



***City of Seattle
Traffic Safety Camera Pilot Project***

Final Evaluation Report

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Executive Summary

In late July 2006, the City of Seattle initiated a 12-month pilot project designed to test the effectiveness of traffic safety cameras – also known as red light cameras – at selected arterial intersections. The purpose of the project was to gauge the extent to which these cameras might reduce the frequency of red light running and associated accidents, events which have become all too frequent in recent years, not only in Seattle but throughout the country.

Altogether, six camera systems were deployed at four intersections in the pilot project. After 12 months, through July 23, 2007, 16,539 citations were issued, with a pay rate exceeding 70%, and more than \$1,076,000 in monetary penalties collected. This report summarizes the results of the pilot and evaluates the performance of the red light cameras and the City's red light camera vendor. Recommendations regarding the future of the program are addressed in the conclusion.

The main findings of the evaluation are as follows:

- **RED LIGHT RUNNING.** There is evidence that the operation of red light cameras has reduced red light running on the order of 50% over the 12-month study period; however, progress has not been uniform, as violations declined sharply from late summer and early fall 2006 through January 2007, then recovered before beginning to level out in April and May and declining again through July.
- **TRAFFIC CRASHES.** There is little evidence that cameras have decreased the frequency of all auto crashes or of the more dangerous angle collisions; however, it does appear that cameras may have mitigated the severity of crashes. There were fewer injury crashes and fewer persons injured in crashes at test intersections than before cameras were installed. Moreover, severity of crashes at a small number of "control" intersections not equipped with cameras showed an increase, as measured by the number of injury crashes and persons injured.

The pilot project evaluation team also has concluded that the American Traffic Solutions vendor has performed well at a reasonable cost, and the public, in general, has responded favorably to this program.

Introduction and Background

At the recommendation of Mayor Greg Nickels, on September 26, 2005, the Seattle City Council unanimously passed an ordinance under a new state law authorizing the use of automated traffic safety cameras (also known as red light cameras) for enforcing local laws against red light running. This ordinance expressly authorized the use of these cameras for recording violations at arterial intersections and established a \$101 monetary penalty for each infraction. Also, in the fall of 2005, the Council passed supplemental budget legislation appropriating a total of \$460,000 for a one-year pilot program to test the performance of traffic safety cameras in Seattle.

Under the leadership of Chief Gil Kerlikowske, the Seattle Police Department (SPD) convened an interdepartmental team to arrange for cameras to be installed at selected intersections and to design an evaluation of the results of camera deployment. The core

project team included representatives from six City departments, including the Department of Finance, the Law Department, the Legislative Department, the Seattle Department of Transportation (SDOT), and the Seattle Municipal Court, in addition to SPD. After a competitive bidding process, in January 2006, the team, working with assistance from City Purchasing and the Department of Information Technology, selected American Traffic Solutions (ATS) of Scottsdale, Arizona, as the City's red light camera vendor.

At 12:01 a.m. on June 22, 2006, ATS commenced camera operations along four approaches at three intersections. Two additional approaches began to operate in early October 2006. Altogether, six camera systems were deployed at four intersections in the pilot project:

- Eastbound and westbound approaches at Denny Way and Fairview Avenue North;
- Northbound and southbound approaches at Rainier Avenue South and South Orcas Street;
- Eastbound approach at 5th Avenue and Spring Street; and
- Eastbound approach at Roosevelt Way and NE 45th Street.

The project team worked closely with SDOT and the camera vendor to identify and select these intersections for the pilot from a list of the city's most hazardous intersections.

For a one-month period after the installation of camera systems at these intersections, advisory warnings were issued to violators without monetary penalty as part of the City's educational outreach to motorists and the general public. On July 24, 2006, SPD began issuing citations with monetary penalties to registered owners of vehicles found to have violated City statutes against red light running. The formal evaluation results discussed below cover the 12-month period commencing on July 24, 2006.

Traffic Safety Camera Technology and Citation Process

Prior to addressing evaluation questions, it may be helpful to review a few points regarding red light cameras and the citation process. The Axis RLC-300 camera system used by American Traffic Solutions has three basic components: a high resolution camera for taking still color photos, a video camera that provides a broader view of the offending vehicle and any other vehicles, pedestrians, or cyclists in the intersection, and a vehicle sensing device that activates the still cameras and captures video of approaching vehicles that the system "predicts" will violate a red signal.

The stills show the vehicle behind the stop line with the traffic signal showing red in an "A" photo and the same vehicle fully beyond the stop line with the traffic signal still showing red in a "B" photo. These two photos, together with a cropped image of the vehicle license plate are included in the citation (also known as the notice of infraction, NOI) that is sent to the registered owner of the vehicle. The still photos and video clip of the event are available to police reviewers, court personnel, and registered owners via secure ATS Internet Web site. All photos and video only show the vehicle from the rear, as Washington law prohibits taking images of the faces of vehicle driver or occupants.

Photographic and video images of violation events are sent electronically from the traffic safety camera system to the ATS data center where they are reviewed against criteria established by the Seattle Police Department. Events that clearly are not violations are rejected at the data center. Trained officers in the SPD Traffic Section, who authorize issuance of citations for those deemed in violation, review events that appear to meet SPD criteria. Pursuant to statute, this review and mailing of the NOI to the registered owner of the vehicle must all occur within 14 days of the violation event.

The registered owner then has 18 days from issuance of the NOI to either pay the monetary penalty specified in the City Ordinance,¹ contest the citation by requesting a Municipal Court hearing, or sign a declaration (affidavit) stating that he or she was not driving the vehicle at the time of the infraction (thereby canceling the citation). It is important to note that, by Washington law, the automated red light violation is treated as a parking infraction and is not part of the registered owner's driving record under RCW 46.52.101 and RCW 46.52.120. Basic program statistics, from inception of monetary penalties on July 24, 2006 through July 23, 2007, are summarized in the table.

Traffic Safety Camera Vital Statistics as of July 23, 2007

Total Events Screened by SPD	17,434
Total Citations Issued	16,539
Issuance Rate	94.9%
Total Citations Paid	11,957
Payment Rate	72.3%
Net Revenue Collected	\$1,076,212
Hearings Held (of Citations Issued)	1,805 (10.9%)
Declarations Received (of Citations Issued)	928 (5.6%)

Evaluation Questions

The project team specified a number of questions to be addressed in the evaluation. They are highlighted briefly here and then discussed in the body of the report.

- *Has red light camera enforcement enhanced public safety in and around those intersections where camera systems have been deployed?*

The project team believes that this is the most significant question to be addressed in the evaluation. There are two basic components to the question:

- *Effects on red light running:* the pilot will be deemed successful to the extent that it has reduced the frequency of red light running by motorists; and
- *Effects on traffic collisions:* the pilot will be deemed successful to the extent that it has reduced the frequency or severity of traffic collisions in those intersections where the cameras have been deployed.

- *Have red light camera systems and the contracted vendor met our expectations?*

In the Request for Proposal (RFP) that was issued prior to selection of a qualified vendor, the City set forth its expectations for the camera system and vendor

¹ This requirement was extended by Court policy to 30 days for rental car agencies in late May 2007, to give out-of-town companies a reasonable time to respond and identify the driver of the violating vehicle.

performance. To answer this question, the project team will revisit the RFP criteria and weigh them against our experience during the pilot project.

- *How have cameras been received by Seattle residents?*

Public reaction to automated red light enforcement is an important part of our evaluation of the results of the pilot.

- *Is there a continuing need for red light camera enforcement?*

Prior to formulating recommendations regarding the future of automated red light enforcement, it is important to gauge the continuing need for this type of program.

- *Have red light cameras paid for themselves?*

Finally, although revenue is not an objective for having a red light program, it is important to weigh the costs and benefits associated with the traffic safety camera technology as deployed by the City of Seattle.

Traffic Safety

As noted above, traffic safety has provided the principal rationale for the red light pilot project. Two dimensions are explored below: the impacts on the frequency of red light running and the impacts on traffic crashes. Although this subject is beset by numerous complexities, and it is important to stress the preliminary nature of our findings, it also is worth trying to summarize the conclusions up front before elaborating in the balance of this section:

- **RED LIGHT RUNNING.** There is evidence that the operation of red light cameras has reduced red light running on the order of 50% over the 12-month study period; however, progress has not been uniform, as violations declined sharply from late summer and early fall 2006 through January 2007, then recovered before beginning to level out in April and May, with further declines thereafter.
- **TRAFFIC CRASHES.** There is little evidence that cameras have decreased the frequency of all auto crashes or of the more dangerous angle collisions; however, it does appear that cameras may have mitigated the severity of crashes. There were fewer injury crashes and fewer persons injured in crashes at test intersections than before cameras were installed. Moreover, severity of crashes at a small number of “control” intersections not equipped with cameras showed an increase, as measured by the number of injury crashes and persons injured.

After a brief discussion of intersection selection and study methodology, we will discuss the frequency of red light violations, then the collision results.

Methodology. The project team considered three types of information in nominating intersections for the study. First, all intersections were among the city’s top intersections for angle crashes based on data from SDOT and the Washington State Department of Transportation (WSDOT). Second, ATS set up and captured video on red light

violations at candidate intersections using their VIMS (Vehicle Incident Monitoring System) equipment. In those cases where the VIMS best corroborated the existence of a problem, a review involving other criteria was conducted, selecting for those intersections where construction work prior to or during the pilot was not likely to be an issue and where technical design problems were not evident. Lastly, the team attempted to get a degree of geographic dispersion into the pilot. The four intersections and traffic approaches chosen as test sites for the traffic safety camera pilot were:

- Eastbound and westbound approaches at Denny Way and Fairview Avenue North;
- Northbound and southbound approaches at Rainier Avenue South and South Orcas Street;
- Eastbound approach at 5th Avenue and Spring Street; and
- Eastbound approach at Roosevelt Way and NE 45th Street.

In addition to these “test” intersections, the study design developed by the project team also called for the selection of like numbers of “halo” and “control” intersections. The former were designated with the intent of seeing whether the cameras have a “halo effect” that extends beyond the test intersections. The “controls” are intersections beyond the likely effects of any halo, similar to the test intersections in traffic-related basics such as traffic volumes and accident records, but not being selected for a traffic safety camera during the pilot project. The intent in looking at these “controls” is to see whether there might be general trends in traffic-related behavior that could be responsible for any changes observed at the test intersections.²

The intersections identified as halos for this study were all close to the respective test sites with which they are paired:

- Denny Way and Stewart Street;
- Rainier Avenue South and South Graham Street;
- 6th Avenue and Spring Street; and
- 11th Avenue NE and NE 45th Street.

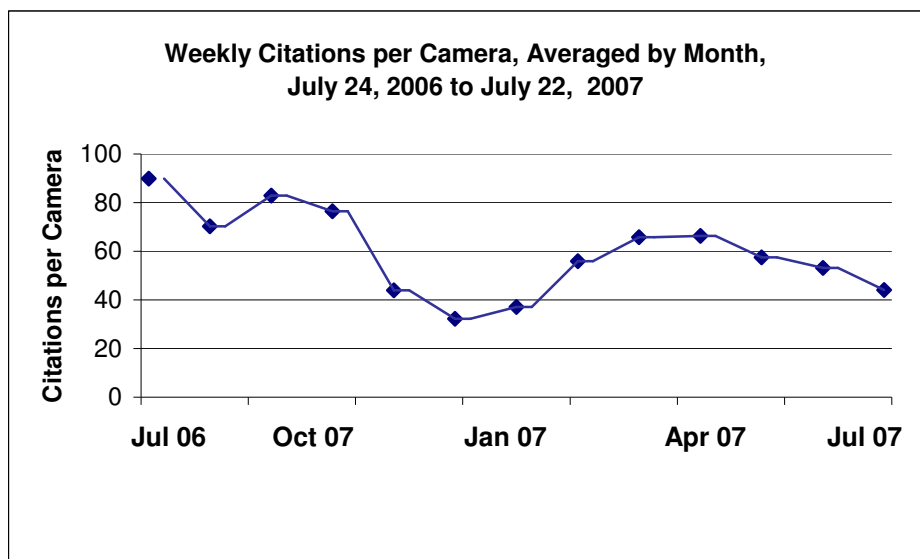
The control intersections chosen for the study include:

- 1st Avenue South and South King Street;
- Boren Avenue and Olive Way;
- Lake City Way NE and NE 80th Street; and
- 30th Avenue NE and NE 125th Street.

Red Light Violations. The study design for gauging changes in red light running at test intersections involves a comparison of the frequency of violations before (pre) installation of cameras and after (post) installation. Although there is not strictly comparable data for the control intersections, the design allows inspection of VIMS red light running results during a single weekday pre and post pilot project.

² Please note that the intersections selected for comparisons very likely do not meet stringent tests required for true scientifically controlled study. They are best seen as “comparisons” rather than scientific controls.

On a per camera basis, the frequency of red light violations resulting in a traffic citation dropped approximately 50% between the first four weeks and the last four weeks of the pilot through July 22, 2007. However, as shown in the chart, the trend in red light violations is not straightforward. Early weeks of the pilot show considerable variation in violation levels, albeit at a relatively high level. The frequencies then start to fall off through the year-end holidays and the start of winter when traffic volumes tend to be dropping; however, beginning in early February the average number of citations per camera per week start to pick up again, growing steadily through mid-April, when they appear to level off and then begin to decline again through the end of the pilot period. Significantly for our conclusion, there is less dispersion in the weekly data points over the last three months, providing evidence that the frequency of violations is, indeed, leveling off.³



VIMS data for the control intersections show no such pattern. Red light running worsened at three of the four comparison intersections over the test period, with an aggregate increase in red light violations, pre- to post-test, from 133 to 181 during the days tested, a 36% increase. These findings suggest that cameras may, indeed, be having a salutary effect on red light running violations at the test intersections.

National studies buttress this conclusion, as cameras elsewhere have been widely reported to reduce the frequency of red light running.⁴ It is important, once again, to observe that these findings are preliminary, and the project team will continue to monitor trends as the program moves forward, especially in light of the seasonality that was observed during the cold months.

³ The first two months post-pilot (August and September 2007) also suggest a flattening of the curve at approximately 50% of the first month of the pilot.

⁴ For the most comprehensive look at the national experience, see Hugh W. McGee and Kimberly A. Eccles, Impact of Red Light Camera Enforcement on Crash Experience: A Synthesis of Highway Practice (Washington, D.C.: National Highway Cooperative Research Program, Transportation Research Board, 2003).

Traffic Collisions. The study design for gauging changes in traffic-related collisions at test intersections involves a comparison of the frequency of collisions before (pre) installation of cameras and after (post) installation. Data on collisions at halo and control intersections may also be examined for the comparable months.

The evidence on the effects of red light enforcement on collisions is less clear than the effects on red light running. During the 12 months during which police have been authorizing citations, crashes overall have changed little. At the test intersections, there were a total of 34 crashes, an average of 5.67 per intersection. This compares with an average total of 33.75, or 5.63 per intersection, during the same period during the four preceding years. Almost all of these collisions were potentially serious – 19 angle collisions, 10 left turn collisions, three pedestrian and two sideswipe collisions. Interestingly, there were no rear-end collisions during the pilot period, given that the research literature shows some concern for these after the installation of cameras.⁵

However, it does appear that the overall severity of collisions, as gauged by the frequency of injury accidents and of persons injured, has decreased at the intersections with cameras, as shown in the accompanying tables. These tables show that there have been significantly fewer persons injured (although not significantly fewer injury accidents) at the camera intersections when compared with the controls, where both the number of injury accidents and persons injured (especially the latter) increased during the pilot period.⁶

Severity of Crashes Pre/Post Pilot Project

	# Injury Crashes		# Persons Injured	
	Test	Control	Test	Control
Pre RLC	17	10	26	17
Post RLC	13	14	18	29

Examination of the collision data at so-called halo intersections shows no consistent pattern over the 12-month period. In one case, accidents appear to trend in the same directions at the test and halo intersections. In another case, the trends contrast. In the two remaining cases, there is no change at halo intersections while conditions at the test intersections are changing.

System and Vendor Performance

The table that follows provides a brief recap of the performance of the technical systems and capabilities of the American Traffic Solutions vendor, as specified in the Seattle Request for Proposals for the Traffic Safety Camera Pilot Project. Overall, the City’s project team has been well pleased with ATS systems and its professional staff. The equipment and its performance, in general, has been everything that was promised, and ATS professionals are first rate. A few examples may suffice to make these points.

⁵ See McGee and Eccles, Impact of Red Light Camera Enforcement on Crash Experience, 2003.

⁶ Pre Red Light Camera (RLC) cells in tables represent annual averages of experience over the four years preceding initiation of the pilot, rounded to nearest whole integer. Numbers for 5th & Spring are extrapolated from 10 to 12 months for comparability with other intersections. There is a statistically significant difference at the .03 level in the # persons injured table, using a one-tailed Fisher’s Exact Test.

Equipment. The workstation and imagery available to SPD reviewers of violation events produces high resolution color photos and video that facilitate decision making, even when “slow-roll” right turn violations are in view. As well, the on-line Axis statistical reporting utility provides excellent, near-real time data to support evaluation and trouble-shooting. On several occasions, the City’s project lead was able to spot emerging problems with video capture almost as quickly as ATS monitoring staff. On another occasion, the statistical reporting categories used to classify event rejections allowed the City to question and evaluate its own enforcement standards.

Professional Staff. ATS professional staff has exceeded our expectations in almost every respect. Two highlights include the manner in which the vendor developed a custom approach for exchange of data with the Seattle Municipal Court staff, and the willingness of ATS to tailor its Axis statistical reporting package in response to suggestions for improvement from the City. In the latter case, ATS altered report design to allow the client to separate out “non-event” camera trips from valid rejections; this allowed calculation of a true rejection rate without hand calculations. In another case, ATS developed a report to allow the client to tally violations by type (right turns, left turns and straight through violations). All of this was done at vendor expense.

In the matrix that follows, there is a single “not met” criterion: cameras activated approximately 12 weeks late as a result of various factors, with responsibility shared by the City and the vendor. The primary factors involved the complexity of design requirements at selected intersections, requiring time-consuming coordination with multiple agencies. In part as a result of these delays, the project launched with four cameras operating at three different locations on June 22, 2006. The last intersection came on line in early October 2006. In this case, another factor slowed work – a month-long labor stoppage made it impossible to pour concrete in King County.

Rating Criteria	Standard	Performance	Comments
Minimum Qualifications			
1) Camera technology	Digital capture of good quality photos	Standard Met	Single RLC-300 camera produces excellent quality prosecutable photos under wide range of conditions
2) Data transmission & storage	Secure chain of evidence	Standard Met	IPSEC VPN secure transmission, two-factor authentication for access to system
3) Violation detection technology	Non-invasive, no loops in the pavement	Standard Met	Video detection system is highly sensitive, even catching marginal events at varying approach speeds
4) Citation processing capability	Robust system capable of configuring to Court needs	Standard Met	ATS designed and executed non-standard design for data exchange with SMC

Rating Criteria	Standard	Performance	Comments
5) Web-based application	Must allow web-based viewing by SPD, SMC, and public	Standard Met	Highly functional, secure access 24/7
6) Experience elsewhere	Successful deployment in a minimum of 3 jurisdictions	Standard Exceeded	ATS a leading vendor with other large city clients (e.g., NYC, Philadelphia, Houston)
Preferred Qualifications			
1) Meet project timeline	Cameras ready to go 4/1/2006	Standard Not Met	Shared responsibility with City (see text); cameras active 6/22/2006
2) Number of approaches covered	Preference for two camera approaches per intersection	Standard Met	Two of four intersections with two approaches
3) Violation capture rate	Vendor quoted 80% capture	Standard Exceeded	Data show 83% capture rate; rejection rate 17% (12% controllable)
4) Photo flash	Low wattage preferred	Standard Met	100 watt flash, ultra fast, no complaints
5) Area View	Video camera to show context for violations	Standard Met	System has met this need, especially for right turn violations
6) Environmental impacts	Minimal preferred	Standard Met	System footprint among best in the industry, least sidewalk clutter
7) Cost neutrality guarantee	City not to lose money	Standard Exceeded	Operation has more than paid for itself (see text)
Other Specifications			
1) Site survey support	Intersection monitoring to advise on selection	Standard Exceeded	ATS did three rounds of monitoring to support selections
2) Design and installation	Fully meet City requirements	Standard Met	ATS worked well with all depts, even in difficult situations. Trees impact location decisions (see text)
3) Service & maintenance	24-hour problem detection, 72-hour resolution	Standard Met	Remote observation, proactive maintenance, timely fixes without local field office
4) Work with City to develop system	Work cooperatively to ensure customer satisfaction	Standard Exceeded	Excellent approach to design and implementation with SPD and SMC

Rating Criteria	Standard	Performance	Comments
5) Statistical reporting	Support monthly statistical reporting	Standard Exceeded	On-line Axisis reporting system available 24/7, ATS tailored system to meet City needs at vendor cost
6) Other support	Expert testimony, public outreach	Standard Exceeded	ATS has offered expert testimony in SMC hearings, performed phone survey at vendor cost
7) Training	Provide all required training	Standard Met	Excellent training provided locally and in Scottsdale

Public Reception

The City has endeavored to ensure good understanding and reception of the City's automated red light enforcement efforts. Three different kinds of evidence suggest that there is a strong level of public support for the cameras.

First, at the outset of the project, the project team authorized a telephone survey to gauge levels of public knowledge and support for cameras and our local project initiative. In April 2006, Richter Research of St. Louis, Missouri, contacted 404 Seattle residents at random and found that seven residents in 10 thought that red light running is, indeed, a problem in Seattle. As well, 82% were in favor of installing automated red light cameras at Seattle's most dangerous intersections. When presented with information about positive experiences elsewhere in decreasing the frequency of red light running and associated collisions, 77% were inclined to regard the use of cameras even more favorably. Of the 14% that opposed the use of cameras, the most typical reason given for opposition involved the alleged invasion of privacy ("Big Brother is watching"). The margin of error for survey results was plus or minus 4.9%. A copy of the full survey is available upon request.

Local media coverage of the photo enforcement pilot project also has generally been quite positive, as measured by editorial comment and feature stories in both the *Seattle Times* and the *Seattle Post-Intelligencer*. The P-I editorial board has been particularly supportive.⁷ Even when caught on camera driving through a red signal, at least one local columnist kept her sense of humor and paid the fine.⁸ There also has been a reasonable level of understanding and support expressed in letters to the editor, although there have been dissident notes as well.⁹

A series of car-pedestrian collisions in November 2006 – one involving the tragic death of City Council staffer Tatsuo Nakata – has, if anything further strengthened

⁷ See "Seattle Traffic: This camera sees red," July 3, 2005 and "Seattle Traffic: Snap when it's red," March 6, 2007, both in the *Seattle Post-Intelligencer*.

⁸ See Nicole Brodeur, "Camera didn't even get the car's good side," *Seattle Times*, December 4, 2006.

⁹ For a mix of opinion, see the letters printed in the *Seattle Times* opinion page on December 9, 2006.

understanding and support for all measures to slow traffic down and encourage respect for traffic signals.¹⁰

Finally, unsolicited communications (mostly e-mails) received by SDOT and SPD have, in the main, offered positive comments and support for the red light pilot project. In fact one of the most frequent reasons for these communications appears to have been to request the installation of traffic safety cameras at particular intersections that do not currently have them. The project lead has received approximately three dozen of these suggestions.

Concerns for pedestrian safety are the principal focus for many of these communications. The tone of much local comment conveys a sense of growing impatience and frustration on the part of the public, some of whom question why the City cannot expand automated red light enforcement more quickly.

Future Demand for Photo Enforcement

Several factors should be considered in assessing the need for red light photo enforcement in Seattle in future years. Most significant of these is the chronic nature of the problem. Even with cameras, warning signs, and public education efforts, violations are both frequent and hazardous. As we have seen, after a steep decline in the frequency of red light violations in December and January at intersections with photo enforcement, red light running recovered somewhat then leveled out at about half the initial frequency. As well, the frequency of accidents has been little changed with the installation of photo enforcement cameras, although the number and severity of injury collisions does appear to have dropped.

There also appears to be a significant level of public support for continuing with red light photo enforcement. The following unsolicited comment may serve to summarize the kind of comments we have been receiving:

“Kudos on your pilot Red Light Runner program. I work in the Seattle Municipal Tower and every day I feel like I take my life in my hands just trying to get to work!! The drivers on 5th and 6th avenues are fearless. Just this morning I was run out into [the] road by a guy taking a free right without even looking to see if anyone was crossing. I’ve seen so many close calls lately, and I’m afraid it is going to take a death before this problem is taken more seriously. I am heavily in favor of expanding this program and making the streets safer for pedestrians.”

A final factor that should go into a decision regarding the future of the traffic safety camera pilot – costs and revenues – is addressed in the next section.

Project Costs and Revenues

A review of expenditures shows that the project has been less costly than anticipated. Through July 2007, the team had expended only about \$369,000 of the \$460,000 budgeted for the project (80%). The Department has continued to operate the cameras into November 2007 with no additional budget authority and should not reach fully expended status until the end of 2007.

¹⁰ See “Jaywalking Doesn’t Pay,” *Seattle Times*, February 5, 2007.

Three variances with our initial budget planning assumptions are largely responsible for this result. First, the SPD Traffic Section found that it could staff the event review and citation function with a North Precinct patrol officer assigned to light duty status. Instead of spending about \$60,000 for overtime staffing, Traffic has only needed a nominal amount of overtime for occasional peak workload periods. Second, Seattle Municipal Court Information Technology Division concluded that its experienced professionals were best equipped to develop data exchange protocols with the vendor. Accordingly, existing resources were devoted to the project rather than contracting for outside assistance. Finally, the City received an excellent monthly services rate from American Traffic Solutions. In the negotiated contract, which is renewable at the City's discretion, ATS is charging the City \$3,500 per month for a two-lane camera approach or \$3,750 per month for three or more lanes. In total, the monthly charge for six approaches (three of each kind) is \$21,750.

Although revenue is not a justification for this project, it is worth noting that revenues from red light notices of infraction will substantially exceed total project costs. As of July 23, 2007, the City had realized \$1,076,212 in net proceeds from payment on 11,957 red light notices of infraction, for a payment rate of approximately 72.7%.

It is important to observe that these numbers could well decrease over time, if and when the use of this technology becomes more widespread in the city and the awareness of the driving public increases.

It also is important to look at alternative means of enforcement. Even if the City were to increase the number of traffic and motorcycle officers devoted to enforcement of traffic laws, there is no way that officers could provide the 24/7 vigilance that is possible with cameras. Each additional motorcycle officer in 2008 would cost approximately \$121,000 a year, including equipment. Given that it would take six officers to provide 24/7 coverage at a single intersection over the course of a year, cameras are remarkably cost effective.

Lessons Learned and Next Steps

The overall findings of the pilot project are favorable. The frequency of red light running has dropped by one-half at the intersections where cameras have been installed. Although the overall number of accidents has not decreased at these intersections, it does appear that the severity of collisions has diminished. The traffic safety cameras have done what they were intended to do, and the American Traffic Solutions vendor has performed well, at a reasonable cost. The public, in general, has responded very favorably to this initiative. Finally, the need for measures to abate red light running remains.

There have been comparatively few "lessons learned" from the pilot project in the sense of negative surprises. Three points, and associated fixes, are worth noting here:

- Red turn arrows. As originally drafted, the City's red light camera ordinance gave the authority to cite violators driving through circular red signals; it did not grant the authority to cite for camera violations where red arrows are involved. The project team has recommended that the ordinance be revised to cure this

deficiency. The Mayor approved this change, which was subsequently adopted by Council ordinance in November 2007.¹¹

- Signage. State law requires the posting of appropriate signage in zones where traffic safety cameras are employed. In Seattle, intersections with approaches covered by red light cameras are posted with warning signs. These signs are 2.5' by 4' and contain the words "photo enforced" with the picture of a traffic signal. The project team has considered making these signs more noticeable to motorists. Understanding that enhanced signage might further reduce the frequency of red light violations, the team may experiment with different approaches to signage over the next year.
- Camera deployment and streetscape issues. We have found that red light camera placement along busy right-of-way often conflicts with competing uses, even with the comparatively small footprint of the camera and accessory equipment. Trees and their growth can be problematic. The project team recommends that any future siting decisions explicitly consider street trees, even if that necessitates use of a mast arm to deploy cameras over the street in some locations.

The larger public policy question for the pilot project and this evaluation is whether to expand the City's initiative with the addition of cameras at other intersections that could benefit from their use. As a result of experience during the pilot, the Interdepartmental Team recommended, and the Mayor included in his Proposed Budget for 2008, the addition of 24 more cameras at hazardous intersections throughout the city. On November 19, 2007, the Seattle City Council adopted the 2008 budget, including an appropriation for the cameras.

The Interdepartmental Team weighed four factors in developing recommendations for particular camera approaches: the number of right-angle crashes, the number of serious pedestrian injuries, the frequency of red light running based on video observation, and geographic distribution. The team also reviewed unsolicited nominations received from members of the community.

The Appendix attached to this report identifies the 24 new camera approaches, sited at 19 different intersections, that will be added in 2008. Together with the existing cameras, there will be a total of 30 traffic safety cameras operating at 22 different intersections citywide by the time construction is complete and all cameras are deployed.

¹¹ This ordinance also changed the monetary penalty for photo-detected red light infractions to equal those for red light violations detected by police officers. At the end of December, the monetary penalty for photo-detected infractions will increase to \$124.

APPENDIX: RED LIGHT LOCATION SUMMARY – NEW AND EXISTING
 30 Cameras (24 new) and 22 (19 new) Intersections

New

Existing

North Seattle

EB NW Market @ 15th NW*
 WB NW Market @ 15th NW*
 SB 15th NW @ NW 80th
 SB Stone Way @ NW 40th
 NB Aurora @ NW 85th
 EB NE 80th @ 5th NE
 EB NE 45th @ Union Bay Place (Five Corners)*
 WB NE 45th @ Union Bay Place (Five Corners)*
 NB NE 45th @ Union Bay Place (Five Corners)*

EB 45th @ Roosevelt

Central Seattle

SB 6th @ James*
 SB 5th @ Spring
 SB 1st @ Marion
 NB Broadway @ Olive (Ped)
 EB Olive @ Broadway (Ped)
 SB Broadway @ Pine* (Ped)
 SB Boren @ James
 SB 23rd @ E John
 NB 9th @ James (Ped)

EB 5th @ Spring
 EB Denny @ Fairview
 WB Denny @ Fairview

South Seattle

NB 14th S @ Cloverdale
 EB Cloverdale @ 14th S
 WB Avalon @ 35th SW
 SB 35th SW @ SW Thistle
 NB Rainier @ S Massachusetts
 WB S McClellan @ Martin Luther King

NB Rainier @ S Orcas
 SB Rainier @ S Orcas

Notes: The (Ped) label indicates that the intersection was pre-screened specifically for pedestrian injuries and then cross-checked for a significant red light running problem. Starred intersections were nominated by one or more members of the community.

Key:

NB = Northbound
 SB = Southbound
 EB = Eastbound
 WB = Westbound