NATMEC - Improving Traffic Data Collection, Analysis, and Use 2010

UTILIZING PRIVATE SECTOR COMPANY'S TRAFFIC DATA IN MOBILITY MONITORING AND TRANSPORTATION PLANNING

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Introduction

- Public agencies collect speed and travel time data to:
  - monitor and track mobility on roadway networks
  - evaluate transportation projects
  - calibrate and validate transportation models
- Current GPS probe car method:
  - expensive
  - low sample rate
  - Incomplete in spatial-temporal coverage
  - Infrequent update cycle
  - lack of data on arterial streets
- ……Is there any other option……..?

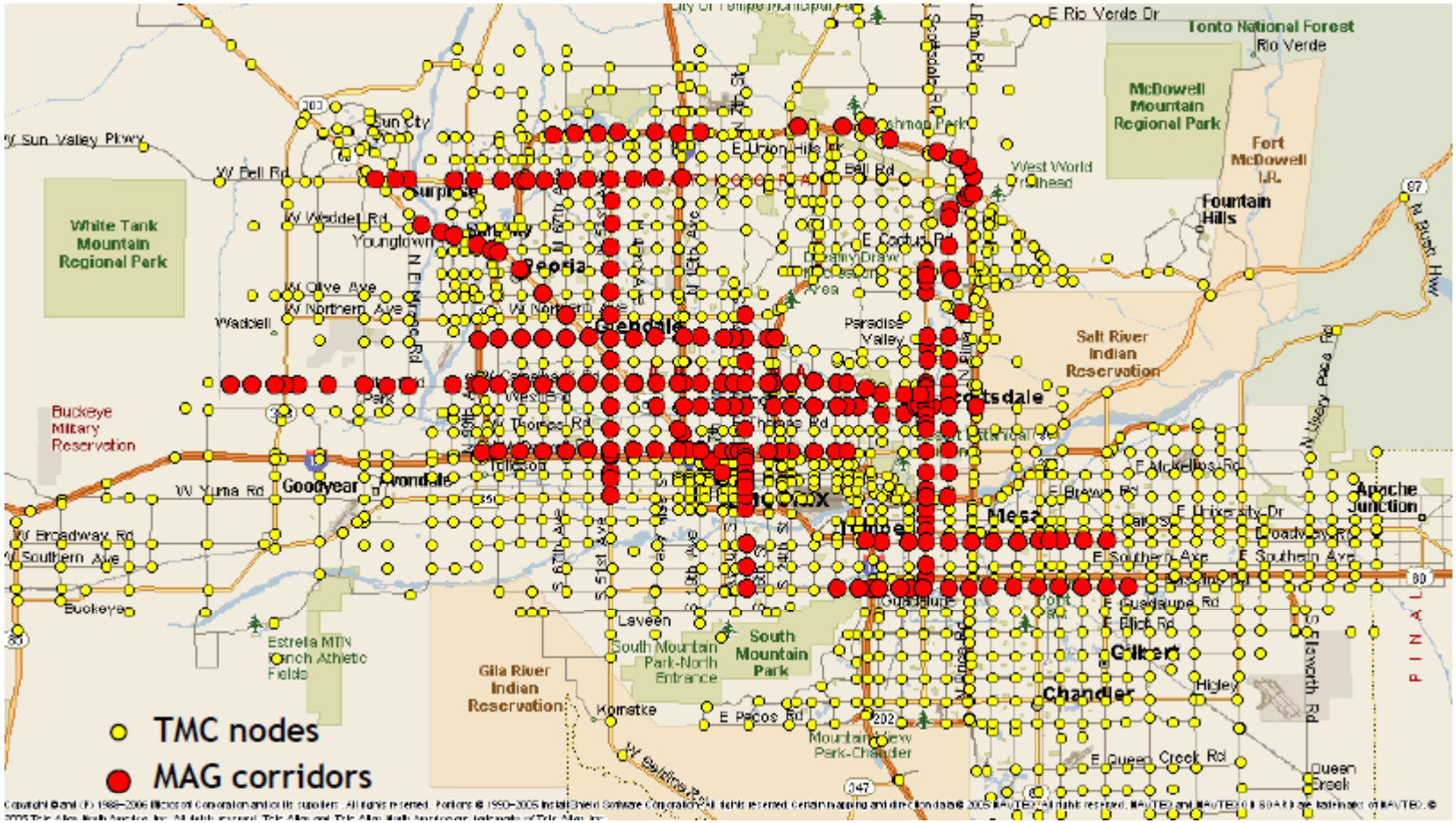
Introduction – private sector data

- Currently fleet-based, but evolving to consumer-based
- Emphasis on widespread traveler information – speed only, no volume
- Customer emphasis: web portals, auto, navigation device…etc
- Historical data highly valued – sometimes used to estimate real-time

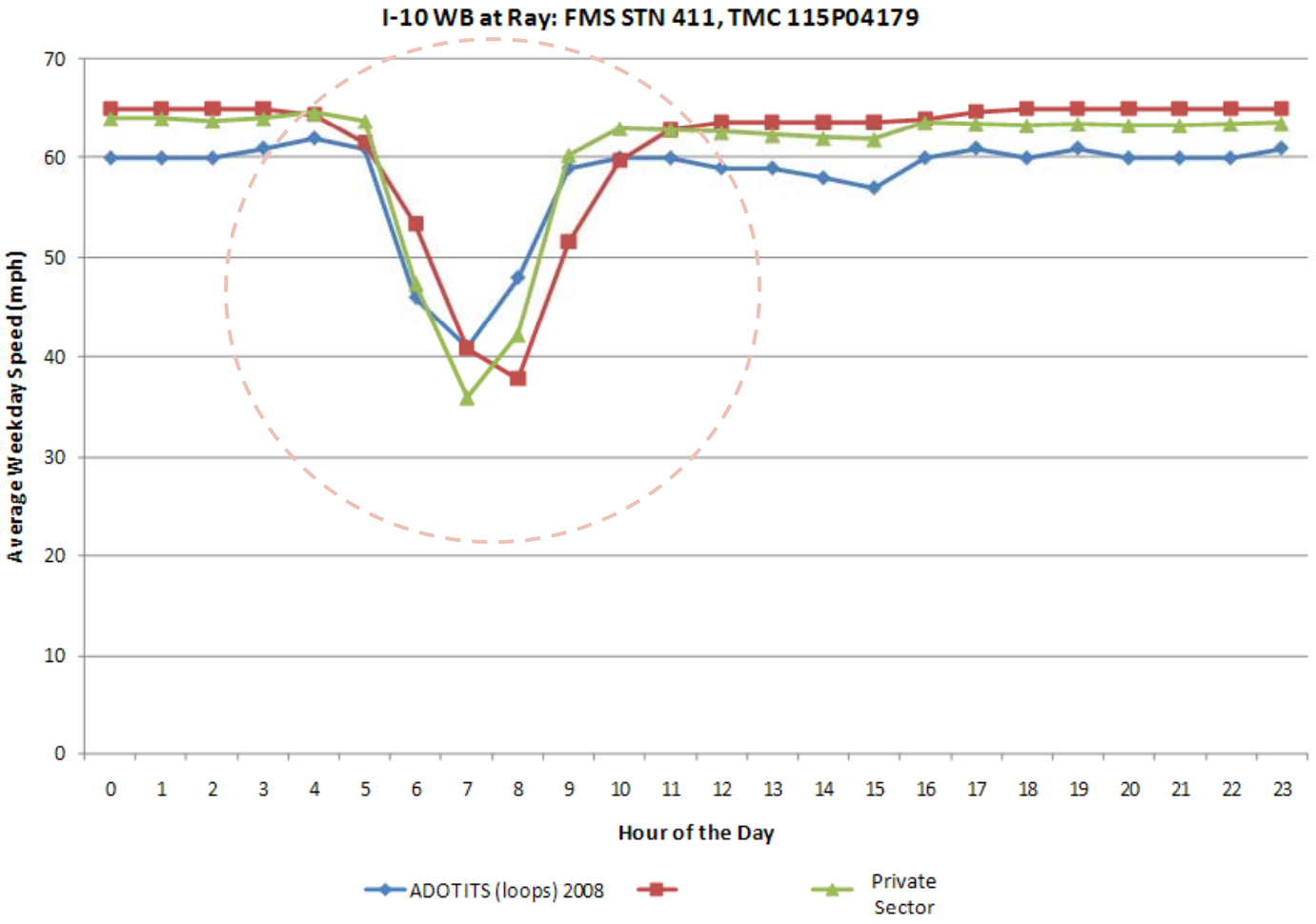
MAG study in 2009

- **MAG speed data vs. Private sector speed data**
  - Speed data (during peak periods) available from MAG 2007 travel speed study (GPS probe car)
  - Bring in private sector speed data and conduct comparison (vs. MAG speed data) and evaluation; on selected corridors in MAG region
  - Compare "average": 3-4 sample speeds per hour (MAG) vs. multiple speed data (private sector)
  - MAG speed data converted to Traffic Message Channel (TMC) segmentation code

MAG Study - corridors

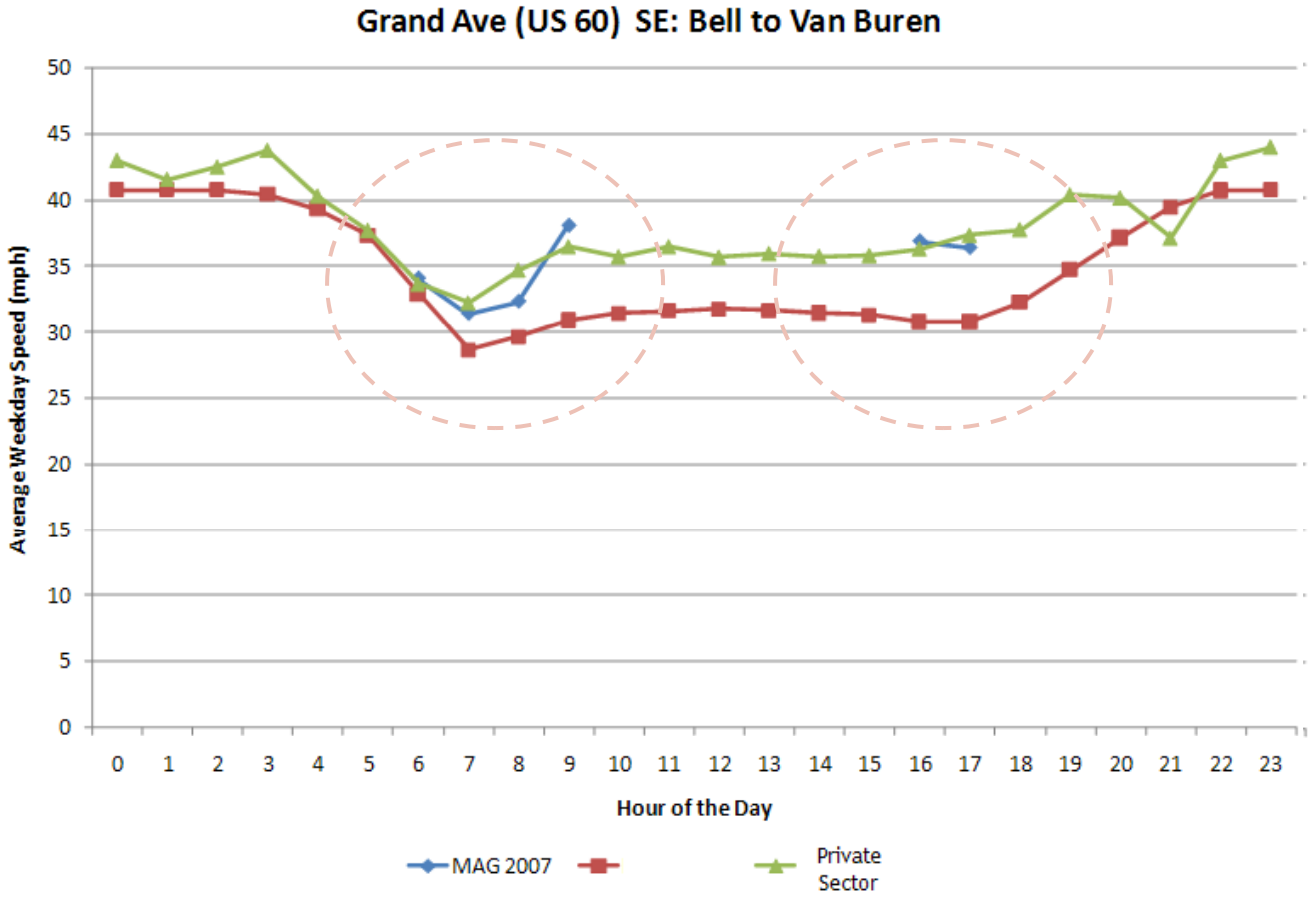


Speed comparison – freeway



Hourly average speed: Freeway Detector (ground truth) vs. Private Sector

Corridor speed comparison - arterial



Corridor speed calculated as average hourly speed on a corridor (of all segments) by TOD

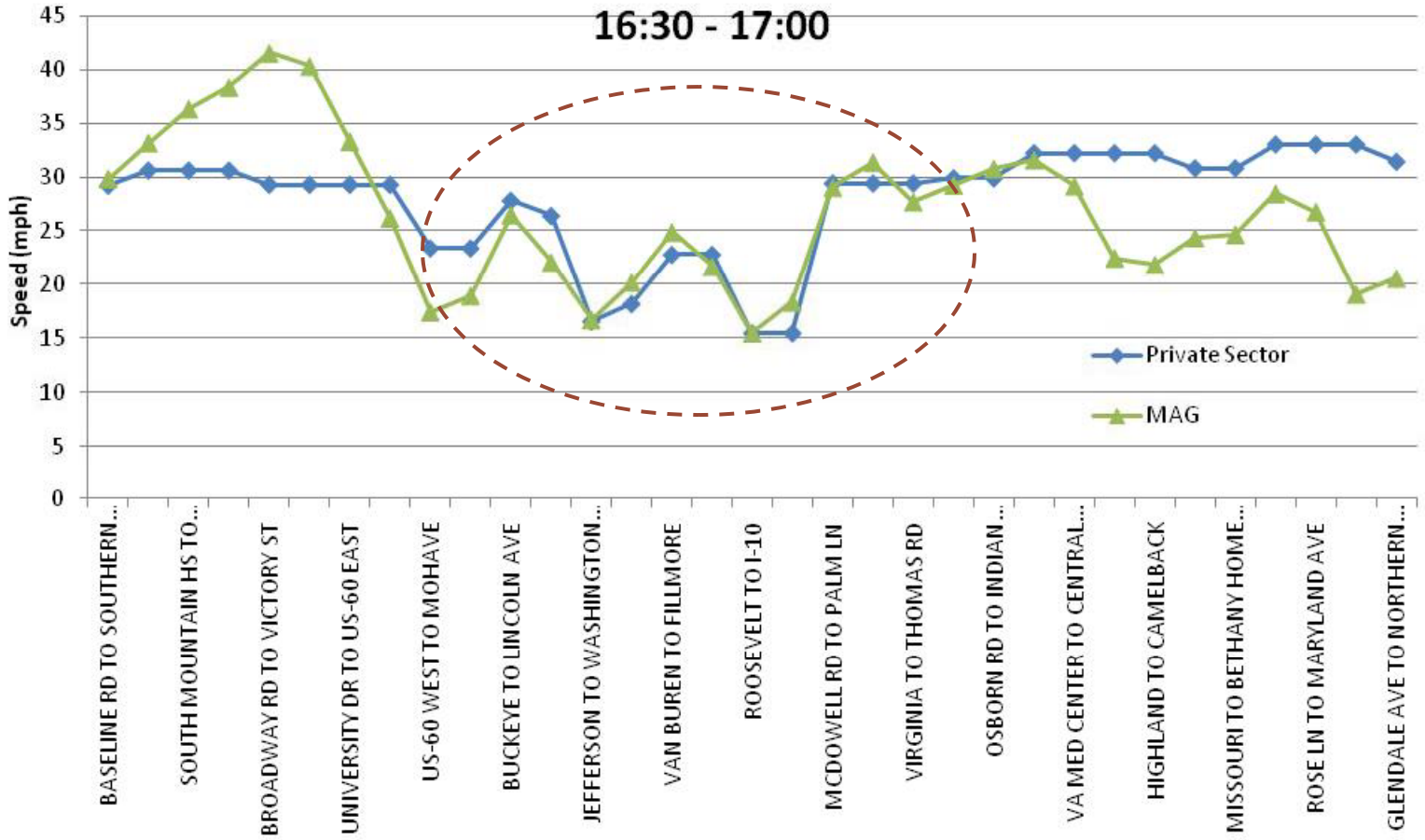
Link speed comparison (spatial)

- Compare speed by link along a corridor during a 30-min time interval
- A link is defined as a segment intercepted by traffic control device (traffic light or stop sign) for arterial, or between two exits for freeway:

  link length = 0.2 - 1 mile

- Normally, MAG average link speed is calculated from 1 or 2 samples, private sector link speed is calculated from multiple (more) samples

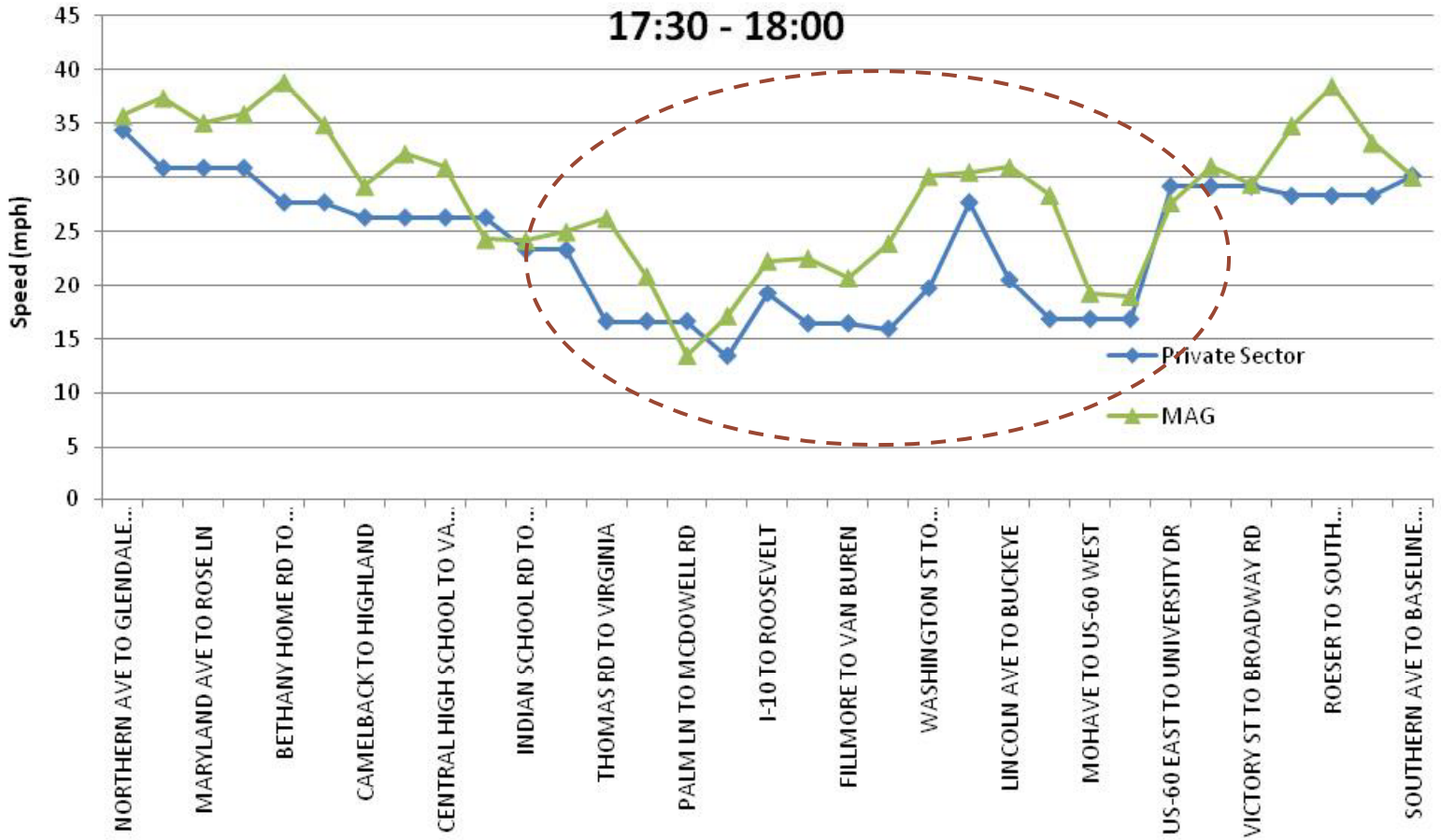
Link speed somparison – 7th St, NB



Similarity of speed out of different data sources , specifically in the middle of this corridor.

*Traffic moves from left to right

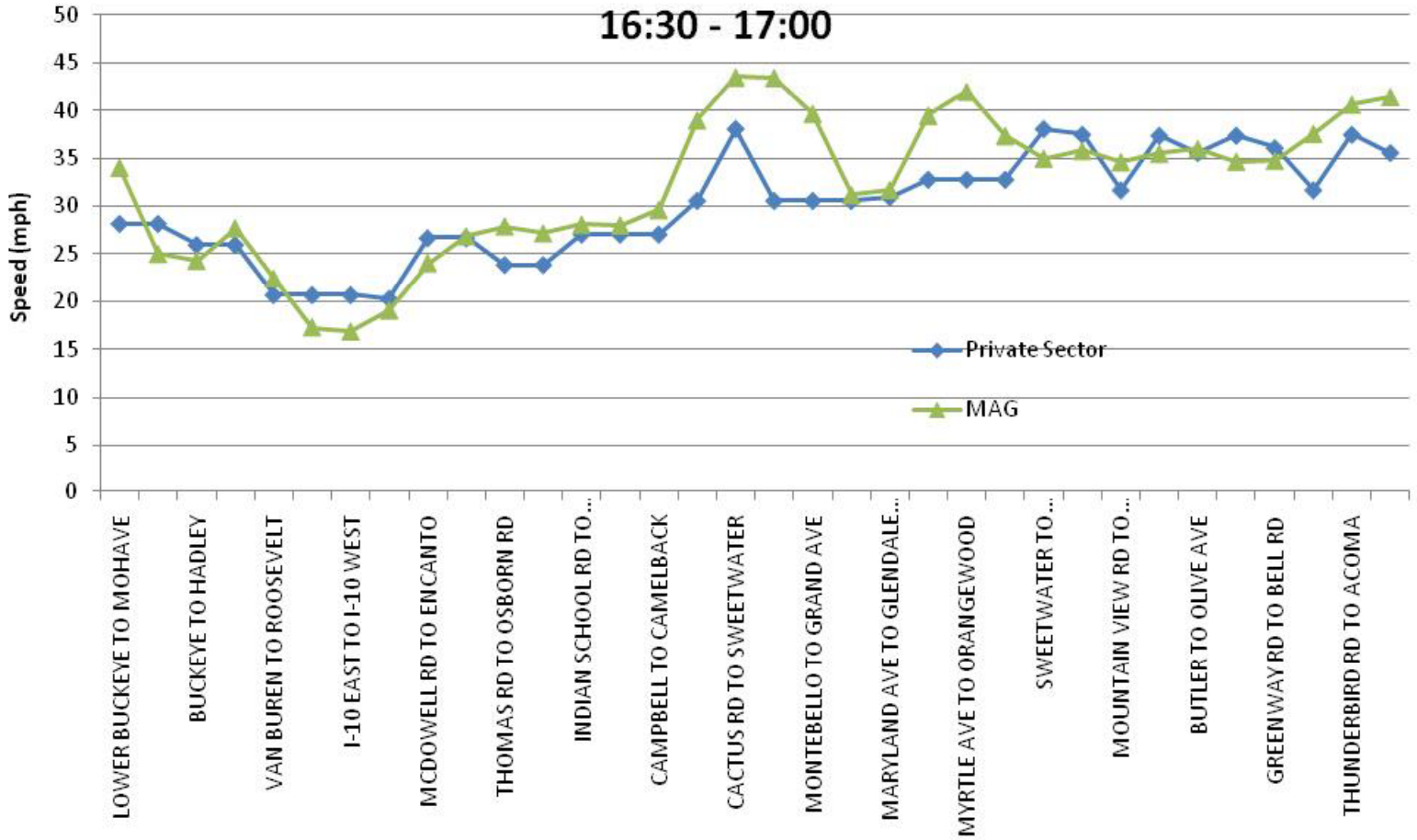
Link speed comparison – 7th St, SB



Consistency in identifying high and low traveling speed segments along the corridor.

*Traffic moves from left to right

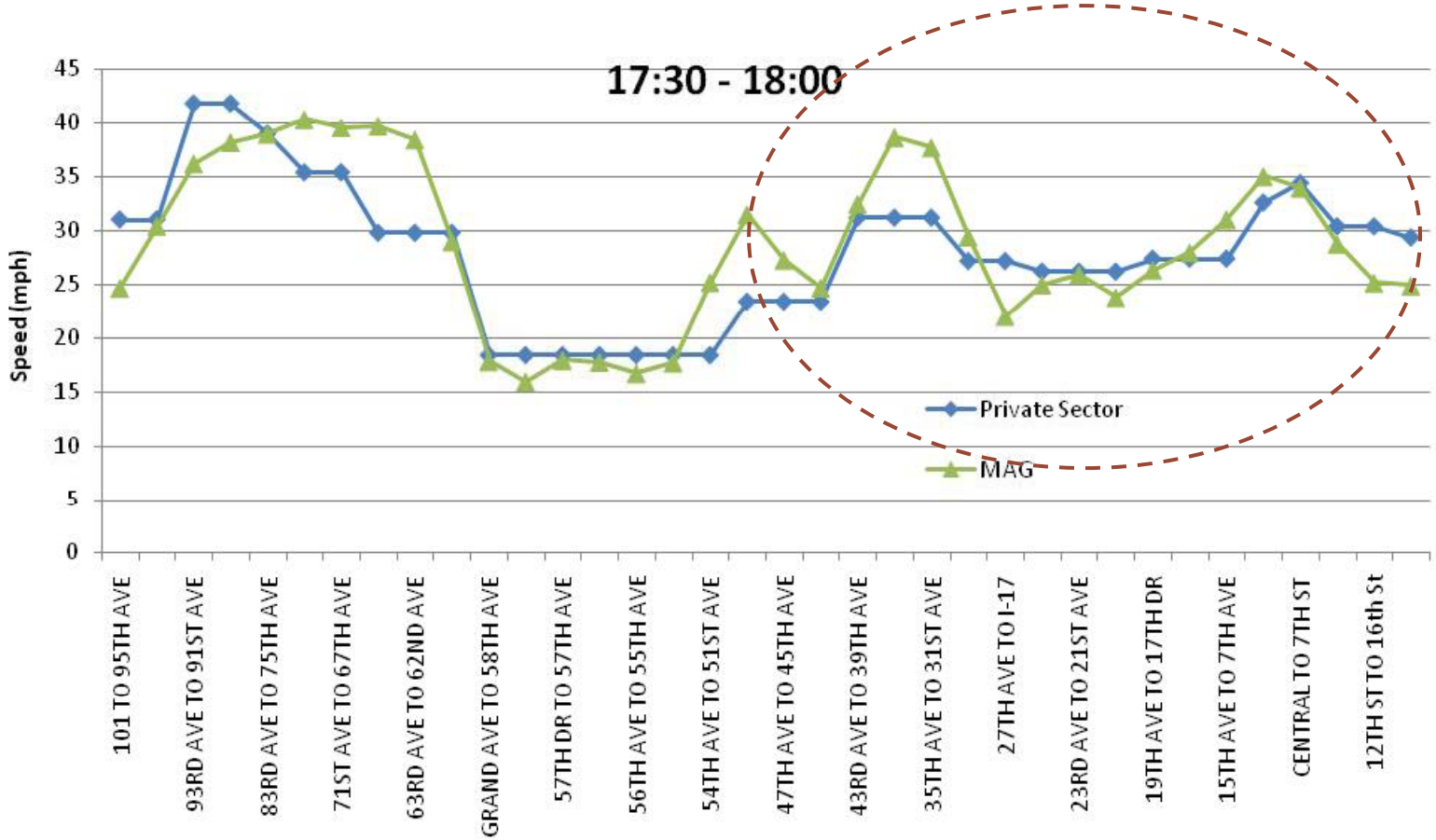
Link speed comparison – 51st Ave, SB/



Almost identical speed from two sources all the way along the corridor.

*Traffic moves from left to right

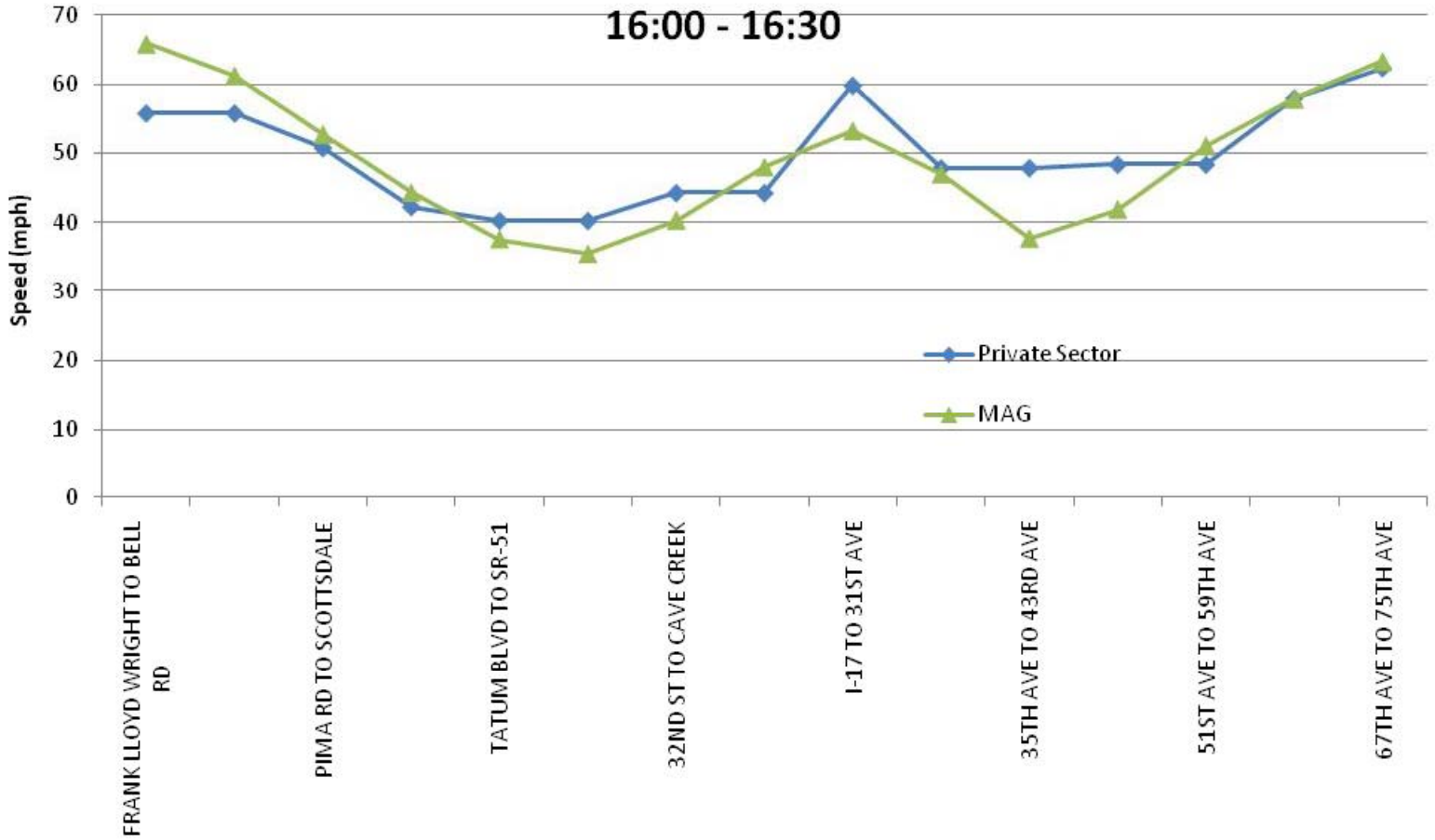
Link speed comparison – Glendale Ave, EB



An excellent match in the entire corridor, on both directions

*Traffic moves from left to right

Link speed comparison – loop 101



Freeway speed demonstrates similar results, the private sector speed data clearly capture two congested traffic zones on this freeway corridor. Freeway comparison tends to be even better than arterial's due to higher sample rate and uninterrupted flow.

Summary of comparison

- Good fit on corridor average speed between private sector data and MAG data on many corridors;
- Good match between private sector speed data and MAG speed data on link basis along a corridor in many of time periods;
- The differences between data sources are within the acceptable range
- Keep in mind that MAG data does not serve as ground truth either, THERE IS NO REAL GROUND TRUTH SPEED DATA FROM ARTERIAL STREET;

Application - private sector speed data

- Mobility analysis
- Data source to validate modeling outputs
- Performance measurement analysis (speed+volume, reliability analysis…etc)
- New information platform for public (archived or streaming data)
- Strategic and land use planning

Application - example

- Calculating mobility measures using available private sector speed and traffic volume data.

Table 1. Equations for Selected Mobility Measures

INDIVIDUAL MEASURES[1]

Cross Street	Eastbound						Westbound					
	AM (6-9a) Speed	PM (4-7p) Speed	Free-Flow Speed	Peak Period TTI	Peak Period Delay	Total Daily Delay	AM (6-9a) Speed	PM (4-7p) Speed	Free-Flow Speed	Peak Period TTI	Peak Period Delay	Total Daily Delay
7TH AVE/EXIT 18	46	65	65	1.23	453	511	64	64	65	1.01	12	28
9TH AVE/EXIT 19	42	65	65	1.29	555	631	65	63	65	1.01	28	29
1ST AVE/EXIT 20	42	65	65	1.28	714	861	65	61	65	1.04	69	77
5TH AVE/EXIT 22	50	64	65	1.16	396	519	65	57	65	1.07	177	209
7TH AVE	52	62	65	1.15	274	439	63	52	65	1.15	406	550
AVE CREEK RD/N 28TH T/EXIT 28	41	63	65	1.32	1,273	1,569	61	54	65	1.13	259	377
WY 51/EXIT 29	52	63	65	1.15	411	587	64	54	65	1.12	468	658
ATUM BLVD/EXIT 31	54	63	65	1.12	244	375	63	52	65	1.14	422	588
6TH ST/EXIT 32	56	64	65	1.09	269	397	63	56	65	1.10	212	325
COTTSDALE RD/EXIT 34	58	64	65	1.07	188	313	64	58	65	1.08	236	356
AYDEN RD/EXIT 35	61	64	65	1.04	61	110	62	56	65	1.11	336	496
RINCESS DR/PIMA D/EXIT36	62	65	65	1.02	27	56	63	59	65	1.07	98	160
RANK LLOYD WRIGHT LVD/EXIT 38	62	65	65	1.03	46	105	61	60	65	1.07	74	133
HAYDEN RD	28	28	35	1.28	256	605	31	30	40	1.36	128	325
WY 101/PIMA FWY	18	18	30	1.75	1,234	3,655	18	15	30	2.01	1,021	2,618
17/BLACK CANYON HWY	25	26	35	1.37	217	534	33	29	40	1.31	211	479

What is next

- Fully understand power of private sector data and make good better use of it
  - more frequent update
  - better coverage
  - higher sample rates (higher confidence)
- What we anticipate (from a public agency standpoint)…etc
  - New data requirements
  - Improvement of private sector data

Questions or Comments ?