

PRELIMINARY RESULTS SUMMARY
Scottsdale 101 Speed Enforcement Demonstration Program
Date: January 3rd, 2007

This summary presents the *preliminary analysis results* of the fixed Speed-Enforcement camera demonstration Project (SEP) that was implemented on Arizona State Route 101 from January 2006 through October 2006. The analysis is focused on quantifying:

- The impact of the SEP on speeding detections (75-mph or greater)
- The impact of the SEP on average speeds
- The effect of the SEP on traffic safety (motor vehicle crashes)
- The expected economic costs and benefits of the SEP

This evaluation, funded by the Arizona Department of Transportation (ADOT), utilizes data from ADOT (motor vehicle crashes, traffic volumes, traffic speeds), the City of Scottsdale (traffic volumes and speeds), RedFlex (detections, traffic speeds), the Arizona Crash Outcome Data Evaluation System (crashes and crash costs), and the National Highway Safety Administration (crash costs). A *Draft Summary Report* will be available in January of 2007, and a *Final Report* during the spring of 2007. Note that these preliminary results reflect an initial assessment with incomplete data and analyses—and so results may change with updated data. The *Draft Summary Report* will include additional details and support for these summary results, while the *Final Report* will include results from additional and more complete analyses and additional data.

Four time periods are referenced in this analysis:

- *Before* (2001 – 2005 – various periods)
- *Warning* (01/22/06 – 02/21/06)
- *Program* (02/22/06 – 10/23/06)
- *After* (10/24/06 – 12/03/06).

Effect on Frequencies of Speeds Detected In Excess of 75-mph

The average number of speeds detected (**per day per camera**) in excess of 75-mph was 162.2 during the *Warning* period, 129.7 in the *Program* period, and 1259.7 in the *After* period. Frequencies were higher on weekends than on weekdays. Detection frequencies increased by about 850% from the *Program* to *After* period.

Effect on Mean Speeds

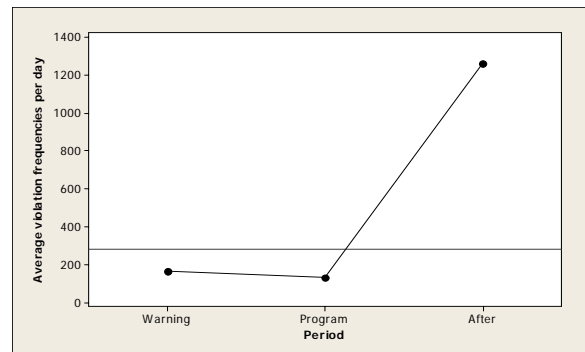
The preliminary results reveal that mean traffic speeds were reduced by 9.4-mph, indicating that the SEP was an effective deterrent to speeding. Reduced speeds lead to decreases in speed variation, reduced crash impact speeds, and reduced demands on vehicular control systems (braking, steering, and suspension).

Period	Estimated Mean Speeds
<i>Before</i> period (1)	73.57
<i>Program</i> period (2)	64.17
Difference (1 – 2)	–9.407

Because peak hour traffic speeds are constrained by congestion, it is highly unlikely that speeds in excess of 75-mph are possible during peak periods. As a result, it is assumed that the SEP will only affect off-peak period travel speeds (and associated crashes).

101 Demonstration Sites

Site ID	Site	Direction
1	Scottsdale Rd. and Hayden Rd.	EB
2	Hayden Rd. and Princess Dr.	WB
3	Frank Lloyd Wright Blvd. and Raintree Dr.	SB
4	Raintree Dr. and Cactus Rd.	NB
5	Shea Blvd. and Mountain View Rd.	NB
6	Shea Blvd. and Mountain View Rd.	SB



Impact on Traffic Safety

The crash analysis results are based on crash data through August 31st, 2006; however, the SEP ended on October 23rd, 2006. These two additional months of crash data will be included in the analysis for the *Final Report*. Crash types affected by the SEP are categorized into four categories: single-vehicle, sideswipe-same direction, rear-end crashes, and other. These crashes constitute about 54%, 17%, 17%, and 12% of all crashes respectively. Only the off-peak periods are analyzed because of the limited expected influence of the cameras on slow moving peak period traffic.

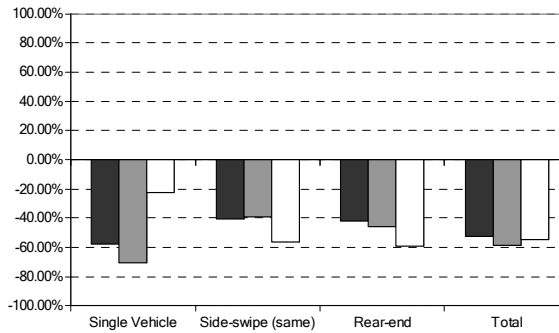
Comparison and SEP sites

The safety analysis consists of three different methodologies: a simple before-and-after (BA) analysis, a BA analysis using a comparison group, and an empirical Bayes’ analysis. The three analysis methods have varying assumptions. The results of the BA with comparison group are shown and discussed here. The comparison site is a 6.5 mile segment on the west-side 101.

- (1) Enforcement zone: MP 34.51– MP 41.06 (Approximately 6.5 miles)
- (2) Comparison zone: MP 3.5 – MP 10 (6.5 miles)



Using the BA analysis with the comparison site, the estimated change in crashes from the SEP ranges from a reduction of 22% (single vehicle total injuries) to a reduction of 70% (single vehicle property damage only crashes). All crash types (single vehicle, same direction sideswipe, rear-end, and other) are estimated to be reduced as a result of the SEP. Most importantly, injury crashes are estimated to be reduced for rear-end and same direction sideswipe crashes.



	Single Vehicle	Side-swipe (same)	Rear-end	Total
■ Crash Frequencies	-58.05%	-40.30%	-42.27%	-52.41%
▒ PDO Crashes	-70.26%	-38.78%	-45.71%	-58.74%
□ Total Injuries	-22.29%	-55.88%	-59.48%	-54.61%

Estimated Benefit of SEP

Crashes and crash severities must be converted into crash costs in order to estimate the benefits of the SEP.

Again using the results from the BA analysis with comparison group, annual estimated benefits of the SEP program include \$3.4 M in disabling injury benefits, \$4.9 M in evident injury crash benefits, \$1.7 M in possible injury crash benefits, \$25.7 M in fatal crash benefits, and \$9.9 M in property damage crash benefits. Total annual estimated benefits for the program are \$45.5 M.

Category	Disabling Injury	Evident Injury	Possible Injury	Fatal Crashes	Property Damage	Total
Total Benefit	\$3,373,280.21	\$4,913,379.97	\$1,682,196.00	\$25,662,941.83	\$9,910,506.04	\$45,542,304.05

Conclusions

- Results based on small samples—future analysis and data will improve and may change results
- Detection frequencies (speeds > 75 mph) increased by about 840% after the SEP ended
- The SEP reduced average speeds in the enforcement zone by about 9.5 mph
- Crashes were reduced between 23% and 70% (based on BA with comparison group)
- Total estimated SEP benefit is \$47.663 Million based on BA with comparison group