

# Estimating Mobility Improvement Benefits Using Private Company Speed Datasets

**NATMEC**  
**May 2016**

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# Presentation Overview

- Data for mobility performance measurement
- Delay calculation process
- Options for estimating delay benefits
- Incorporating mobility treatments



# *Our Mobility Data World*

- Roadway inventory data (HPMS or state DOT)
  - AADT
  - Lanes
  - Truck percentages
- Speed data
  - Average week
  - Every 15 minutes of the year



# *The Speed Data*

- Various sources/companies
- Average week of the year
  - 672 speeds (7 days x 96 15-minute periods)
  - +/- million miles of coverage
- Reference or freeflow speed
  - Some have this, others need to calculate it



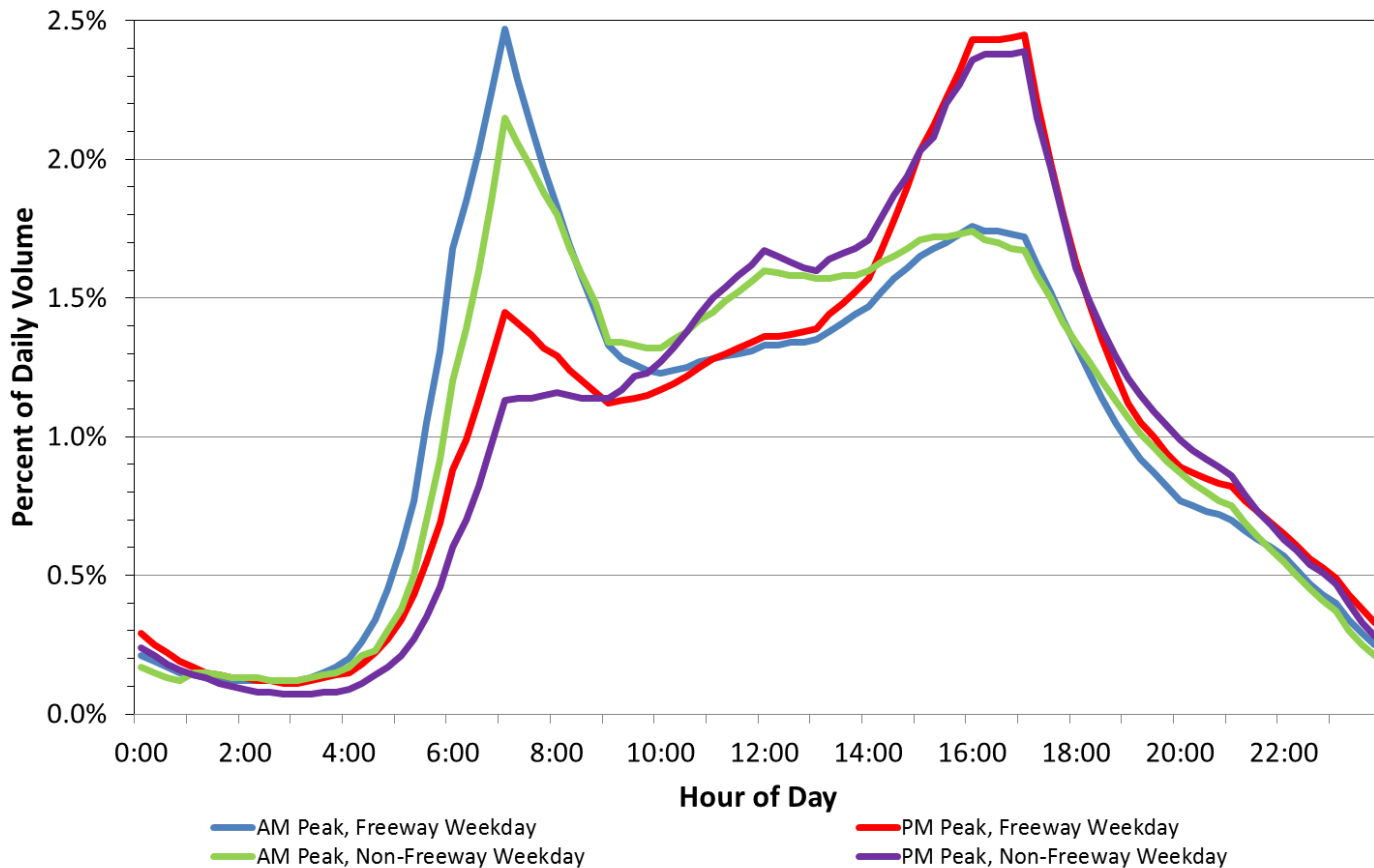
# *15-Minute Volumes*

- Average annual daily traffic counts
- Use speed data to help generate 15-minute volumes
  - AM or PM peaking?
  - How much difference between peak speed and freeflow?

# 15-Minute Volumes

- 16 curves for mixed vehicles, 6 for trucks

Weekday Traffic Distribution Profiles - Low Congestion (15 Minute)





# *Delay Calculation*

- Conflation of networks
- 15-minute volumes and speeds together
- Freeflow or reference speed
- Calculate hours of delay in each of the 672 bins of the average week

**So how do we get there?**





# *Different Methods to Estimate Benefits*

- Dilemma: How can we use the existing speed data from private providers to estimate future mobility levels?
- Possible options:
  - Apply a straight delay reduction percentage
  - The effects of all treatments have to be tied back to amount of capacity increase provided (eg, what is the new lane-equivalence provided by the treatment?)



# *Lane-equivalence Method*

- Assign a lane-equivalence to each treatment at a location
- Can tailor for each location
- Added capacity can differ
  - Eg, auxiliary lane in 4 lane vs 8 lane
- Allows for traffic growth as well and thus a “no build” scenario



# *Lane Equivalence Examples*

- Local agencies set these equivalencies and they may vary depending on the application

## Examples

- Mainlane = 1
- Reconfigure ramps = 0.25
- Ramp metering = 0.75
- Service patrols = 0.5
- Signal coordination = 0.5
- Direct connect reconstruction = 0.5
- Auxiliary lane = 0.25
- Others



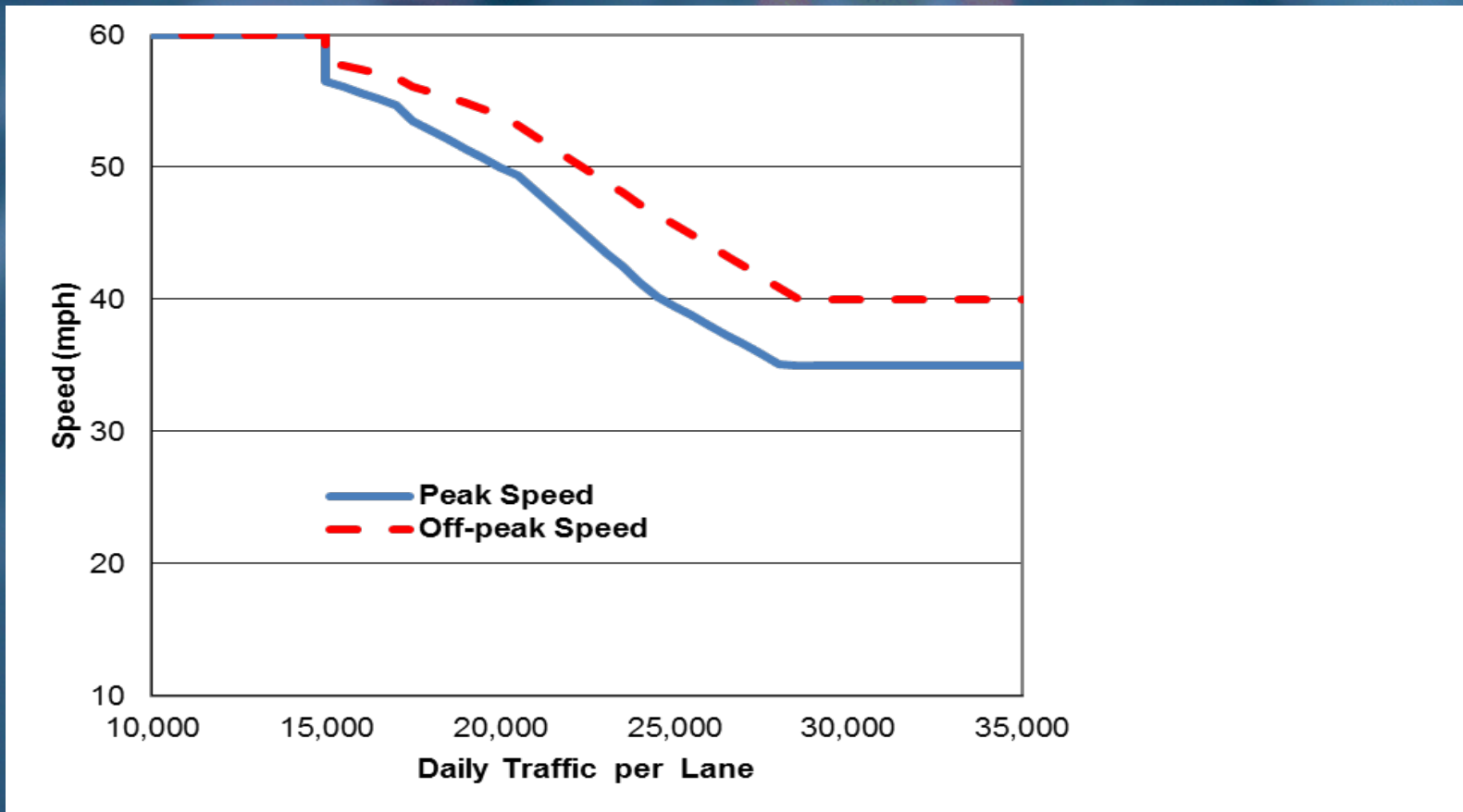
# *Old Speed Estimation Method*

- AADT and Lanes generate traffic density
- Not much speed data available.
  - speed data from TMCs create an estimation process.
- Different curves for freeways and arterials
- Peak and off-peak directions
- Peak period average speeds



# Old Speed Estimation Method

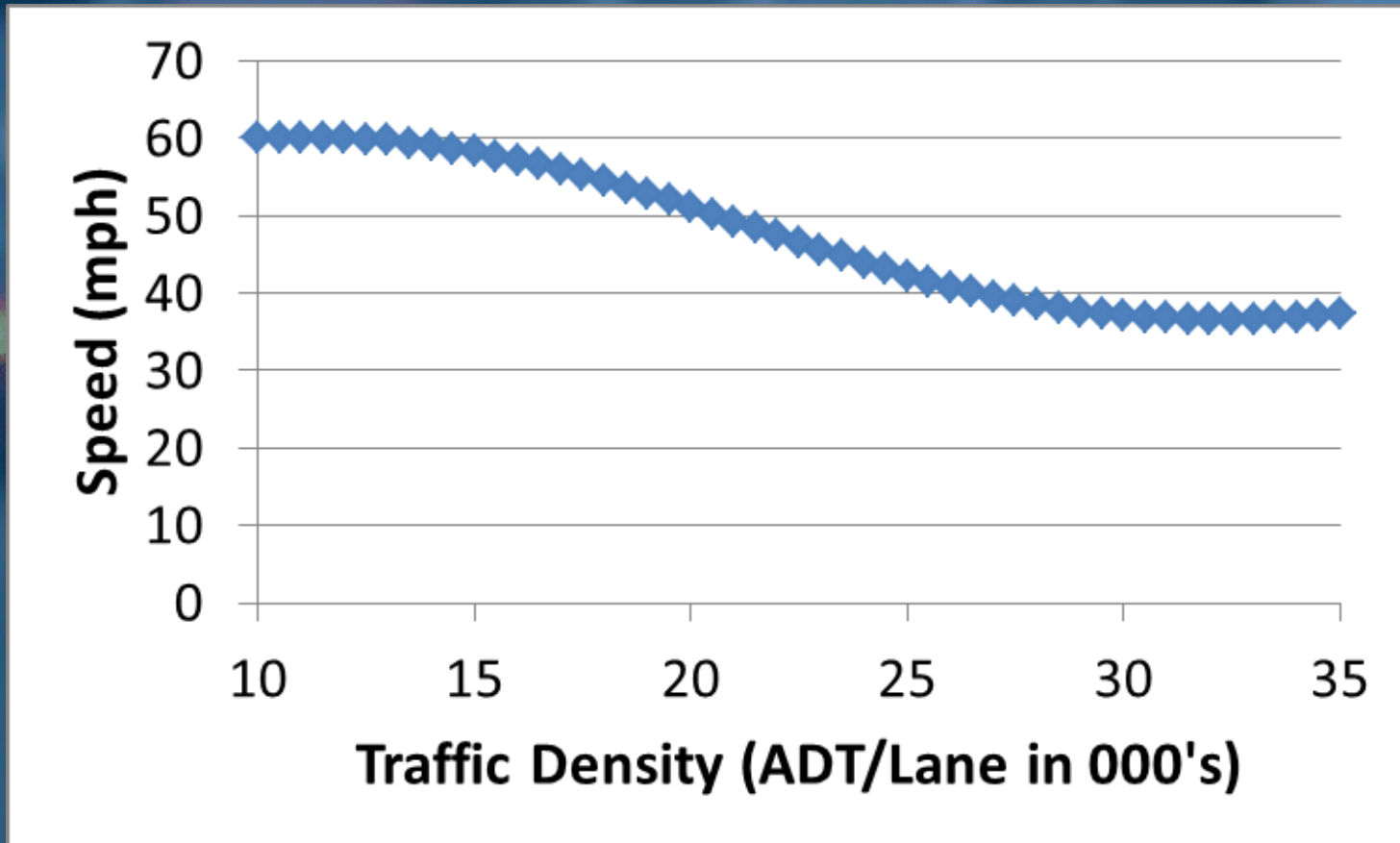
- Peak and offpeak direction freeway curves





# Old Speed Estimation Method

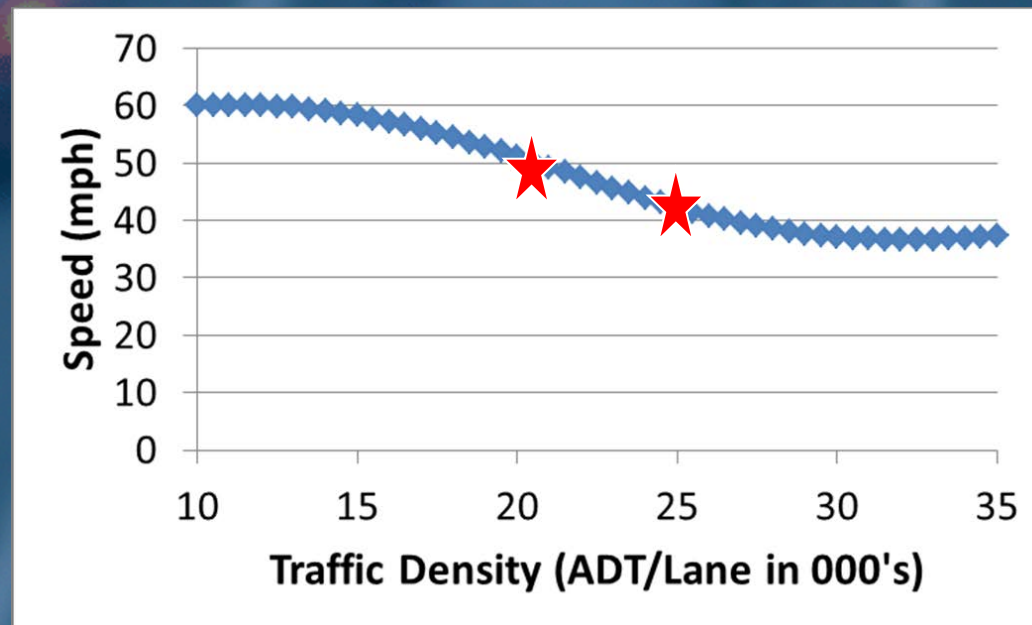
- Blended Freeway Curve





# Calculations (Lane adjustments)

- Determine the speeds associated with the before and after ADT/Lane
- Calculate the travel rate (min/mile) of before versus after and determine the percent change in travel rates.





# ***Final Performance Measures***

- Apply the travel rate percent change to the travel rate for each of the 672 observed speeds at that location
- Re-calculate the delay-based measures with the new speed sets and original 15-minute volumes
- Compare original delay-based measures against the new set to determine the overall impact of the improvement



# Conclusions

- Can estimate benefits of potential treatments
- There is not just one way to do this.
- Remember that whatever way you decide on needs to be flexible because treatments don't have the same impact at any two locations
- Can estimate future roadway conditions using same method but growing the volumes rather than changing the capacity.
- Remember: the answers are ***ESTIMATES***



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