A photograph of a busy street intersection with traffic lights and cars, overlaid with text. The image is faded and serves as a background for the title and author information. A green street sign for 'East Avenue' is visible in the upper center. The text is centered and reads:

Montgomery County Signal Timing Optimization

Keith Riniker, PE, PTOE
2005 Baltimore Signal Forum

MSHA Signal Timing Program

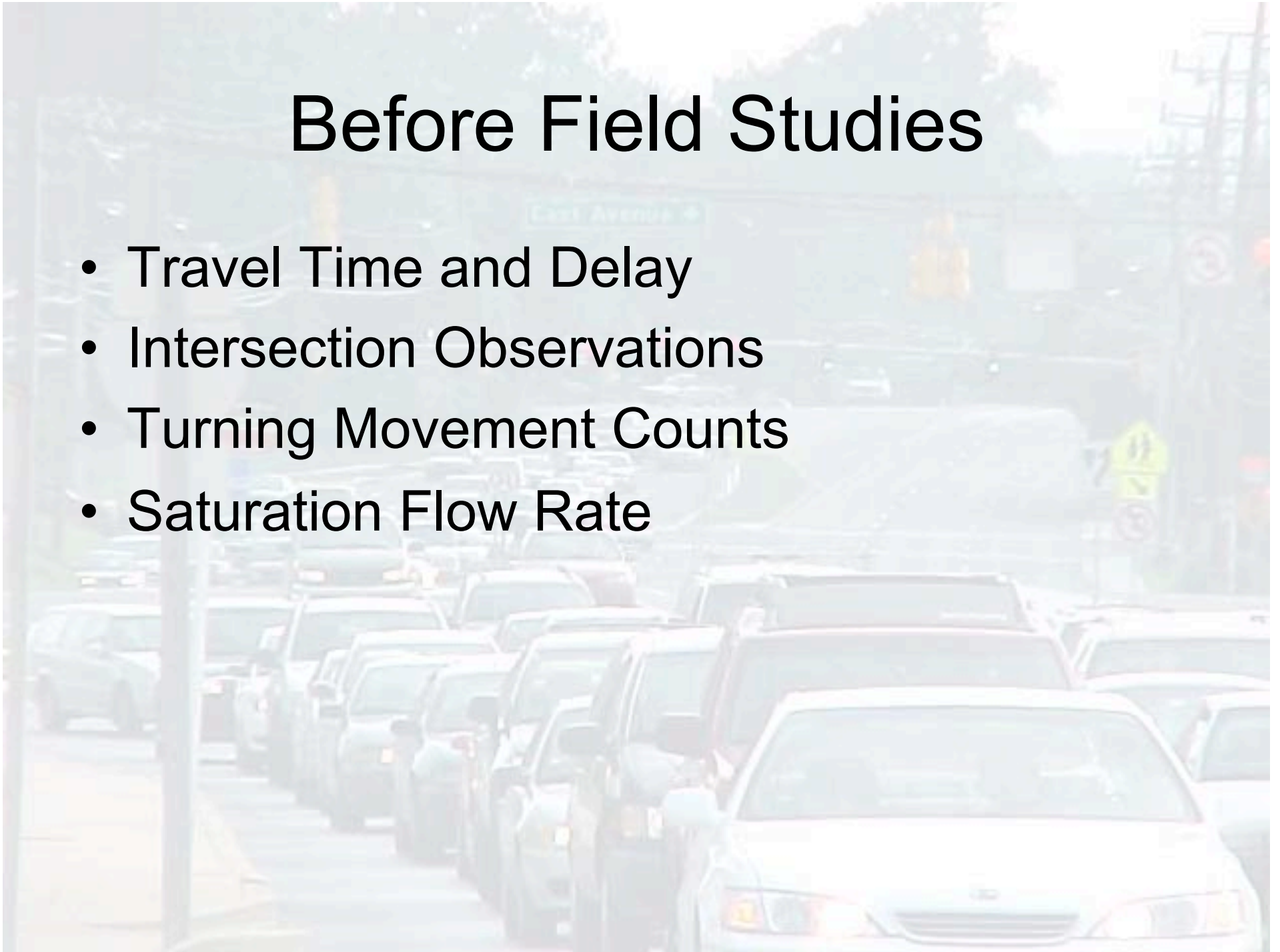
- 3-Year Cycle
- SHA Business Plan goals
- Montgomery County TMC
- Project Goals: Synchro Database and Include in 3-Year Cycle
- Montgomery County corridors
 - MD 185
 - MD 97
 - US 29
 - MD 355
 - MD 190
 - MD 28
 - MD 586
 - MD 193
 - MD 124
 - MD 117
 - MD 119

FY 2005

FY 2006

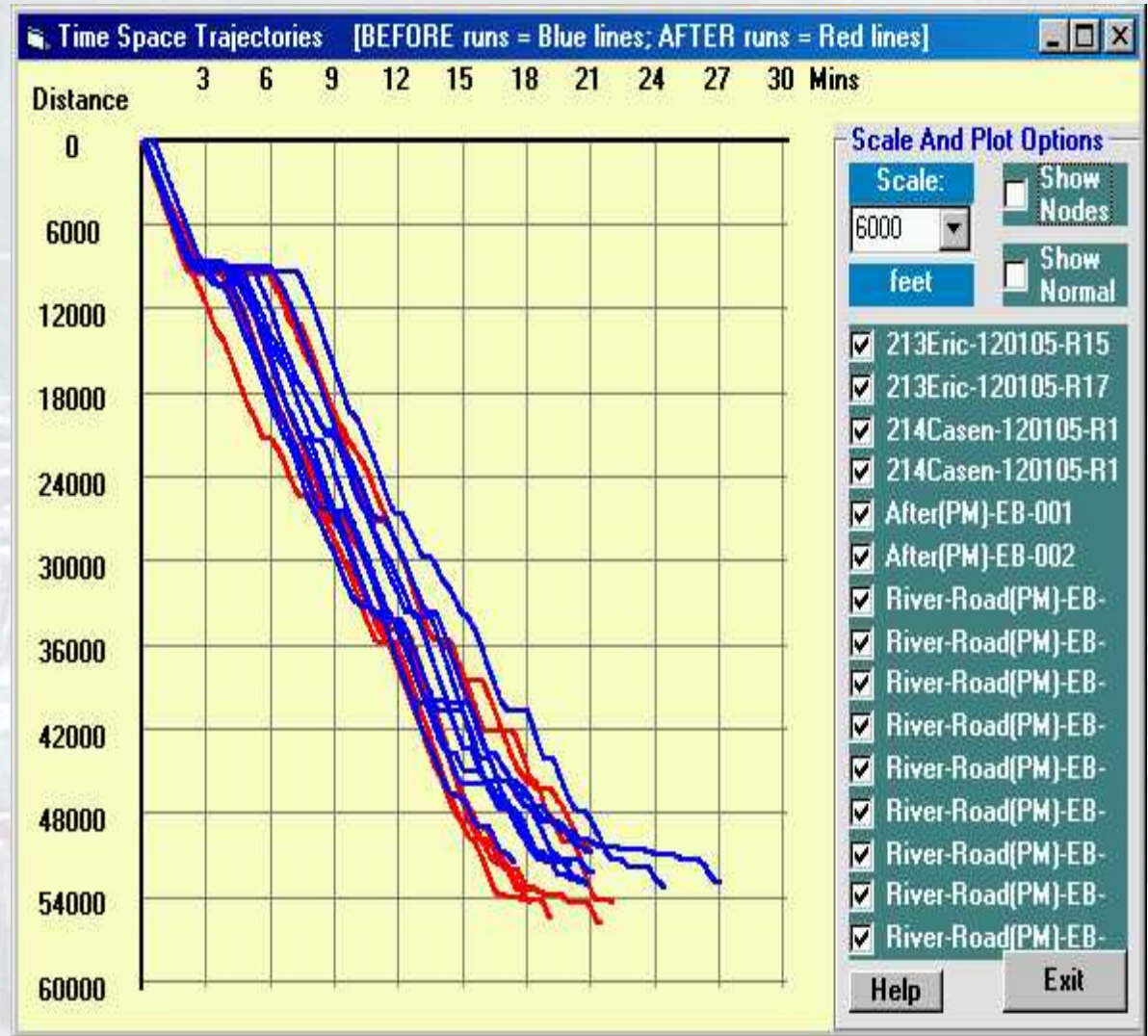
Before Field Studies

- Travel Time and Delay
- Intersection Observations
- Turning Movement Counts
- Saturation Flow Rate



Travel Time and Delay

- Establish Base Conditions
- Calibration Measure
- GPS Devices



Calibration

- Calibration: **modify inputs to make the model match field conditions**
- Calibration Measures
 - Volume Balancing
 - Saturation Flow Rate
 - Link Speeds
 - PHF
 - Pedestrian Volumes (CBD)

Validation

Accuracy

+ - 5%

+ - 5%

7%

* 2

? + - 14%

+ - 5%

+ - 5%

? + - 21%

Delay Computation Variable

Typical accuracy of volume counts

Typical accuracy of saturation flows calibration

Total = Combined v/c error

Magnification of v/c error when v/c is $> +0.9$

Total = raw delay error

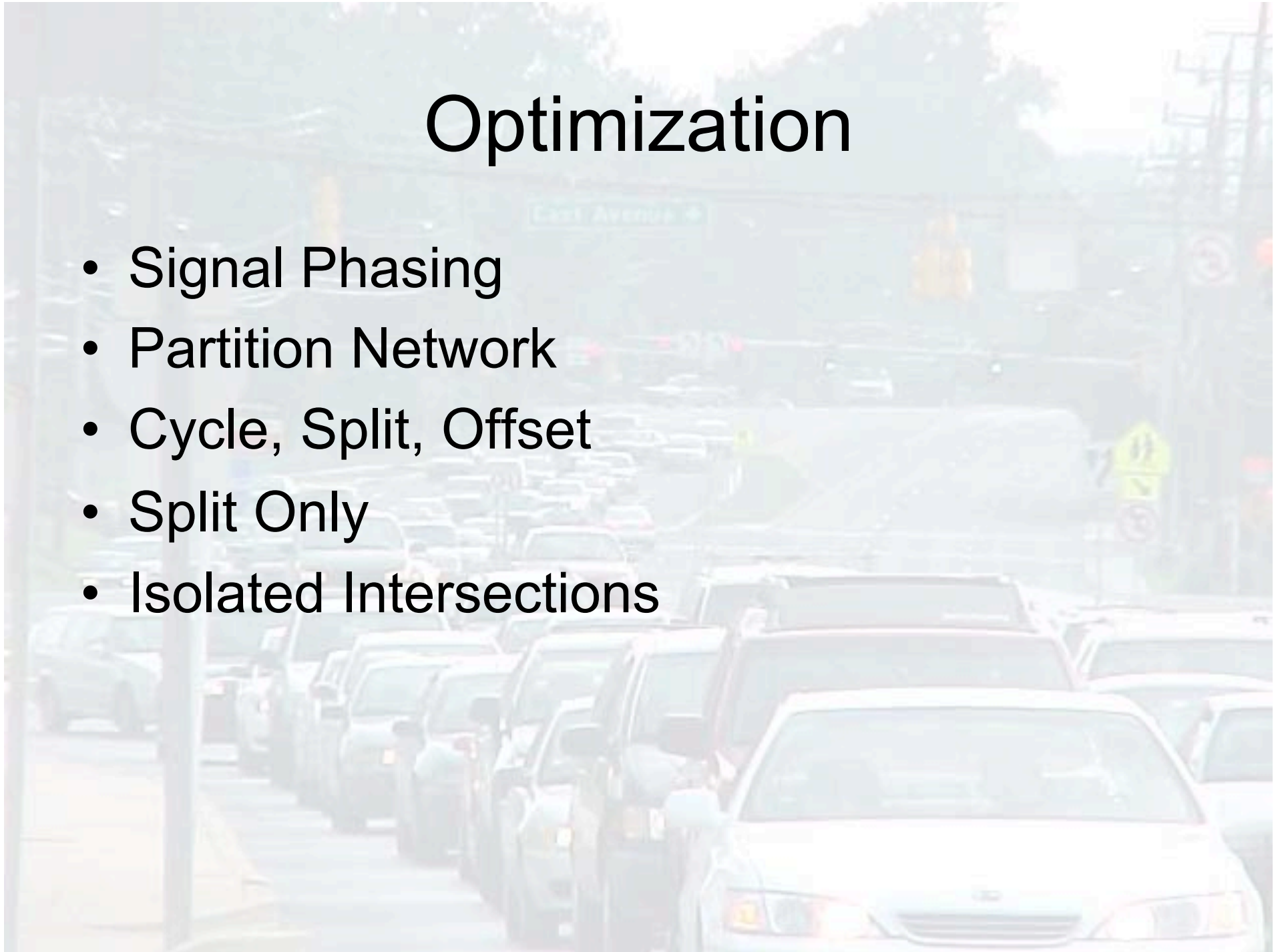
Uncertainties about signal timings

Uncertainties about lost time

Expected Accuracy

Optimization

- Signal Phasing
- Partition Network
- Cycle, Split, Offset
- Split Only
- Isolated Intersections



Implementation, Fine Tuning and After Studies

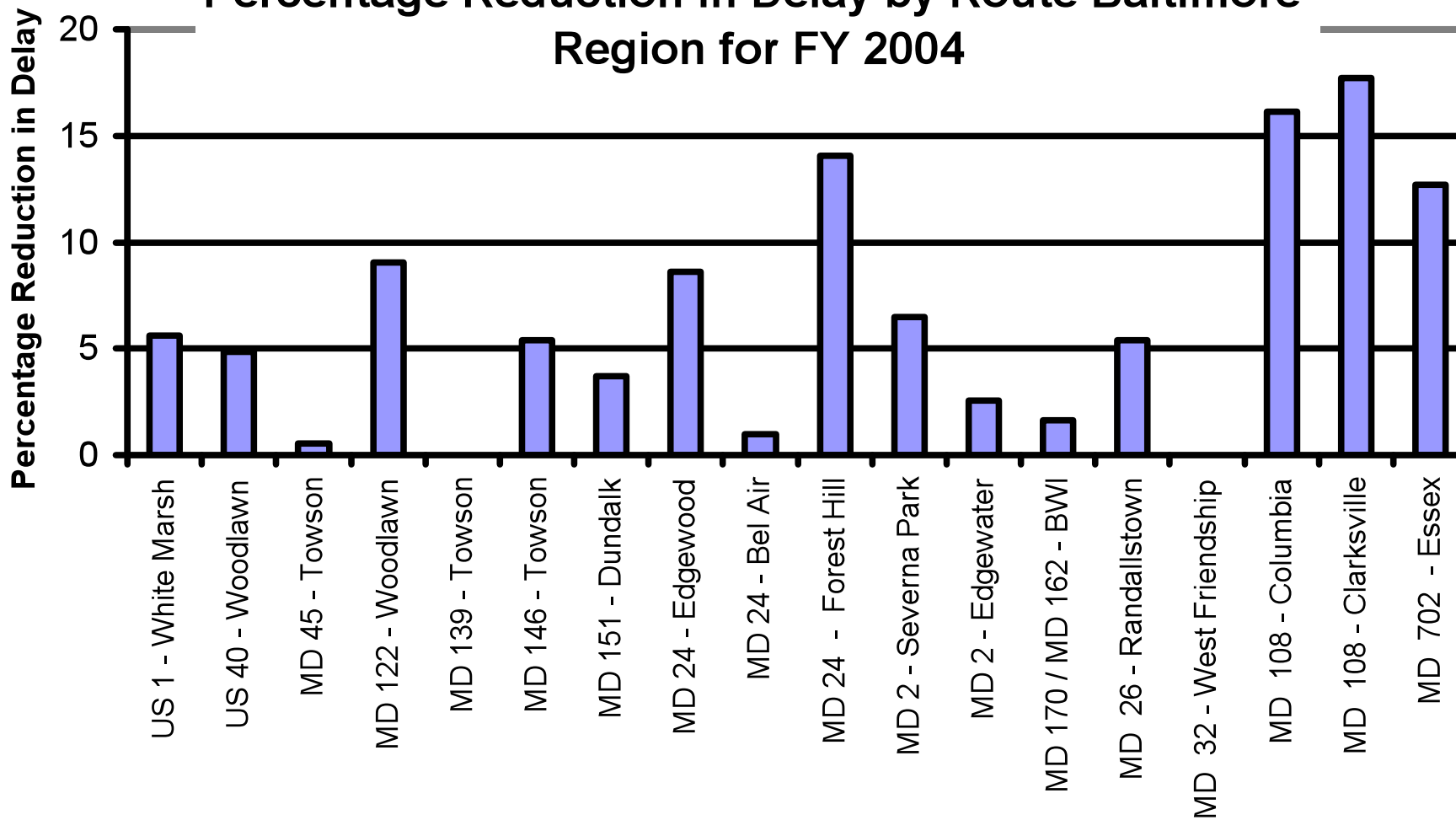
- Implementation
- Fine Tuning
 - Airplane
 - Surveillance Cameras
- After Studies
 - Travel Time and Delay



Benefits

- Shorter Travel Times, Fewer Stops, Lower Emissions, Reduced Fuel Consumption
- Montgomery County
 - 0% to 30% decrease in signal delay
 - 0 to 3 mph increase in travel speeds
 - 0 to 4 minute decrease in travel times
- Statewide Experience (FY 2004 data)
 - 6% decrease in travel time
 - 20% decrease in signal delay
 - 3% decrease in fuel consumption
 - 55:1 Benefit-to-Cost Ratio

Percentage Reduction in Delay by Route Baltimore Region for FY 2004



Percentage Reduction in Delay by Route: DC Region for FY 2004

Percentage Reduction in Delay

