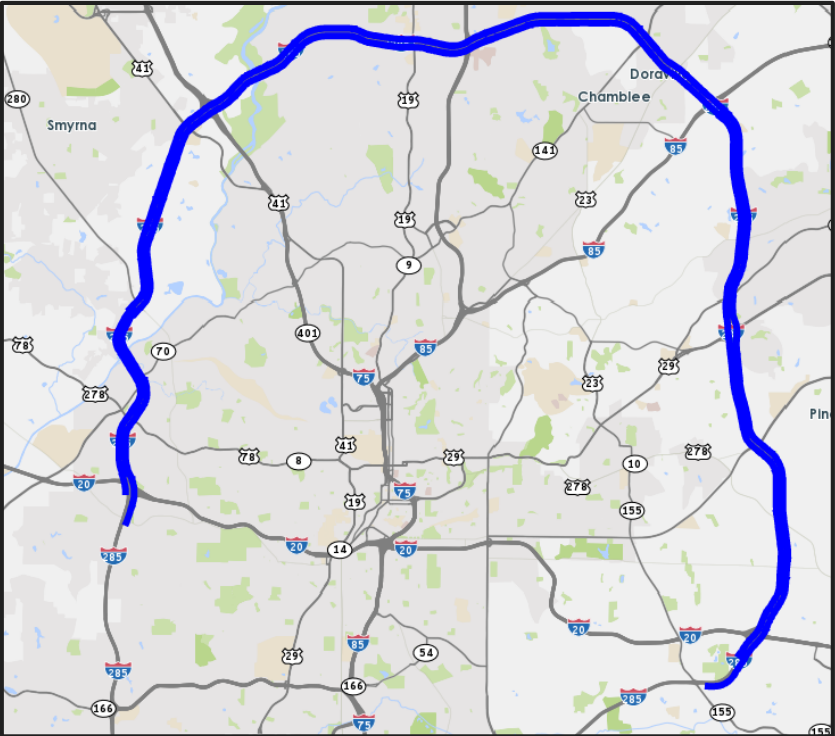
- ABM-DTA Integration (SHRP2 C10) with INRIX Data
- I-85 Bridge Collapse Travel Patterns with Streetlytics Data
- Externals Model with Airsage Data
- I-285 / GA-400 Interchange Reconstruction Commute Options with Streetlight Data
- Regional Origin-Destination Analysis with Teralytics Data
- Volume-Delay-Reliability Functions (SHRP2 L04) with NPMRDS Data

Corridor Analysis Data Tools with INRIX

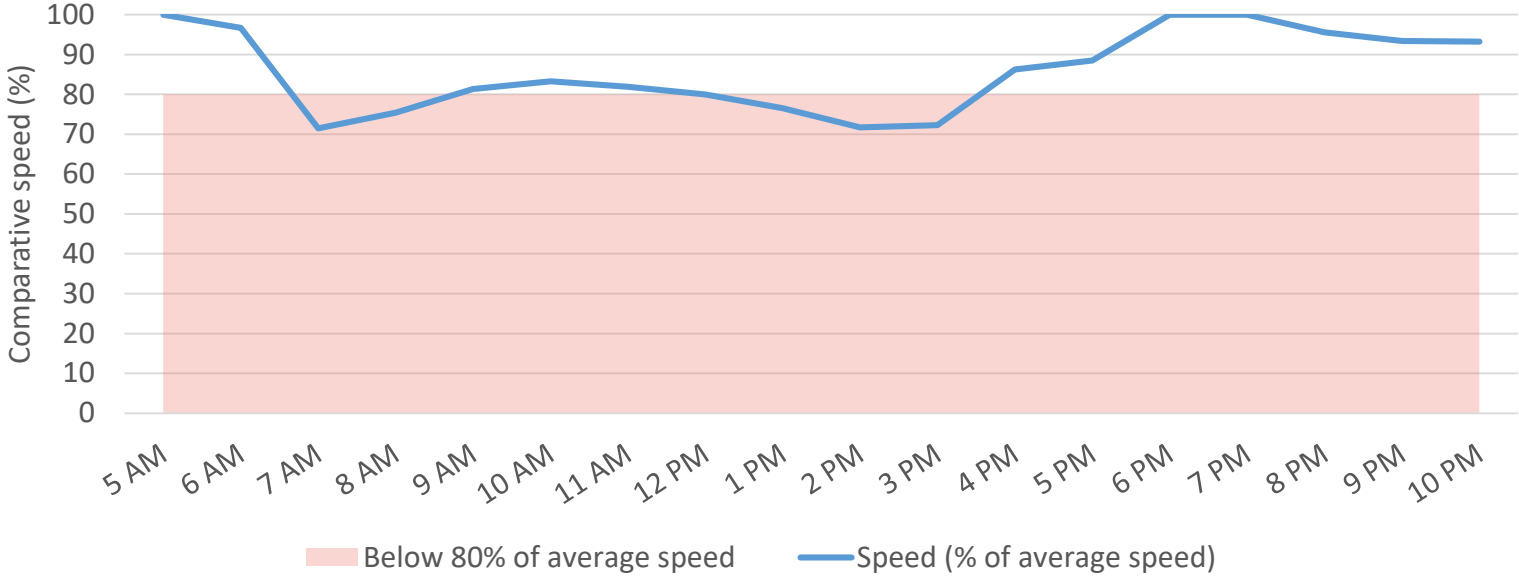
- Comparative travel speed- measured as a percentage of average speed for that day/time
- Using 2015 INRIX Data
- Freeway Corridors (Interstate and State Routes)
- Regionally Significant Corridors (Arterials)

Corridor: I-285 (top end)

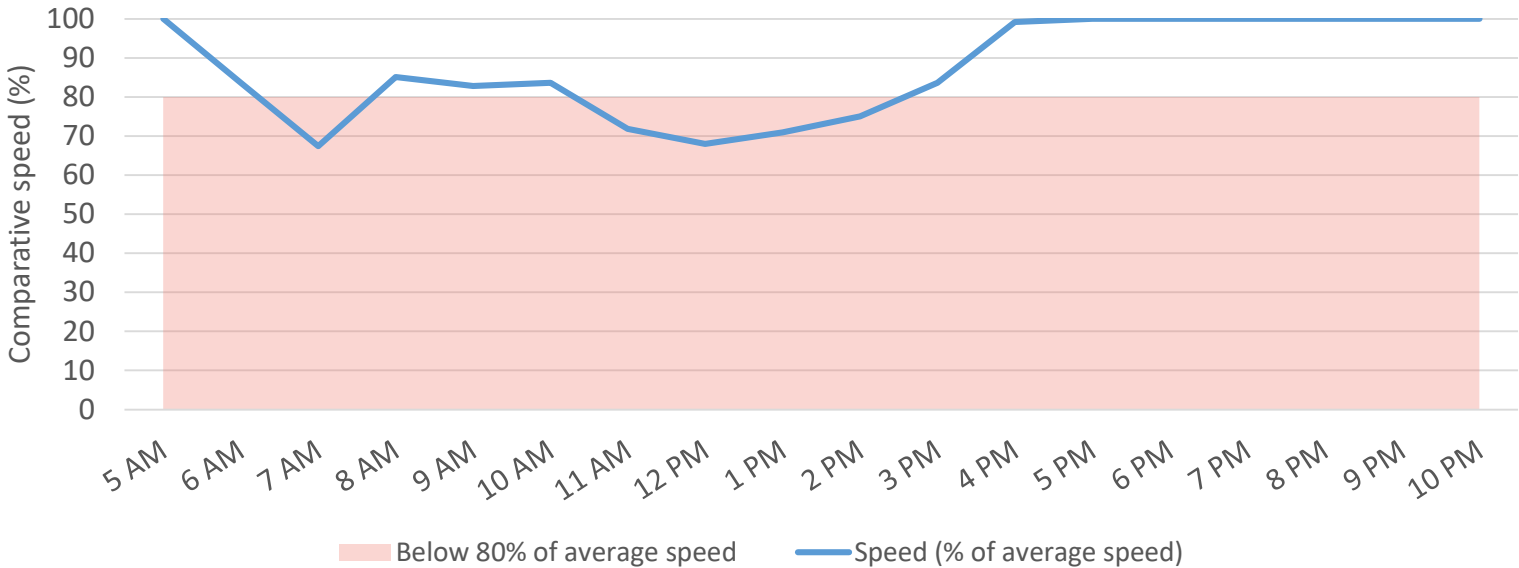
- The **blue line** in the chart shows **comparative speed**, which is the speed of traffic for that time measured as a percentage of historic average speed for that day/time.
- For example, if “normal” traffic speed is 40mph, 100% would represent 40 mph and 50% would represent 20 mph
- The **red area** on the chart highlights where speed has dropped **below 80 percent** of historic average speed.



I-285 (top) **clockwise**, average of April 3 - April 6 2015



I-285 (top) **counterclockwise**, average of April 3 - April 6 2015

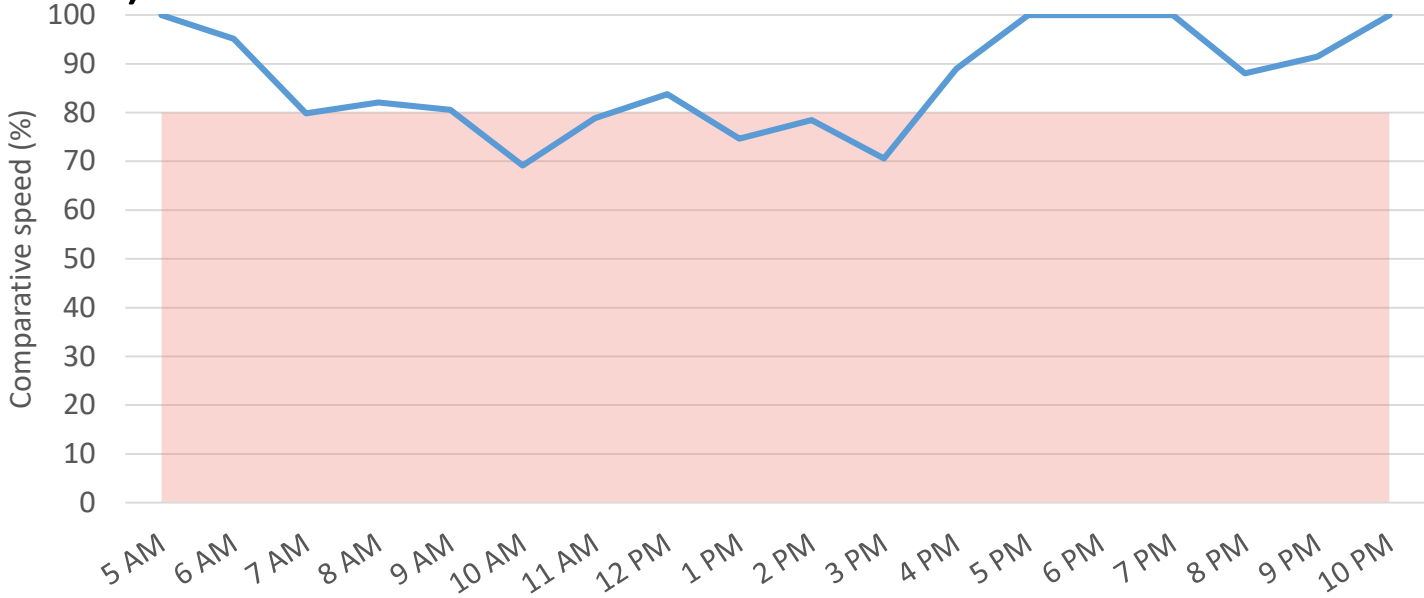


Corridor: I-285 (I-75 to GA-400)

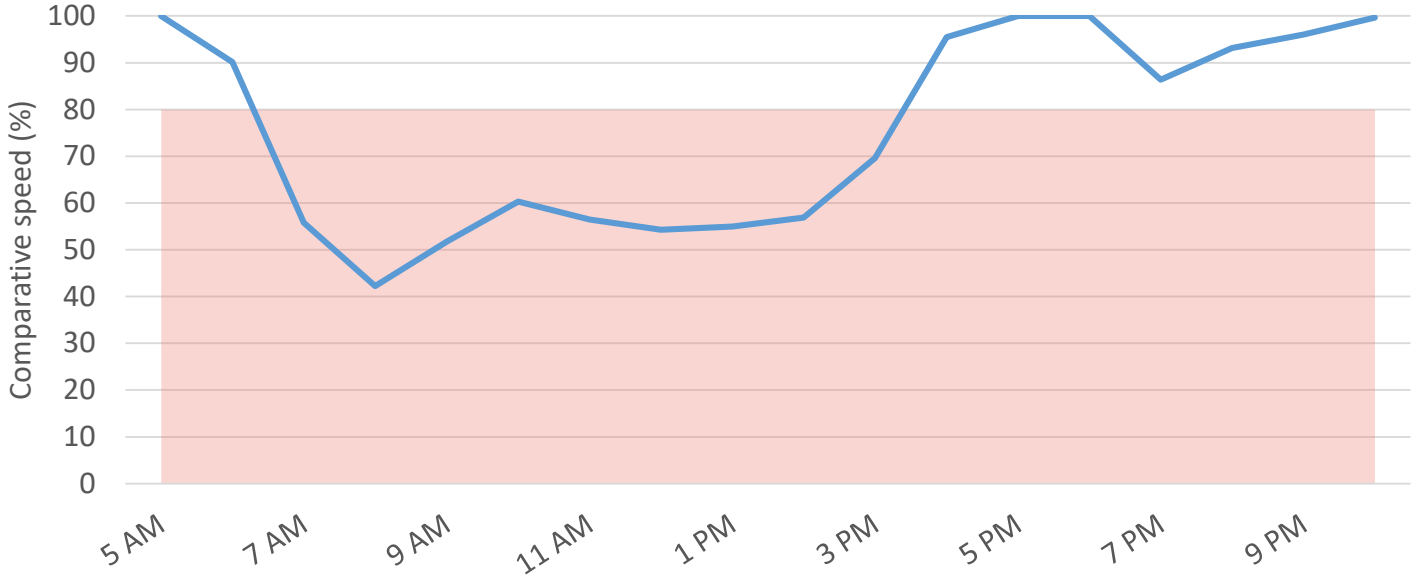
- The **blue line** in the chart shows **comparative speed**, which is the speed of traffic for that time measured as a percentage of historic average speed for that day/time.
- For example, if “normal” traffic speed is 40mph, 100% would represent 40 mph and 50% would represent 20 mph
- The **red area** on the chart highlights where speed has dropped **below 80 percent** of historic average speed.



I-285 (I75 to 400) clockwise, average of April 3 - April 6

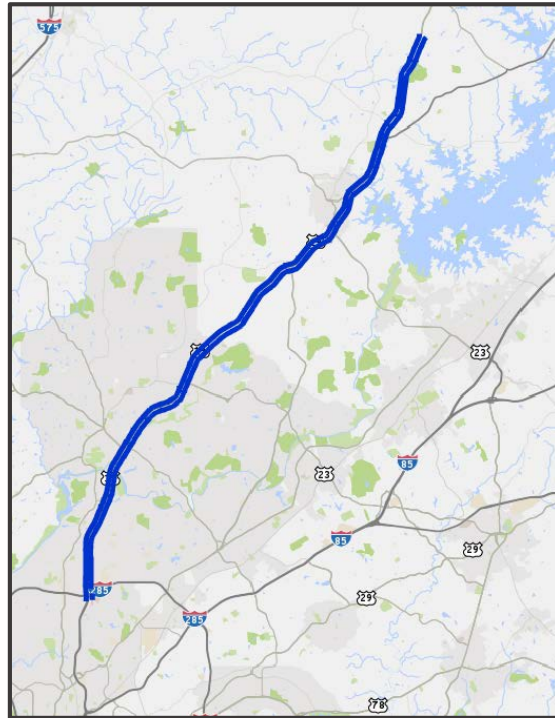


I-285 (I75 to 400) counterclockwise, average of April 3 - April 6

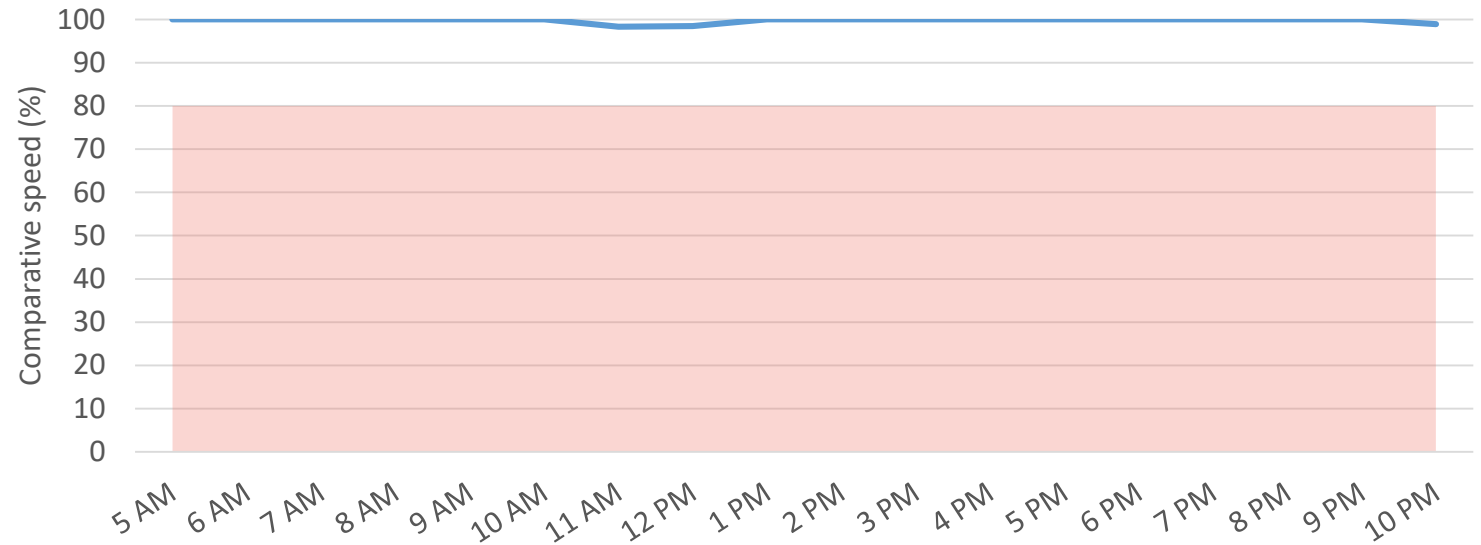


Corridor: SR 400 (north of I-285)

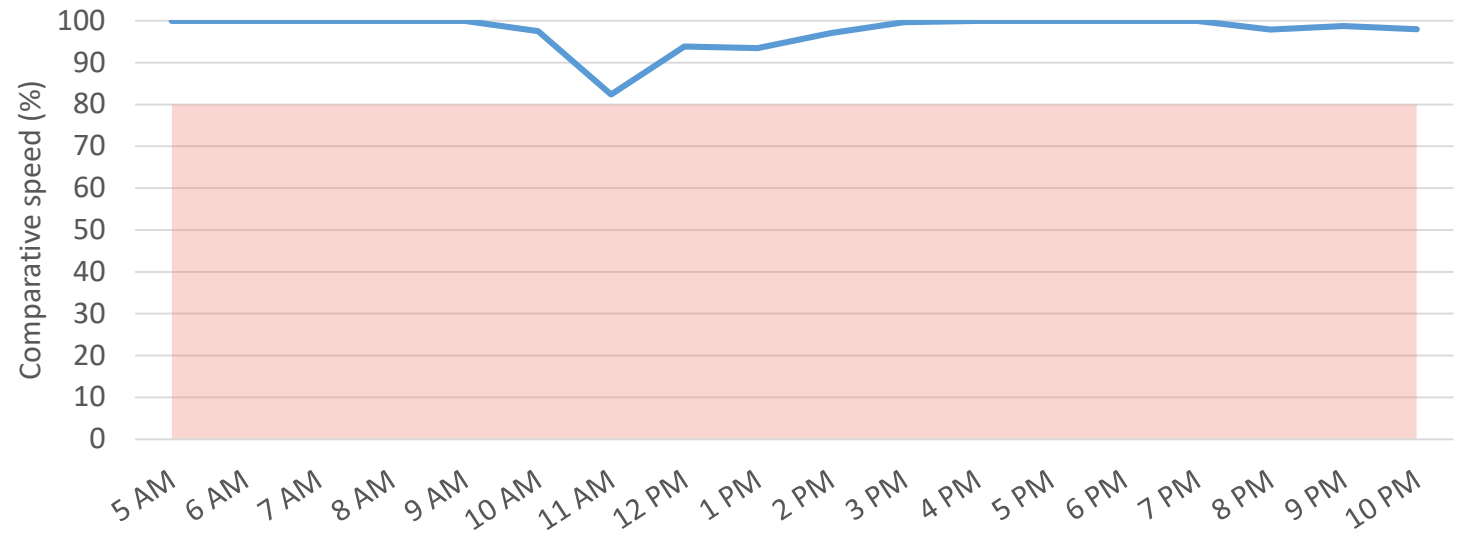
- The **blue line** in the chart shows **comparative speed**, which is the speed of traffic for that time measured as a percentage of historic average speed for that day/time.
- For example, if “normal” traffic speed is 40mph, 100% would represent 40 mph and 50% would represent 20 mph
- The **red area** on the chart highlights where speed has dropped **below 80 percent** of historic average speed.



SR 400 (north of I-285) northbound, average of April 3 - April 6

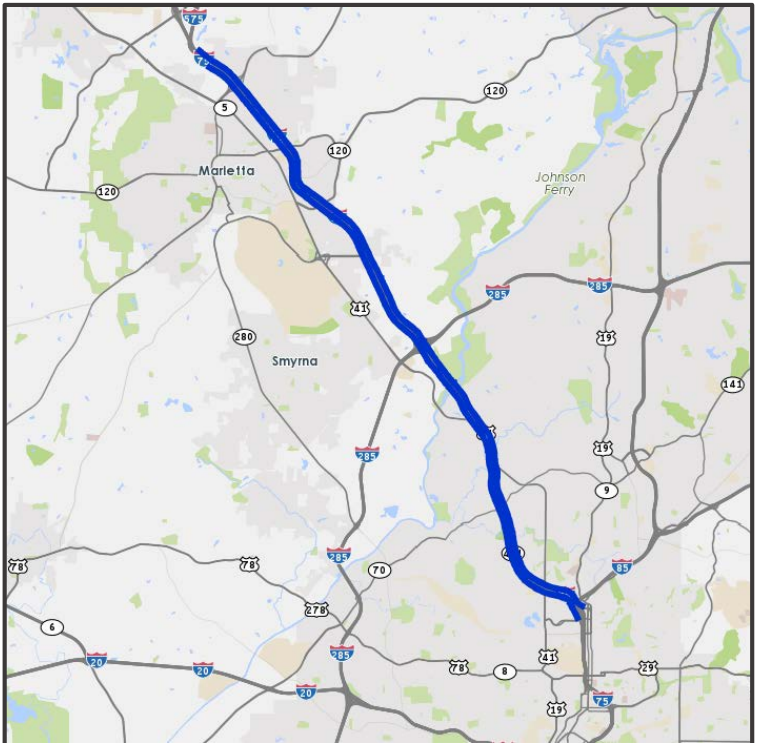


SR 400 (north of I-285) southbound, average of April 3 - April 6

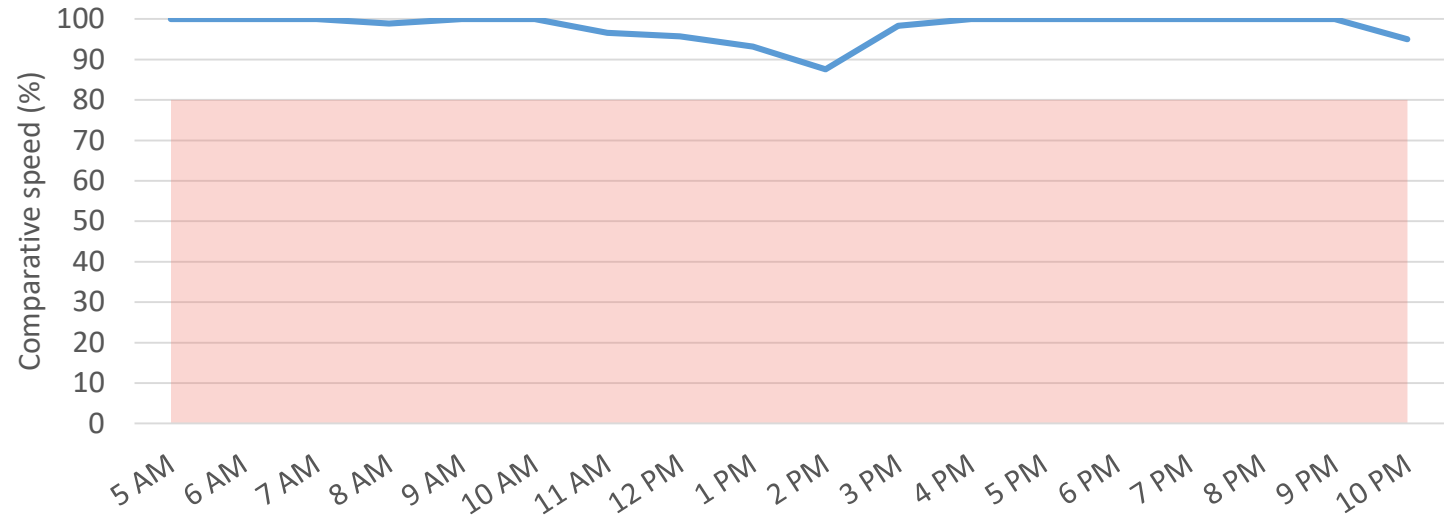


Corridor: I-75 (downtown to I-575)

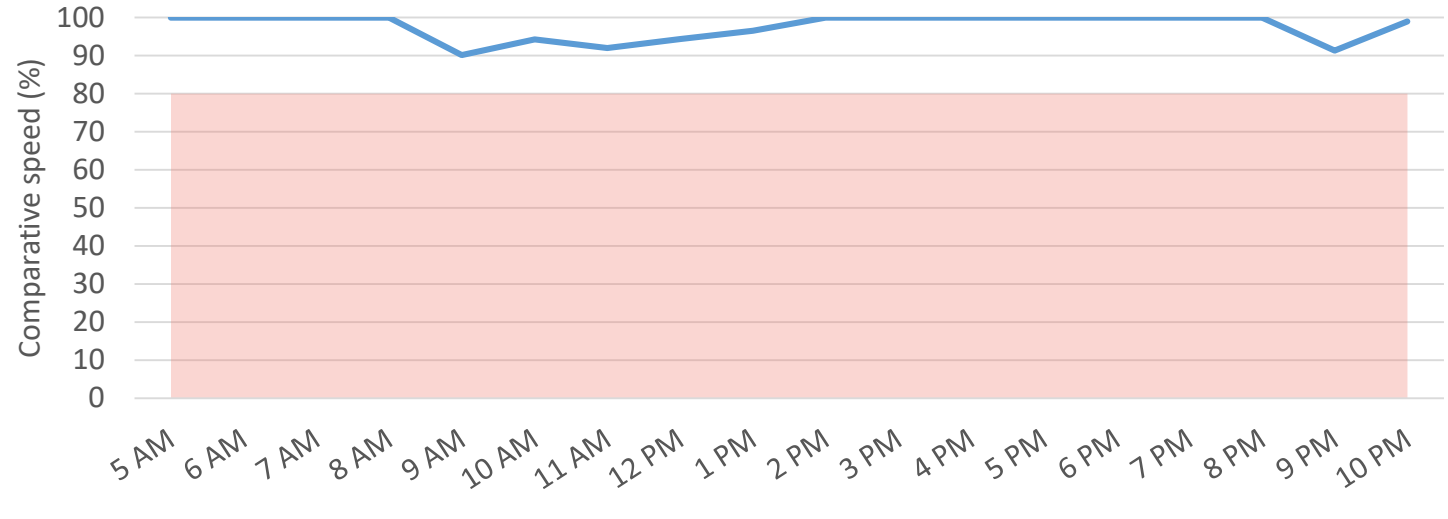
- The **blue line** in the chart shows **comparative speed**, which is the speed of traffic for that time measured as a percentage of historic average speed for that day/time.
- For example, if “normal” traffic speed is 40mph, 100% would represent 40 mph and 50% would represent 20 mph
- The **red area** on the chart highlights where speed has dropped **below 80 percent** of historic average speed.



I-75 (downtown to I-575) northbound, average of April 3 - April 6

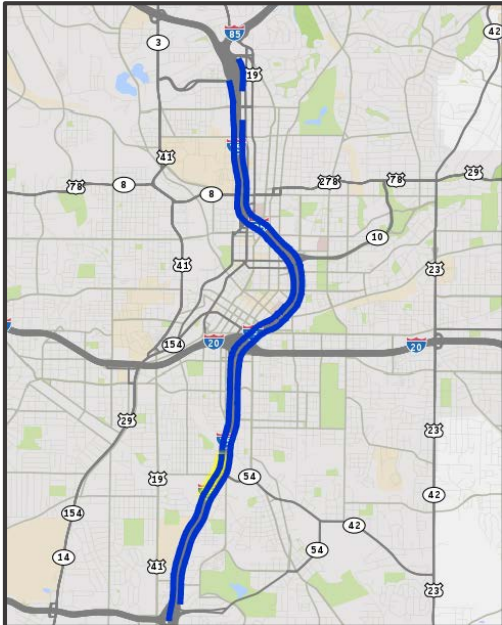


I-75 (downtown to I-575) southbound, average of April 3 - April 6



Corridor: I-75/85 (Brookwood split to I-85 S split)

- The **blue line** in the chart shows **comparative speed**, which is the speed of traffic for that time measured as a percentage of historic average speed for that day/time.
- For example, if “normal” traffic speed is 40mph, 100% would represent 40 mph and 50% would represent 20 mph
- The **red area** on the chart highlights where speed has dropped **below 80 percent** of historic average speed.



I-75/85 (Brookwood split to I-85 S split) northbound, average of April 3 - April 6

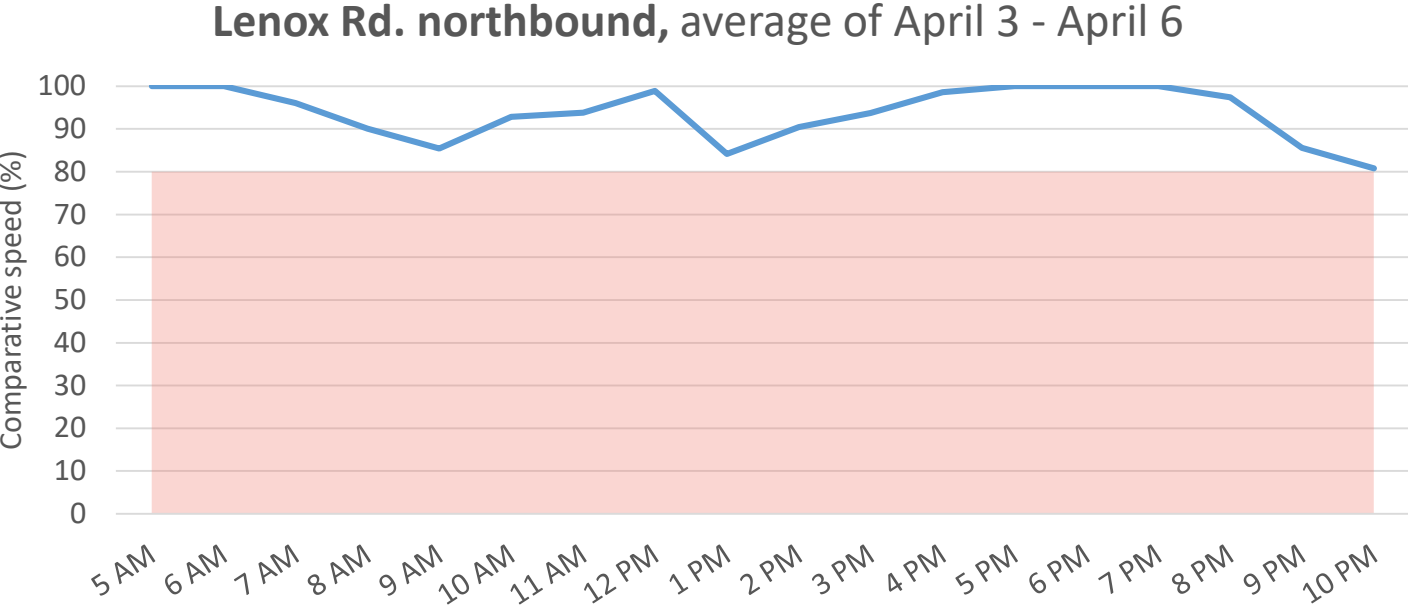
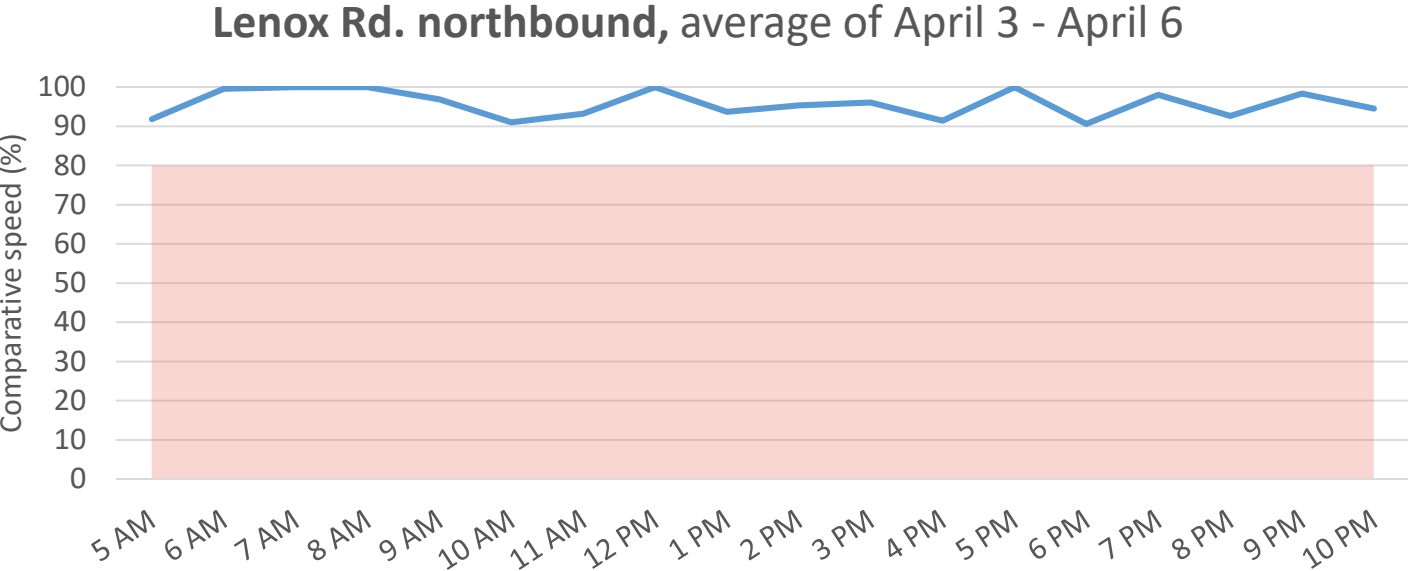
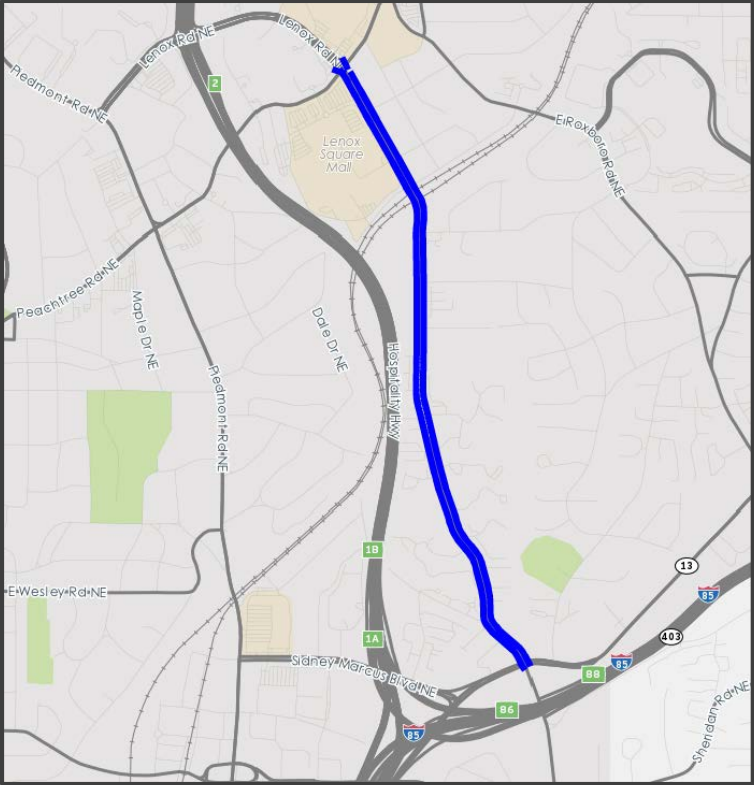


I-75/85 (Brookwood split to I-85 S split) southbound, average of April 3 - April 6

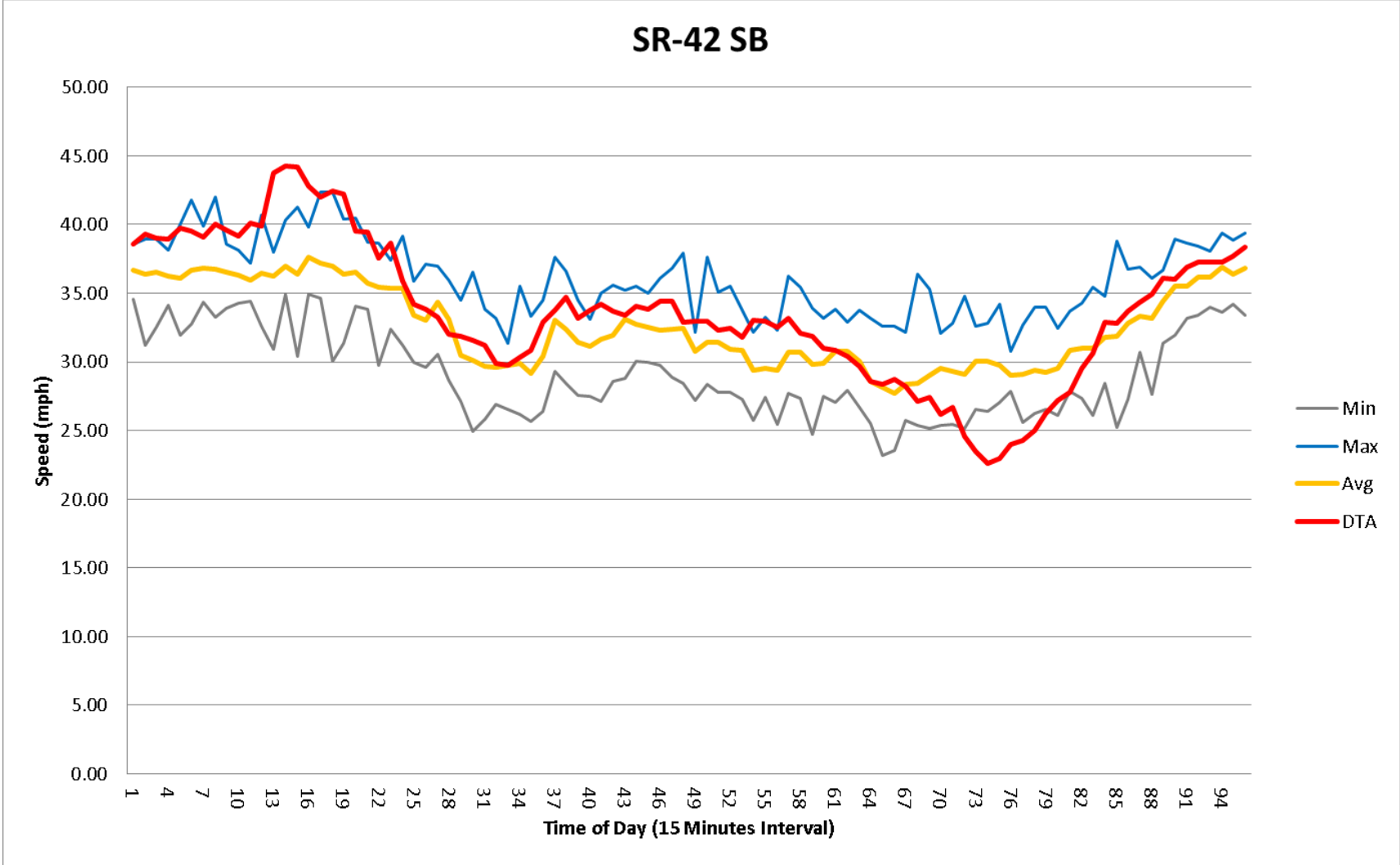


Corridor: Lenox Rd

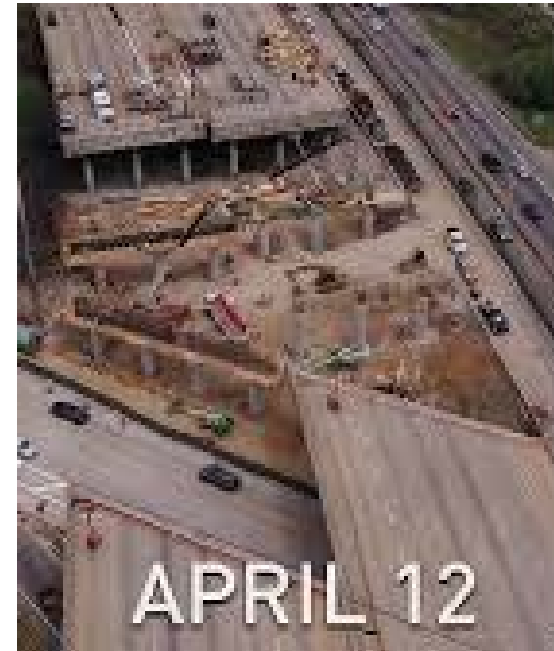
- The **blue line** in the chart shows **comparative speed**, which is the speed of traffic for that time measured as a percentage of historic average speed for that day/time.
- For example, if “normal” traffic speed is 40mph, 100% would represent 40 mph and 50% would represent 20 mph
- The **red area** on the chart highlights where speed has dropped **below 80 percent** of historic average speed.



State Route - 42 South Bound INRIX vs. DTA Speeds

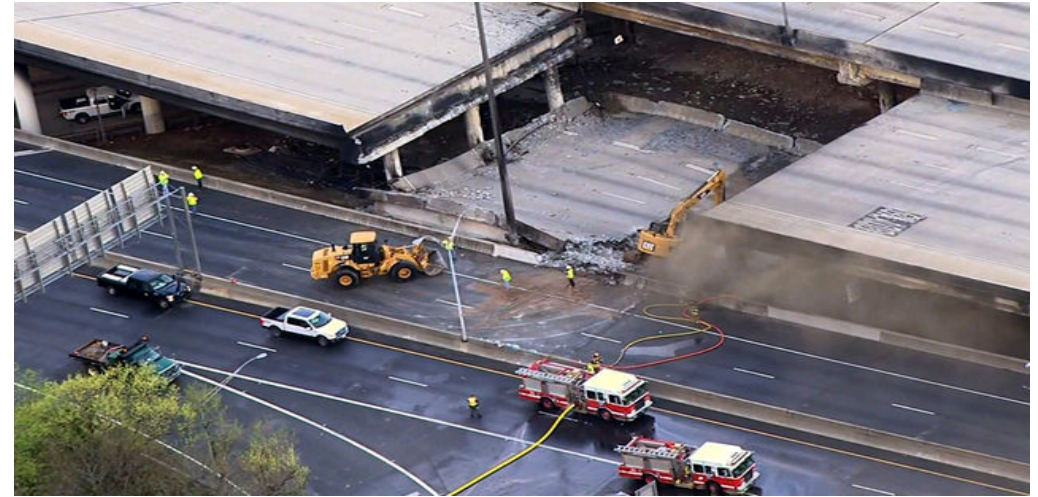


March 30 2017 I-85 Bridge Collapse Travel Patterns Analysis with Streetlytics Data



I-85 Bridge Collapse

- **March 30 2017**: Fire underneath I-85 NB caused the bridge to collapse and altered the commutes for hundreds of thousands of commuters.
- Around **250,000** trips go through the impacted area each weekday.
- Eastern half of the I-285 perimeter impacted the most, but travel was impacted all throughout the region, with a minimum of **30%** increase in volumes across network.
- Many MARTA stations, especially those in the northern part of the region, have experienced large **increases** in ridership after the bridge collapse.
- **75%** of the businesses in the area have experienced a loss of customers due to the collapse.
- **Bridge reopened on May 15, 6 weeks later ...**



Who travels on I-85?

<http://arcg.is/0LC1mW>

- The affected area on I-85 is a critical link in the transportation network
- In the morning travel period, trips routinely flow from as far south as Newnan and from as far north as Cumming

Trip Origins

Trip Destinations

Green = trip origins

Blue = trip destinations



Source: Streetlytics

Externals Model Update with Airsage Data

- Work is about to get underway
- Airsage Data Processing & External Model Update Methodology
 - Define Zone Structure
 - Create Equivalencies between External Stations and External County Zones (multiple stations will fall within an external county zone)
 - Comparison of OD Trips to Traffic Counts as **Validation** of Data Integrity
 - Factor External OD Trips to Match Traffic Counts & Verify Travel Patterns
 - Data Disaggregation by Time Period, then Convert from OD to PA Format
 - Assign Disaggregated OD Trips to Highway Network and Perform Additional **Validation** of Data Integrity
 - Trip Generation & Compute Accessibility Terms to External Stations
 - Trip Distribution & Prepare Average Trip Length Targets & Frequency Curves for **Calibration**, then **Calibrate** Friction Factors to Match Observed Trip Lengths & Frequency Curves

I-285 @ GA-400 Interchange Reconstruction Commute Options with Streetlight Data

- Goal: Better Understand Travel Behavior Using Origins and Destinations with Select Links for Different Employment Centers
 - Trip Duration & TLFD
 - Commercial Trips & Personal Trips
 - Provide Alternative Commute Options to Travelers Affected by Interchange Reconstruction

The screenshot displays a software interface for configuring project options. It is divided into two main sections:

1. Input Your Zones

Gates, Segments, or Areas

This section contains three maps. The first map shows a regional view with several orange-shaded zones. The second map is a detailed view of a highway interchange with yellow and purple highlighted segments. The third map shows a specific area with blue-shaded zones.

2. Set Up & Specify Project Options

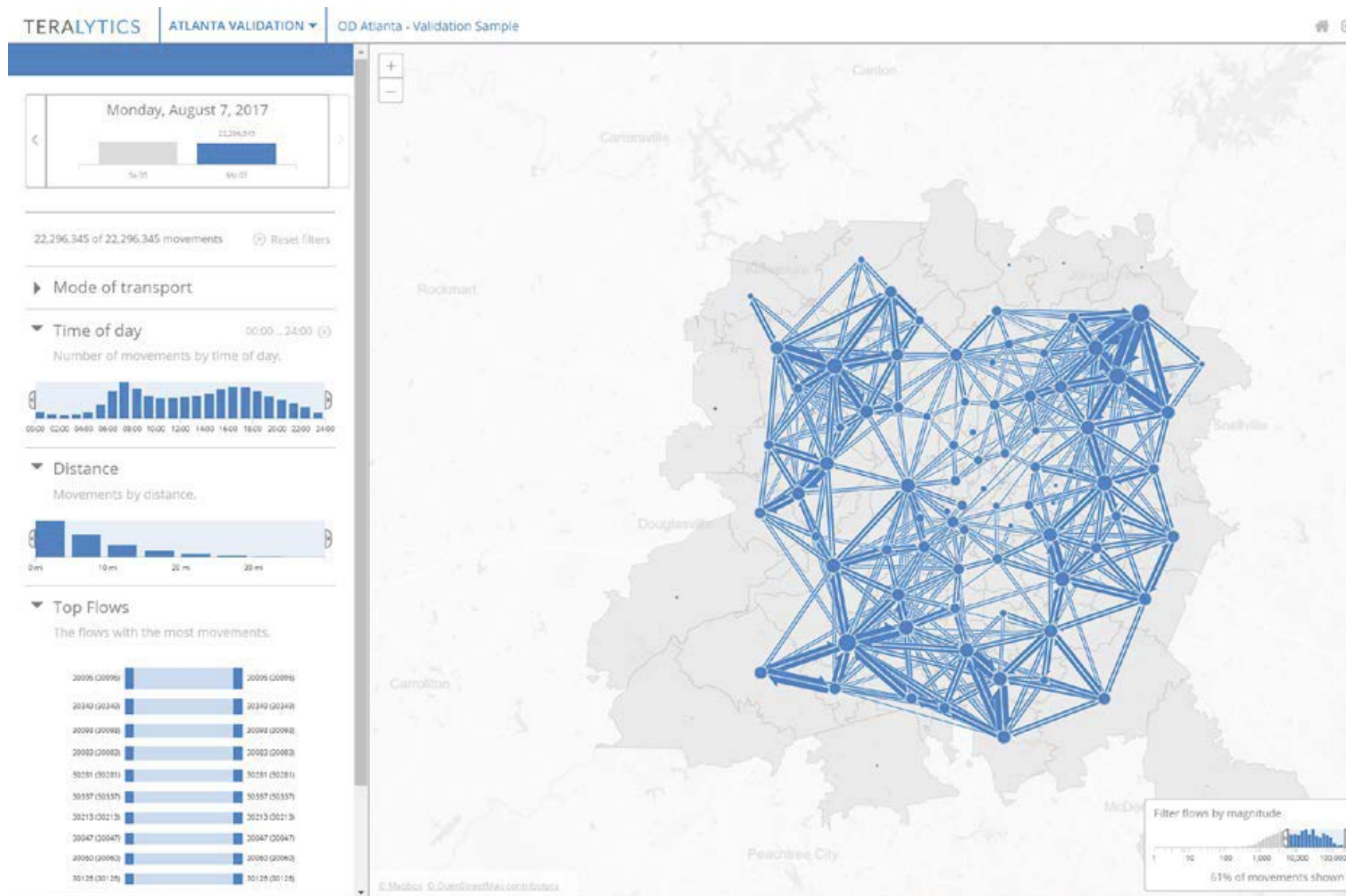
Standard Options

This section contains a configuration panel with tabs for "Date Periods", "Day Types", "Day Parts", and "Other Options". The "Day Parts" tab is active, showing a table for defining day parts:

Day Part Name	Start Time	End Time
Early AM	12am	6am
Peak AM	6am	10am
MidDay	10am	3pm
Peak PM	3pm	7pm
Late PM	7pm	12am

At the bottom of the panel, there is a button labeled "Add New Day Part".

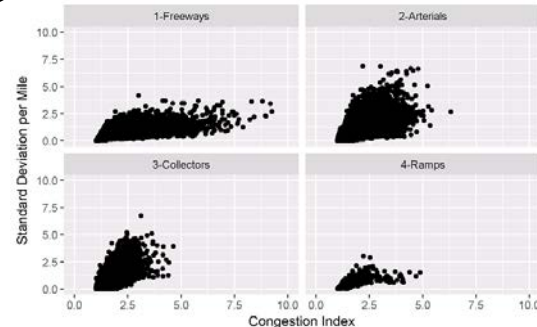
Regional Origin-Destination Analysis with Teralytics Data (Work NOT yet Underway)



~~VDF~~ Volume-Delay-Reliability Functions (SHRP2 L04) with NPMRDS Data

- Roadway link-level reliability measures were estimated to establish VDRF functions to replace the standard VDFs in highway assignment
- Functions fully segmented by link function class types

- Freeways
- Arterials
- Collectors/locals
- Ramps



- Standard Deviation (SD) of travel time per mile is the explored dependent variable.
- The main independent (explanatory) variable was Congestion Index (CI) which is a ratio of average travel time to free-flow time