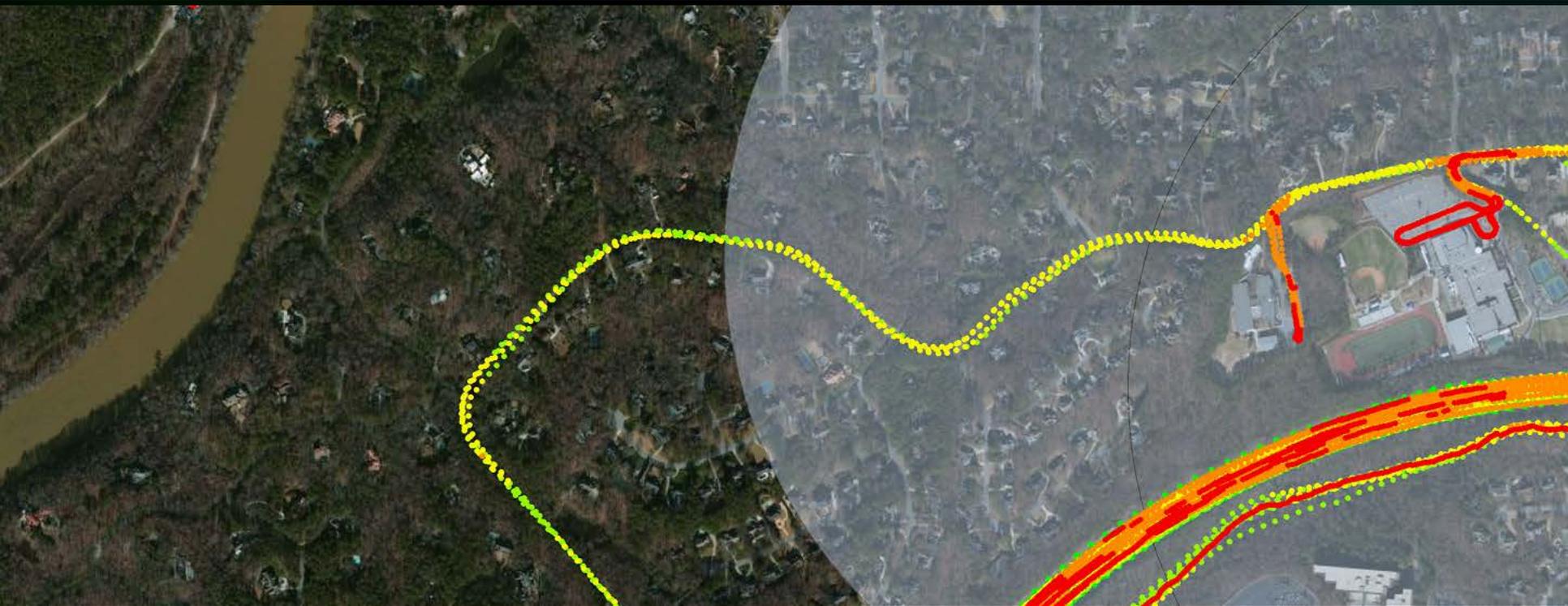




Using GPS-based HTS data for Identifying Operational Transportation System Needs at the Community Level



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The main idea....

- Budgets and schedules for major transportation investment prohibit any short-term impacts
- ITS and data-driven planning processes are focused on the high-volume facilities where data is available and site specific strategies have the biggest quantifiable impact
- Significant travel delays for residents of a region occur on lower volume roads
- Small scale operational improvements are effective and can be systematically identified through personal travel data

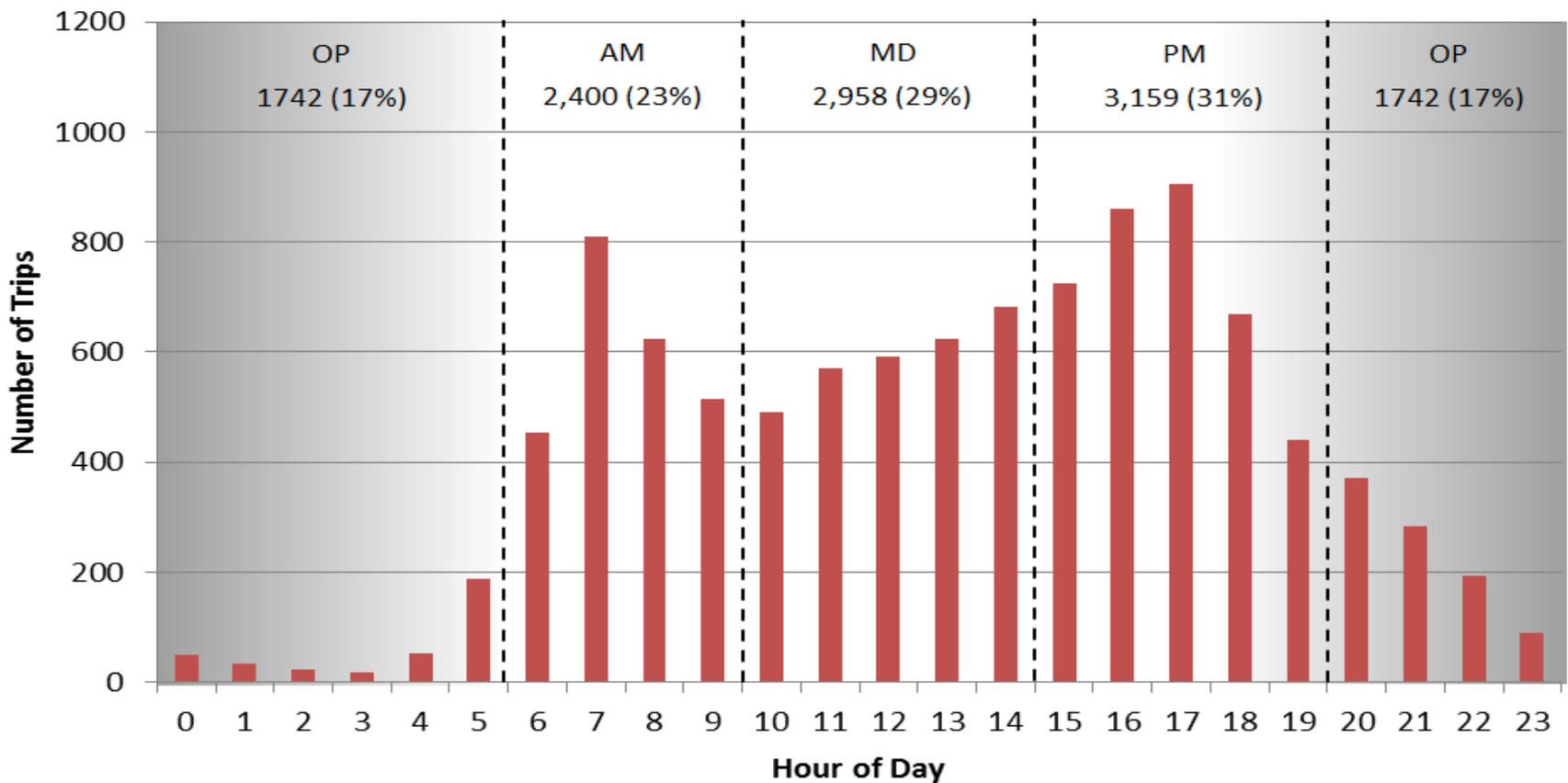


The data...

- GPS portion of Atlanta Regional Household Activity Survey from 2011
- Main survey conducted by NuStats and GPS component conducted by GeoStats (subcontractor)
- GPS trips that traveled on freeways were selected for the analysis (>10,000 trips)



The data ...





Link-matching and data prep

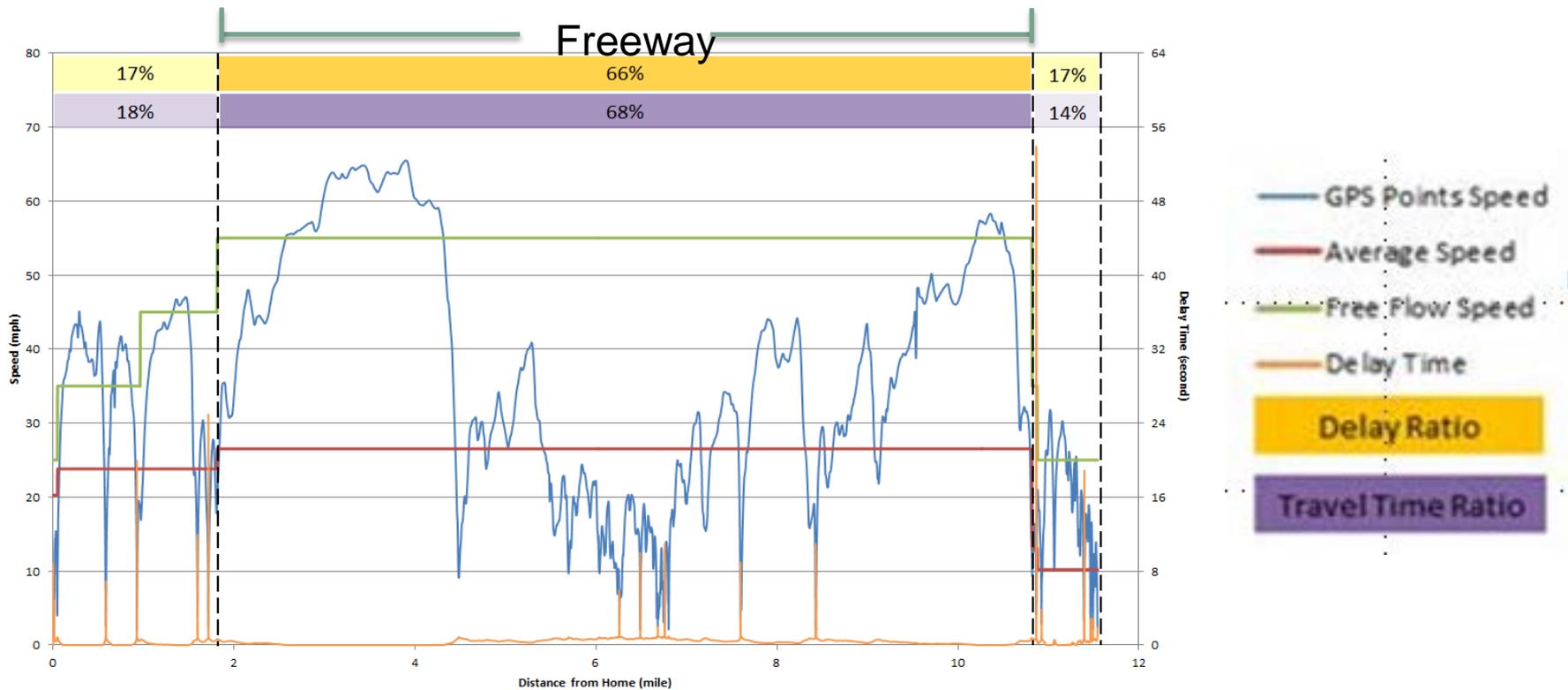
- GPS trips were “matched” to a roadway centerline database that included travel demand model baseline network data (IDs, functional classification, free flow speed, etc.)
- Final result is a sequence of links matched with GPS points
- Map matching process used a multiple hypothesis technique method which evaluated multiple candidate routes
- A scoring system which weighted distance and heading differences drove the selection of the final route



Link-matching and data prep

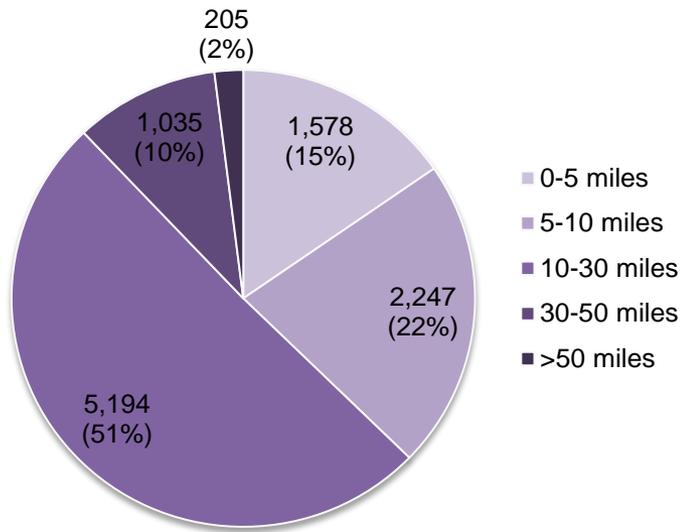
- Delay statistics were estimated for each link based on GPS speed and model network free flow speed
- Calculated values for trip delay components
 - From trip origin to the freeway
 - Freeway
 - From freeway to trip end

Typical HBW trip showing freeway congestion

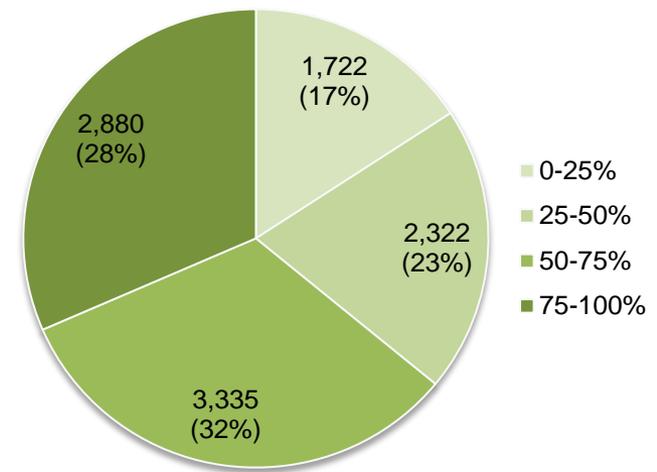


Overall Trip Statistics

Number of Trips by Distance



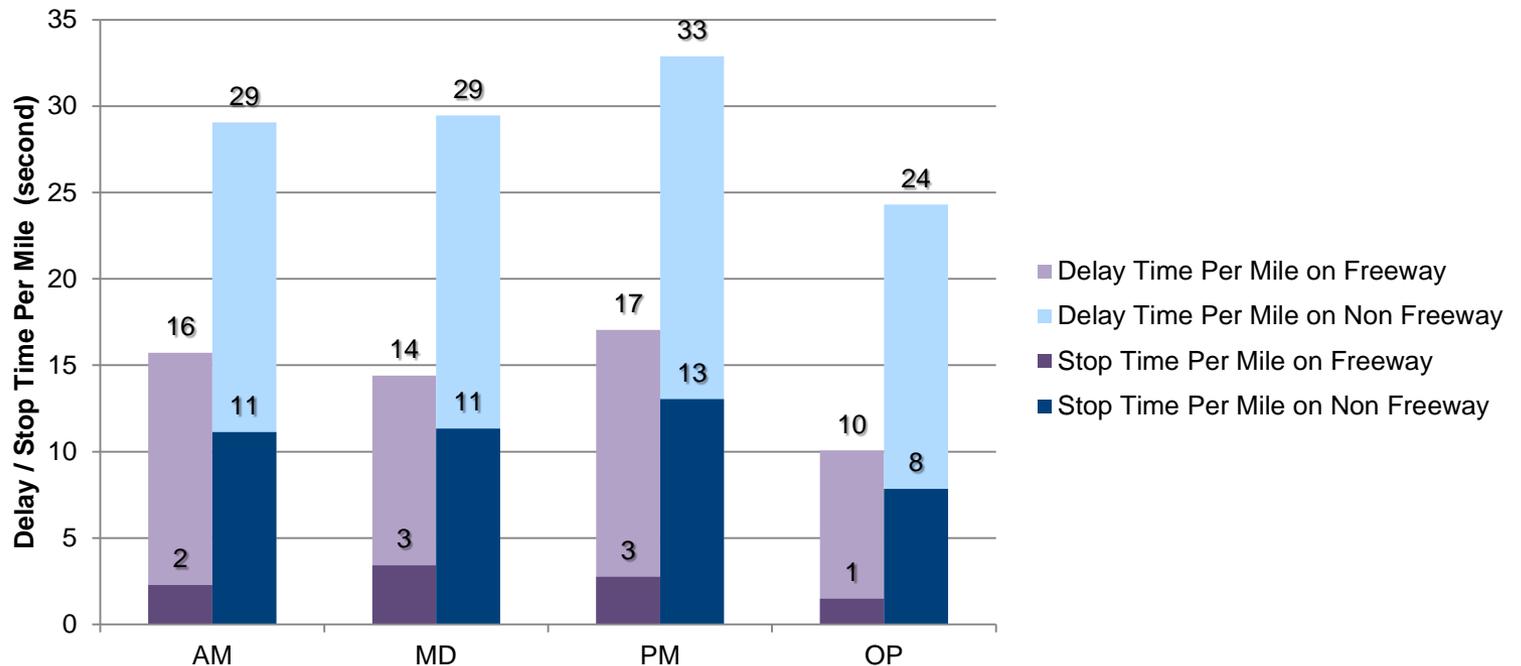
Number of Trips by Freeway Distance Percentage



* based on 10,259 GPS trips that occur on freeways.

Delay / Stop Time Per Mile

- Non-freeway delay is more than twice of freeway delay

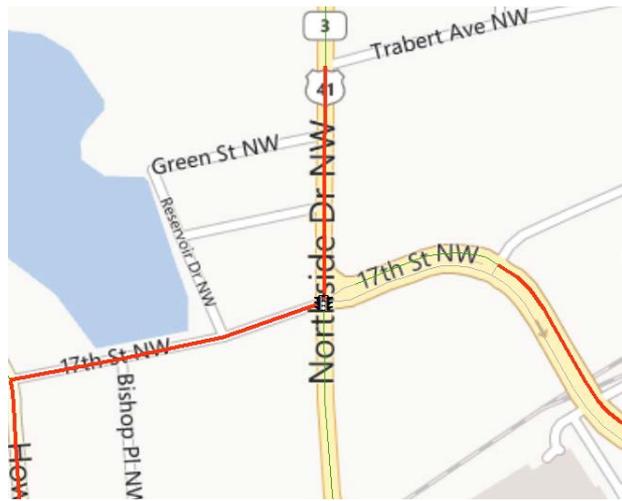




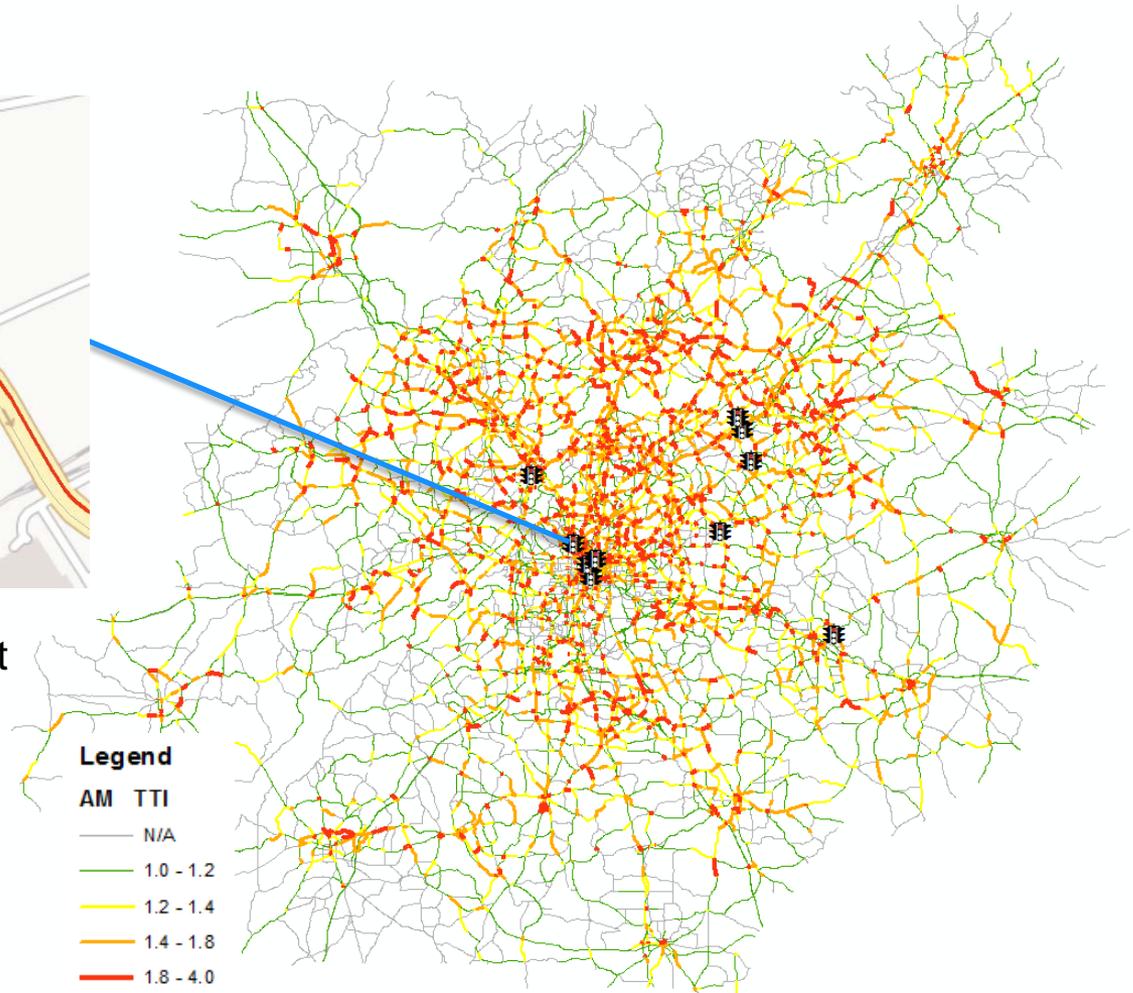
Identifying specific non-freeway locations with high delay values

- Calculate intersection delays
- Calculate turning movement delays
- Identifying neighborhoods with high non-freeway delays

Sample intersection ...



Northside Dr SB @ 17th St
AM TTI: 3.05
Runs: 11



Sample high delay left turn



Left turn from Atlanta Rd EB to on-ramp of I-285 NB.

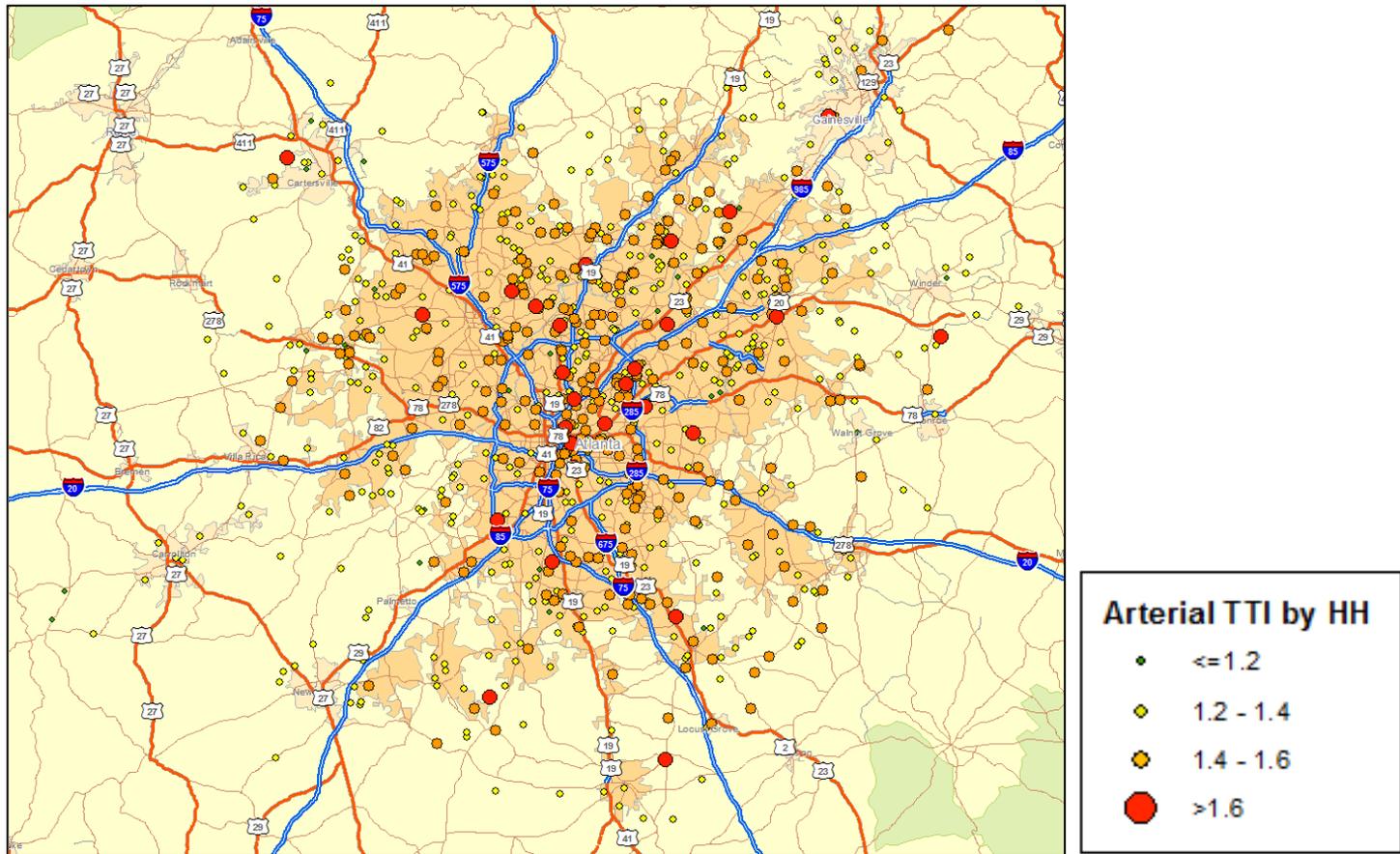
Try to get onto an extremely busy highway (I-285 Top End) with no separated left turn lane

TTI: 2.97

Sample listing/ranking of turning movement delays

Turn from	Turn to	Direction of Turning	TTI
Conners Rd WB	Mirror Lake Blvd SB	Left	2.93
I-285 SB off ramp	Camp Creek Pkwy EB	Left	2.89
I-285 NB off ramp	Camp Creek WB	Left	2.86
GA-138 EB	Jonesboro Rd NB	Left	2.83
State Bridge Rd SB	Kimball Bridge Rd EB	Left	2.82
I-285 EB off ramp	Ashford Dunwoody Rd NB	Left	2.73
Sidney Marcus Blvd WB	Piedmont Rd NB	Right	2.73
Evans Dr SB	Macon Hwy	Left	2.72
GA-138 EB	I-75 NB on ramp	Left	2.71
Peachtree Industrial Blvd WB	I-285 SB on ramp	Left	2.70

Identification of neighborhoods with high non-freeway delays





Findings

- Local road and intersection delays can be a significant portion of trip delays, even for those trips that use the major freeways
- Data used had a limited sample size that prevents an assessment of all facilities across all time periods, but large enough to identify and rank potential problem areas
- Quick use of GPS data for those areas that have large GPS datasets from their region
- Application of these techniques across a larger consumer database could prove very effective in finding and identifying major sources of non-freeway travel delay