BACKGROUND

The Insurance Institute for Highway Safety (IIHS) estimates that over 800 deaths occur annually as a result of red light running (RLR).[1] The IIHS further reports that fatal crashes at signalized intersections increased by 24 percent from 1992 to 1997.[2] A 1990-1991 study of urban police reports indicated that 22 percent of all urban crashes resulted from running traffic controls.[3] Of these, 24 percent involved running red lights. Consequently, RLR has attracted the attention of federal, state, and local officials. With police resources declining in relation to the number of vehicles on the road, local officials have begun exploring the use of cameras to detect traffic signal violators and support enforcement actions.[4]

This paper summarizes the experience of Charlotte, North Carolina in establishing and operating an automated RLR photo enforcement program, which it calls "*Safe*Light Charlotte." The program produced a substantial reduction of RLR violations and associated crashes at *Safe*Light intersections.[5] Furthermore, the city gained significant revenue from increased enforcement activity. These successes, however, did not occur without careful preparation and implementation of the *Safe*Light program. Other cities considering photo enforcement programs would be well advised to examine Charlotte's example.

In 1993, New York City became the first U.S. jurisdiction to implement red light cameras. Now, close to 50 cities in 10 states operate 250 cameras in red light enforcement programs.[6] Camera suppliers predict that this number will double annually.[7] California and Arizona are the only states that regard the camera-caught red light violation as criminal, moving violations marked by a fine and deduction of driver license points. Due to the requirement that the driver be clearly identified in order to assess driver points, cities in California and Arizona must produce frontal photos of the driver plus license plate identification. Other states, including North Carolina, impose a civil, non-moving penalty with no deduction of driver points and therefore require only license plate photo verification, usually from the rear of the vehicle. A civil penalty citation is issued to the vehicle's registered owner.

Each of Charlotte's red light photo enforcement intersections, called *Safe*Light intersections, is comprised of at least two piezoelectric loops per approach lane buried in the pavement to detect vehicles, a control box near the sidewalk that coordinates the signal with the loops and camera, and a 35mm camera atop a 15-foot pole. When the signal turns to the red phase and after a .03 second grace period, the system becomes active. Once the system activates, a vehicle traveling over 15mph[8] will trigger the piezoelectric loops (located directly in front of the stop bar) causing the camera to take one rear photograph of the vehicle showing the red phase of the signal and verifying that the traffic signal turned red before the vehicle entered the intersection.[9] A second rear photograph captures the vehicle in the intersection during the red phase.[10]

WHAT LED CHARLOTTE TO PURSUE AUTOMATED RED LIGHT PHOTO ENFORCEMENT?

Charlotte's vehicle crash ranking among North Carolina urban jurisdictions rose from 18th in 1996 to 1st in 1998.[11] In 1996, 34 percent of Charlotte's total vehicle crashes were attributed to RLR.[12] Furthermore, of the 179 signalized intersections on the 1998 Charlotte High Accident Location (HAL) list,[13] 49 percent of the crashes at these intersections resulted from RLR.[14]

Citizen concern matched crash statistics in Charlotte. Seventy-six percent of the city's residents believed RLR to be a major safety hazard.[15] Consequentially, the media began reporting alarming incidences of Charlotte red light runners.[16] Red light running even became a frequent topic on morning radio. The statistics and public concern drew the attention of the Charlotte City Council, Charlotte Police Department (CPD), and Charlotte Department of Transportation (CDOT) officials. After careful research by CDOT, automated camera enforcement emerged as the most effective and easiest method to reduce RLR and RLR-associated crashes.

WHAT STEPS WERE TAKEN TO OBTAIN LOCAL AND STATE ENABLING LEGISLATION?

Charlotte's DOT oversees the city's transportation system and subsequently led the push for automated red light photo enforcement. Seven other major players were also involved: North Carolina Department of Transportation, CPD, Charlotte city manager, North Carolina General Assembly,[17] Charlotte City Council, citizens, and local media.[18] Before pursuing red light photo enforcement, jurisdictions must determine what enabling legislation is required to impose a civil penalty and issue citations by mail.[19]

Charlotte took seven steps to obtain local and state approval to use photo enforcement at signalized intersections. First, CDOT managers obtained department head approval. Second, the city manager approved the idea. Third, CDOT presented the council with statistics and information regarding the need for red light photo enforcement. The council unanimously supported the idea and authorized CDOT to pursue state approval. Fourth, before approaching the legislature, CDOT worked with AAA Carolinas and local media to educate the public on the reasons for pursuing RLR photo enforcement as opposed to increasing traditional manual enforcement and the results other similar jurisdictions experienced with photo enforcement. Fifth, CDOT brought the proposal to the fifteen Mecklenburg County Delegation state legislative members.[20] Sixth, the delegation presented the proposal to the General Assembly whereupon the proposal was approved (Appendix A). Finally, Charlotte approved a city ordinance establishing the *Safe*Light program (Appendix B). Two years lapsed from idea inception to actual camera implementation.

WHAT CONCERNS SURROUNDED THE DEBATE OVER RED LIGHT PHOTO ENFORCEMENT?

Several key arguments framed the debate over camera enforcement. Most notably, critics argued that the cameras invade one's privacy rights – the "Big Brother" argument.[21] In response, North Carolina State Sen. LaFontine Odom (D-Mecklenburg, Iredell, and Lincoln) noted that "it's the responsibility of city government to enforce law . . . and cameras seemed to work best."[22] Critics also argued that government should not fine and deduct insurance points from the car's owner if he/she was not driving the vehicle.[23] In response, the legislature classified a camera-caught RLR violation as a civil, non-moving offense.[24] A vehicle's owner may transfer his/her violation's liability by signing an affidavit identifying the actual driver at the time the violation occurred.

In North Carolina, criminal motor vehicle fines revert to school coffers.[25] However, by categorizing the camera-caught RLR violation as a civil offense, Charlotte was able to retain all resulting revenue.[26] Some citizens believed the program was simply a government money-making scheme. In response, Charlotte emphasized that the program's goal was to reduce intersection crashes and deaths, thus making Charlotte a safer community. Fines simply served as the penalty mechanism to alter individual driving habits.[27] Citizens who suggested that manual enforcement instead be stepped up were told that the police did not possess the resources to conduct an increased level of concentrated and ongoing manual enforcement of Charlotte intersections. Cameras, however, monitor intersections 24 hours a day, 7 days a week.

Charlotte sought to contract out the daily operations and management of the *Safe*Light program. Some critics cited the involvement of a private, for-profit company as a conflict of interest. Camera proponents countered that the public/private partnership would reduce crashes and RLR violations, require no new tax burden, and produce additional local government revenue. Furthermore, any potential for abuses would be held in check by a neutral, third-party appeal process.[28]

HOW DOES CHARLOTTE IMPLEMENT THE SAFELIGHT PROGRAM?

Lockheed Martin IMS (IMS) operates the program under a contractual turnkey arrangement.[29] One city employee oversees the *Safe*Light program and conducts the program's public relations.[30] IMS employs nine full-time and two part-time employees on this project.

Of the 28 *Safe*Light intersections, 20 are equipped with a camera on any given day.[31] Technicians service the cameras daily and remove the expended film. The film is then scanned into a computer and analyzed to verify picture integrity and identify vehicle license plate numbers. An identified license plate number is then run though North Carolina Division of Motor Vehicle (DMV) records to identify the vehicle's owner.[32] After IMS obtains a positive DMV verification, a first notification citation is mailed to the vehicle's owner.[33] The preceding steps occur within 48 hours of the actual violation. Should the violator fail to respond, a "Failure to Comply Notice" is issued. If this fails to garner a response, the citation is turned over to a collection agency and an attorney notice is sent to the vehicle's owner.

RESULTS OF THE SAFELIGHT PROGRAM

*Safe*Light began issuing citations in August 1998. By October 1998, the number of *Safe*Light intersections had grown from two to twenty. As of December 1999, twenty-eight intersections were equipped to use cameras.[34] *Safe*Light reports the following results.[35]

- Citywide crash totals increased 5.69 percent.
- *Safe*Light intersections experienced a 9.14 percent decrease in total crashes (Appendix C).
- Crashes on camera approaches (traffic direction approaching the camera that is subject to photograph) decreased 27.11 percent.
- RLR associated crashes decreased 19.3 percent at *Safe*Light intersections (Appendix D).
- Crash severity[36] per crash decreased 27.14 percent at *Safe*Light intersections.
- At eight studied *Safe*Light intersections, RLR decreased 93 percent.[37]

Spillover effects to non-*Safe*Light intersections have yet to be scientifically determined. However, a random sample of three *Safe*Light and three non-*Safe*Light intersections suggests that Charlotte has yet to experience a reduction in RLR-associated crashes at non-*Safe*Light intersections (Appendix E).

*Safe*Light has produced a far higher number of citations than under manual enforcement. In 1999, 1,420 manually issued citations were processed (Appendix F). In the first year of operation (August 98 – July 99), *Safe*Light issued 27,870 citations (Appendix G). Of this number, 369 appellants filed for an administrative hearing. Sixty-two (17 percent) were dismissed. Charlotte does not view automated camera enforcement as a citywide replacement to manual RLR enforcement. The cameras are intended to *supplement* police RLR enforcement. However, camera equipped intersections are left to the *Safe*Light program to monitor.

According to the CPD's traffic unit director, 12-13 minutes are required for an officer to apprehend and issue a RLR citation.[38] Assuming five officers could each issue three citations per hour, seven hours per day per 5 day work week for 50 weeks, the officers would issue a total of 26,250 citations – still less than *Safe*Light's total.[39] At *Safe*Light intersections alone, the decrease in crashes allowed the CPD to save, or reallocate, approximately 59 enforcement hours.[40] A CPD official stated that officer tasks in the city's traffic unit have not changed since *Safe*Light's inception. However, CPD predicts that in the long run, fewer intersection crashes will reduce workloads and allow officers to address other police needs.[41]

The *Safe*Light program is financed entirely by citation revenue. Under the contractual arrangement, Charlotte receives $22 (44 percent) of each $50 RLR citation.[42] The rest goes to the contractor, IMS. During *Safe*Light's first year, fines totaled $1,393,500. From this amount, IMS collected $1,086,357. Of the $1,086,357, IMS received $611,522 and Charlotte received $447,835 (Appendix H). *Safe*Light expects to issue $1,825,250 in fine revenue during its 2000 fiscal year.[43] Of this amount, Charlotte expects to receive approximately $800,000. Since implementation of 20 cameras in October 1998, Charlotte's monthly revenue has averaged $52,787.[44]

Capital costs to implement the *Safe*Light program are considerable. According to IMS, the equipment and installation costs per intersection in Charlotte average $72,000, which includes one $50,000 camera. IMS spends approximately $55,000 annually on mail production costs for distributing notices to violators.

IMS predicts mailing costs to rise to $86,000 in 2000 due to an expected increase in volume of citations. Additionally, costs for personnel, data center, and other administrative expenses exceed one million dollars annually.[45] According to IMS's Project Manager of Municipal Services in Charlotte, IMS has yet to return a profit, but – considering that IMS received $611,522 in FY 1999 and expects to receive approximately $1.2 million in FY 2000 and $1.6 million in FY 2001[46] – the project manager expects *Safe*Light to become profitable within the next couple years.[47]

Other red light photo enforcement programs in the U.S. have experienced similar reductions in RLR and associated crashes to those of Charlotte.[48] The U.S. Federal Highway Administration predicts that RLR camera programs will experience a reduction in RLR violations between 20 and 60 percent.[49] However, caution is in order when interpreting violation and crash results from jurisdictions. First, the number of violations may or may not be related to the number and severity of collisions. And second, the results cited may or may not be the result of controlled, scientific studies.[50] Although initial results are promising, concrete results require additional data and analysis over longer periods of time.

RECOMMENDATIONS FOR OTHER LOCAL GOVERNMENTS

Red light running literature and interviews with Charlotte DOT, IMS, and the Mecklenburg County Legislative Delegation suggest that photo enforcement can reduce RLR violations and associated crashes. Below are nine recommendations for optimizing red light photo enforcement programs (see also Appendix I).

1) Impose a Civil Penalty. Criminalizing drivers who run red lights requires positive driver identification, thus the need for an additional frontal camera. Sun visors and rear-view mirrors, sun glare, and the wearing of sunglasses and hats hampers positive driver identification. Research reports that red light running citation issue rates (number of citations issued to violators with respect to total number of recorded violations on film) vary between 13 and 30 percent in jurisdictions which classify red light running as a criminal, moving violation.[51] Such low rates reduce a program's ability to achieve its goals and support itself financially.[52] Therefore, jurisdictions are prudent to impose a civil penalty rather than a criminal penalty.[53]

2) Conduct a Public Information and Education Campaign.[54] An effective campaign is critical to obtain support for implementing a RLR photo enforcement program and for the program's continued success. In fact, the U.S. Federal Highway Administration identifies this as the most critical issue.[55] Citizen support can be garnered through early and frequent dissemination of information regarding the need for automated enforcement and the results of automated camera use. Media support should be pursued as a means of gaining citizen support.[56]

3) Consider Contracting Out Program Operation. The author has not determined if it has been smarter, financially, for Charlotte to contract out the *Safe*Light program as opposed to operating the program in-house, it is clear that the public/private partnership has produced significant revenue for Charlotte. Additionally, contractual arrangements hold two major advantages. First, contractors specializing in this field enjoy technological advantages over most local government staffs. Second, contracting simplifies abandonment should the program fail to achieve expected results.[57]

4) Choose Appropriate Intersections. Initially, Charlotte placed all cameras at High Accident Location (HAL) intersections. However, Charlotte learned that HAL intersections do not necessarily translate into intersections that experience high numbers of red light runners. In fact, research only tentatively recommends using HAL intersections as camera locations, and notes that more definitive research is needed.[58] Other factors to consider when choosing a red light camera intersection include number of right-angle crashes, police reports, citizen complaints, number of RLR violations, and specific intersection studies.[59] Interestingly, research warns against relying on traffic volume to determine camera

locations. Instead, potential camera locations should be chosen based on the estimated or actual number of RLR violations occurring at particular intersections.[60]

5) Use Roadway Signs to Notify the Public of Photo Enforcement. Although Charlotte's cameras monitor one intersection approach, all four approaches at a *Safe*Light intersection display warning signs within 300 feet of the intersection as mandated by North Carolina General Statute.[61] Howard County, Maryland posts warning signs on freeways and other major highways leading into the county, but not at specific intersections. New York City posts no warning signs. If allowable, this study recommends posting the signs similar to the Howard County, Maryland method in order to increase visibility to a broader population and to encourage safe driving habits at all intersections rather than at the camera equipped intersections only.[62] North Carolina's 300-foot intersection signage requirement could help explain the absence of spin-off value in reduction of RLR violations and associated crashes at *non-Safe*Light intersections in Charlotte.

6) Locate Stop Bar Appropriately. The lateral extension of the curb lines or, if lacking curbs, the lateral edge extension of the roadway defines an intersection's boundaries according to North Carolina General Statute.[63] Therefore, jurisdictions in North Carolina that establish red light photo enforcement programs should carefully position the stop bar according to statute definition. North Carolina jurisdictions that locate the stop bar behind an intersection's legal definition may create an opportunity for legal challenge.

7) Prepare for Success. Charlotte administrators recommend performing extra "homework" to learn about camera technology and its record of success and failure – including site visits to other operating programs. Elected officials, citizens, and city supervisors are more apt to support a RLR photo enforcement program when time is taken to educate the stakeholders on the needs and potential results of automated enforcement. Most importantly, select a "champion/opinion leader" among the city's staff to push the idea along at all stages and go "out on a limb" to support the idea if necessary.[64]

8) Budget Time Wisely. Expect significant time requirements in three areas. First, expect to spend about six weeks at the state legislature. Legislative approval is not pro forma.[65] As a result, lobbying is a difficult task. Second, marketing the idea to the media and public should be an on-going effort. Third, Charlotte's Request for Proposal (RFP) process took nine months and proved very challenging. Allow extra time to understand and evaluate the proposals and be sure to require the contractors to demonstrate experience in operating a fully functioning red light photo enforcement system as part of the RFP.

9) Consider Digital Cameras. Digital cameras offer significant benefits over 35mm cameras. Primarily, digital cameras capture higher resolution photos and allow photos to be electronically sent from the camera at an intersection directly to the program's main computers, thus eliminating the need for film removal and developing – which in turn reduces time and personnel needs.

CONCLUSION

Since the U.S. introduction of automated red light photo enforcement in 1993, the technology has shown promising results in reducing the number of RLR associated crashes and especially RLR violations. Additionally, jurisdictions have gained valuable experience operating successful red light photo enforcement programs. In the first year of operation, Charlotte's *Safe*Light equipped intersections experienced an overall crash reduction of 9.14 percent, a 19.3 percent reduction in the number of RLR associated crashes, a 27.11 percent reduction in crashes on the camera approach, and a study of eight *Safe*Light intersections revealed a RLR reduction of 93 percent. Furthermore, without reliance on any additional taxpayer support, Charlotte received $447,835 in new revenue from fines during the program's first year.[66] Initial results suggest that the *Safe*Light program is achieving its goal of creating a safer Charlotte by improving highway safety at signalized intersections.[67]

Appendix A

N.C.G.S. 160A-300.1

GENERAL ASSEMBLY OF NORTH CAROLINA
1997 SESSION

SESSION LAW 1997-216
SENATE BILL 741

AN ACT TO AUTHORIZE LOCAL GOVERNMENTS TO USE PHOTOGRAPHIC IMAGES AS PRIMA FACIE EVIDENCE OF A TRAFFIC VIOLATION.

The General Assembly of North Carolina enacts:

Section 1. Chapter 160A of the General Statutes is amended by adding a new section to read:

"Chapter 160A-300.1. Use of traffic control photographic systems.

(a) A traffic control photographic system is an electronic system consisting of a photographic, video, or electronic camera and a vehicle sensor installed to work in conjunction with an official traffic control device to automatically produce photographs, video, or digital images of each vehicle violating a standard traffic control statute or ordinance.

(b) Any traffic control photographic system or any device which is a part of that system, as described in subdivision (a) of this section, installed on a street or highway which is a part of the State highway system shall meet requirements established by the North Carolina Department of Transportation. Any traffic control system installed on a municipal street shall meet standards established by the municipality and shall be consistent with any standards set by the Department of Transportation.

(c) Municipalities may adopt ordinances for the civil enforcement of G.S. 20-158 by means of a traffic control photographic system, as described in subsection (a) of this section. Notwithstanding the provisions of G.S. 20-176, in the event that a municipality adopts an ordinance pursuant to this section, a violation of G.S. 20-158 at a location at which a traffic control photographic system is in operation shall not be an infraction. An ordinance authorized by this subsection shall provide that:

(1) The owner of a vehicle shall be responsible for a violation unless the owner can furnish evidence that the vehicle was, at the time of the violation, in the care, custody, or control of another person. The owner of the vehicle shall not be responsible for the violation if the owner of the vehicle, within 21 days after notification of the violation, furnishes the officials or agents of the municipality which issued the citation:

a. The name and address of the person or company who leased, rented, or otherwise had the care, custody, and control of the vehicle; or

b. An affidavit stating that the vehicle involved was, at the time, stolen or in the care, custody, or control of some person who did not have permission of the owner to use the vehicle.

(2) A violation detected by a traffic control photographic system shall be deemed a noncriminal violation for which a civil penalty of fifty dollars ($50.00) shall be assessed, and for which no points authorized by G.S. 20-160 shall be assigned to the owner or driver of the vehicle.

(3) The owner of the vehicle shall be issued a citation which shall clearly state the manner in which the violation may be challenged, and the owner shall comply with the directions on the

citation. The citation shall be processed by officials or agents of the municipality and shall be forwarded by personal service or first-class mail to the address given on the motor vehicle registration. If the owner fails to pay the civil penalty or to respond to the citation within the time period specified on the citation, the owner shall have waived the right to contest responsibility for the violation, and shall be subject to a civil penalty not to exceed one hundred dollars ($100.00). The municipality may establish procedures for the collection of these penalties and may enforce the penalties by civil action in the nature of debt.

(4) The municipality shall institute a nonjudicial administrative hearing to review objections to citations or penalties issued or assessed under this section."

Section 2. This act applies to the City of Charlotte only.

Section 3. This act is effective when it becomes law.

In the General Assembly read three times and ratified this the 23rd day of June, 1997.

s/ Dennis A. Wicker

President of the Senate

s/ Harold J. Brubaker

Speaker of the House of Representatives

*Continue to next page.

Appendix A (cont.)

N.C.G.S. 160A-300.1 (Amended)

GENERAL ASSEMBLY OF NORTH CAROLINA
1999 SESSION

SESSION LAW 1999-182
HOUSE BILL 514

AN ACT TO AUTHORIZE THE CITIES OF WILMINGTON, GREENVILLE, AND GREENSBORO, AND THE TOWNS OF HUNTERSVILLE, MATTHEWS, AND CORNELIUS TO USE PHOTOGRAPHIC IMAGES AS PRIMA FACIE EVIDENCE OF A TRAFFIC VIOLATION, AND TO PREVENT INSURANCE POINTS FROM BEING ASSESSED.

The General Assembly of North Carolina enacts:

Section 1. Section 1 of Chapter 216 of the 1997 Session Laws reads as rewritten:

"Section 1. Chapter 160A of the General Statutes is amended by adding a new section to read:

`§ 160A-300.1. Use of traffic control photographic systems.

(a) A traffic control photographic system is an electronic system consisting of a photographic, video, or electronic camera and a vehicle sensor installed to work in conjunction with an official traffic control device to automatically produce photographs, video, or digital images of each vehicle violating a standard traffic control statute or ordinance.

(b) Any traffic control photographic system or any device which is a part of that system, as described in subdivision (a) of this section, installed on a street or highway which is a part of the State highway system shall meet requirements established by the North Carolina Department of Transportation. Any traffic control system installed on a municipal street shall meet standards established by the municipality and shall be consistent with any standards set by the Department of Transportation. (b1) Any traffic control photographic system installed on a street or highway must be identified by appropriate advance warning signs conspicuously posted not more than 300 feet from the location of the traffic control photographic system. All advance warning signs shall be consistent with a statewide standard adopted by the Department of Transportation in conjunction with local governments authorized to install traffic control photographic systems.

(c) Municipalities may adopt ordinances for the civil enforcement of G.S. 20-158 by means of a traffic control photographic system, as described in subsection (a) of this section. Notwithstanding the provisions of G.S. 20-176, in the event that a municipality adopts an ordinance pursuant to this section, a violation of G.S. 20-158 at a location at which a traffic control photographic system is in operation shall not be an infraction. An ordinance authorized by this subsection shall provide that:

(1) The owner of a vehicle shall be responsible for a violation unless the owner can furnish evidence that the vehicle was, at the time of the violation, in the care, custody, or control of another person. The owner of the vehicle shall not be responsible for the violation if the owner of the vehicle, within 21 days after notification of the violation, furnishes the officials or agents of the municipality which issued the citation: a. The name and address of the person or company who leased, rented, or otherwise had the care, custody, and control of the vehicle; or b. An affidavit stating that the vehicle involved was, at the time, stolen or in the care, custody, or control of some person who did not have permission of the owner to use the vehicle.

(2) A violation detected by a traffic control photographic system shall be deemed a noncriminal violation for which a civil penalty of fifty dollars ($50.00) shall be assessed, and for which no points authorized by G.S. 20- 16(c) shall be assigned to the owner or driver of the vehicle. vehicle nor insurance points as authorized by G.S. 58-36-65.

(3) The owner of the vehicle shall be issued a citation which shall clearly state the manner in which the violation may be challenged, and the owner shall comply with the directions on the citation. The citation shall be processed by officials or agents of the municipality and shall be forwarded by personal service or first-class mail to the address given on the motor vehicle registration. If the owner fails to pay the civil penalty or to respond to the citation within the time period specified on the citation, the owner shall have waived the right to contest responsibility for the violation, and shall be subject to a civil penalty not to exceed one hundred dollars ($100.00). The municipality may establish procedures for the collection of these penalties and may enforce the penalties by civil action in the nature of debt.

(4) The municipality shall institute a nonjudicial administrative hearing to review objections to citations or penalties issued or assessed under this section.'"

Section 2. Section 2 of Chapter 216 of the 1997 Session Laws, as amended by Chapter 17 of the 1999 Session Laws, reads as rewritten:

"Section 2. This act applies to the Cities of Charlotte and Fayetteville only. Charlotte, Fayetteville, Greenville, Wilmington, and Greensboro, and the Towns of Huntersville, Matthews, and Cornelius only."

Section 3. This act becomes effective January 1, 2000.

In the General Assembly read three times and ratified this the 16th day of June, 1999.

s/ Dennis A. Wicker

President of the Senate

s/ James B. Black

Speaker of the House of Representatives

Appendix B

CHARLOTTE CITY CODE

ORDINANCE NUMBER: 966
AMENDING CHAPTER 14

AN ORDINANCE AMENDING CHAPTER 14 OF THE CHARLOTTE CITY CODE ENTITLED "MOTOR VEHICLES AND TRAFFIC"

WHEREAS, the North Carolina General Assembly has enacted 1997 N.C. Session Law c. 216 which established G.S. 160A-300.1, entitled "Use of traffic control photographic systems," applicable to the City of Charlotte; and

WHEREAS, G.S. 160A-300.1 authorizes the City of Charlotte to use photographic images as prima facie evidence of traffic violations as defined in G.S. 20-158; and

WHEREAS, in the year 1995, approximately 25% of Charlotte's total traffic accidents occurred at signalized intersections, and a majority of those accidents may have occurred as a result of violations of G.S. 20-158; and

WHEREAS, the objective of a monitoring program is to increase safety at the intersections within the City of Charlotte where the most accidents occur, and to change the driving habits of local motorists, and to provide a deterrent to potential violators; and

NOW, THEREFORE, BE IT ORDAINED by the Charlotte City Council that the City of Charlotte implement a system for capturing traffic control violations, as defined under G.S. 20-158, with a traffic control photographic system that will use the photographic images as prima facie evidence of the traffic violations and will authorize the Charlotte Department of Transportation or an agent of the department to issue civil citations for the violations.

Section 1. Chapter 14, "Motor Vehicles and Traffic," of the Charlotte City Code is hereby amended to create Article VIII, entitled "Traffic Control Photographic Systems" to read as follows:

ARTICLE VIII. TRAFFIC CONTROL PHOTOGRAPHIC SYSTEMS

Sec. 14-226. Definitions.

(a) "Traffic control photographic system" is an electronic system consisting of a photographic, video or electronic camera and a vehicle sensor installed to work in conjunction with an official traffic control and to automatically produce photographs, video or digital images of each vehicle violating a standard traffic control.

(b) "In operation" means operating in good working condition.

(c) "System location" is the approach to an intersection toward which a photographic, video or electronic camera is directed and is in operation.

(d) "Vehicle owner" is the person identified by the North Carolina Division of Motor Vehicles as the registered owner of a vehicle.

Sec. 14-227. General.

(a) The City of Charlotte Department of Transportation shall administer the Traffic Control Photographic Program and shall maintain a list of system locations where traffic control

photographic systems are installed.

(b) Any citation for a violation of G.S. 20-158 issued by an officer of the Charlotte-Mecklenburg Police Department at a system location shall be treated in the same manner as prescribed in this Article.

(c) The citation shall clearly state the manner in which the violation may be appealed. The citation shall be processed by officials or agents of the City of Charlotte and shall be forwarded by personal service or first-class mail to the owner's address as given on the motor vehicle registration.

Sec. 14-228. Offense.

(a) It shall be unlawful for a vehicle to cross the stop line at a system location when the traffic signal for that vehicle's direction of travel is emitting a steady red light, or for a vehicle to violate any other traffic regulation specified in G.S. 20-158.

(b) The owner of a vehicle shall be responsible for a violation under this section, except when he can provide evidence that the vehicle was in the care, custody, or control of another person at the time of the violation, as described in subsection (c).

(c) Notwithstanding subsection (b), the owner of the vehicle shall not be responsible for the violation if, within 21 days after notification of the violation, he furnishes the officials or agents of the city:

1. The name and address of the person or entity who leased, rented, or otherwise had the care, custody, and control of the vehicle at the time of the violation; or

2. An affidavit by him stating that, at the time of the violation, the vehicle involved was stolen or was in the care, custody, or control of some person who did not have his permission to use the vehicle.

Sec. 14-229. Penalty.

Any violation of Section 14-228 (a) shall be deemed a noncriminal violation for which a civil penalty of fifty dollars ($50.00) shall be assessed, and for which no points authorized by G.S. 20-16(c) shall be assigned to the owner or driver of the vehicle. Failure to pay the civil penalty or file an appeal within twenty-one (21) days after notification of the violation shall result in an additional penalty of fifty dollars ($50.00). The city may establish procedures for the collection of the civil penalties and may enforce the penalties by a civil action in the nature of a debt.

Sec. 14-230. Appeals.

A notice of appeal shall be filed within twenty-one (21) days after notification of the violation. The failure to give notice of appeal within this time period shall constitute a waiver of the right to contest the citation. Appeals shall be heard through an administrative process established by the City of Charlotte Department of Transportation. An individual desiring a hearing must post a bond equal to the amount of the civil penalty before an appeal hearing will be scheduled. The hearing officer's decision is subject to review in the Superior Court of Mecklenburg County by proceedings in the "nature of certiorari."

Section 2. This ordinance shall become effective upon adoption.

Passed January 12, 1998

Appendix I

The following automated red light running enforcement implementation strategies were developed in 1997 by Karl A. Passetti, at that time a Civil Engineering graduate student at Texas A&M University**.**

1. **Demonstrate a need for the program.** In addition to problem identification and local statistics regarding red light running, additional studies can be obtained by the Insurance Institute for Highway Safety, the Federal Highway Administration, and many other recent studies of red light running.

2. **Establish institutional arrangements.** In order for automated red light enforcement programs to become a valid alternative for a jurisdiction, strong partnerships between the police department, political leaders, citizen safety organizations, and transportation officials must be developed.

3. **Review applications in the United States and abroad.** Various sources should be consulted to learn about the limitations, challenges, results and methods of program implementation.

4. **Create a public education and awareness campaign.** An effective campaign should publicize the importance of the issue and emphasize the need for action to be taken.

5. **Establish legislation to allow for the use of automated enforcement technology and processes.** The most important decision to be made when presenting the need for legislation is whether violations detected using automated enforcement will be categorized as a moving violation (criminal offense) or non-moving violation (civil offense) and who will be responsible for the violation. Violations classified as a moving violation require positive driver identification, thus the need for frontal photography. Jurisdictions which require frontal photography experience a lower percentage of violators to which citations are sent due to the difficulty in positively identifying the driver. Consequently, frontal photography is very labor intensive.

6. **Advertise a Request for Proposal (RFP).** Ideally, the RFP process should follow a procedure that allows for the selection of a system that is believed to offer the best match for the jurisdiction, not necessarily the system that is submitted by the lowest bidder.

7. **Undertake a demonstration project.** In conducting the demonstration project, goals and criteria should be established before the program begins so participating vendors can be fairly evaluated. Also, ensure the demonstration project operates under a variety of conditions (i.e. various weather patterns, differing traffic situations, different intersection designs, etc.)

8. **Evaluate the demonstration project.** In addition to the evaluation of demonstration project, a cost benefit analysis [or cost accounting study] should be undertaken to calculate how much each violation produced by the automated enforcement system costs the operating agency compared to other methods of manual red light enforcement such as team enforcement.

9. **Implement selected vendor systems.** Effort should be made to produce detailed statistical results of the program to allow legislators and the public to see the effectiveness of the program and provide a basis for future program expansion.

10. **Expand the program.** After the program has operated to the satisfaction of local officials for a given period of time, consideration should be given to expanding the program. Expansions should be publicized to the media to inform and educate the public.

NOTES

[1] Richard Retting. "Automated Enforcement of Traffic Laws." TR News, March-April 1999, p. 15-18, 29.

[2] Insurance Institute for Highway Safety (IIHS). Safety Facts. 16 December 1999. 9 January 2000 <http://www.highwaysafety.org/safety_facts/qanda/rlc.htm>.

[3] *Ibid*.

[4] M. Freedman and N. Paek, 1992. "Enforcement resources relative to need: changes during 1978-89." Insurance Institute for Highway Safety, Arlington, VA.

[5] Charlotte Department of Transportation *Safe*Light Program. Yearly Accident Statistics @ *Safe*Light Intersections (Aug – Jul). Charlotte, NC, December 1999 (hereafter cited as *Safe*Light Statistics).

[6] "Cameras working against light-runners." USA Today 13 January 2000 <http://www.usatoday.com/news/washdc/ncswed03.htm>.

[7] *Ibid*.

[8] The use of a minimum travel speed helps eliminate potential false positive violations associated with left-turn-only lanes, right-turn-on-red maneuvers, and emergency vehicles. Some intersections in Charlotte require a higher threshold vehicular speed (16mph or 18mph) to activate the cameras.

[9] On the first photo, the computer prints the date, time, elapsed time since the beginning of the red light phase, duration of the yellow phase, violation number, lane number, and intersection location code.

[10] On the second photo, the computer prints the date, time, elapsed time between photos, total elapsed red light time at time of second violation photo, vehicle speed, and violation number.

[11] North Carolina Department of Transportation, Traffic Crash Facts 1996 (NCDOT, Raleigh, NC, 1997), p. 106; North Carolina Department of Transportation, Traffic Crash Facts 1997 (NCDOT, Raleigh, NC, 1998), p. 156; North Carolina Department of Transportation, Traffic Crash Facts 1998 (NCDOT, Raleigh, NC, 1999), p. 156.

[12] Brett Vines, City of Charlotte Special Programs Manager / *Safe*Light Director. Personal interview. 16 December 1999.

[13] The High Accident Location (HAL) list, produced by the Charlotte Department of Transportation (CDOT), ranks intersections based on how dangerous a particular intersection is compared to all other intersections in Charlotte. HAL rankings are based upon three factors: 1) the number of crashes occurring in a 3-year period at that particular intersection, 2) the total volume of traffic entering that particular intersection in a 24-hour period, and 3) the severity of the injuries sustained for each crash occurring at that particular intersection. The three factors are put into an equation and used to calculate the Estimated Property Damage Only index (EPDO). The resulting index determines the ranking of the HAL intersections. The HAL list includes the 221 most unsafe intersections.

[14] City of Charlotte, NC. *Safe*Light Program. 31 December 1999. 15 January 2000 <http://www.ci.charlotte.nc.us/citransportation/programs/ltfacts.htm>

[15] City of Charlotte, North Carolina. Charlotte Department of Transportation. *Safe*Light First-Year Report. p. 4. Charlotte, North Carolina: *Safe*Light Program. Fall 1999. MarketWise, Inc, conducted the first survey in the Fall of 1997. MarketWise also conducted a post implementation survey of 404 Mecklenburg County residents in August 1999. The study indicated that 78% supported the *Safe*Light program, while only 8% opposed it. Thirty-six percent indicated that the program has changed driving habits at intersections. Overall, there have been no major negative citizen outcries or concerns regarding Charlotte's *Safe*Light program.

[16] Dianne Whitacre. "Drivers flouting the rules, City tries to stem rise in accidents." 29 November 1997. Online posting. Charlotte *Safe*Light Program. 12 February 2000 <http://www.ci.charlotte.nc.us/citransportation/programs/press25.htm>.

[17] North Carolina courts have traditionally interpreted local government powers as arising from state legislative delegated authority only. Thus, North Carolina local governments inherit all powers from the state. Furthermore, state motor vehicle laws, in general, implicitly preempt – or "occupy the field" – any local attempts to regulate motor vehicles (Robert E. Hagemann, Asst. City Attorney of Charlotte. Personal interview. 31 March 2000.). As of this writing, no North Carolina appellate court has heard a case regarding automated red light photo enforcement.

[18] Randy Jones, former Manager of Public Service for Charlotte DOT. Personal interview. 19 January 2000.

[19] For U.S. cities, state law generally categorizes RLR as a criminal, moving violation. Therefore, jurisdictions seeking to avoid the legal restrictions associated with classifying RLR as a criminal violation (i.e. positive driver identification and rules of evidence) require legislative local acts allowing jurisdictions to classify camera-caught violations as a less severe, civil penalty. Enabling legislation may also be required to authorize enforcement agencies to cite red light violators by mail, to not require an officer to attend the equipment at all times, and to not require both an officer's and law violator's signature to appear on the issuing violation ticket.

[20] Clear identification of the highway safety hazard and evidence that red light cameras proved successful in other U.S. and worldwide jurisdictions prompted the delegation to unanimously support the proposal.

[21] For purposes of this paper, "big brother" refers to excessive governmental monitoring or directing of individual actions.

[22] Sen. T. LaFontine Odom, Sr. "Re: Charlotte's *Safe*Light Program." E-mail to the author. 13 January 2000. Driving is considered a privilege. As such, North Carolina courts have generally allowed government regulation to correct private driving hazards that effect the general driving public.

[23] To require loss of driver points (which would classify the violation as a criminal, moving violation), a positive driver identification is required.

[24] The civil (non-moving violation) RLR offense in Charlotte carries a $50 fine. The criminal (moving violation) red light running offense (caught by a police officer) in North Carolina carries a $25 fine plus $86 court costs and deduction of driver points.

[25] Article IX, Sec. 7 of the North Carolina State Constitution.

[26] The legality over cities retaining red light camera generated revenue has yet to be challenged in court. Randy Jones, former Manager of Public Service for Charlotte DOT, noted that it would be highly unlikely that cities could afford the high costs of camera programs without offsetting costs with fine revenue.

[27] Vicki Hyman. "Charlotte program credited with reducing crashes 27 percent." News and Observer. 24 October 1999: 26A+. Brett Vines, *Safe*Light Director, noted in the above cited newspaper article that Charlotte spends its *Safe*Light generated revenue on pedestrian safety, public safety campaigns, and sidewalk construction.

[28] The appeals process includes an administrative review, an administrative hearing before an independent hearing officer, and an appeal through the Superior Court of Mecklenburg County.

[29] Under the 5-year contract, Lockheed Martin IMS (IMS) operates the program by providing camera installation, camera servicing and maintenance, film processing, violation processing, customer service, adjudication support, payment processing, financial and statistical report generation, and project management. Among cities that do not completely privatize, the contractor normally provides camera installation, camera servicing and maintenance, and film processing. In these cities, the police department usually assumes the tasks of violation processing or verification, customer service, adjudication support, and payment processing.

[30] Lockheed Martin IMS employs its own project manager to oversee its Charlotte operation and work closely with the city's *Safe*Light Director.

[31] Charlotte operates a total of 572 signalized intersections.

[32] The system is also integrated to obtain DMV motor vehicle owner records from virtually all U.S. states. For rental cars, IMS contacts the rental car company to obtain the renter's name and mailing address. If they cannot obtain the name, IMS sends the violation to the rental car company for them to forward to the driver. According to IMS, most rental car companies are cooperative, helpful, and supportive.

[33] The citation includes an explanation of the violation, intersection location, photo of the vehicle's license plate, and a photo of the vehicle in the intersection during the signal's red phase.

[34] *Safe*Light expects to have 33 *Safe*Light equipped intersections by April 2000. Twenty intersections will possess permanent cameras while one or two cameras will rotate among the remaining 13 *Safe*Light intersections.

[35] Charlotte Department of Transportation *Safe*Light Program. *Safe*Light Statistics. Except for the last bullet point, all data was recorded from August 1997 through July 1998 and August 1998 through July 1999.

[36] The Estimated Property Damage Only index (EPDO) determines estimated crash severity. See endnote 13.

[37] City of Charlotte, *Safe*Light First-Year Report, 10. A pretest, conducted by CDOT, examined eight intersections for one twelve hour segment (7:00 a.m. to 7:00 p.m.) prior to camera installation. The pretest determined that motorists violated red lights a total of 875 times. A posttest, after camera installation revealed that the total number of violations at the same eight intersections decreased to 58 over a 24-hour period.

[38] Manual enforcement by a single officer is very difficult and dangerous. The officer must be able to clearly see the vehicle, stop bar, and traffic signal at the same time. In apprehending a red light violator, the officer must rapidly pursue the violator through the red phase – thus endangering the officer, other motorists, and pedestrians.

[39] Court appearance time and other forms of "down" time were excluded from the calculation. In comparison, Howard County, MD estimated that automated enforcement of one intersection could produce 2000 citations in one month. Howard County, MD estimated that it would take two officers approximately two years to issue 2000 red light running citations.

[40] Capt. Blydenburgh, head of Highway Interdiction and Traffic Safety for the Charlotte Police Department, estimated that one officer spends one hour at a typical red light running crash scene and filing subsequent paperwork. This paper does not examine the monetary costs associated with manual red light running enforcement in Charlotte. However, a 1997 Texas Transportation Institute study by Karl A. Passetti found that in Howard

County, MD, a cost analysis of manual team-oriented RLR enforcement yielded a cost of $25.40 for each manually issued RLR citation.

[41] Capt. Larry Blydenburgh, head of Highway Interdiction and Traffic Safety - Charlotte Police Department. Personal interview. 21 January 2000.

[42] Additionally, the contractual revenue breakdown for IMS does not provide a significant incentive to increase the number of issued citations. For less than 35,000 citations issued per year, IMS receives $28 of each $50 citation. IMS gains an extra $4 per citation if it issues more than 35,000 but less than 60,000 citations. Should IMS issue over 60,000 citations per year, IMS obtains only an extra $1.50 per citation.

If the violation is not paid or appealed within 21 days, a $50 late penalty is charged. Charlotte DOT collects $27 of each $50 late penalty; IMS receives $23. However, if a violator does not pay until after a third notice is sent, IMS receives $76 of the total $100 fine and late penalty, and CDOT receives $24.

[43] Charlotte Department of Transportation *Safe*Light Program. "City of Charlotte SafeLight Program Summary of Revenues and Expenditures." Charlotte, NC, December 1999 (hereafter cited as "Revenues and Expenditures").

[44] October 1998 to December 1999.

[45] Terence J. Lynam. Lockheed Martin IMS. "Re: Charlotte Red Light Program." E-mail to the author. 21 December 1999.

[46] Charlotte Department of Transportation *Safe*Light Program, "Revenues and Expenditures."

[47] Johnnie Fogg, Project Manager Municipal Services - Lockheed Martin IMS. Personal Interview. 16 December 1999. According to John Veneziano, Director of Public Works for Fairfax, VA, the city's 3-camera Photo Red Light Program returned a profit after 15 months. As of December 1999, Fairfax had paid $831,380.00 in total contractual costs and the city's net revenue totaled $131,819.70. Fairfax contracts the intersection installation, camera maintenance, and film developing. The police department reviews the photo violations, mails the citations, handles customer service, and supports the appeals process.

The author did not audit IMS's cost figures. However, the approximate $50,000 purchase price for each of Charlotte's Gatsometer 35mm cameras is consistent with prices charged for such high speed/resolution cameras. Research by Hummer *et al.* (See endnote 47) found that in Howard County, MD, installation of the pavement loops and the poles for the camera cost between $3,000 and $7,000. Significant price differences can be experienced between types of cameras (35mm or digital) and type of vehicle detectors (air tubes, inductive loops, earth magnetic loops, piezoelectric strips, video loops, or laser).

[48] Richard A. Retting, Allan R. Williams, Charles M. Farmer, and Amy F. Feldman. "Evaluation of Red Light Camera Enforcement in Fairfax, Va., USA." ITE Journal. August 1999: 30-34. Fairfax, Virginia's violation rate across camera *and* non-camera intersections was reduced approximately 40 percent one year after photo enforcement began.

Richard A. Retting, Allan R. Williams, Charles M. Farmer, and Amy F. Feldman. "Evaluation of Red Light Camera Enforcement in Oxnard, California." *Accident Analysis and Prevention,* 31 (1999): 169-174. In Oxnard, California, the violation rate across camera *and* non-camera intersections was reduced approximately 42 percent.

United States. Department of Transportation. Synthesis and Evaluation of Red Light Running Automated Enforcement Programs in the United States. FHWA-IF-00-004. Washington, D.C.: Federal Highway Administration. September 1999, 17 (hereafter cited as Synthesis and Evaluation). New York City experienced a 38 percent reduction in RLR violations.

Joseph E. Hummer, Joseph S. Milazzo II, Leanne M. Wissinger, and Larry R. Goode. "Traffic Signal Enforcement Innovations for North Carolina." North Carolina State University at Raleigh. Report submitted to the North Carolina Governor's Highway Safety Program, October 29, 1999, 24 (hereafter cited as "Traffic Signal"). San Francisco experienced a 42 percent reduction in violation rates during a six-month pilot program. Preliminary crash data suggested the cameras in San Francisco reduced citywide crashes and injuries by red light runners.

Karl A. Passetti. "Use of Automated Enforcement for Red Light Violations." Compendium: Graduate Student Papers on Advanced Surface Transportation Systems. Texas Transportation Institute, August 1997, J-30. Howard County, Maryland experienced a 23 percent reduction in the number of RLR violations.

[49] United States. Department of Transportation. Synthesis and Evaluation, 27.

[50] Hummer, *et al.*, "Traffic Signal," 25.

[51] Hummer, *et al.*, "Traffic Signal," 23.

[52] Brett Vines (current *Safe*Light Director) and Randy Jones (former Manager of Public Service for Charlotte DOT) both posit that categorizing an automated enforcement red running violation as a civil penalty produces just as good of results (reductions in RLR violations and associated crashes), if not better, than those jurisdictions which criminalize the offense.

[53] Two main issues arise regarding statutory authority. First, does the local government have authority to create a civil penalty for failure to obey a red light? If not, a state legislative local act or other statutory allowance must be obtained. Second, three difficulties exist should a local government not obtain authority to impose a civil penalty and subsequently install cameras to catch red light runners. One, legal rules of evidence do not generally apply to administrative adjudication of civil penalties whereas rules of evidence do apply to criminal proceedings. Two, positive driver identification with a criminal penalty is difficult to obtain. Three, the practicality of using cameras with a criminal penalty means that with the high number of camera-caught red light violators, camera technicians and staff will spend much of their time in court rooms defending equipment validity and reliability and program procedures.

[54] The Federal Highway Administration (FHWA) has developed the *Red Light Running Campaign Strategic Planning Guide*SM to assist local governments in developing an effective public information and education campaign. The guide can be used as a basis to formulate ideas on how to create a public information and education program or as a reference to improve specific aspects of a campaign. To obtain a copy of the guide, contact the FHWA in Washington, D.C. or send a request to jbernard@golinharris.com.

[55] United States. Department of Transportation. Synthesis and Evaluation, 25.

[56] As a program's first camera-equipped intersections begin operation, a "warning period," whereby only warning tickets are issued (for one or two months), should be considered as an element of the public information and education campaign.

[57] Jones, interview. Vines, interview.

[58] Hummer, *et al.*, "Traffic Signal," 73.

[59] Keep in mind that RLR problems may be the result of poorly designed intersections, poor sight lines to the traffic signal, or poor traffic light phase timings.

[60] Hummer, *et al.*, "Traffic Signal," 61.

[61] North Carolina General Statute (N.C.G.S.) 160A-300.1

[62] In focus groups conducted by Hummer *et al.*, most participants felt that the best way to publicize was either by the Charlotte or Howard County, MD method.

[63] Definition of "red light running" according to N.C.G.S 20-158b(2): "*Vehicles facing a red light controlling traffic passing straight through an intersection from a steady or strobe beam stoplight shall not enter the intersection while the steady or strobe beam stoplight is emitting a red light controlling traffic passing straight through an intersection…*"

Definition of an "intersection" according to N.C.G.S 20-4.01(16): "*The area embraced within the prolongation of the lateral curblines or, if none, then the lateral edge of roadway lines of two or more highways which join one another at any angle whether or not one such highway crosses the other*."

[64] Jones, interview. Vines, interview.

[65] The North Carolina General Assembly has approved camera use for the following cities: Charlotte, Cornelius, Fayetteville, Greensboro, Greenville, High Point, Huntersville, Matthews, Rocky Mount, and Wilmington. The General Assembly has denied camera approval for Chapel Hill and Raleigh. Cities that are currently known to be seeking approval include Durham and Knightdale.

[66] It would be incorrect to say there have been no costs to Charlotte to implement the *Safe*Light program. Significant staff time was required from CDOT and the City Attorney's Office to get the program established and operating.

[67] The completion of this paper could not have been accomplished without the assistance of many individuals. In particular, a warm thanks goes to Capt. Larry Blydenburgh from the Charlotte Police Department; Elizabeth Babson from Charlotte DOT; and Randy Jones, former Manager of Public Service for Charlotte DOT. A special thanks goes to Brett Vines, *Safe*Light Director for his help at all stages of this project. Additionally, great appreciation and thanks goes to Professor David N. Ammons for his insights, guidance, encouragement, support, mentorship, and friendship.