State of North Carolina

County of New Hanover   Acknowledgement of Assignment

This Acknowledgement of Assignment ("Acknowledgement") is made by and between the City of Wilmington ("City") and TraffiPax ("TraffiPax" or "Assignor") and American Traffic Solutions ("ATS" or "Assignee") this the 14th day of May, 2010.

Whereas, the City entered into a contract with TraffiPax on September 1, 2009, as amended October 5, 2009 to provide automated red light enforcement services; and

Whereas, the Assignor advised City of its intentions to terminate providing such services within 30 days after notification on February 8, 2010, and

Whereas, said contract between City and Assignor provided for its assignment upon City approval; and

Whereas, TraffiPax and ATS negotiated and have entered into an agreement between themselves to assign said contract to ATS, subject to all of its same terms and conditions; and

Whereas, the Wilmington City Council authorized acceptance of such assignment to ATS on April 6, 2010, and

Whereas, the parties to this Acknowledgement now desire to acknowledge assignment of said contract to ATS, and agree as follows:

1. Purpose – This Acknowledgement serves to acknowledge the assignment of the contract between the City and TraffiPax, dated September 1, 2009, as amended October 5, 2009, to American Traffic Solutions, and the signatures affixed hereto by their respective authorized representatives confirms agreement by TraffiPax to assign said contract to ATS, confirms agreement by ATS to accept such assignment, and confirms approval by the City of such assignment, subject to the terms and conditions stated below.

2. Terms and Conditions – This Acknowledgement is conditioned upon ATS acknowledgement that the assignment of said contract referenced above is subject to all the terms and conditions set forth therein, and said contract is hereby incorporated by reference to this Acknowledgement as attached hereto as Exhibit A; and as further evidenced by correspondence between Assignor and Assignee dated May 6, 2010 attached hereto as Exhibit B.

3. Remedies – In the event of any breach by ATS, the City shall all of the same remedies provided by law or equity as provided in said contract referenced above and may enforce such remedies against ATS as if it had been the original party to said contract.

The parties by affixing the signatures of their authorized agents or representatives hereby acknowledge the assignment of the contract to provide red light camera services as outlined above.

Assignor: TraffiPax   *Stuart MacKiernan CEO*
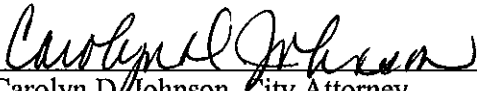
Date: *May 18, 2010*
Attest:

Assignee: American Traffic Solutions

Date: *May 19th, 2010*
Attest: *Catherine E Wilkins*

Acknowledged by City of Wilmington

City Manager

5-24-2010
Date

APPROVED AS TO FORM:

Carolyn D. Johnson (signature)
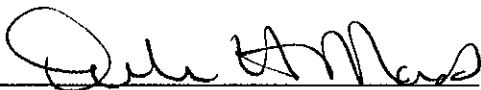
Carolyn D. Johnson, City Attorney

CITY ACCOUNTANT'S CERTIFICATION

This instrument has been preaudited in the manner required by the Local Government

Budget and Fiscal Control Act this the ___11___ day of ___June___, 2010

Debra H. Mack (signature)

Debra H. Mack, Finance Director

Project No. __08TR10__
Account No. __021-0000-440-31-60__
Amount: __$344,000.00__

CERTIFICATE OF LIABILITY INSURANCE

ACORD®

DATE (MM/DD/YYYY) 04/22/2010

PRODUCER		
877-945-7378		
Willis of Arizona, Inc.		
26 Century Blvd.		
P. O. Box 305191		
Nashville, TN 37230-5191		

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURERS AFFORDING COVERAGE	NAIC#
INSURER A: Wausau Underwriters Ins. Co.	26042-001
INSURER B: Wausau Business Insurance Co.	26069-001
INSURER C: Twin City Fire Ins. Co.	29459-001
INSURER D:	
INSURER E:	

INSURED
American Traffic Solutions, Inc.,
7681 E Gray Road
Scottsdale, AZ 85260

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	ADD'L INSRD	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YYYY)	POLICY EXPIRATION DATE (MM/DD/YYYY)	LIMITS	
A	X	**GENERAL LIABILITY** X COMMERCIAL GENERAL LIABILITY CLAIMS MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY [X] PRO-JECT [ ] LOC	YYKZ91453113029	11/17/2009	11/17/2010	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 1,000,000 $ 300,000 $ 15,000 $ 1,000,000 $ 2,000,000 $ 2,000,000
B		**AUTOMOBILE LIABILITY** X ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS HIRED AUTOS NON-OWNED AUTOS	ASKZ91453113039	11/17/2009	11/17/2010	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 1,000,000 $ $ $
		GARAGE LIABILITY ANY AUTO				AUTO ONLY - EA ACCIDENT OTHER THAN EA ACC AUTO ONLY: AGG	$ $ $
		EXCESS / UMBRELLA LIABILITY OCCUR CLAIMS MADE DEDUCTIBLE RETENTION $				EACH OCCURRENCE AGGREGATE	$ $ $ $ $
B		**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? [N] (Mandatory in NH) If yes, describe under SPECIAL PROVISIONS below	WCKZ91453113019	12/31/2009	12/31/2010	X WC STATU-TORY LIMITS OTHER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $ 1,000,000 $ 1,000,000 $ 1,000,000
C		OTHER Crime	00KB025236108	11/17/2009	11/17/2010	See Below	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS

Contract No: S6-0209

See Attached.

CERTIFICATE HOLDER	CANCELLATION
The City of Wilmington, North Carolina 102 North Third Street Post Office Box 1810 Wilmington, NC 28402-1810	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES. AUTHORIZED REPRESENTATIVE

ACORD 25 (2009/01)   Coll:2995573 Tpl:1019049 Cert:14115845   © 1988-2009 ACORD CORPORATION. All rights reserved.
The ACORD name and logo are registered marks of ACORD

	DATE
	04/22/2010

PRODUCER   877-945-7378

Willis of Arizona, Inc.
26 Century Blvd.
P. O. Box 305191
Nashville, TN 37230-5191

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURERS AFFORDING COVERAGE	NAIC#
INSURER A: Wausau Underwriters Ins. Co.	26042-001
INSURER B: Wausau Business Insurance Co.	26069-001
INSURER C: Twin City Fire Ins. Co.	29459-001
INSURER D:	
INSURER E:	

INSURED   American Traffic Solutions, Inc.,
7681 E Gray Road
Scottsdale, AZ 85260

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/EXCLUSIONS ADDED BY ENDORSEMENT/SPECIAL PROVISIONS

Commercial Crime Coverage
Twin City Fire Insurance Company, Policy #00KB025236108
Term: 11/17/2009 to 11/17/2010
Employee Theft: $1,000,000
Depositors Forgery and Alteration: $1,000,000
Inside the Premises - Money, Securities and Other Property: $1,000,000
Computer and Funds Transfer Fraud: $1,000,000
Money Orders and Counterfeit Currency: $50,000
Deductibles: $10,000*
*Except for Money Order and Counterfeit Currency: $0 deductible

The City of Wilmington, North Carolina is included as an Additional Insured as respects to General Liability and Crime coverage.

IMPORTANT

If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

DISCLAIMER

This Certificate of Insurance does not constitute a contract between the issuing insurer(s), authorized representative or producer, and the certificate holder, nor does it affirmatively or negatively amend, extend or alter the coverage afforded by the policies listed thereon.

STATE OF NORTH CAROLINA   CONTRACT NO: S6-0209

COUNTY OF NEW HANOVER

AGREEMENT BETWEEN
THE CITY OF WILMINGTON, NORTH CAROLINA
AND
TRAFFIPAX, INC.

THIS AGREEMENT, made this the 1st day of _September_, 2009, by and between the CITY OF

WILMINGTON, NORTH CAROLINA (hereinafter called "CITY"), a municipal Corporation located in

New Hanover County, North Carolina; and TRAFFIPAX, INC, corporation organized under the laws of

the State of Delaware (hereinafter called "CONTRACTOR").

WITNESSETH:

Section I

1.0   **Description of Project.** The City of Wilmington proposes to create a program of traffic signal violation photo image monitoring and enforcement. The purpose of the program is to improve safety on public streets.

The successful Contractor will be responsible for the provision, implementation and continuing satisfactory performance of the equipment, software, and other services provided pursuant to this agreement. This responsibility includes, without limitation, the obtaining and integration of all necessary equipment, computer hardware and software, related infrastructure, citation processing services, and collections, as well as other services described in this agreement.

Project Location. A portion of the operations of this project must be located within the City of Wilmington including maintenance of equipment. Sufficient local staffing must be provided to ensure adequate equipment maintenance and proper conduct of public business. Other functions such as image retrieval/processing, issuance of citations, collections of citations, overall management of the program, and mainframe/computer interface may be located elsewhere.

Scope of Work:

Purchase of Equipment. The Contractor must have financial resources adequate to provide, install, operate and maintain approved equipment for the monitoring of up to thirteen (13) intersections. The initial cost and ongoing maintenance of the equipment shall be included in the cost provided in Section V of this agreement. All equipment shall remain the property of the Contractor.

1.2.2   **Installation of Equipment.** One camera must be installed at each of two (2) designated locations within 60 days of award of the contract by City Council but not operating before October 1, 2009. These two cameras will be operated for a test period of a minimum of 15 days during which time red light violators will be photographed/imaged, identified and warning citations issued. Upon successful completion of this test to ensure that all program processes are working properly, and after receiving written notice to proceed from the City Project Manager, citations will be issued and the remaining eleven (11) cameras will be installed, and the program fully operational within 60 days unless otherwise directed by the City Project Manager. No additional compensation will be provided to the contractor during this period. If the results of the test are not acceptable, in the opinion of the City, the test will be repeated until acceptable results are attained. The City will allow three successive attempts to determine if the contractor can produce acceptable results. If the Contractor fails

to achieve acceptable results, the test will be terminated, the equipment removed at the contractors cost, and the contract terminated.

1.2.3   Maintenance. Contractor must maintain the automated enforcement system and all associated equipment in good working order.

1.2.4   Enforcement. Contractor must use City-authorized contractor personnel. Contractor will be responsible for issuing civil citations to enforce regulations relating to red light traffic violations.

1.2.5   Collections. Contractor must collect payments from the public on the civil citation. The contractor will make a reasonable effort using commercially available means to correct addresses and retransmit citations that are returned as mail undeliverable.   If after 63 days from the original printing of the citation, the offender has not paid the citation the contractor shall provide that information to the City's collections office for further pursuit of payment.

1.2.6   Time. The cameras shall operate 24 hours per day, 7 days per week. The City reserves the right to temporarily suspend enforcement during emergencies, weather events, convoys, special events or circumstances as needed.

1.2.7   Adjudication. Contractor will be required to coordinate the administrative appeal hearings for citizen protests of citations. This will include receiving initial appeal requests, scheduling appeal hearings between the citizen and an independent hearing officer, and providing the hearing officer with all background materials pertinent to the appeal, as well as providing space for the hearing. The City will directly pay for the costs of the independent hearing officers. The cost to the Contractor for scheduling these hearings and providing the supporting background information should be incorporated into the Contractor's cost structure. The adjudicator, or hearings officer, would be an independent contractor paid by the City, but would be scheduled, trained, and coordinated by the Contractor.

The Contractor will be responsible for providing a copy of the citation under appeal along with an affidavit designed to authenticate and ensure the admissibility of the citation if required by a court. The affidavit must be from someone capable of stating facts necessary to qualify the citation as a business record and to establish the reliability of the equipment and processes that produced the citation. In the event that a court requires the personal appearance of an individual capable of testifying as to the authenticity of the citation as a business record and/or to establish the reliability of the equipment and processes that produced the citation so as to ensure the admissibility of the citation, the Contractor will be responsible for satisfying any such court-imposed requirement

1.2.8   City Oversight. The City will provide an employee who will observe the operations of the Contractor and act as the City's representative and liaison. As part of the City oversight the Contractor shall develop and produce reports, and statistics and other information as needed regarding issuance rates, collection rates, dismissal rates financial performance as needed by the City. Citations shall be reviewed and approved by the City prior to issuance. The contractor shall provide a secure website for the purposes of City review. The website shall provide the ability to review all recorded images for both violations and citations to ensure all valid violations are converted to citations. The Contractor shall institute all necessary controls to ensure to prevent fraud and theft by its employees. These controls shall consider such issues as cash handling, deposit protocols, citation dismissal and other issues deemed necessary by the City.

1.2.9   Management. Contractor shall provide overall management of the automated enforcement program, at the direction of the City Project Manager.

1.2.10   Customer Service. Contractor must satisfactorily handle and provide response to all public inquiries whether written, in person, by e-mail or by phone about the automated enforcement program, including ticketing, enforcement and overall program management in accordance with the City of Wilmington's principles on customer service. Contractor must provide within the Wilmington City limits an office for convenient walk-up or drop-off payment of citations. The Contractor shall keep a record of all citizen complaints, the resolution, and the action taken to contact the complainant; such records shall be retained for the duration of the project,

and made available upon request to the City Project Manager. The Contractor shall include a provision for payment by generally accepted credit cards such as MasterCard, Visa, and others.

1.2.11   Public Information. The City will be lead agency for the automated enforcement program's public information effort; however, the Contractor shall participate in the development of the marketing plan, contributing ideas and research on efforts that have been effective in other cities that have similar programs. The City will assume all costs of implementing the public information program. This does not include the time given by the Contractor to participate in the plan development meetings and research. The Contractor shall establish and maintain a website for the program. The website shall contain information specific to the City's program, enable customers to securely log in and view their citation/video, pay their citation and check on the status of their case. The City will provide a link to this website from the City's website. All contact with the media shall be coordinated through the City Project Manager and the City Public Information Officer. The contractor shall not speak to or provide information to the media, either on or off the record, unless authorized by the City.

The Contractor shall not disclose or make available to any person information about an individual derived from the North Carolina Division of Motor Vehicles. In addition, the Contractor shall not release or allow public inspection of any confidential information. Confidential information is defined to include (1) social security or employer taxpayer identification numbers; (2) drivers license, state identification card, or passport numbers; (3) checking account numbers; (4) savings account numbers; (5) credit card numbers; (6) debit card numbers; (7) personal identification (PIN) code as defined in G.S. 14-113.8(6); (8) digital signatures; (9) any other numbers or information that can be used to access a person's financial resources; (10) biometric data; (11) medical information; (12) fingerprints; and (13) passwords.

1.3   Additional Service. The Contractor must agree to add up to five (5) additional intersections to be monitored, at the direction of the City, at the same unit prices agreed to within the Section V of this agreement.

1.4   Project Information. The following is general information about the project.

1.4.1   Phasing. The project involves the monitoring of up to thirteen (13) intersections. The first two (2) test cameras must be installed at locations specified by the City and be fully operational no later than 60 days after contract award by City Council but not before October 1, 2009. "Fully operational" is defined as the cameras being installed in final configuration and in full working order, the process to capture, transport and process images to the location where the citations are to be produced; the office for processing of citations must be operating with needed personnel hired, processing equipment in place; any software needed to produce citations, track violations, issue citations; production of clear, easily identifiable citations; connections needed with the Division of Motor Vehicles to obtain motor vehicle registration information. The remaining eleven (11) cameras shall be installed within 60 days of written approval of the test sites, with the cameras being fully operational, as defined above.

1.4.2   Record Keeping. The Contractor shall keep true and accurate records of revenue, expenses, and shall provide copies to the City upon request in a form to be determined by the City. All financial records relating to the project shall be made available to a duly authorized representative of the City upon request. Information and data collected shall be stored in a database to enable tracking of tickets and the capability to print statistical reports as needed. The Contractor may be requested to maintain other non-financial information as it relates to the project, and as mutually agreed upon. All citation images must be stored for a 3-year period on reproducible CD/DVD format or equivalent and accessible on request by the City Project Manager. Annually, the contractor shall furnish the City all citation data in an Excel spreadsheet or Access database format. All fields in the citation record and the images shall be included.

1.4.3   Rates. The amount of citations for running a red light is $50.00. An additional $50.00 late penalty will be assessed 30 days after the due date shown on the original citation. All due dates assigned shall exclude weekends and published City holidays. A three day mail delivery time shall be considered in the issuance of late notices such that the late notice is mailed 33 days after the citation is mailed, not printed

9 of 83

1.4.4 Revenues. Revenues are to be accounted for in accordance with generally accepted accounting principles. The Contractor will provide a monthly report to the City in a form acceptable to the City Finance Department. All revenue from citations will be deposited in an account designated by the City. All citizen payments shall be made payable to the City of Wilmington. All payments will be sent to the Contractor who will record the payments and then deposit the funds in a City-specified account. If the option of a per paid citation charge is chosen, the Contractor will then invoice the City for the amount owed to the Contractor for these violations.

1.4.5 Contract. The length of contract is three (3) years, evaluated annually, with two one-year extensions at the City's option. No changes to the contract terms shall be effective unless agreed to and accepted in writing by the City and the Contractor.

1.5 Control. In the event of a change of "Control" of the Contractor (as defined below), the City shall have the option of terminating this Agreement by written notice to the Contractor. The Contractor shall notify the City within ten (10) days of the occurrence of a change of control. As used in this Agreement, the term "Control" shall mean the possession, direct or indirect, of either (I) the ownership of or ability to direct voting of, as the case may be fifty-one percent (51 %) or more of the equity interests, value, or voting power in the Contractor or (II) the power to direct or cause the direction of the management and policies of the Contractor whether through the ownership of voting securities, by contract or otherwise.

1.6 Invoices. The Contractor shall submit a correct invoice no more than once each month to the City in accordance with financial terms agreed upon. The City shall pay the Contractor within thirty (30) days of receipt of a correct invoice, as determined by the City. For monthly fee rate schedule, all invoices shall be prorated for actual days of operation for any site that remains out of enforcement for more than 24 hours.

1.7 Equipment. All equipment shall meet applicable codes and standards. All field equipment provided shall be Certified by Underwriters Laboratories or acceptable documentation provided to satisfy inspectors. All field equipment shall be housed in a cabinet separate from the traffic signal controller. The City will provide all connections within the traffic signal control box. The contractor shall provide all documentation and equipment necessary to make the connection. The North Carolina Department of Transportation requires the connection to the signal controller box be electrically isolated from the control box. The Contractor is responsible for securing power service for its equipment. All utility connections shall be underground, unless otherwise approved by the City. At the end of this contract the Contractor shall remove all equipment from the public rights-of-way and restore any damaged areas.

1.8 DMV Access. The Contractor shall be responsible for coordinating with the appropriate state Departments of Motor Vehicles and establishing record access as needed for issuing citations.

1.9 Citations. Each citation should include, among other things, a minimum of three images showing the vehicle entering the intersection, the vehicle in the intersection, and a close view of the license tag. See Service Standards for additional requirements.

1.10 Payments and Customer Contact. A Wilmington, N.C. address shall be used to receive all mail in payments. A Wilmington, North Carolina phone number shall be provided for all inquiries regarding specific citations and general program information.

1.11 RFP Information. The City reserves the right to obtain clarification of any point in a respondent submittal or to obtain additional information.

1.11.1 Finances. Each respondent must supply one of the following types of financial information or acceptable substitutes to establish their financial viability. Latest Audited Financial Statements (preferred). Latest quarterly report Dunn & Bradstreet and/or Standard & Poors ratings.

The City may require further financial information as part of the review process.

10 of 83

1.11.2 **Evaluation.** The evaluation criteria that will be used by City staff to evaluate the information provided by the respondent as follows:

A. Experience of the firm with similar projects
B. Financial stability of the firm
C. Proposed personnel and staffing plan as proposed in the response to the RFP, including ability to meet Service Standards
D. Financial arrangement for the City. This criterion will be weighed heavily. Note that this is a service contract and that the City is not required to accept the best financial proposal.
E. The contractors understanding of the City's program and experience in this and other US jurisdictions.
F. Experience and knowledge of the personnel proposed for the City's program.
G. The Contractors ability to meet the schedule requirements.

Section II: Service Standards

Explanation of Standards: These standards are the general service standards that City has set for the automated enforcement program. These standards are not requirements. Please indicate in the response column your ability to meet each standard or if possible, propose a higher standard. If you cannot meet a standard, indicate what level is achievable. The selected Contractor shall meet these standards as described in Proposer Response. Use attached sheets if necessary to enable you to fully describe your responses.

	Service Standards	Information Requested	Proposer Response
1.	The agreement indicates that a portion of the operations must be located within the City of Wilmington.	Describe those portions of the project operations that will be within the City and describe those portions that will be performed in other locations and indicate where.	Data retrieval, processing, DMV data retrieval and citation/late notice mailing will be performed out of the Linthicum, MD processing center. Maintenance will be handled both remotely via data link, and locally by a Wilmington based TraffiPax maintenance representative. TraffiPax will staff, within a City provided office, walk up customer service and appeals scheduling and processing. Payments can be submitted via USPS, secure internet site, or via the walk up office.
2.	As stated in Section 1.2.2, the Contractor must install the first two (2) cameras within 60 days of award of contract by City Council and they must be fully operational.	Indicate that you will meet this standard, and how you will meet this standard. Indicate your installation and setup procedures for a camera site.	Traffipax has systems already operation in all 13 locations. We will meet this timeline for technology upgrades to all locations required
3.	As stated in 1.2.2, the Contractor must be prepared to install the remaining 11 cameras within sixty (60) days after completion of the testing of the first two (2) cameras described in service standard #2, unless otherwise directed by the City	Indicate if you will meet this standard.	Traffipax has systems already operation in all 13 locations. We will meet this timeline for technology upgrades to all locations required
4.	System proposed for Wilmington should currently be in operation elsewhere. "In operation" includes not only camera operation, but also image processing, and software operation	Submit location within continental U.S. If no operating system within U.S., proposer must be willing to set up and demonstrate system in Wilmington.	Current Site 516 (Market @ 17th) in Wilmington with video upgrade
5.	Camera system should provide clear daytime and nighttime images such that the license plate, the vehicle make and model and the traffic signal indication are clearly discernable. Black & white, color and other images are acceptable.	Submit an original daytime and nighttime image of a red light violation produced by proposed camera system. Also, submit a sample citation produced from each of these images. Identify the type of camera system used, including manufacturer and type of	Please see sample images from Traffipax systems proposed herein in Appendix D of Attachment A. These color images/citations were collected in our Murfeesboro and Cleveland, TN programs using Robot 560 camera equipment proposed herein.

12 of 83

#			image --color, black & white, or other.
6.	System should be able to record all violators on the approaches being monitored. Note Section III proposed locations requiring monitoring. These locations may have as many three (3) approach lanes to be monitored.	Indicate the recycle time of the camera and the percent of violations expected to escape detection and circumstances when vehicles will escape detection.	Following the complete capture of one incident the camera is ready to capture the next incident in 0.5 second recycle time
7.	The Contractor shall supply all necessary hardware as well as the installation of this equipment.	Identify firm responsible for installation, if not performed by proposer.	Installation will be managed by Traffipax under the direction of the Wilmington Maintenance Representative. Any subcontracted construction required will be performed by MBE firms or other approved City Contractors
8.	Contractor will be fully responsible for maintenance of camera system. All repairs needed shall be made within twenty four (24) hours of reported malfunction.	Identify firm that will provide hardware maintenance, if not performed by proposer. Indicate that this standard will be achieved. Indicate your procedures to ensure that repairs/replacements are done within specified parameters.	Maintenance will be managed by Traffipax under the direction of the Wilmington Maintenance Representative
9.	Camera system should be able to operate from vehicle loops/sensors or out of pavement detection installed at the stop bar. Contractor shall work with City to identify detection zone placement. Detection equipment shall not interfere with intersection detection.	Describe detection system configuration. Submit photograph of proposed layout of detection zones.	See full description of detection system(s) proposed in section 1.7 and product specifications in Appendix C both in Attachment A. It is our expectation to use Sensys pucks wherever possible
10	The equipment must be able to automatically detect a vehicle that is violating a red traffic signal, including detecting the speed of such vehicles and the amount of time elapsed accurate to 0.1 second between when the signal turned red and the when the violation occurred.	Provide a list of the data that can be collected by the camera/detection system.	Please see description of the databar and data collected in Section 1 on page 11 of Attachment A.

13 of 83

11	The equipment must be able to capture three (3) images per violation, the first of which depicts the violating vehicle in advance of the stop bar, while the signal on that approach is red, and the second of which depicts the same vehicle completely beyond the stop bar, while the signal for that approach is red. The last shall be a clearly readable image be of the vehicles license plate	Provide two images of one violation, as described in the standard.	See sample images meeting this criteria in Appendix D of Attachment A
12	Camera should be able to operate in all lighting and weather conditions and produce clear and readable images after enhancement by the software.	Indicate any weather conditions in which your camera system may not provide a clear, legible image. If available, please provide images taken in inclement weather.	See sample images meeting this criteria in Appendix D of Attachment A showing a variety of inclement weather situations captured by Traffipax cameras proposed
13	90% of images taken should be able to be developed as citations. All images, including those not fit to be issued as a citation, shall be stored by Contractor. Uncitable images should be marked with reason why image was not issued as a violation.	Indicate if you are able to meet this standard. If not, state the level you will be able to achieve.	Traffipax can meet this requirement. See a sample exception report in Appendix E of Attachment A.
14	The camera should be mounted on a stand-alone pole. The camera housing and pole, alone, must be painted a color to be acceptable to the City.	Submit photograph of camera housing. Describe mounting system.	See sample housing and other equipment photos Section 1.70 of Attachment A
15	Camera housing should be secure and tamper-proof to protect against unauthorized opening, and must be designed so access can be achieved without disrupting traffic. All collections of images are to either be off-street, electronic or during the hours of midnight to 06:00 AM	Describe how you will access images from the camera. Indicate ability to achieve this standard.	Traffipax proposes a modular housing of stell construction. The housing can be lowered to ground level by the technician to eliminate ladders and other safety concerns. New and upgraded installation will include DSL or other internet transmisstion of the camera data eliminating most site visits other than standard maintenance. See more information on our housing in Section 1.7 or Attachment A
16	Each red light citation should be processed and mailed to owner of vehicle involved in violation within two **2** **business days** of jurisdiction approval.	Indicate whether standard can be met and provide the average amount time between violation and sending of citation to the vehicle owner.	This will be virtually impossible without NLETS data access which requires Wilmington authorization as previously requested. Our current goal is 7 days to mail and we can work with the City to improve this service standard based on the technology upgrades proposed.

14 of 83

#	Requirement	Describe	Response
17.	98% of all citizen inquiries by walk-in, letter, email or telephone, should be resolved by Contractor.	Describe customer service process that you intend to use as part of the project. Include mechanism for walk-in,-mail or internet payment of citations. How will your firm process written correspondence, walk-in payments, telephone calls and e-mail. Include telephone number of a customer service center set up to respond to inquiries for a project similar to Wilmington's automated enforcement program.	Traffipax staff will handle virtually all of the customer service for the program as we have in the current program. More information on our customer service approach including local addresses and telephone numbers is found in Section 1 of Attachment A. The Wilmington number is 910.343.4762
18.	Collect at least 80% citations issued	Describe collection practices and procedures that will be used to achieve this standard.	Traffipax expects to meet this requirement. See payment and collection processed proposed in Section 1.2.5 of Attachment A
19.	Store data and citation information in database. Describe information system to be used. Information software system must provide record keeping and tracking functions for all citations from issuance through final disposition, including the capability of producing the following reports: a) Total violations by location by hour of day, day of week, week of month, month of year, or year. b) Total payments received by day of week, week of month, month of year, or year. c) Total number and dollar amount of delinquent offenders; List of delinquent offenders. d) Statistical report of billing and collections. e) Statistical report of revenue collected or billed by type (fine, late fee) f) Number and list for payments from first notice, second notice and third notice. g) Number and list of non-finable violations by exception code. h) Number of violations per State (based on registration plate)	Describe management software and its capabilities. Indicate what types of data reports are available from your management software. Please provide a sample of reports.	TIPS Software in described in various sections of this proposal. Sample reports can be found in Appendix E of Attachment A

15 of 83

No.	Requirement	Instruction	Response
	i) Number of violations per various speeds.		
20.	Software should be able to interface with DMV records to automatically insert vehicle registration information and ownership.	Identify name and developer of software. Identify method in which DMV information will be used through software. Provide photograph of input screen for program management software.	With Wilmington authorization and ORJ permission, we can utilize current NLETS partnership like we do in other programs. NLETS process is described in Sections 1 on page 8 of Attachment A
21.	The software/camera system must imprint on each image the time and date of the violation; frame sequence number; intersection identification; the amber time duration and amount of time that the picture was taken after the signal had turned red and the speed of the violating vehicle. This data shall be encoded on the original image at the time of capture. Timing shall be recorded to the hundredth of a second and reported to the nearest tenth of a second.	Indicate if your system meets this standard. Indicate if your system provides any additional information on the violation record. Submit photographs showing data.	Yes, please see a sample databar and data description beginning on page 11 of Attachment A
22.	Software should be able to enhance images in low light or glare conditions. Resultant images must be clear and readable regardless of weather condition and time-of day.	Describe your software's capabilities of enhancing the clarity of the violation Images.	The TIPS application is described in detail in Section 1 of Attachment A. Images can be enhanced by Traffipax and Wilmington Staff during incident review.
23.	The software shall have an internet application provided that will allow authorized City personnel to search citations for the purpose of determining the proper citation for payment and posting of said payment to the correct citation.	Describe the ability of the software to allow authorized persons to receive and post payments.	Yes, a wide variety of payment methods including walk-in, mail-in and telephone/online credit card payments are available for Wilmington today. See a full description of the TIPS software in Section 1.0 of Attachment A
24	The software shall have an internet application that will allow the vehicle owner receiving the citation the ability to review the citation, to enhance the images in read only mode, view any video if applicable, and make payment via credit card. All common credit cards should be available.	Describe the ability of the software to allow read only access and make payments. Please indicate all card issuers that will be accepted.	The TIPS application is described in detail in Section 1 Attachment A. Images can be enhanced by Traffipax and Wilmington Staff during incident review. Citizens can view the images, video clip, citation information and provide payment online 24 hours per day

Section III:-Proposed Camera Locations*

1. Eastbound Dawson Street at Third Street

2. Eastbound Dawson Street at Sixteenth Street

3. Northbound Seventeenth Street at Dawson Street

4. Westbound Wooster Street at Seventeenth Street

5. Southbound Sixteenth Street at Wooster Street

6. Westbound Wooster Street at Fifth Avenue

7. Southbound Third Street at Wooster Street**

8. Northbound Carolina Beach Road at Southern Boulevard**

9. Westbound Market Street at Martin Luther King Jr. Parkway

10. Westbound Market Street at Kerr Avenue

11. Westbound Market Street at Seventeenth Street

12. Northbound College Road at 17th Street

13. Westbound Wrightsville Avenue at Colonial Drive/Country Club Drive

*This list of intersections and/or the approach monitored is subject to change dependent on field survey of implementation feasibility and a result of new safety data.
**Proposed first two intersections for monitoring.

The City makes no representation or guarantee as to the number of violations that may or may not occur at these locations both before and after the enforcement program is operating.

17 of 83

Section IV-Required Proposal Contents The following items must be addressed in your proposal response:

Section	Description
4.01	Company Profile and History, and key employees' resumes
4.02	A brief statement of the proposer's understanding of the work to be done.
4.03	Detailed description of how work is to be performed.
4.04	Response to Service Standards
4.05	A list of three (3) references for which the proposer has provided similar services to include the following: •Project description length of contract and location where work was/is being performed. •Contact name, telephone number and address. Proposed implementation schedule.
4.06	Proposed implementation schedule.
4.07	Financial Responsibility (see section 1.11.1)
4.08	Proof of Insurability (see insurance requirements).
4.09	MBE/DBE/WBE Provisions
4.10	Complete Price Proposal Page
4.11	List of any and all contracts that contractor has had for installation of automated enforcement equipment in the past three years that have been canceled and reason for cancellation.

18 of 83

Section V -Price Proposal Page The detailed cost breakdown on the program is as follows:

	Description	Cost
1	Amount City will pay Contractor for each civil penalty **collected** within thirty (30) days of mailing the citation to vehicle owner. For civil penalties assessed for violations, the amount the City will pay the Contractor for each of the civil penalties that are deposited in a designated City bank account within the "Collection Year." A "Collection Year" shall be the twelve-month period beginning with the date when the first civil penalty is deposited in a designated City bank account and each twelve-month period thereafter.	Cost per paid citation per loc./month Citation 1-100 - $35 Citation 100-200 - $5 Citation 201 & up - $1.
2	Amount of the $50.00 late penalty that City will pay Contractor for each penalty collected thirty (30) days after the citation has been mailed to the registered vehicle owner. For civil penalties assessed for failure to timely pay the initial penalty, the amount the City will pay the Contractor for each penalty deposited in a designated City account.	$3
3	Amount of the $50.00 late penalty that City will pay Contractor for each penalty collected by civil action or collection agency. If such penalties are collected by a collection agency to which the Contractor had referred the penalty or as a result of a filing of a civil action, additional amount the City will pay the Contractor. Any court costs are to be paid by the Contractor and will be repaid by the City upon collection of the debt.	N/A
4	As an alternate, monthly cost per enforced location, paid for complete processing of all violations, including late collections.	$3900 per approach per month
5a	Cost of moving a camera and housing from one designated location to another. This is not the cost of adding additional monitoring sites.	$28,000 per site
5b	Cost of moving camera to a different approach at the same enforced location.	$28,000 per site

All prices must include all costs for the full implementation and operation of the traffic signal violation automated enforcement system. Any stop loss clause to protect the City shall be noted in the contract, please attach the clause to the proposal.

19 of 83

Release and Indemnity

To the fullest extent permitted by law, CONTRACTOR shall release, indemnify, keep and save harmless the CITY, its agents, officials and employees, from any and all responsibility or liability for any and all damage or injury of any kind or nature whatever (including death resulting there from) to all persons, whether agents, officials or employees of the CITY or third persons, and to all property proximately caused by, incident to, resulting from, arising out of, or occurring in connection with, directly or indirectly, the performance or nonperformance by CONTRACTOR (or by any person acting for the CONTRACTOR or for whom the CONTRACTOR is or is alleged be in any way responsible), whether such claim may be based in whole or in part upon contract, tort (including alleged active or passive negligence or participation in the wrong), or upon any alleged breach of any duty or obligation on the part of the CONTRACTOR, its agents, officials and employees or otherwise. The provisions of this Section shall include any claims for equitable relief or for damages (compensatory or punitive) against the CITY, its agents, officials, and employees including alleged injury to the business of any claimant and shall include any and all losses, damages, injuries, settlements, judgments, decrees, awards, fines, penalties, claims, costs and expenses. Expenses as used herein shall include without limitation the costs incurred by the CITY, its agents, officials and employees, in connection with investigating any claim or defending any action, and shall also include reasonable attorney's fees by reason of the assertion of any such claim against the CITY, its agents, officials or employees. The CONTRACTOR expressly understands and agrees that any performance bond or insurance protection required by this agreement, or otherwise provided by the CONTRACTOR, shall in no way limit the CONTRACTOR'S responsibility to release, indemnify, keep and save harmless and defend the CITY as herein provided. The intention of the parties is to apply and construe broadly in favor of the CITY the foregoing provisions subject to the limitations, if any, set forth in N.C.G.S. 22B-1.

Personnel

It is mutually agreed that CONTRACTOR is an independent contractor, and as such the CONTRACTOR shall not be entitled to any CITY employment benefits, such as, but not limited to, vacation, sick leave, insurance, workmen's compensation, or pension and retirement benefits.

Conflict of Interest

No paid employee of the CITY shall have a personal or financial interest, direct or indirect, as a contracting party or otherwise, in the performance of this agreement.

Non-Waiver of Rights

It is agreed that the CITY'S failure to insist upon the strict performance of any provision of this agreement, or to exercise any right based upon a breach thereof, or the acceptance of any performance during such breach, shall not constitute a waiver of any rights under this agreement.

Suspension or Termination of Agreement

1. In the event that review of the CONTRACTOR'S performance shows non-conformance to the work required by this contract, the Scope of Services or other terms or conditions contained herein as a result of the CONTRACTOR'S negligent errors, omissions or acts, the CONTRACTOR shall be in breach of this agreement and the CITY may take corrective action as it deems necessary including, but not limited to, termination, withholding or reduction of payment.

2. The CITY shall also have the right to suspend this agreement upon written notice to the, Such written notice shall state the reasons for suspension and allow for a review period of ten (10) days during which the CONTRACTOR shall be provided with an opportunity to respond with an explanation or justification, and/or shall undertake any reasonable remedial action required by the CITY, If, in the opinion of the CITY the CONTRACTOR remains in violation of this agreement at the completion of the ten (10) day suspension period, the CITY shall have the right to terminate this agreement whereupon all obligations of the CITY to the CONTRACTOR shall cease,

20 of 83

3. In the event this project is terminated prior to completion of the services by the CONTRACTOR, the CONTRACTOR shall be paid for services performed to the date of termination, (In no event will the amount due CONTRACTOR in the event of termination exceed that amount set forth in paragraph of this agreement. CONTRACTOR shall be paid for all reimbursables, as defined herein, which are due him,)

4. This agreement may be terminated without cause by either party with thirty (30) days written notice,

5. Nothing contained herein shall prevent the CITY from pursuing any other remedy which it may have against CONTRACTOR including claims for damages,

Assignment of Agreement

It is mutually agreed by the parties hereto that this agreement is not transferable by either party without the written consent of the other party to this agreement,

Insurance Requirements

The amount of insurance to be provided for all coverages listed under this section shall be not less than $1,000,000,00, unless otherwise specified, per occurrence for claims arising from bodily injury and/or property damage, including accidental death which may arise directly or indirectly from CONTRACTOR'S performance of professional services under this contract. The CONTRACTOR shall be responsible for any liability directly or indirectly arising out of professional services performed under this contract by a subcontractor which liability is not covered by the subcontractor's insurance,

1. The CONTRACTOR shall maintain during the life of this contract WORKERS' COMPENSATION and EMPLOYER'S LIABILITY INSURANCE covering all of the CONTRACTOR'S employees to be engaged in the work under this contract, providing the required statutory benefits under North Carolina Workers Compensation Law, and Employers Liability Insurance providing limits at least in the amount of $500,000/500,000/500,000 applicable to claims due to bodily injury by accident or disease, Whenever work under this contract includes exposure to claims under the U. S, Longshoremen's and Harbor worker's Act, such coverage shall be provided by appropriate endorsement to this policy,

2. The CONTRACTOR shall take out and maintain during the life of this contract COMMERCIAL GENERAL LIABILITY INSURANCE, including coverage for INDEPENDENT CONTRACTOR OPERATIONS, CONTRACTUAL LIABILITY assumed under the provisions of this contract, PRODUCTS/COMPLETED OPERATIONS LIABILITY and BROAD FORM PROPERTY DAMAGE LIABILITY insurance coverage, Exclusions applicable to explosion, collapse and underground hazards are to be deleted when the work to be performed involves these exposures. The CITY shall be named as an additional insured under this policy. Unless otherwise specified, this coverage shall be written providing liability limits at least in the amount of $1,000,000, Combined Single Limits, applicable to claims due to bodily injury and/or property damage arising from an occurrence.

3. The CONTRACTOR shall take out and maintain during the life of this agreement AUTOMOBILE LIABILITY INSURANCE. Such coverage shall be written on a comprehensive form covering owned, non-owned and leased vehicles

4. The CONTRACTOR shall take out and maintain an EMPLOYEE BLANKET FIDELITY BOND protecting the CONTRACTOR and the CITY with limits at least in the amount of $50,000. The CITY shall be named as an additional insured under the BOND.

The CONTRACTOR shall furnish the schedule of insurance carried under this contract in the form of a Certificate of Insurance attested by the insurance carrier or appointed agent, indicating the type, amount, class of operations covered, effective date and expiration date of all policies. This Certificate shall be in six (6) counterparts and when the contract is signed by the CONTRACTOR, a copy thereof shall be inserted in each copy of the contract documents and upon insertion shall become a part of such documents. The insurance carrier or its agent shall also certify on these documents that it will notify the CITY by registered mail at least twenty (20) days prior to any cancellation or non-renewal of these coverages.

21o-f83

Findings Confidential

All of the information, reports, cost estimates, plans, specifications and documents prepared or assembled by the CONTRACTOR under this agreement are the property of the CITY. The CONTRACTOR agrees that any such documents shall not be made available to any individual or organization other than appropriate CITY officials without prior written approval of the CITY. Nothing contained in this paragraph shall be construed to prevent the CONTRACTOR from making information, reports and documents available to those individuals or firms directly concerned with the project involved with prior written agreement of the CITY.

Subcontracts

The CONTRACTOR shall utilize no subcontracts for carrying out the services to be performed under this agreement without the written approval of the CITY.

Entire Agreement

This agreement constitutes the entire understanding of the parties.

Binding Effect

This agreement shall be binding upon the heirs, successors, assigns, agents, officials, employees, independent contractors, and subcontractors of the parties.

Continuing Obligation

The parties will make and execute all further instruments and documents required to carry out the purposes and intent of the agreement.

Reference

Use of the masculine includes feminine and neuter, singular includes plural; and captions and headings are inserted for convenience of reference and do not define, describe, extend or limit the scope of intent of the agreement.

Interpretation

All of the terms and conditions contained herein shall be interpreted in accordance with the laws of the State of North Carolina. In the event of a conflict between the various terms and conditions contained herein or between these terms and other applicable provisions, then the more particular shall prevail over the general and the more stringent or higher standard shall prevail over the less stringent or lower standard.

Preaudit

This contract has been preaudited in the manner required by the Local Government Budget and Fiscal Control Act as evidenced by City Purchase Order No. 613826 which is incorporated as if fully set out.

Other Laws and Regulations

CONTRACTOR will comply with any and all applicable federal, state and local standards, regulations, laws, statutes and ordinances regarding toxic, hazardous and solid wastes and any other pollutants; public and private nuisances; health or safety; and zoning, subdivision or other land use controls. CONTRACTOR will take all reasonably necessary, proper or required safety, preventative and remedial measures in accordance with any and all relations and directives from the North Carolina Department of Human Resources, the United States Environmental Protection Agency, the North Carolina Department of Environmental Management, Health Departments, and any other federal, state or local agency having jurisdiction, to insure the prompt prevention or cessation (now or in the future) of violations of either the applicable provisions of such standards, regulations, laws, statutes, and ordinances or any permits or conditions issued thereunder.

Amendments

This agreement shall not be modified or otherwise amended except in writing signed by the parties.

Immunity Not Waived

This agreement is governmental in nature for the benefit of the public and is not intended to be for private profit or gain. Any fees charged hereunder are intended to reflect as closely as possible the CITY'S actual cost and neither party

intends to waive its sovereign immunity by reason of this agreement.

Saving Clause

If any section, subsection, paragraph, sentence, clause, phrase or portion of this agreement is for any reason held invalid, unlawful, or unconstitutional by any court of competent jurisdiction, such portion shall be deemed severable and such holding shall not affect the validity of the remaining portions hereof.

Minority Business Enterprise/Disadvantaged Business Enterprise/Women Business Enterprise (MBE/DBE/WBE)

The CITY desires that minority business enterprises have the maximum opportunity to participate in the performance of this contract and will:

1 Promote affirmatively (where feasible) in accordance with North Carolina General Statute 143-129, together with all other applicable laws, statutes and constitutional provisions) the procurement of goods, services in connection with construction projects for minority owned business enterprises.

2 Insure that competitive and equitable bidding opportunities are followed to afford minority business enterprises participation. Strive to obtain contract and subcontract awards to minority business enterprises.

3 Identify and communicate to the minority business enterprises community procedures and contract requirements necessary for procurement of goods and services for construction projects and subcontracts.

4 Provide technical assistance as needed.

5 Promulgate and enforce contractual requirements that the general contractor or all construction projects shall exercise all necessary and reasonable steps to insure that minority business enterprises participate in the work required in such construction contracts.

The CONTRACTOR shall insure that minority business enterprises have the maximum opportunity to compete for and perform portions of the work included in this contract and shall not discriminate on the basis of race, color, national origin or sex. The CONTRACTOR shall include this special provision, Minority Business Enterprise (MBE), in all subcontracts for this contract. Failure on the part of the CONTRACTOR to carry out the requirements set forth in this special provision may constitute a breach of contract and after proper notification may result in termination of the contract or other appropriate remedy.

A minority business enterprise is defined as a business, with at least fifty (51%) percent owned and controlled by minority group members. The minority ownership must exercise actual day-to-day management. Minority group members may consist of Black Americans (an individual of the Black race of African origin), Hispanic Americans (an individual of a Spanish speaking culture and origin at parentage), Asian Americans (an individual of a culture, origin or parentage traceable to the areas of the Far East, Southeast Asia, the Indian subcontinent and the Pacific Islands), Indian Americans (an individual who is an enrolled member of a Federally recognized Indian tribe, or recognized by the tribe as being an Indian, as evidenced by a certification of a tribal leader), American Aleuts or any recognized minority group approved by the CITY.

A Woman Business Enterprise is a business with at least fifty (51%) percent owned and controlled by women who exercise actual day-to-day management.

The CONTRACTOR shall exercise all necessary and reasonable steps to insure that Minority Business Enterprises and Woman Business Enterprises participate in the work required in this contract. The CONTRACTOR agrees by executing this contract that he will exercise all necessary and reasonable steps to insure that this special provision contained herein on Minority Business Enterprise is complied with.

Non-Discrimination

CONTRACTOR will take affirmative action not to discriminate against any employee or applicant for employment or otherwise illegally deny any person participation in or the benefits of the program which is the subject of this agreement because of race, creed, color, sex, age, disability or national origin. To the extent applicable, CONTRACTOR will comply with all provisions of Executive Order No. 11246 the Civil Rights Act of 1964, (p.L. 88-352) and 1968 (P.L. 90-284), and all applicable federal, state and local laws, ordinances, rules, regulations, orders, instructions, designations and other directives promulgated to prohibit discrimination. Violation of this provision, after notice, shall be a material breach of this agreement and may result, at CITY'S option, in a termination or suspension of this agreement in whole or in part.

23 of 83

IN WITNESS WHEREOF, the CITY has caused this agreement to be duly executed in its name and behalf and the CONTRACTOR has caused this agreement to be duly executed in its name and behalf and its corporate seal to be hereunto affixed, and attested to.
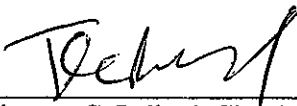
CITY OF WILMINGTON, NORTH CAROLINA

BY: _____
Sterling B. Cheatham, City Manager

WITNESS:

_____
Daryle L. Parker, Purchasing Manager
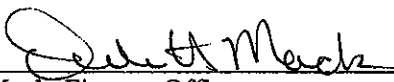
APPROVED AS TO FORM:

_____
Thomas C. Pollard, City Attorney

CITY ACCOUNTANT'S CERTIFICATION

This instrument has been preaudited in the manner required by the Local Government Budget and

Fiscal Control Act this the ⟋⟍ day of ⟍Sept⟋ , 2009.

_____
Debra Mack, Finance Officer

Project No. __08TR10__
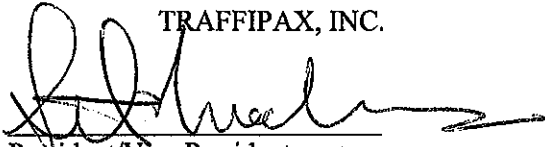
Account No. 21-0000-440-31-60

Amount of Contract $____500,000.00____

PO# 013826

Traffipax, Inc, a Delaware corporation

                                                    TRAFFIPAX, INC.

                                    By: _____
                                         President/Vice President

STATE OF _Maryland_

COUNTY OF _A.A._

I, _Linda D. Hammond_, a Notary Public, certify that

Stuart MacKiernan, personally came before me this day and acknowledged that he (she) is

President of _Traffipax, Inc._, a corporation, and that by authority duly given and as the

act of the corporation, he(she)executed the foregoing instrument on behalf of the corporation.

Witness my hand and official seal, this the _1ST_ day of _September_, 2009.

My Commission Expires: _Linda D. Hammond_

_3/12/2013_   Notary Public

traffipax
TRAFFIC SAFETY SYSTEMS

WILMINGTON
NORTH CAROLINA

the incident, camera location, posted speed limit and actual vehicle speed detected, time of the amber and red signal phases, and lane designation can also be customized to City specifications.

The Traffipax citation management application, *TIPS* (Traffic Incident Processing System), is a web-based application developed solely for the management of photo enforcement programs, incorporating software that is both customer-friendly and provides a complete turnkey violation processing solution. *TIPS* is a comprehensive, configurable violation processing

> **Web-based citation processing for easy IT Installation and maintenance**

system with the ability to handle high volume violations processing including event review, name and address acquisition, notice mailing, payment processing, customer service, collections and, most importantly, establishing a secure chain of custody throughout the review process. *TIPS*, installed and maintained at our Maryland headquarters, incorporates sophisticated logic to manage the workflow required to issue, track and review violations, provide customer service, correspondence handling, generate court evidence packages, manage court hearing schedules, payments and collections with all modules protected with appropriate security protocols. Complete access to the violation processing system is conveniently available online via a web browser 24/7 to authorized users.

The City will need a partner that will perform complete turnkey services to view each incident and make preliminary decisions as to whether they meet the City's criteria for citation issuance, and that violations are always issued in accordance with the City's policies. Our multi-level review of violations minimizes the City's workload for processing violations.

Traffipax understands that a well organized and efficient Violation Processing Center operation is essential to ensure that all tasks from processing to payment collection and customer service are performed in a professional and timely manner. Images are downloaded to the Traffipax Violation Processing Center and saved to a central server where they can be accessed by the *TIPS* application. Traffipax uses an administration module to register system users and establish a specific profile of permissions for each user. This establishes an ethical separation of permissions for functions such as removing and spoiling a citation, modifying due dates, etc, based on pre-defined levels of authority.
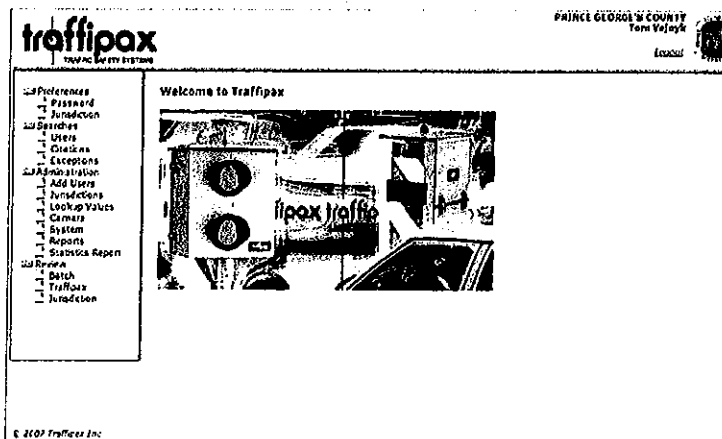

2G of 83

Through viewing of our clear, easily identifiable violation images, experienced Traffipax personnel carefully review each incident captured. Traffipax software allows for the adjustment of contrast and lighting. Each user can filter out excess light or reflection from flash or a protective plate spray when reviewing an image. The processor then crops the license plate out of the main image to create an enlarged view of the license plate as a 3rd image in preparation for final client approval. During the initial processing, if an incident does not meet City criteria, the processor will enter an approved rejection code for the incident. All exceptions are classified according to a comprehensive list so that performance may be clearly tracked. Supervisors may review the rejected images and have special user IDs which will only allow him/her to review rejected events.

Exceptions

Batch Code	Seq	Violation Date	Exception Category	Exception Description	Created By	
516_010307b	003	01/03/07 09:16:00	EXCEPTION	STOP BAR	DSWECKER	View
516_010307b	004	01/03/07 09:21:00	EXCEPTION	STOP BAR	KSCHALIZKI	View
516_010307b	005	01/03/07 10:53:00	EXCEPTION	STOP BAR	DSWECKER	View
516_050307	003	05/03/07 17:00:00	EXCEPTION	STOP BAR	DSWECKER	View
516_060307	002	06/03/07 16:47:00	EXCEPTION	STOP BAR	DSWECKER	View
516_060307	003	06/03/07 17:51:00	EXCEPTION	STOP BAR	DSWECKER	View
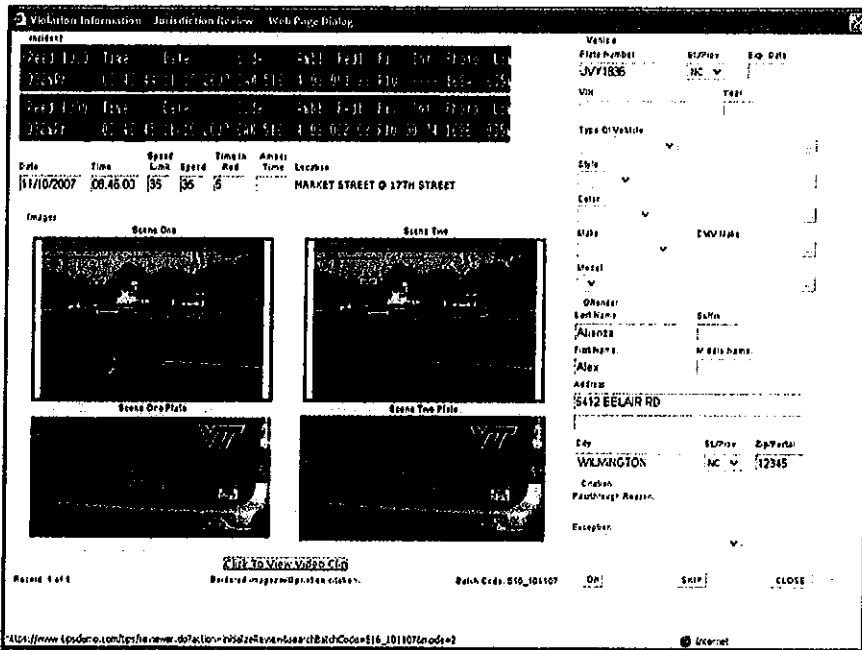
Traffipax knows that efficiently retrieving and utilizing accurate registered owner information is essential to the success of the City's safety program and subsequent collections process. Understanding the constraints associated with citation issuance, it is critical for a vendor to have access to resources for timely name and address retrieval. Please note Traffipax is a certified NLETS Strategic Partner (National Law Enforcement Teletype System) and has received authorization to place

Nlets

---

27 of 83

registered vehicle owner queries for all 50 states whereby our processors can access a web-based application to collect registered owner information.

It should be noted here that most, if not all other red light camera vendors, sub-contract out the printing, stuffing and mailing of citations from a remote out-of-state company near the US Border. Traffipax, in order to maintain a strict "CHAIN OF CUSTODY" does all of the printing, envelope stuffing and mailing of the citations from our secure In-House facility in the US. We do not believe that the PRIVATE Motor Vehicle information of your citizens should be sent out of state to an uncontrolled and Non-responsible 3rd party where it could be exposed to the world.

Registered owner look-ups through the Department of Motor Vehicles (DMV) can also be performed using our process of on-line file transfer to address any personal privacy and/or security concerns. Traffipax currently has in place a direct electronic data exchange process (via FTP access) or online access with Tennessee, Missouri, West Virginia, Maryland, Florida, Illinois, North Carolina, Ohio and Texas.

Once registration information is obtained, the appropriate fields on the citation template are populated by *TIPS*. The vehicle description is carefully compared to the vehicle in the captured image, and once accepted, the citation is created through a multi-part process requiring input from both the processors, processing supervisor and police personnel for final approval. This method allows for very fast retrieval of registration data, requires no involvement by City personnel but yet preserves the highest security level because the process will not involve vendor personnel ever actually handling any of the registration data. In the event that the violating vehicle is a rental, fleet or government vehicle, the citation is mailed to the company or agency that the vehicle is registered to and it is their obligation to pay the citation or transfer liability to the actual driver. The auto-population process allows Traffipax to get citations in the mail in a quick and efficient manner.

The multi-level review of violations by Traffipax lessens the City's workload for processing violations. An initial "Processor" performs the first violation review session followed a step where the incident is updated with vehicle registration information followed by a supervisor level final review. After removal of out-of-scope images that should not be cited (i.e., emergency vehicles, funeral), or rare in-scope images that cannot be cited (i.e., obstructed license plate), Police personnel would review and approve citations. These review steps provide a thorough quality control process; reliance is not on any one individual but rather on several individuals. No one individual can issue a citation on their own.

REVIEW STEPS:

Level 1:	TRAFFIPAX	PROCESSOR
Level 2:	TRAFFIPAX	SUPERVISOR
Level 3:	Wilmington Staff	APPROVER
Level 4:	TRAFFIPAX	CITATION CREATED, REVIEWED & MAILED

As shown below, both images are taken from the rear:

- Image A shows the first image of the vehicle behind the stop bar with the light red.

- Image B shows the second image of the vehicle inside the intersection (rear wheels beyond the stop bar) with the light still red.

- Image C shows a third image of the license plate close-up which was created by zooming in on either of the first two images.

Image A   **Image B**
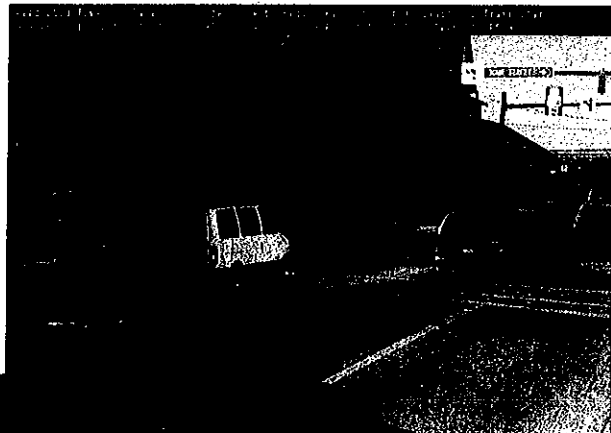
Image C: Plate Close-up

Authorization of citations by the City's Police Department includes:
- Confirmation that all violation criteria is met
- Confirmation that the vehicle make and model match the registration data

Via secure website access, City personnel will also have the ability to view relevant system information including:
- Vehicle registration(plates)
- State of issue for violating vehicle
- Date of violation
- Time of violation
- Location of violation
- All three clear digital images; enforceable violation events that are pre-reviewed and submitted for final Police approval
- Video clip of violation event
- All violation images and related data for any open violation
- Payment status
- Hearing status / evidence print function
- All correspondence records
- Standard monthly reports (designated reports to be defined in contract between Traffipax & City)

With existing Internet access, most office computer systems are equipped to begin processing violations. Officers need just a standard web browser, user name and password to begin processing and issuing citations.

Approved citations will have the approving officer's name and ID number electronically inserted onto the citation. Traffipax personnel print, review and mail citations the day they print or the following day depending upon time of day when Police approval is performed. A record of mailed citations is maintained in the *TIPS* application.

Traffipax will provide remote log-on access for other City personnel, such as Police Department Detectives as requested. This access will have limited capability, and the parameters of information available will be determined during business rules requirements meetings with the City.

VIOLATION DATA BAR

Traffipax is one of the few vendors that imprint the data bar at the time of the violation picture being taken, a very important consideration in chain of evidence requirements.

> *Traffipax is one of the few vendors that imprint the data bar at the time of the violation picture being taken, without obstructing the images of the vehicle, a very important consideration in chain of evidence requirements.*

Violation data corresponding to each image, such as the date and time of the violation and the speed of the violator, will be "embedded" into the image at the point of capture using our proprietary file format. This file format especially developed for our back-office application (Traffipax Incident Processing System - *TIPS*) overlays relevant data on the corresponding images to facilitate image analysis and eliminates possible sources of error resulting from the placement of the violation data in data-only files which must be correctly linked to their corresponding images in later stages of image analysis.

Each camera captures the incident images, date, time and other pertinent factors for each violation. All infringement data is digitally signed and imprinted along the top edge of each still image at the point of capture to insure data integrity. This data does not obstruct the violation image(s) in any way.

A sample Data Bar produced within the camera system at the time of capture is shown below. In the example below, the date, month and year of the violation (04/05/2008) is clearly displayed:

| SPeed 1000 | Time | Date | Code | Ambl | Red1 | Fix | Int | Photo | Limit | L | TraffiStar |
| 036mPh | 12:18:22 | 04/05/2008 | CAM 760 | 3.99 | 001.31 | R10 | 00.96 | 102B | 035mPh | 2 | R560 |

The customizable data bar embedded onto the violation images include:

- Violation date in MM/DD/YYYY or DD/MM/YYYY - The time of the infraction in the sample above is 12:18:22 and utilizes a 24 hour clock.
- The "Red1" data above shows the red signal was active for 1.31 seconds.

- Duration of preceding yellow phase indication detailed to 1/100 of a second - The "Amb1" data shows the amber signal was active for 3.99 seconds before the red signal activated.
- Elapsed time between violation images - The time elapsed between images is 00.96 in the sample above.
- The unique sequence number is a combination of the camera location code (CAM 760) and the image number photo (102B)
- Unique violation identifier location code - "CAM 760" which is the numeric site code
- Violation time in hours, minutes, seconds (24 hour clock)
- Violation Number
- Frame Sequence Number (displayed as 102B)
- Direction of travel - In the data bar above, the location is unique to one intersection approach approved by the City.
- Camera ID
- Elapsed time from beginning of red indication detailed to 1/100 of a second
- Speed of violating vehicle
- Legal speed limit
- Lane of travel
- Technology supplier

> *Data Bar can be customized to City specifications*

A very important aspect of the Traffipax camera system technology is its rigorous attention to providing a secure "unbroken" chain of evidence. This process will be implemented in all locations in Wilmington and will replace the current Guardian "In-Station" program housed in the City's River Road offices on our behalf.

All incidents are captured and staged within the Red Light Camera using a proprietary file based encryption. An automated and recorded process transmits the incidents utilizing an AES (Advanced Encryption Standard) encrypted VPN (Virtual Private Network) connection to the Traffipax Data Center where they are decrypted and processed.
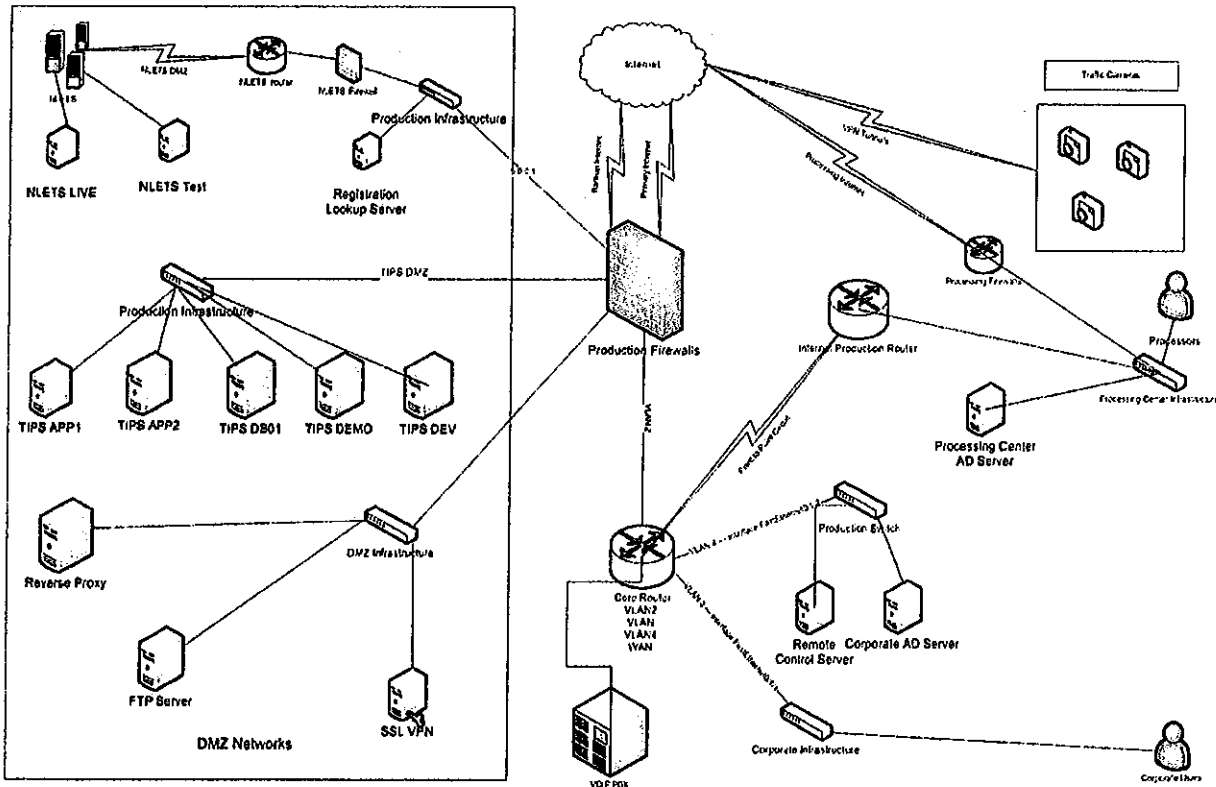
1.1 Project location

A portion of the operations of this project must be located within the City of Wilmington including maintenance of equipment. Sufficient local staffing must be provided to ensure adequate equipment maintenance and proper conduct of public business. Other functions such as image retrieval/processing, issuance of citations, overall management of the program, and mainframe/computer interface may be located elsewhere.

Currently, the City has generously provided office space in two locations in the City. Traffipax staff manages the customer service responsibilities out of the Chestnut street offices and the data transfer responsibilities inherent to the current Guardian technology deployed years ago out of the River Road offices. Traffipax understands that we will be required to obtain our own office space under this agreement and, with the full deployment of new, state-of-the-art technology we will no longer need dual office locations. We are currently working with an MBE certified leasing agent(s) to locate suitable office space for our continuation of first-level incident

Contractor must maintain the automated enforcement system and all associated equipment in good working order.

Traffipax has received a commitment from long-time employee Bill Faircloth to work on behalf of Traffipax in support of the Safelight program. Mr. Faircloth was involved in the initial installation of the sites, the upgrade of site 516 to current Traffipax technology a few years ago, and the ongoing maintenance of all locations if necessary. Bill left Traffipax last spring in pursuit of a new local career and is recommitted to serving the Safelight program again. He will be supported by our team of field technicians but there is no one that knows your program more than he.

1.2.4 Enforcement
Contractor must use CITY authorized CONTRACTOR personnel, CONTRACTOR will be responsible for issuing civil citations to enforce regulations relating to red light traffic violations.

Traffipax will continue to use existing staff to perform continued service to the City under any new contract. All processing staff with access to the database are subjected to a formal background check via FBI fingerprint processes as required by our strategic partner NLETS. Traffipax will continue to work with the city to validate appropriate staff in support of the Safelight program as we retain responsibility for issuing civil citations on your behalf following individual approval of each incident.

1.2.5 Collections
CONTRACTOR must collect payments from the public on the civil citation, including pursuing civil suit for non-payment of citations, in accordance with city directed procedures.

Once a citizen receives a notice of violation in the mail, our Traffic Information Processing System (*TIPS*), provides secure access for the capability for the public to view their Citations on-line, make payments and obtain general information. Through input of a violation reference number and zip code, they can easily access all violation images, video clip of the violation event, and related information regarding payment, appeal and general program information. The information displayed is easy to understand, explaining why they received the Citation, all pertinent facts and the choices they have. The images viewed on-screen are the same images viewed by all Processors and Approvers. Citizens can pay their Citation with a credit/debit card through this secure server, 24 hours a day, 7 days a week.

Citizens are offered a variety of payment choices:

- Check, payable to the City of Wilmington;
- Money order, payable to the City of Wilmington;
- Credit card, (MasterCard®/VISA®)
- Debit card with a Visa® or MasterCard® logo
- Walk-up service to the Traffipax Wilmington Customer Service Center

Traffipax will maintain a web link from the City's web site or provide a separate web link for credit/debit card payments. Customers are be able to access the web page and make credit card payments that will be immediately verified and deposited to the City's bank account.

A citizen may call the Wilmington customer service center to pay their Citation or inquire as to its status. Citizens simply dial the toll-free phone number supplied by Traffipax. All that is needed is a credit card or debit card, citation reference numbers and zip code. Customers will be given a payment ID confirmation number at the end of the call and all payments are posted within 24 hours.

Additionally, if the City wishes, citizens can mail checks or money order to our local Wilmington processing center where Traffipax staff processes the checks, makes the deposits into the city's account, and updates the citation record in *TIPS*. For online transactions, Traffipax will use the remittance data to update their accounts receivable system and to manage credit and collections.

Citizens can always contact program representatives via our toll-free telephone number. Our associates will respond to and handle all mail and telephone inquiries about the program, payment of fines, enforcement, complaints, and various other citizen concerns.

Once Citations are issued, the practice of managing collections efficiently and effectively will be a vital aspect of this program for the City. At the City's discretion, we will work to ensure the maximum achievable collection rates.

If there continues to be no response from the citizen after expiration of the second notice due date and the $50.00 additional penalty remains unpaid, the case will be turned over to a collections agency that will further verify registered owner information and address.

The collections agency will provide:
- Skip tracing to obtain current addresses for those violators who have moved and have not notified their Motor Vehicle Department;
- Reports and notices of collections activity;
- A violator inquiry "800" telephone number;
- Credit evaluation of debtors and assignment of accounts to a law firm in order to seek entry of Civil Judgments, if the City requests this service.

1.2.6 Time
The cameras shall operate 24 hours per day, 7 days per week. The CITY reserves the right to temporarily suspend enforcement during emergencies, weather events, convoys, special events or circumstances as needed.

We understand that the camera systems must operate 24/7 and the city may suspend enforcement under special circumstances.

1.2.7 Adjudication
CONTRACTOR will be required to coordinate the administrative appeal hearings for citizen protests of citations. This will include receiving initial appeal requests, scheduling appeal hearings between the citizen and an independent hearing officer, and providing the hearing officer with all the background materials pertinent to the appeal, as well as providing space for the hearing. The CITY will directly pay for the cost of the independent hearing officers. The cost to the CONTRACTOR for scheduling these hearings and providing the supporting background information should be incorporated into the CONTRACTOR's cost structure. The adjudicator, or hearings officer, would be an

pricing options and contract negotiations, billing requirements for Traffipax revenue will be reconfirmed following contract award.

1.4.5 Contract
The length of contract is three (3) years, evaluated annually, with two one-year extensions at the at the CITY's option. No changes to the contract terms shall be effective unless agreed to and accepted in writing by the CITY and the CONTRACTOR.

Traffipax understands the contract terms provided above.

1.5 Control
In the event of a change of "Control" of the CONTRACTOR (as defined below), the CITY shall have the option of terminating this Agreement by written notice to the CONTRACTOR. The CONTRACTOR shall notify the CITY within ten (10) days of the occurrence of a change of control. As used in this Agreement, the term "Control" shall mean the possession, direct or indirect, of either (I) the ownership of or ability to direct voting of, as the case may be fifty-one (51%) or more of the equity interests, value, or voting power in the CONTRACTOR or (II) the power to direct or cause the direction of the management and polices of the CONTRAACTOR whether through the ownership of voting securities, by contract or otherwise.

Traffipax understands the contract terms provided above although no change in control is anticipated.

1.6 Invoices
The contractor shall submit a correct invoice no more than once each month to the CITY in accordance with financial terms agreed upon. The City shall pay the contractor within 30 days of receipt of a correct invoice, as determined by the CITY. For monthly fee rate schedule, all invoices shall be prorated for actual days of operation for any site that remains out of enforcement for more than 24 hours.

This is the current practice in place with the city and will continue as required.

1.7 Equipment
All equipment shall meet applicable codes and standards. All field equipment provided shall be Certified by Underwriters Laboratories or acceptable documentation provided to satisfy inspectors. All field equipment shall be housed in a cabinet separate from the traffic signal control box. The CONTRACTOR shall provide all documentation and equipment necessary to make the connection. The North Carolina Department of Transportation requires the connection to the signal controller box be electrically isolated from the control box. The Contractor is responsible for securing power service for the equipment. All utility connections shall be underground, unless otherwise approved by the City. At the end of this contract the CONTRACTOR shall remove all equipment from the public rights-of-way and restore any damaged areas.

The Traffipax camera system contains an advanced, high quality, digital traffic camera with a resolution of 10.7 mega pixels. In addition, our camera uses progressive (full image) scan camera modules which allow shutter times down to 1/10,000 seconds at full pixel resolution.

35 of 83

Our parent company, Robot Visual Systems, manufactures the primary camera equipment used in Traffipax installations. We have deployed Bosch video cameras and have four (4) different vehicle detection systems described below. Product specification and data sheets for our primary equipment can be found in Appendix C.

The Traffipax camera system is fully capable of continuous-mode automated stand-alone operation and accurately detects and captures crystal clear digital images of violators under all weather and lighting conditions, heavy traffic volumes, nighttime operation, road surface configurations and across all moving lanes of traffic on each approach. The Traffipax camera system is designed to withstand extreme environmental conditions and has been tested in a wide range of operating conditions, including the extreme weather conditions of the desert and in near arctic latitudes; ensures system operation under an ambient temperature range of 0° to 122° Fahrenheit and a maximum humidity of 99%.

Although our camera system results in images of superior quality, the City will realize an advantage to viewing color video at the intersection of violations as secondary evidence in certain situations. As a violation is detected, a full motion video clip is captured (30 frames per second) and can include an audio clip integrated with the still images at the point of violation and saved with the incident.

On the following pages please see information about the systems proposed. Additional technical specifications and data sheets can be found in Appendix C.

Traffipax is pleased to provide the City of Wilmington with a detailed equipment list for the Traffipax camera system. This equipment (minus the video camera) is currently installed in Wilmington at Site 516 (Market @ 17th St.) Below you will find sample equipment for one monitored approach, up to five (5) lanes, including left turns and capable of right turn monitoring:

Quantity	Equipment	Description	Dimensions	Pictures
1	Traffistar III Camera System	State-of-the-Art Commercial Camera System located in the TraffiTower™	18"x16"x26"	
1	Modular Camera Housing	Low Maintenance Housing Lowers to Ground Level	9'x18"x18"	
1	Video Camera	Day/Night video Camera located in the TraffiTower™	8"x3"x3" with lens	
1	Digital Video Recorder (DVR)	To record streaming video, mounted in the TraffiTower™	7"x5"x2	
1	Mini-PC for storing video clips	For storing video clips located in the TraffiTower™	7"x8"x3"	

The modular housings proposed have been used successfully in many installations performed by Traffipax. This specific housing is steel, weather resistant and paintable to City specifications. Primary features of this housing (containing the camera systems) include its ability to be lowered easily by the field technician to ground level for simple and safe access and maintenance.

Below is the equipment if laser detection is utilized:

Quantity	Equipment	Description	Dimensions	Pictures
1	Laser	High Quality Laser with adjustable beam	3.5" x 3.5" x 1.5"	

Below is the equipment if radar detection is utilized:

Quantity	Equipment	Description/	Dimensions	Pictures
1	Radar	High Quality Radar	5" x 10 x 3"	

Traffipax recommends the upgrade and installation of all Wilmington sites to include the Sensys Wireless detection system below as appropriate.

Below is the equipment if wireless detection is utilized:

Quantity	Equipment	Description	Dimensions	Pictures
1	Wireless Receiver	AP Receiver	6" x 6 x 3.5"	
1	Puck	Wireless Sensor	2" x 2.9" x 2.9"	
1	Card	Contact Enclosure Card	7" x 4.5" x 1.1"	

3$ of 83

Vehicle Detection Systems

Traffipax offers four (4) types of detection systems: inductive loops, laser, radar and a wireless system. These detection capabilities are offered to the City in order to allow for the greatest flexibility and thus capability to effectively detect the highest percentage of violator vehicles. Often there will be constraints at particular sites which require the ability to have alternatives for enforcement in order to effectively monitor all approaches desired by the City not only with a system that detects all violators but that is also visually aesthetic and unobtrusive to the environment.

Inductive Loops: Traffipax offers traditional inductive loop systems. Each lane of travel has two inductive loops (loop A and loop B) located right before the stop bar. When on the red phase of the signal if a vehicle is moving faster than the predetermine speed threshold (programmed in the camera MPU) the camera will take two pictures (one before the vehicle crosses the stop bar and intersection, and one when the vehicle is in the middle of the intersection proving continuation through the intersection on the red phase. To determine the speed of the vehicle as the vehicle crosses over loops the MPU computes a time/distance calculation. An Inductive Loop detects metal objects (i.e. cars, trucks, bikes and other roadway vehicles) based on the change in the inductance that they produce in the loop. A loop is an inductor in an LC circuit that is tuned to resonate at a particular frequency. Metal objects cause magnetic fluctuations to be shorted – reducing the inductance of the loop. This creates a change in the resonant frequency, which is detected and sent to the MPU of our camera

Laser Detection: Traffipax offers a vertical laser trigger that is not susceptible to light or temperature changes. These lasers are accurate and reliable; requiring minimal maintenance for the life of the contract. The laser system features two dependent lasers vertically directed at each monitored lane. These twin lasers measure speed by time/distance calculation which is performed in the Micro-Processor Unit (MPU) when the lasers are triggered by passing vehicles breaking the beams.

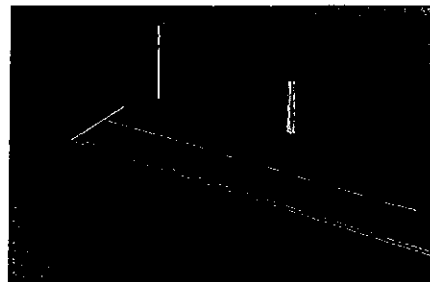**Radar Detection:** Traffipax has over 40 years experience utilizing our radar tracking sensor for red light enforcement. The radar sensor has the capability to monitor the speed and position of multiple vehicles at the same time. The radar sensor which was developed specifically for photographic safety applications represents a new measuring system in the photo enforcement field that also measures the angle to the vehicle in addition to speed and distance (only two parameters measured in most existing detection systems). In the 300 yard range of the radar, the position and speed of each vehicle is recorded and constantly monitored for the entire time the vehicle is driving through the range. Through the use of complex algorithms, the 3D radar tracking sensor is capable of cyclically measuring the distance,

39 of 83
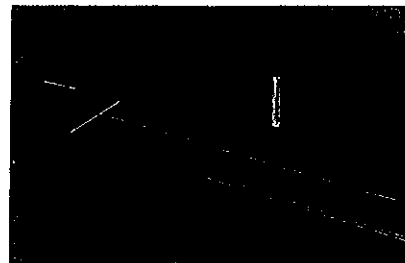
angle and speed of several vehicles at the same time and track their position (multi-target-tracking). In contrast to other non-invasive measurement systems such as video loops, the cyclic measuring process achieves a very high degree of accuracy. Additionally, the radar antenna can be powered by solar energy and has a wireless transceiver making it very easy to set up. No wires and thus no conduit are needed and it can be attached to existing poles. Traffipax is the official radar speed enforcement provider to the U.S. Army.

Wireless Vehicle Sensor Detection: This revolutionary new sensor system created by Sensys Networks, integrates wireless sensor technology with the Traffipax red light camera system. This sensor is a small device that takes no more than 12 minutes to install. This sensor triggers the Traffipax computer when a vehicle crosses the detection zone without coming to a complete stop, or exceeds the threshold speed settings. All system thresholds are set based on the contractual requirements of the jurisdiction authority. This system allows for monitoring of up to six (6) lanes of traffic. They have an extended life expectancy (10 years) and _DO NOT_ interfere with any existing loop signals. They are not susceptible to damage from roadway repaving.
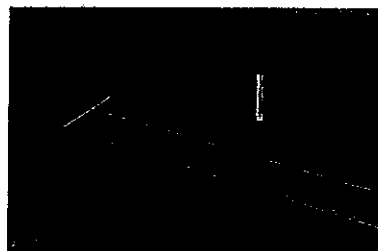
Limitations of Detection Systems:

Inductive Loops: Requires construction in the roadway surface

Laser Sensor: Laser beams travel through the air and may be impacted by a lack of visual line of sight. Example, Fog will act like a prism causing the laser (beam of light) to dissipate (scatter) over a given space.

Radar Sensor: Traffic radars measure the relative speed a target is approaching (or receding) the radar. If a target is traveling directly (collision course) at the radar, the relative speed is actual target speed. If the target is not traveling directly toward (or away) the radar but slightly off to avoid a collision, the relative speed with respect to the radar is slightly lower than target speed. The phenomenon is called the Cosine Effect because the measured speed is directly related to the cosine of the angle (**alpha**) between the radar and **target direction** of travel.

Wireless Sensor: Battery life may become a limitation as batteries degrade over time (10 year life expectancy) and must be replaced.

While we propose to install the Sensys Wireless detection systems in all current sites that are upgraded, based on our work with the City to establish and build the systems to required specifications, we will jointly determine the detection system most appropriate for each approach.

traffipax
TRAFFIC SAFETY SYSTEMS

TraffiStar R560
with ROBOT SmartCamera III

Technical Data

Camera Resolution:	10.7 megapixel (4004 x 2672), active pixel
Dynamics:	14 Bit A/D converter
Shutter:	Electronic, 1/50 to 1/10,000
Lens connection:	ROBOT mount
Integrated Computer:	Pentium 1.4 GHz, RAM 1 GB, internal flash disk
Connections:	Ethernet 10/100 Mbits/sec. Serial (RS232) 2 x USB (2.0)
Display of camera:	4-line LCD display
Integrated Monitor:	6.5" Digital TFT LCD Resolution: 640 x 480 Contrast: 1:300
Keypad:	8 button soft key technology GUI can be translated into different languages On site viewing of offence images
Flash unit:	300 Ws, separately adjustable for the 1st and 2nd photo
Laser Detection	Virtual dual loop per lane, up to 3 lanes in total
Measuring rate:	up to 4 kHz
Wave Length:	905 nm
Measuring range:	2 - 30 m
Measuring accuracy:	1.9 mrad
Beam Divergence:	5 - 20 mm
Eye safety class:	Laser class 1
Operating voltage:	230 V/50 Hz (115V/60Hz optionally)
Dimensions (W x D x H):	328 mm x 303 mm x 456 mm
Weight:	Approx. 20 kg Plug & play technology, no cabling

Optionally:
Synchronisation of clock via GPS
ROBOT sequence camera

The **TraffiStar R560** is a new digital red light enforcement camera system, combining proven ROBOT plug & play design with latest available camera and non-invasive sensor technology. It was specially developed for use in traffic safety applications.

The **TraffiStar R560** utilizes a progressive CCD front end with a chip of 36mm x 24mm in size, a powerful PC and flash memory storage in a compact housing combination as camera component (ROBOT CCD 11MP). A multitasking operating system forms the basis for the appropriately powerful operating software. An integrated monitor allows for convenient setting of parameters and immediate control of image quality. Data can be retrieved via USB port or Ethernet port.

Full Documentation
The measuring data received from the detection system is combined with additional data such as time, date, location, sequence number and picture number. All information is stored together with the image in proprietary BIFF format (Basic Image File Format) optionally in JPEG format. The data can be encrypted and sealed to protect it against tampering.

In contrast to conventional red light enforcement systems based on invasive inductive loop technology, the **TraffiStar R560** uses non-invasive laser detection. Two laser systems per lane mounted separately at the roadside project virtual loops onto the street replacing conventional dual loop setting. Accordingly, no costly and time-consuming street invasion during installation will be necessary anymore. It provides the full evidence of two pictures per red light offence. Optionally the TraffiStar R560 is available with ROBOT 640 x 480 sequence camera for covering the entire offence in motion. A jpeg image with 16 single frames can be stored along with the high resolution images.

Easy to Use
In addition to the user-friendly GUI which is available in several languages the **TraffiStar R560** can be fully remote controlled if necessary infrastructure will be available. Furthermore, ROBOT's Network Management System TraffiNet can control up to 100 **TraffiStar R560** within a linked camera network. The parameter of each measurement site are stored in an EEPROM in the outer housing. After activating the camera rack, the individual site parameters are then automatically synchronized.

Example: Sample roadside installation of non-invasive R 560 Laser Detection

A **ROBOT SmartCamera III** consists of a combination of a **ROBOT SmartCamera III-MPU** and a **ROBOT Smart-Camera III Head**. The MPU is a special module that is needed to operate a camera head.

The abbreviation MPU consists of the first letters of the name Main Processing Unit, which describes what the equipment does.

A **ROBOT SmartCamera III MPU** controls the connected camera head and processes the data that comes from it. A **ROBOT SmartCamera III MPU** is an extremely robust, powerful, fan-less unit that has no rotating parts whatsoever and is therefore extremely reliable.

The resulting (new) physical separation between the camera head and the MPU provides service-friendly and low-cost options during the implementation of technical service concepts.
Mass storage can be provided by third parties and is connected to the USB port of the **ROBOT SmartCamera III**, provided that the storage is FAT32 formatted. The user is therefore in control of wearing parts and in a position to utilise the cost benefits during procurement.

The operating concept is exactly the same as the one for the well-tried and successful ROBOT SmartCamera II generation.
The combination of the MPU and a ROBOT sensor (e.g. RRS24FS1, RRS24FS2/20, IPV, ISK) provides a complete measuring system for monitoring traffic flows.

Technical data

Processor:	CPU Intel 1,4 GHz
RAM:	1 GB
Internal memory:	Solid State Disk
Operating system:	ROBOT Linux
Power supply:	11 V DC to 14 V DC, external
Power consumption:	3,5 A
Display:	ASCII, 4 lines, 20 characters per line, for displaying system information
Connections:	1 x sensor
	1 x flash
	1 x SmartCamera III Head IEEE 1394
	1 x sequence camera (option)
	1 x USB 2.0
	2 x USB 2.0 (option)
	1 x network IEEE 802.3u, 100Base-Tx
Temperature range:	-10 °C to 60 °C
Dimensions:	250 mm x 92 mm x 270 mm, without the camera head
Weight:	4,3 kg

robot

VISUAL SYSTEMS
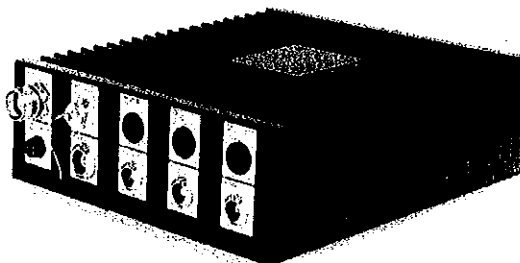
ROBOT SmartCamera III
Head M11
Head C11

Technical Data

The **ROBOT SmartCamera III-Head M1 / ROBOT SmartCamera III-Head C11** are the ROBOT camera head variants with the highest resolution. These fan-less camera heads have been specially developed for use in harsh traffic monitoring environments and are high-resolution, digital and extremely compact. The main component of this variant is the progressive monochrome or colour CCD sensor with 11 million pixels. The device impressively demonstrates its extremely good performance capability in the monitoring of crossings or multiple lanes. All **ROBOT SmartCamera III** camera head models require a special module (SmartCamera III MPU) for processing the images. The MPU is selected depending on the application and the requirements, its output is scaled and it can be used a considerable distance away from the camera head if required. The technical data for the **ROBOT SmartCamera III** with 11 megapixels is shown in the adjacent table.
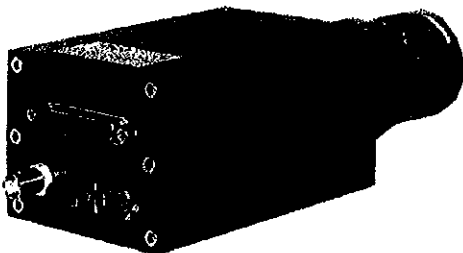
Item number	648-007 (monochrome)
Item number	648-006 (colour)
CCD sensor:	Monochrome or colour
Scanning system:	Progressive scan
Effective pixels:	11 megapixels (4008 x 2672)
CCD image format:	37.25 x 25.7 mm
AD converter:	14 bits / pixels
Sensitivity:	400 to 750nm
Image triggering:	Software/hardware triggering
Typical interval between pictures:	0.5 sec.
Shutter:	Electronic shutter 1/50 to 1/10,000 sec.
Lens connection:	ROBOT Mount
System connections:	Sync, Trigger, RS422/232 IEEE1394, integrated fibre-optic cable interface IEEE1394
Temperature range:	-20° to +60°C, fan-less
Dimensions:	65 x 80 x 150 mm (HxWxD) without lens
Weight:	0.650 kg / without lens
Power supply:	by IEEE1394 or external 9-18 V DC
Power consumption:	600 mA
Accessories: Lenses:	3.8/ 60mm; 3.8/80mm

ROBOT/54/146/27.04.06/en/A

BOSCH
Invented for life

LTC 0620 Series DinionXF Day Night Cameras
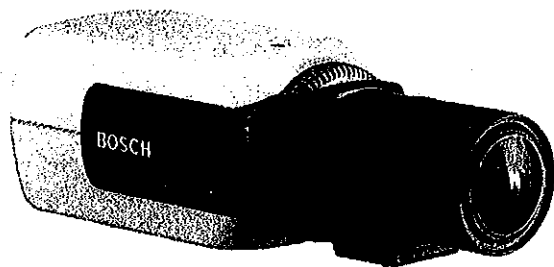
- ▶ 15-bit DSP Technology
- ▶ Superb sensitivity
- ▶ Mechanically switching IR filter for IR sensitivity at night
- ▶ XF-Dynamic for unsurpassed wide dynamic range
- ▶ Bilinx Communication for remote set-up and control
- ▶ Default Shutter eliminates motion blurring
- ▶ Four area video motion detection
- ▶ 540 TVL resolution

The LTC 0620 High Performance 1/2-inch Digital CCD Day/ Night Camera ensures the highest image quality possible at any time. Depending on the available light the camera will automatically switch from color to monochrome.

A unique combination of 15-bit digital video processing that enhances sensitivity and XF-Dynamic which extends the dynamic range provides a sharper, more detailed image with outstanding accuracy in color reproduction.

All Dinion cameras are supplied ready to operate. Simply attach and focus the lens, then connect power. No tools are required for back focus and power connection. For especially challenging situations where fine tuning or special settings are required, the camera parameters can be individually set using the control buttons on the side of the camera and On-screen Display (OSD). The camera automatically detects the lens type. The Lens Wizard ensures accurate back-focusing for perfectly sharp pictures at all times.

Functions

XF-Dynamic
The highly accurate 15-bit digital signal is automatically processed to optimally capture the detail in both the high and low light areas of the scene simultaneously, maximizing the information visible in the picture.

Bilinx Technology
Bilinx is a bidirectional communication capability embedded in the video signal of all Bosch Dinion cameras. Technicians can check status, change camera settings and even update firmware from virtually anywhere along the video cable. Bilinx reduces service and installation time, provides for more accurate set-up and adjustment, and improves overall performance. In addition, Bilinx uses the standard video cable to transmit alarm and status messages, providing superior performance without additional installation steps.

Video Motion Detection
The built-in video motion detector allows you to select up to four fully programmable areas with individual thresholds. The global scene change detector minimizes false alarms caused by sudden lighting condition changes, such as switching on or off the indoor or security lighting. When motion is detected alarms may be displayed in the video signal while the output relay can be closed in addition to alarm message transmission on Bilinx.

Auto Black
The automatic black level feature enhances contrast by compensating for reduced contrast (i.e. glare, fog, mist).

www.boschsecurity.com

44 of 83

Default Shutter

The LTC 0620 features a fast, default shutter speed in sufficient lighting conditions to capture moving objects. When light levels fall and other adjustments have been exhausted, the shutter speed reverts to the standard setting to maintain sensitivity.

Back Light Compensation (BLC)

Offering a fully programmable BLC area of interest, and a variable BLC level, the camera can be easily set up for even the most challenging entrance applications.

Lens Wizard

.The Lens Wizard automatically detects the lens type and helps focus the lens at the maximum opening to ensure proper focus is maintained throughout the 24-hour cyle. No special tools or filters are required.

Programmable Modes

Three independent, preprogrammed operating modes support typical applications, but are fully programmable for individual situations. Switching between modes is easy via Bilinx or the external alarm input.

Day/Night Mode

The Day/Night Mode LTC 0620 provides enhanced night viewing by increasing the IR sensitivity. The IR filter can switch from color to monochrome automatically by either sensing the illumination level or via the alarm input. The filter can be switched manually via the alarm input, through the camera menu or via the Bilinx coaxial control interface. An internal through the lens IR detector enhances the monochrome mode stability, as it prevents reverting to the color mode when IR illumination is dominant.

SensUp

By increasing the integration time on the CCD up to 10 times, the effective sensitivity is dramatically enhanced. This is especially useful when relying only on moonlight for illumination.

Certifications and Approvals

Electro Magnetic Compatibility

Emission	EN55022 class B, FCC class B part 15
Immunity	EN50130-4 Alarm Systems, Part 4
Vibration	Camera with 500 g (1.1 lbs) lens according to IEC60068-2-27

Safety

LTC 0620/11 and LTC 0620/51: EN60065
LTC 0620/21 and LTC 0620/61: UL6500, cUL CAN/CSA E60065-00

Installation/Configuration Notes
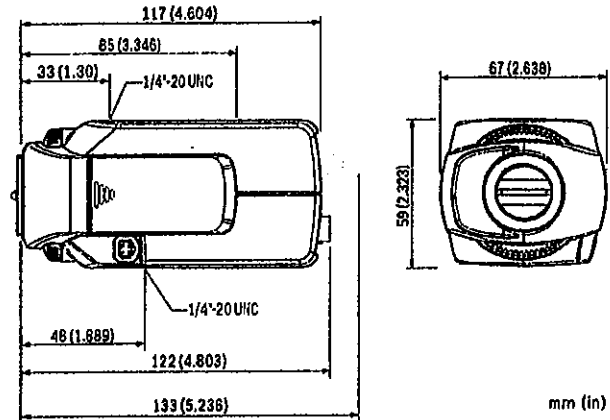
Dimensions in mm (inches)

Parts Included

Quantity	Component
1	LTC 0620 Series Dinion^{XF} Day\Night Camera
1	C/CS – mount conversion ring
1	Spare male 4-pin lens connector
	Lens not included

Technical Specifications

Electrical

Model No.	Rated Voltage	
LTC 0620/11	12–28 VAC	45–65 Hz
	11–39 VDC	
LTC 0620/21	12–28 VAC	45–65 Hz
	11–39 VDC	
LTC 0620/51	85–265 VAC	45–65 Hz
LTC 0620/61	85–265 VAC	45–65 Hz
Power Consumption	4 W	
Imager	Interline transfer CCD, 1/2-inch image format	

Active Pixels

PAL Model	752 H x 582 V
NTSC Model	768 H x 492 V

Sensitivity (3200 k)

Sensitivity (full video)[1]	1.4 lux (0.14 fc)
Sensitivity 50 IRE[1]	0.31 lux / 0.052 lux (0.031 fc / 0.0052 fc) (Monochrome Mode)
Minimum illumination[1]	0.18 lux / 0.024 lux (0.018 fc / 0.0025 fc) (Monochrome Mode)
Minimum illumination with SensUp	0.018 lux / 0.0024 lux (0.0018 fc / 0.00024 fc) (Monochrome Mode)
Horizontal Resolution	540 TVL
Signal-to-Noise-Ratio	> 50 dB
Video Output	1 Vpp, 75 Ohm
Y/C Output	Y: 1 Vpp / C: 0.3 Vpp
Synchronization	Internal, LineLock, HV-lock and Genlock (Burst lock) selectable
Shutter	Auto (1/60 (1/50) to 1/500000), fixed, flickerless, default
Sensitivity up	Off, automatic continuous up to 10x
Auto Black	On, off selectable
Range	32x dynamic range enhancement
Noise Reduction	Auto, off selectable
Contour	Sharpness enhancement level selectable
BLC	Off, area and level selectable
Gain	Auto (maximum level selectable to 28 dB) or fixed level selectable
Lens Mount	CS (max lens protrusion 5 mm, 0.2 in.)
White Balance	ATW (2500–10000 K), AWB hold, manual WB selectable
VMD	4 area, sensitivity selectable
Alarm Output	VMD or Bilinx
Alarm Input (TTL)	Profile switching, +5 V nominal, +40 VDC max.
Alarm Output Relay	Max. 30 VAC or +40 VDC, max. 0.5 A continuous, 10 VA
External Synchronal Input	75 Ohm or high impedance selectable
Cable Compensation	Up to 1000 m (3000 ft) coax without external amplifiers (automatic set-up in combination with coaxial communication)
Camera ID	16 character editable string, position selectable
Lens Types	Manual, DC- and Video-iris auto-detect with override
	DC-iris drive: max. 50 mA continuous
	Video iris: 11.5 ± 0.5 VDC, max. 50 mA continuous
Remote Control	Bilinx coaxial communication

1) F/1.2, 89% reflection, SensUp off

Mechanical

Dimensions (H x W x L)	59 x 67 x 122 mm (2.28 x 2.6 x 4.8 in.) without lens
Weight	450 g (0.99 lbs) without lens
Tripod Mount	Bottom (isolated) and top 1/4-inch 20 UNC
Controls	OSD with softkey operation

Environmental

Operating Temperature	-20 °C to +50 °C (-4 °F to +122 °F)
Storage Temperature	-25 °C to +70 °C (-13 °F to +158 °F)
Operating Humidity	20% to 93% Relative humidity
Storage Humidity	Up to 98% Relative humidity

Ordering Information

LTC 0620/11 DinionXF Day Night Camera 1/2-inch, high performance, 540 TVL, PAL, DSP, 12 – 28 VAC/11 – 39 VDC, 50 Hz	LTC0620/11
LTC 0620/21 DinionXF Day Night Camera 1/2-inch, high performance, 540 TVL, NTSC, DSP, 12 – 28 VAC/11 – 39 VDC, 60 Hz	LTC0620/21
LTC 0620/51 DinionXF Day Night Camera 1/2-inch, high performance, 540 TVL, PAL, DSP, 85 – 265 VAC, 50 Hz	LTC0620/51
LTC 0620/61 DinionXF Day Night Camera 1/2-inch, high performance, 540 TVL, NTSC, DSP, 85 – 265 VAC, 60 Hz	LTC0620/61

Accessories

LTC 3764/20 Varifocal Lens IR corrected 1/2-inch, 4 – 12 mm, DC-iris, C-mount, F1.2-360, 4-pin	LTC3764/20
LTC 3774/30 Varifocal Lens IR corrected 1/2-inch, 10 – 40 mm, DC-iris, C-mount, F1.4-360, 4-pin	LTC3774/30
LTC 3783/50 Zoom Lens IR corrected 1/2-inch, 8.5 – 85 mm, Video-iris, C-mount, F1.6-360, 4-pin	LTC3783/50
LTC 3793/50 Zoom Lens IR corrected 1/2-inch, 8 – 144 mm, Video-iris, C-mount, F1.6-360, 4-pin	LTC3793/50
TC120PS Power Supply Unit 110-120 VAC/15 VDC, 50/60 Hz, 300 mA	TC120PS
TC220PS Power Supply Unit 230 VAC/12 VDC, 50 Hz, 10 VA	TC220PS
TC220PSX-24 Power Supply Unit 230 VAC/20 VAC, 50 Hz, 20 VA	TC220PSX-24
TC1334 Power Supply Unit 120 VAC/24 VAC, 60 Hz, 30 VA	TC1334

Software Options

VP-CFGSFT Configuration Software for cameras using Bilinx, Includes VP-USB Adaptor	VP-CFGSFT

Ll6 of 83

47 of 83

BOSCH

Invented for life

VideoJet X10/X20/X40 Video Encoder
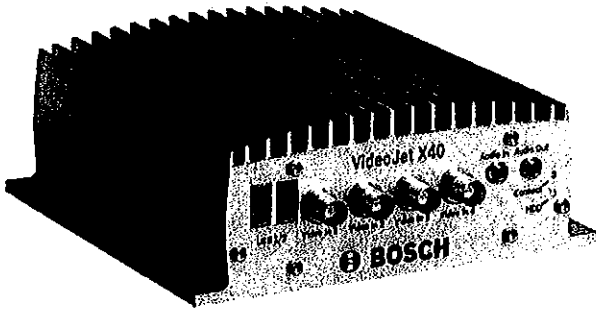
► Ruggedized for extended environmental conditions

► High-quality MPEG-4 video over IP

► Units with one, two, or four video inputs

► Built-in intelligence-at-the-Edge

► Network-attached RAID5 storage via iSCSI

The Bosch VideoJet X encoders belong to a family of industrial, high-performance, single, dual, or quad input CCTV video encoders. They are built into a rugged housing and constructed to withstand extreme environmental conditions. The VideoJet X encoders may be used at extreme temperatures, operating from -30 °C to +60 °C (-22 °F to +140 °F). These powerful and flexible devices represent the cutting edge of high performance video over IP for CCTV today.

Functions

Rugged environments

VideoJet X encoders are ideal for outdoor applications such as perimeter, border and fence control, as well as for industrial applications where they are tolerant of harsh environments.

When used at remote locations you benefit from their wide 10 to 30 VDC power input range, so that they can be battery or solar powered. You also benefit from their SFP slot that allows a direct connection to a fiber interface module without the need for external fiber hardware.

Their industrial-grade vibration resistance makes these encoders extremely suitable for use in mobile applications such as trains, busses or other vehicles.

Viewing

View the VideoJet X encoder video on a PC using a web browser, in VIDOS, in the Bosch Video Management System or integrate it into another video management system. By routing the IP video to a high performance VIP XD video decoder or a VIDOS monitor wall, you can present the video with ultimate clarity.

Dual streaming

The VideoJet X encoders use dual streaming to generate two independent IP video streams per channel. This allows viewing and recording at two different quality levels to save disk space and bandwidth. On alarm, they can send an e-mail with JPEG images attached.

Flexibility

VideoJet X encoders offer unparalleled recording flexibility. Stream video across the network and store it using Network Video Recorders (NVRs). Record locally on internal RAM, CompactFlash or use an optional automotive-grade internal hard drive. Network-attached RAID5 iSCSI storage devices can also be used. The built-in iSCSI support enables the VideoJet X encoders to act as conventional DVRs while streaming high performance live video across the network. Additional USB interfaces allow future connectivity via WAN or Wireless LAN networks to cover applications that will be used at the edge.

Recording profiles

The encoders feature a highly flexible recording scheduler, providing up to 10 programmable recording profiles and allowing individually assigned camera profiles. With these profiles, you can accelerate the frame rate as well as increase the resolution on alarm, saving recording space during non-alarm periods.

Frame rates and resolution

When one or two inputs are used, the encoders deliver MPEG-4 video over IP at a full frame rate of 25 (PAL) or 30 (NTSC) images per second with up to 4CIF resolution on every channel. If four inputs are used the maximum frame rate is 12.5/15 images per second at 4CIF resolution.

The maximum frame rates listed in the table below depend on the resolution, picture content and movement, and the number of inputs used.

	4 Inputs	2 Inputs	1 Input
4CIF	12.5/15 ips	25/30 ips	25/30 ips
2/3 D1	25/30 ips	25/30 ips	25/30 ips
2CIF	25/30 ips	25/30 ips	25/30 ips

ips = frame rate in images per second

Reliability

Designed for reliability, the VideoJet X encoders feature a wide range power supply, dual-redundant Ethernet network ports, a third SFP network slot with switching capability between the network ports, dual USB ports and fault-tolerant mass storage via iSCSI.

Access security

The VideoJet X encoders offer various security levels for accessing the network, the unit and the data channels. As well as password protection with three levels, they support 802.1x authentication using a RADIUS server for identification. Web browser access can be secured by HTTPS using a SSL certificate that is stored in the unit.

Increased intelligence

With built-in video content analysis, VideoJet X encoders reinforce the Intelligence-at-the-Edge concept where edge devices become increasingly intelligence. The VideoJet X comes with built-in MOTION+ video motion detection. This motion detection algorithm is based on pixel change and includes object size filtering capabilities and sophisticated tamper detection capabilities.

Bosch offers more advanced video content analysis (VCA) applications with its Intelligent Video Motion Detection (IVMD). A licensable option, it bases the IVMD algorithm on digital imaging technology that uses multi-level image analysis of pixel, texture and motion (trajectory) changes.

Easy upgrade

Remotely upgrade the VideoJet X encoders whenever new firmware becomes available. This ensures up-to-date products, thus protecting investment with little effort.

Certifications and Approvals

Safety

Region	Number
EU	IEC60950
USA	UL60950

Electromagnetic compatibility

Region	Number
EU	EN55103-1 Video and audio equipment
	EN55103-2 Video and audio equipment
	EN50130-4 Alarm systems
	EN55022 ITE
	EN55024 ITE
	EN50121-4 Railway applications

Environment

Region	Number
EU	EN61000-3-2
	EN61000-3-3
	EN60068-2-6 Fc
	EN60068-2-30 Db
	EN60068-2-1 Ab
	EN60068-2-2 Bb
	EN60068-2-14 Na

Installation/Configuration Notes

VideoJet X encoders have an integrated heat pipe which needs a specific mounting direction to be fully functional. Mount VideoJet X encoders in any direction except with the front (BNC side) pointing upwards.

Front connectors and indicators
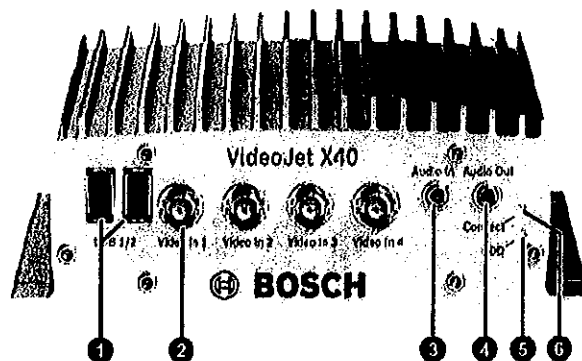
VideoJet X40 · front

49 of 83

1   USB 1 and 2
2   Video Input 1 (2, 3, and 4 where applicable)
3   2-channel audio input (1 channel for X10)
4   2-channel audio output (1 channel for X10)
5   LED HDD (only operates on HDD versions)
6   LED connect

Back connectors and indicators
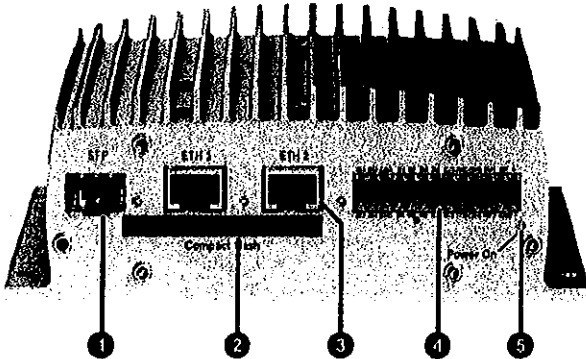
VideoJet X series - back

1   SFP GBIC slot
2   Compact flash slot
3   Ethernet 1 and 2
4   Alarm input, relay output, serial interface and power input connector block
5   LED Power on

Parts included

Quantity	Component
1	VideoJet X encoder
1	Quick installation guide
1	CD Rom with software and documentation
1	Drilling template
1	Set of spring clamp contact connectors

An optional extended range power supply can be ordered separately with power cord versions for the EU/US, UK and AUS regions.

Technical Specifications

Electrical

Power supply	Stand-alone, exclusive, or external battery
Input voltage	10 to 30 VDC
Power consumption	X10: approx. 16 VA, fully equipped X20/X40: approx. 22 VA, fully equipped

Video

Video compression standards	MPEG-4, M-JPEG, JPEG
Video data rate	9.6 kbps to 6 Mbps per channel
Video resolution and frame rate (PAL/NTSC)	4CIF (704 x 576/480), 25/30 ips 4CIF (704 x 576/480), 12.5/15 ips (4 inputs used) 2CIF (704 x 288/240), 25/30 ips 2/3 D1 (464 x 576/480), 25/30 ips 1/2 D1 (352 x 576/480), 25/30 ips CIF (352 x 288/240), 25/30 ips QCIF (176 x 144/120), 25/30 ips
GOP structure	I, IP
Overall delay	120 ms
Video In	VideoJet X10: 1x BNC connector VideoJet X20: 2x BNC connectors VideoJet X40: 4x BNC connectors Analog composite (NTSC or PAL) 75 Ohm switchable, 0.7 to 1.2 Vpp

Audio

Audio standard	G.711; 300 Hz to 3.4 kHz
Audio data rate	80 kbps at 8 kHz Sampling Rate
Line in	Dual channel via 3.5 mm stereo jack, 9 kOhm typical, 5.5 Vpp max. (mono only for X10)
Line out	Mono line output on 3.5 mm stereo jack, 3.0 Vpp at 10 kOhm / 1.7 Vpp at 16 Ohm typical

Network

Ethernet	Dual port 10/100 Base-T, auto-sensing, half/full duplex, RJ45
Protocols	RTP, Telnet, UDP, TCP, IP, HTTP, HTTPS, IGMP V2/V3, ICMP, ARP, SNTP, SNMP (V1/V2c/V3 MIB-II)
Encryption	TLS 1.0, SSL, AES (optional)

Control

Software update	Flash ROM, remote programmable
Configuration	Configuration Manager or web browser
RAM recording	32 MB total, 8 MB per channel

Connections

SFP	1x1 Gbps SFP slot for optional standard SFP GBIC module
CompactFlash	1x CF slot for optional standard Type I/II CompactFlash memory card
USB ports	USB 2.0 high-speed ports, 2.5 W max. feed each (future use)
Alarm in	4x (non-isolated closure contact type), max. activation resistance 10 Ohm, 6 spring clamp contacts
Relay out	4x, 30 Vpp, 2 A, 8 spring clamp contacts
COM port	1x RS232/422/485, 6 spring clamp contacts

50 of 83

Mechanical

Dimensions (H x L x D)	61 x 178 x 160 mm (2.4 x 7.01 x 6.3 in)
Weight	Approx. 1.5 kg (3.2 lb) with HDD

Environmental

Operating temperature	-30 °C to +60 °C (-22 °F to +140 °F) ambient temperature
Humidity	0 to 95% atmospheric humidity, non-condensing
Heat value	82 BTU/h max.

Ordering Information

VJT-X10S   VJT-X10S
VideoJet X10 with 1 video input

VJT-X10S-H004   VJT-X10S-H004
VideoJet X10 with 1 video input and a 40 GB
hard disk

VJT-X20S   VJT-X20S
VideoJet X20 with 2 video inputs

VJT-X20S-H004   VJT-X20S-H004
VideoJet X20 with 2 video inputs and a 40 GB
hard disk

VJT-X40S   VJT-X40S
VideoJet X40 with 4 video inputs

VJT-X40S-H004   VJT-X40S-H004
VideoJet X40 with 4 video inputs and a 40 GB
hard disk

Accessories

VJT-XACC-PS   VJT-XACC-PS
VJX10/20/40 wide-range extended-tempera-
ture power supply

VJT-XACC-PSUK   VJT-XACC-PSUK
VJX10/20/40 wide-range extended-tempera-
ture power supply for UK

VJT-XACC-PSAU   VJT-XACC-PSAU
VJX10/20/40 wide-range extended-tempera-
ture power supply for AUS

DVA-12T-04050RA   DVA-12T-04050RA
iSCSI RAID5, 12 bay 1.5 TByte net capacity (4
hard drives installed)

DVA-12T-12050RA   DVA-12T-12050RA
iSCSI RAID5, 12 bay, 5.5 TByte net capacity
(12 hard drives installed)

Ordering Information
Software Options

VJT-X10-FS1   VJT-X10-FS1
VideoJet X10 IVMD 1.0 VCA Software License

VJT-X20-FS1   VJT-X20-FS1
VideoJet X20 IVMD 1.0 VCA Software License,
valid for 2 channels

VJT-X40-FS1   VJT-X40-FS1
VideoJet X40 IVMD 1.0 VCA Software License,
valid for 4 channels

VJT-X10-FS2   VJT-X10-FS2
VideoJet X10 IVMD 2.0 VCA License

VJT-X20-FS2   VJT-X20-FS2
VideoJet X20 IVMD 2.0 VCA License, valid for
2 channels

VJT-X40-FS2   VJT-X40-FS2
VideoJet X40 IVMD 2.0 VCA License, valid for
4 channels

SENSYS Networks

AP240 Access Points

The Sensys™ Wireless Vehicle Detection System uses pavement-mounted magnetic sensors to detect the presence and movement of vehicles. The magneto-resistive sensors are wireless, transmitting their detection data in real-time via low-power radio technology to a nearby Sensys access point that then relays the data to one or more local or remote traffic management controllers and systems.

The Sensys Access Point. A Sensys access point is an intelligent device operating under the Linux operating system that maintains two-way wireless links to an installation's sensors and repeaters, establishes overall time synchronization, transmits configuration commands and message acknowledgements, and receives and processes data from the sensors. The Sensys access point then uses either wired or wireless connections (or both) to relay the sensor detection data to a roadside traffic controller or remote server, traffic management system, or other vehicle detection application.

Types of Access Point. An access point uses a single cable to support 10Base-T Ethernet communications as well as DC power input and, in some versions, serial communications to the Sensys contact closure card that furnishes the interface to standard traffic controllers. An integrated radio modem can also be ordered as an access point option to provide IP connectivity using either GSM-based or CDMA-based cellular data services.

AP240-S

- RJ45 port supports serial interface to Sensys contact closure Master Card (CC card) for relay of detection data; supports Ethernet interface for field configuration only (paths split via Sensys AccessBox)
- No processing of sensor detection data
- 48VDC power input from Sensys CC card via RJ45 port

AP240-E

- RJ45 port supports Ethernet interface for relay of detection data and field configuration
- AP processor supports statistics-processing and VPN functionality
- Can be ordered with either 48VDC or 12VDC power input via RJ45 port
- S option: RJ45 port simultaneously supports serial interface to Sensys CC card and Ethernet interface for relay of detection data (paths split via Sensys AccessBox)
- G or C option
  - G: Integrated GPRS cellular data modem for relay of detection data via GSM cellular data services
  - C: Integrated 1xRTT cellular data modem for relay of detection data via CDMA cellular data services (different versions for different service providers)
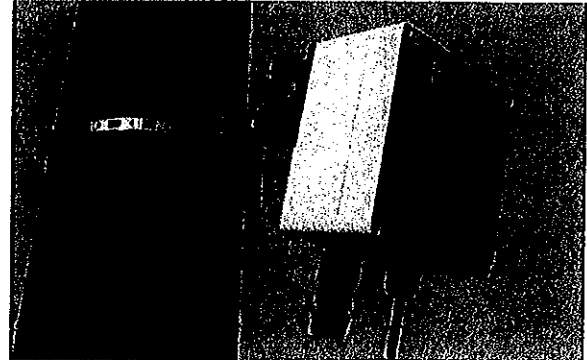
Functions/Features

- **Sensys radio communications**
  - To/from Sensys wireless sensors
  - To/from Sensys repeaters

- **Relay of sensor data**
  - Via contact closure signals to traffic controller
  - Via IP connectivity (wired or wireless) to traffic management systems, upstream servers, etc.
  - Optional integrated cellular data modem

- **Processing of sensor data**
  - Per-lane or per-vehicle data
  - Data binning over selectable time intervals
  - Data filtering (e.g., adaptive holdover)

- **Storage of sensor data**
  - Data buffering (event caching)
  - Data storage (processed data)

- **Master timebase for all supported wireless sensors**
  - Common clock for sensor timestamps
  - Can be synchronized to NIST timing signals

- **Radio signal quality measurements**
  - Receive Signal Strength Indicator (RSSI, in dBm)
  - Link Quality Index (LQI, figure of merit 40-99)

- **Firmware upgrades**
  - Can be upgraded via IP connectivity or via local PC connection
  - Can deliver upgrades to all other Sensys devices

- **Simple Installation**
  - Any roadside location that provides adequate signal coverage to sensors/repeaters
  - No special requirements regarding setback, relative angle of the sun, or mounting stability

- **Low power consumption**

- **No calibration or adjustment required**

Functional Specifications

Interfaces	• to/from sensors via 802.15.4 PHY radio • to/from repeaters via 802.15.4 PHY radio • to/from configuration device (PC) via TCP/IP over 10Base-T Ethernet • to roadside traffic controller via Sensys CC card • to/from central network management / data collection facilities via TCP/IP — 10Base-T Ethernet — cellular data modem
IP connectivity	• Telnet, FTP, HTTP, PPP, PPTP, optional encryption over tunnel • 10Base-T via RJ45 connector (10 Mbps) • GSM GPRS connectivity (optional) — dual-band 850/1900 MHz GSM (N. American version) — dual-band 900/1800 MHz GSM (int'l version) — up to 85.6 kbps • CDMA2000 1xRTT connectivity (optional) — dual-band 800/1900 MHz CDMA (per specific cellular service provider) — up to 153.6 kbps
per-lane data processing	• counts (volume) • occupancy • average and median speeds • binned speeds and vehicle lengths over selectable time intervals
per-vehicle data processing	• initial vehicle detect time • gap • speed • length
data storage	• ~130 kB for event caching • ~500 kB for processed data storage
over-the-air protocol	Sensys NanoPower (SNP) protocol (TDMA)
physical layer protocol	IEEE 802.15.4 PHY
modulation	Direct Sequence Spread Spectrum Offset Quadrature Phase-Shift Keying (DSSS O-QPSK)
transmit/receive bit rate	250 kbps
frequency band	2400 to 2483.5 MHz (ISM unlicensed band)
frequency channels	16
channel bandwidth	2 MHz
antenna type	microstrip patch antenna (behind front face panel)
antenna field of view	±60° (azimuth & elevation)
nominal output power	0 dBm
spurious emissions	• 30 - 1000 MHz: < -56 dBm • 1 - 12.75 GHz: < -44 dBm • 1.8 - 1.9 GHz: < -56 dBm • 5.15 - 5.3 GHz: < -51 dBm
typical receive sensitivity	-95 dBm (PER = 1%)
saturation (max input level)	≥ 10 dBm

Types of Access Points

	processing capability	power options		detection data interfaces			
		48 VDC	12 VDC	contact closure	10Base-T	GSM GPRS	CDMA2000 1xRTT
AP240-S		•		•			
AP240-E	•	•	•		•		
AP240-ES	•	•		•	•		
AP240-EG	•	•	•		•	•	
AP240-EC	•	•	•		•		•
AP240-ESG	•	•		•	•	•	
AP240-ESC	•	•		•	•		•

Power, Physical, & Environmental

Input voltage	• via PoE cable to RJ45 connector • 36-58 VDC (48 VDC nominal) • 10-20 VDC (12 VDC nominal)
power consumption	• AP240-S, -E, -ES: 2 W • AP240-EG, -EC, -ESG, -ESC: 3.5 W
dimensions	6 ¼" x 6 ¼" x 3 ½" / 15.9 cm x 15.9 cm x 8.9 cm
weight	• AP240-S, -E, -ES: 1.9 lbs / 0.9 kg • AP240-EG, -EC, -ESG, -ESC: 2.1 lbs / 0.9 kg • mounting kit: add'l 1.2 lbs / 0.5 kg
environmental	• designed for weatherproof, outdoor operation • NEMA Type 4x enclosure • IP67 ingress protection
operating temp	-40°F to 176°F / -40°C to +80°C

RJ45 Pinout

RJ45 (8P8C)	Ethernet (AP240-E, -EG, -EC)	communications via AccessBox (AP240-S, -ES, -ESG, -ESC)
pin 1	ETXD+	ERXD+
pin 2	ETXD-	ERXD-
pin 3	ERXD+	ETXD+
pin 4	DC PWR+	RS485+
pin 5	DC PWR+	RS485-
pin 6	ERXD-	ETXD-
pin 7	PWR RTN	DC PWR+
pin 8	PWR RTN	PWR RTN

Compliance

safety	2006/95/EC CE
EMC	• FCC: This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. • 2004/108/EC CE

Local Distributor

SENSYS
Networks

2560 Ninth Street, Suite 219
Berkeley, CA 94710
tel / +1 (510) 548-4620; fax / +1 (510) 548-8264
email / info@sensysnetworks.com
Web / www.sensysnetworks.com

53 of 83

⊕ SENSYS
Networks

The Sensys™ Wireless Vehicle Detection System

VSN240 Wireless Sensors

The Sensys™ Wireless Vehicle Detection System uses pavement-mounted magnetic sensors to detect the presence and movement of vehicles. The magneto-resistive sensors are wireless, transmitting their detection data in real-time via low-power radio technology to a nearby Sensys access point that then relays the data to one or more local or remote traffic management controllers and systems.

The Sensys Wireless Sensor. A Sensys wireless sensor is a sensitive magnetometer equipped with a low-power radio and packaged in a small, hardened plastic case suitable for pavement mounting.

In typical traffic management applications, a Sensys wireless sensor is placed in the middle of a traffic lane to detect the presence and passage of vehicles. To measure vehicle speeds and length, two wireless sensors are installed in the same lane with the exact distance between them measured and configured in software. The recommended distance between sensors depends on the range of expected speeds to be measured: for typical freeway applications, a separation of approximately 20 to 24 feet / 6.1 to 7.3 meters is recommended; for typical arterial applications, a separation of 10 to 12 feet / 3.1 to 3.7 meters is preferred.

Advanced Magnetometer-Based Vehicle Detection. The state-of-the-art magneto-resistive sensing devices employed in each Sensys wireless sensor measure the x-, y-, and z-axis components of the Earth's magnetic field at a 128 Hz sampling rate. As vehicles come within range, changes in the x, y, or z axes of the measured magnetic field become apparent. When no vehicles are present, each sensor continually measures the background magnetic field to estimate a reference. Each sensor automatically self-calibrates to the specific installation site and to any long-term variations of the local magnetic field by allowing this reference value to change over time.

Types of Wireless Sensors. Sensys currently offers two types of flush-mount wireless sensors:

VSN240-F – flush-mount wireless sensor

• Flush-mount wireless sensor for in-pavement installation

• Suitable for *all* freeway, arterial, and traffic signal control applications

VSN240-T – flush-mount wireless sensor

• Flush-mount wireless sensor for in-pavement installation

• Suitable for traffic signal control applications *only*
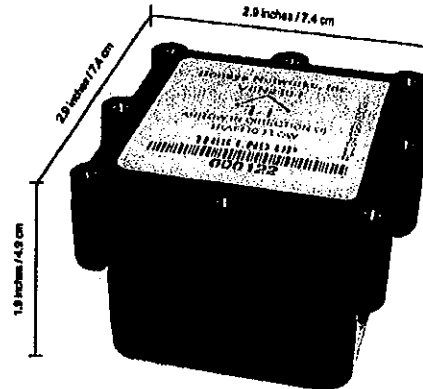
Functions / Features

• **3-axis magnetometer for vehicle detection**
  — 128 Hz sampling rate
  — Count and presence detection modes
  — Modes for bicycle and motorcycle detection

• **Superior accuracy**

• **Exceptional reliability**

• **Flush-mount in-pavement installation with no wires or lead-in cabling**

• **Fast & simple installation**
  — Installs in less than 10 minutes in small hole using a hammer or core drill
    ❖ 4" / 10 cm diameter; 2 ¼" / 5.7 cm deep
    ❖ Covered with fast-drying epoxy
  — Minimal lane closure time
  — No saw cuts

• **Extremely long battery life – average of 10 years**

• **Rugged mechanical design**

• **Auto-calibration**

• **Reliable 2-way radio communications with Sensys access point**
  — Uniquely addressable and configurable
  — Firmware can be upgraded over-the-air

• **Can be readily deployed where other systems cannot be used**
  — Split roadways
  — High water tables
  — Damaged pavement

Functional Specifications

detection technique	3-axis magnetic field sensing
sampling rate	128 Hz
programmable vehicle detection parameters (mode B only)	• Z-axis detect threshold (mG) • Z-axis undetect threshold (mG) • X-axis undetect threshold (mG) • onset filter (ms) • holdover (ms) • auto-recalibration timeout (secs)
over-the-air protocol	Sensys NanoPower (SNP) protocol (TDMA)
physical layer protocol	IEEE 802.15.4 PHY
modulation	Direct Sequence Spread Spectrum Offset Quadrature Phase-Shift Keying (DSSS O-QPSK)
transmit/receive bit rate	250 kbps
frequency band	2400 to 2483.5 MHz (ISM unlicensed band)
frequency channels	16
channel bandwidth	2 MHz
antenna type	microstrip patch antenna (mounted below top surface of sensor)
antenna field of view	±60° (azimuth & elevation)
nominal output power	0 dBm
spurious emissions	• 30 - 1000 MHz: < -56 dBm • 1 - 12.75 GHz: < -44 dBm • 1.8 - 1.9 GHz: < -56 dBm • 5.15 - 5.3 GHz: < -51 dBm
typical receive sensitivity	-95 dBm (PER = 1%)
saturation (max input level)	≥ 10 dBm

Vehicle Detection Zones

traffic lane
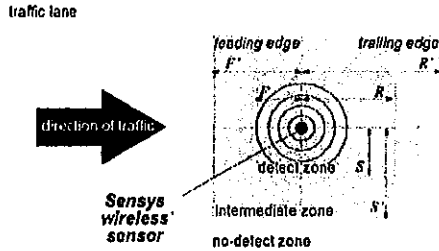
	F	F'	R	R'	S	S'
freeway & arterial applications (typical configuration)	~2 ft / ~0.6 m	~4 ft / ~1.2 m	~4 ft / ~1.2 m	~6 ft / ~1.8 m	~2 ft / ~0.6 m	~4 ft / ~1.2 m
Intersection applications (typical configuration for passenger vehicles)	~3 ft / ~0.9 m	~5 ft / ~1.5 m	~3 ft / ~0.9 m	~5 ft / ~1.5 m	~3 ft / ~0.9 m	~5 ft / ~1.5 m

SENSYS
Networks

2560 Ninth Street, Suite 219
Berkeley, CA 94710
tel / +1 (510) 548-4620; fax / +1 (510) 548-8264
email / info@sensysnetworks.com
Web / www.sensysnetworks.com

Sensor Modes

mode	application	description
B (event)	count stations; advance detection	• sends timestamped ON and OFF detection events using configurable detection parameters • not supported by VSN240-T
E (idle)	status reporting	disables magnetometer and sends sensor hardware and software version information
STOPBAR-# (presence detection)	stop bar detection; ramp management	sends timestamped ON and OFF detection events using pre-configured detection parameters

• 16 different stop bar detection modes can be selected
• recommended stop bar detection modes for specific applications:

STOPBAR-0	bicycles/scooters
STOPBAR-2	motorcycles
STOPBAR-5	passenger vehicles (normal recalibration)
STOPBAR-7	passenger vehicles (fast recalibration)
STOPBAR-14	light rail

Power, Physical, & Environmental

power supply	• non-replaceable primary Li-SOCl2 3.6V battery pack • 7.2 Ah (nominal capacity)
dimensions	2.9" x 2.9" x 1.9" / 7.4 cm x 7.4 cm x 4.9 cm
weight	0.6 pounds / 0.3 kg
environmental	• designed for in-pavement mounting • NEMA Type 6P enclosure • IP68 Ingress protection
operating temp	-40°F to 176°F / -40°C to +85°C

Compliance

safety	2006/95/EC CE
EMC	• FCC: This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. • 2004/108/EC CE

Local Distributor

ⓢ SENSYS
Networks

The Sensys™ Wireless Vehicle Detection System

CC & EX Contact Closure Cards

The Sensys™ Wireless Vehicle Detection System uses pavement-mounted magnetic sensors to detect the presence and movement of vehicles. The magneto-resistive sensors are wireless, transmitting their detection data in real-time via low-power radio technology to a nearby Sensys access point that then relays the data to one or more local or remote traffic management controllers and systems.

The Sensys CC and EX Contact Closure Cards. The Sensys Wireless Vehicle Detection System can be used with Type 170, NEMA TS1, NEMA TS2, or Type 2070 ATC traffic controllers by installing one or more Sensys contact closure cards into a detector shelf of the controller and connecting them to one or more Sensys access points. The Sensys Master (CC) and Expansion (EX) contact closure cards support this traffic controller interface, converting the real-time detection signals of the Sensys wireless sensors supported by a Sensys access point into contact closure signals to the traffic controller.

Each CC and EX card provides one, two, three, or four channels, where each channel comprises an optically isolated contact closure relay and, if configured for TS2 operation, an additional contact closure relay to indicate the channel status. If the sensors supported by an access point require more than the four channels of a CC card, as many EX cards as required (up to 63) can be daisy-chained to the CC card, either via front-panel RJ45 jacks or via rewiring of the backplane connections. Multiple cards may also be needed if the traffic controller shelf has pre-defined functions or phases for each slot.

Each Sensys wireless sensor can be mapped to its own individual channel or up to 15 Sensys wireless sensors can be mapped to a single channel to effectively "OR" the sensor signals together so that if any of them detect a vehicle, the contact closure relay for that channel will close. In this way, a Sensys Wireless Vehicle Detection System can be easily configured in the same way that inductive loops are configured to interface with a traffic controller.

Types of Contact Closure Cards. CC and EX cards must be ordered to address the particular traffic controller with which they will be used.

CC-170; EX-170
- Type 170 controllers
- Type 2070 controllers (without status relay)
- NEMA TS1 controllers

CC-TS2; EX-TS2
- Type 2070 controllers
- NEMA TS2 controllers
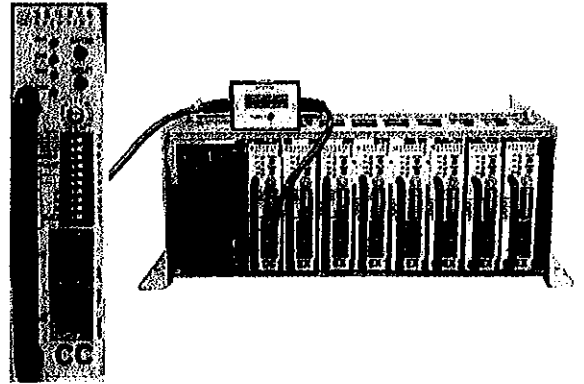
Functions / Features

- **Sensys contact closure interface to traffic controller**
  - Type 170 controllers
  - NEMA TS1 controllers
  - Type 2070 controllers
  - NEMA TS2 controllers

- **Plugs directly into input file or detector rack without any additional adapter**

- **Up to four detection channels per card**
  - Optically isolated contact closure signals
  - CC-TS2 / EX-TS2 includes status channels

- **Pulse or presence and delay or extension modes**

- **Easy installation**
  - Can be configured via Sensys access point using TrafficDot (Java application)
  - Can be configured via front panel switches
  - Buzzer to assist in on-site verification

Functional Specifications

Interfaces	• to/from traffic controller via 2x22 pin edge card connector
	• to/from access point via Sensy AccessBox
	— connections
	  ❖ IN port of CC card to CC port of AccessBox
	  ❖ Access port of AccessBox to access point
	— detection data via RS485 serial comms
	— power (48 VDC nominal)
	• to/from other Sensys contact closure cards
	— daisychaining from OUT port of CC or EX card to IN port of EX card
	— daisychaining via hardwired backplane connections
	• to/from configuration device (PC) via TCP/IP over 10Base-T Ethernet (via Sensys AccessBox)

TS2 status reporting	• all sensors active on channel — status relay: closed (continuous Low or On state) — TS2 state=1 (normal) • no sensors active on channel (no data rec'd in last 60s) — status relay: open (continuous High or Off state) — TS2 state=2 (failure) • not all sensors active on channel — status relay: pulse modulation with 150 ms Off time — TS2 state=5 (excessive inductance change)

Front Panel User Interface

controls	• ENTER: configure card with DIP switch/rotary dial settings • RESET: ignore events and clear pending events (all channels) • rotary switch: 16 settings for card configuration [0-15]
LEDs	• CH1, CH2, CH3, CH4: on/vehicle present or no sensors detected; off/vehicle not present or channel disabled; blinking: vehicle detected • LINK: on/operational; off/no link; blinking/active • FAULT: on/an enabled channel has a fault • MONITOR: on/state of selected channel or reconfiguration in process

Power, Physical, & Environmental

input voltage	• via traffic controller backplane • 11-26 VDC
power consumption	5 W max (assuming connection to AP240-ESG)
surge protection	GR-1089
AC power cross protection	GR-1089
dimensions	• single-slot width with extension to double-slot width • single-slot: 7" x 4.5" x 1.1" / 17.8 cm x 11.4 cm x 2.9 cm • double slot: 7" x 4.5" x 2.3" / 17.8 cm x 11.4 cm x 5.9 cm
weight	• CC: 5.5 oz / 0.16 kg • EX: 5 oz / 0.14 kg
operating temp	-40°F to 176°F / -40°C to +80°C
humidity	10 – 95% non-condensing
vibration	MIL-STD-810
transportation vibration	bounce & drop per ISTA Proc. 1A

Front Panel DIP Switch Bank

switch	label	function	left	right
10	CH [3,4] [1,2]	channel address bit 1	3, 4	1, 2
9	CH [2,4] [1,3]	channel address bit 0	2, 4	1, 3
8	ENABLE	enable	enable	disable
7	PRESEN/PULSE	channel mode	presence	pulse
6		delay enable bit 1	see	
5		delay enable bit 0	Delay/Extension Table	
4	L	reserved		
3	H	reserved		
2	X	card address display mode	query	normal
1	BUZZ	enable buzzer	on	off

Delay/Extension Table

DIP switch 6	DIP switch 5	delay/extension mode	rotary switch setting = X
0	0	off	--
0	1	extension	(0.5 x X) seconds
1	0	delay	X seconds
1	1	delay	(16 + X) seconds

2 x 22-Pin Edge Card Connector

pin	function (TS2 / TS 1)	pin	function (TS2 / TS 1)
1	channel 1 delay enable / [none]	A	GND
2	channel 2 delay enable / [none]	B	24 VDC
3	address 3	C	reset input
4	daisy chain RS485 uplink +	D, E	
5	daisy chain RS485 uplink -	F	channel 1 collector
6	address 0	H	channel 1 emitter
7	channel 1 status / [none]	J, K	
8	daisy chain RS485 downlink +	L	chassis ground
9	daisy chain RS485 downlink -	M	AC power neutral
10	address 1	N	AC power line
11	AC power neutral	P, R	
12	AC power line	S	channel 3 collector
13, 14		T	channel 3 emitter
15	address 2	U, V	
16	channel 3 status / [none]	W	channel 2 collector
17, 18, 19		X	channel 2 emitter
20	channel 2 status / [none]	Y	channel 4 collector
21		Z	channel 4 emitter
22	channel 4 status / [none]		

key slots between B/C, E/F, and M/N

IN Port (RJ45 Pinout)

pin	function (CC card / EX card)
1	no connection / daisy chain RS485 downlink +
2	no connection / daisy chain RS485 downlink -
3	no connection / daisy chain RS485 uplink +
4	RS485 + / no connection
5	RS485 - / no connection
6	no connection / daisy chain RS485 uplink -
7	+48 VDC / no connection
8	48 VDC return / no connection

OUT Port (RJ45 Pinout)

pin	function
1	daisy chain RS485 downlink +
2	daisy chain RS485 downlink -
3	daisy chain RS485 uplink +
4	no connection
5	no connection
6	daisy chain RS485 uplink -
7	no connection
8	no connection

DIP Switch Bank SW1 (CardID/Type)

switch	function	up	down
1	bit 4 of CardID	0	1
2	bit 5 of CardID	0	1
3	TS2 or TS1 selection	TS2	TS1
4	reserved		

DIP Switch Bank SW2 (Backplane Override)

switch	function	up	down
1	address 0	0	backplane or 1
2	address 1	0	backplane or 1
3	address 2	0	backplane or 1
4	address 3	0	backplane or 1

Compliance

Caltrans TEES (Transportation Electrical Equipment Specifications)	Revision 11/19/1999
NEMA	TS 2-2003 v02.06
FCC	Part 15

SENSYS Networks

2560 Ninth Street, Suite 219
Berkeley, CA 94710
tel / +1 (510) 548-4620; fax / +1 (510) 548-8264
email / info@sensysnetworks.com
Web / www.sensysnetworks.com

Local Distributor

Appendix D – Sample Images and Citations

Clear Day Photo with Corresponding Citation Sample on Following Page

WILMINGTON
NORTH CAROLINA
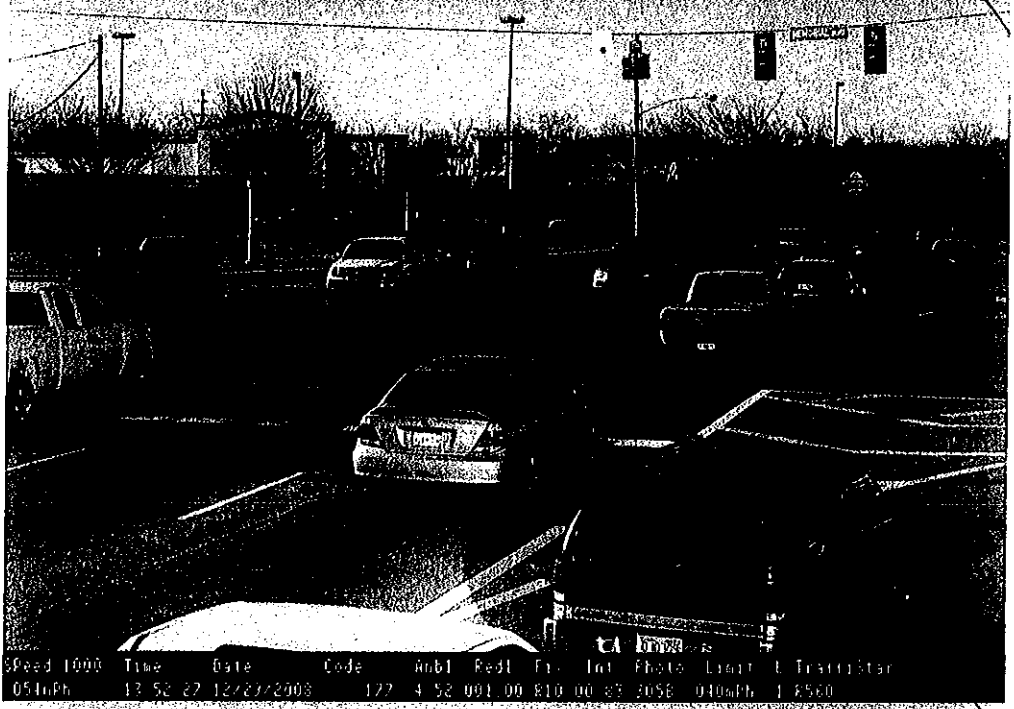
CITY OF MURFREESBORO
SafeStreet® Program
NOTICE OF CITATION

Mail Date: 01/07/2009

Henry Doe

A vehicle registered in your name was photographed using an automated traffic enforcement system at the location, date and time listed below. A Murfreesboro Police Department Officer has determined that the vehicle so recorded, failed to obey the red light traffic control signal in violation of Murfreesboro City Code §32-403. As the registered owner of the vehicle, you are liable for payment of the $50.00 penalty for this nonmoving traffic violation. This citation and its payment will not be reported to the Tennessee Department of Safety.

If you fail to pay or to contest this citation within 30 days, you will be deemed to have admitted your liability for the violation.

If you fail to pay the amount you owe for this citation, the debt may be turned over to a collection agency; it may also be reported to one or more credit bureaus and affect your credit rating.

On the back of this notice you can find payment instructions and how you may contest this violation.

To view the violation online or make credit card payment, you may contact us on the internet or at a kiosk located at City Court or Murfreesboro Police Department at https://www.safecitystreets.com/murfreesboro. You will be asked for the Citation Number, vehicle registration and 5 digit zip code before accessing violation information.

DATE AND TIME OF VIOLATION	LOCATION OF VIOLATION	VEHICLE REGISTRATION
12/29/08 1:32 PM	WB Northfield Blvd & Memorial Blvd	TN 914153
CITATION NUMBER	AMOUNT DUE	DUE DATE
MU-000012355	$50.00	02/06/2009
VIOLATION TYPE		
Failure to Obey A Traffic Signal		

A law enforcement officer of the City of Murfreesboro Police Department has inspected and reviewed the recorded images set forth above and based upon the facts contained therein and available evidence, and an affidavit has been executed, has conclusively the license tag or other of an existing vehicle. Such recorded images are evidence of a violation of Murfreesboro City Code §32-403.

Officer's Signature Here: _____ PIN# 332

--- Detach here and return with payment ---

DATE AND TIME OF VIOLATION	LOCATION OF VIOLATION	VEHICLE REGISTRATION
12/29/08 1:32 PM	WB Northfield Blvd & Memorial Blvd	TN 914153
CITATION NUMBER	AMOUNT DUE	DUE DATE
MU-000012355	$50.00	02/06/2009
VIOLATION TYPE		
FAILURE TO OBEY TRAFFIC SIGNAL		

Henry Doe
789 Deer dr
MURFREESBORO, TN 36591

Contact us on the internet or at a kiosk located at City Court or the Murfreesboro Police Department for contest and payment information at:
https://www.safecitystreets.com/murfreesboro

Night Photo with Corresponding Citation Sample on Following Page

60 of 83

![traffipax TRAFFIC SAFETY SYSTEMS] **WILMINGTON** NORTH CAROLINA
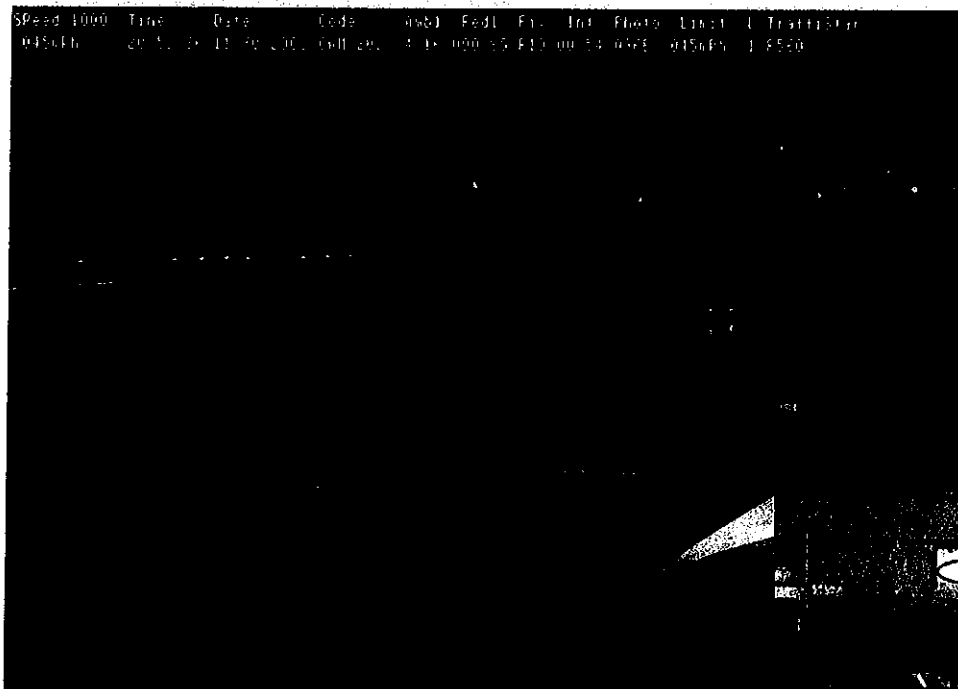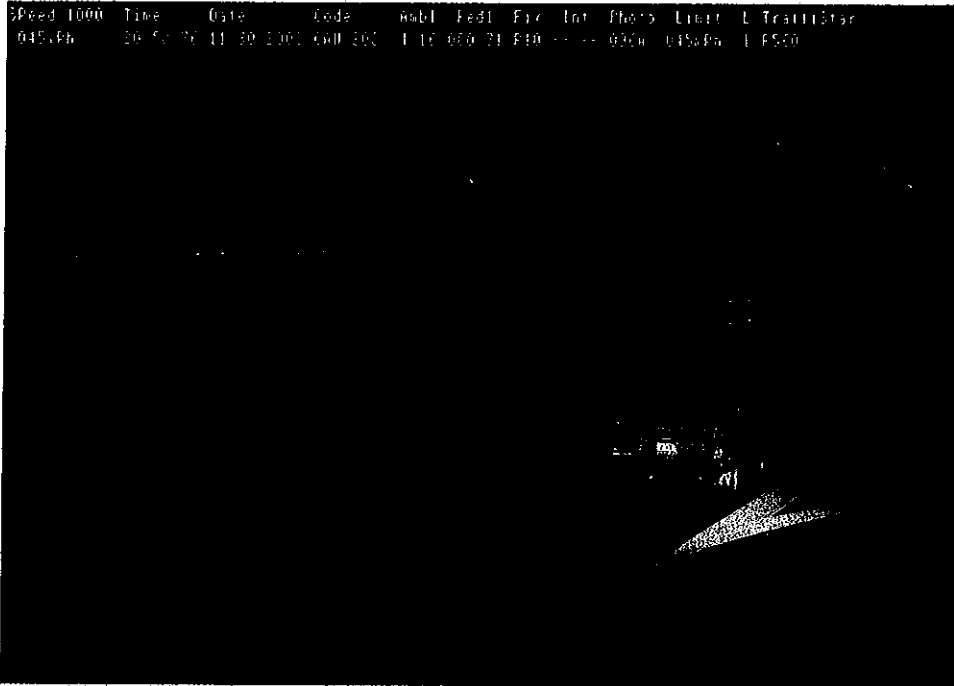
CITY OF CLEVELAND
*Safe*Street® Program
NOTICE OF CITATION

Mail Date: 12-04-2008

Joe Smith

A vehicle registered in your name was photographed using an automated traffic enforcement system at the location, date and time listed below. A Cleveland Police Department Officer has determined that the vehicle so recorded, failed to obey the red light traffic control signal in violation of Cleveland Municipal Code Section 15-803. As the registered owner of the vehicle, you are liable for payment of the $50.00 civil penalty for this nonmoving traffic violation. This citation and its payment will not be reported to the Tennessee Department of Safety.

If you fail to pay or to contest this citation within 30 days of the mail date listed above, you will be deemed to have admitted your liability for the violation and a default judgment will be entered. A default judgment will include additional court costs of $91.00 and state litigation tax of $13.75.

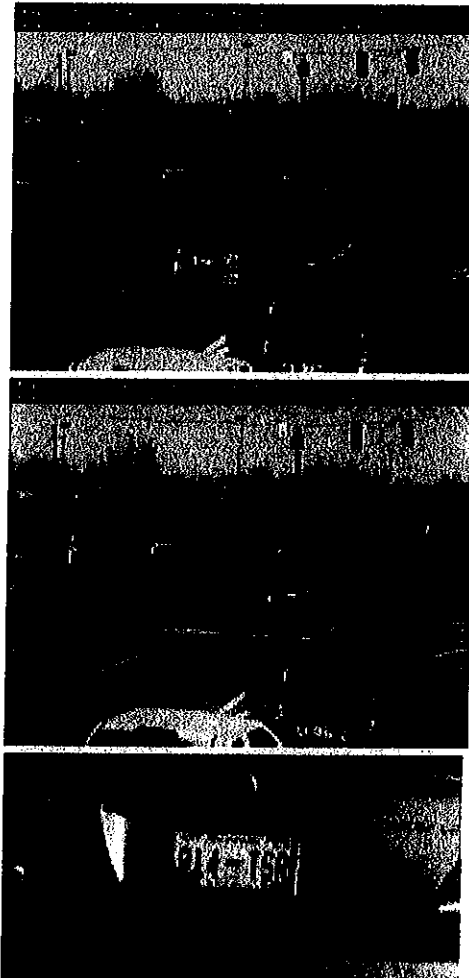If you fail to pay the amount owed for this citation and a default judgment is entered for non-payment, the debt may be turned over to a collection agency.

On the back of this notice you can find payment instructions and how you may contest this violation.

To obtain citation information or make credit card payment you may contact us on the internet at https://www.safecitystreets.com/clevelandtn. You will be asked for the Citation Number, vehicle registration and 5 digit zip code before accessing violation information.

DATE AND TIME OF VIOLATION	LOCATION OF VIOLATION	VEHICLE REGISTRATION
11/20/08 1:32 PM	Keith St (SB) @ Baxter Dr	TN 7472.1
CITATION NUMBER	AMOUNT DUE	DUE DATE
CL-0000001027	$ 50.00	1/30/2009
VIOLATION TYPE		
Failure to Obey A Traffic Signal		

A law enforcement officer of the City of Cleveland Police Department has reviewed and compared the recorded images on both sides and based thereon has found reasonable and probable grounds to believe that a violation has been committed, and can identify the operating number of the offending vehicle. Such recorded images are evidence of a violation of Cleveland Municipal Code 1505-35 Section 15-803.

Officer's Signature Here: ~~Beam~~ PCN# 343

- - - - - - - - - - - - - - Detach here and return with payment - - - - - - - - - - - - - - - - - - -
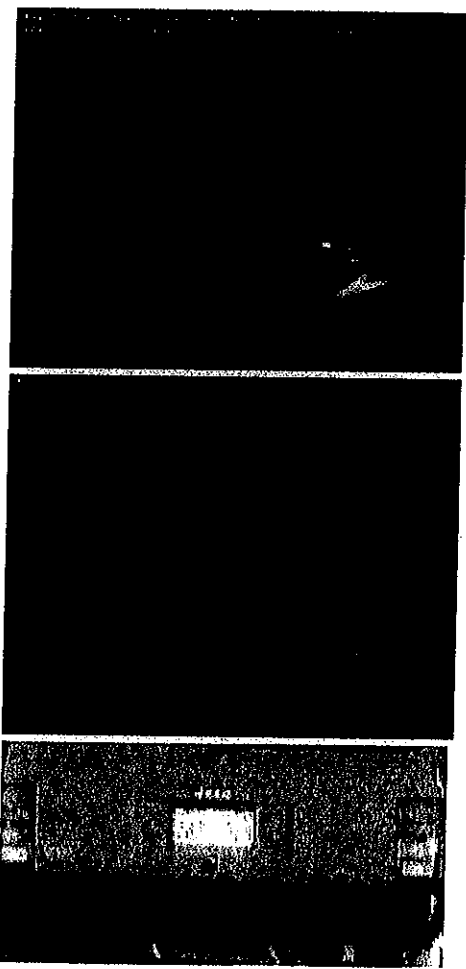
Make credit card payment by
phone or internet
OR
Send check or money order payable to:

City of Cleveland
SafeStreet® Program
PO Box 22651
Nashville, TN 37224-1651

(866) 791-2660

DATE AND TIME OF VIOLATION	LOCATION OF VIOLATION	VEHICLE REGISTRATION
11/20/08 1:32 PM	Keith St (SB) @ Baxter Dr	TN 7472.1
CITATION NUMBER	AMOUNT DUE	DUE DATE
CL-0000001027	$ 50.00	1/30/2009
VIOLATION TYPE		
FAILURE TO OBEY TRAFFIC SIGNAL		

Joe Smith
123 Main Ave
Anywhere, TN 12345

Contact us on the internet at:
https://www.safecitystreets.com/clevelandtn

CL0000001027000TN787TLT

61 of 83

Daytime - Rain Conditions

Confidential and Proprietary
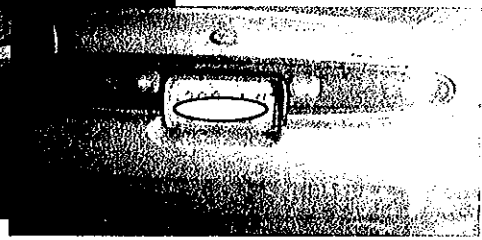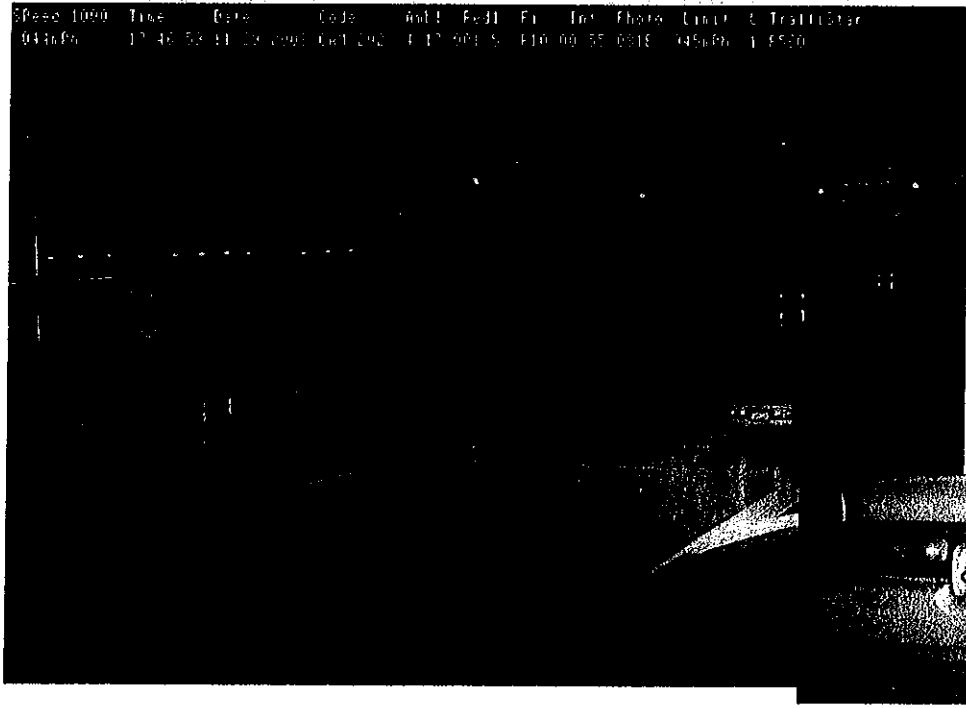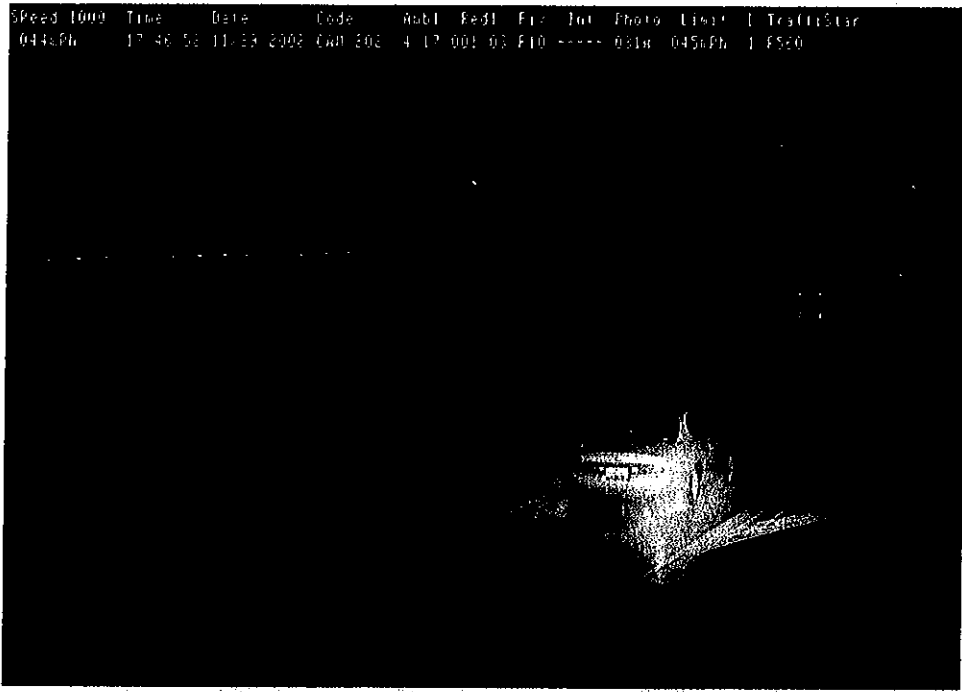
Sunlight Pointing in Direction of Camera
Note: Actual picture of sunlight pointing directly into the camera. The advanced filter allows maximum incident capture (red circle highlights red signal).
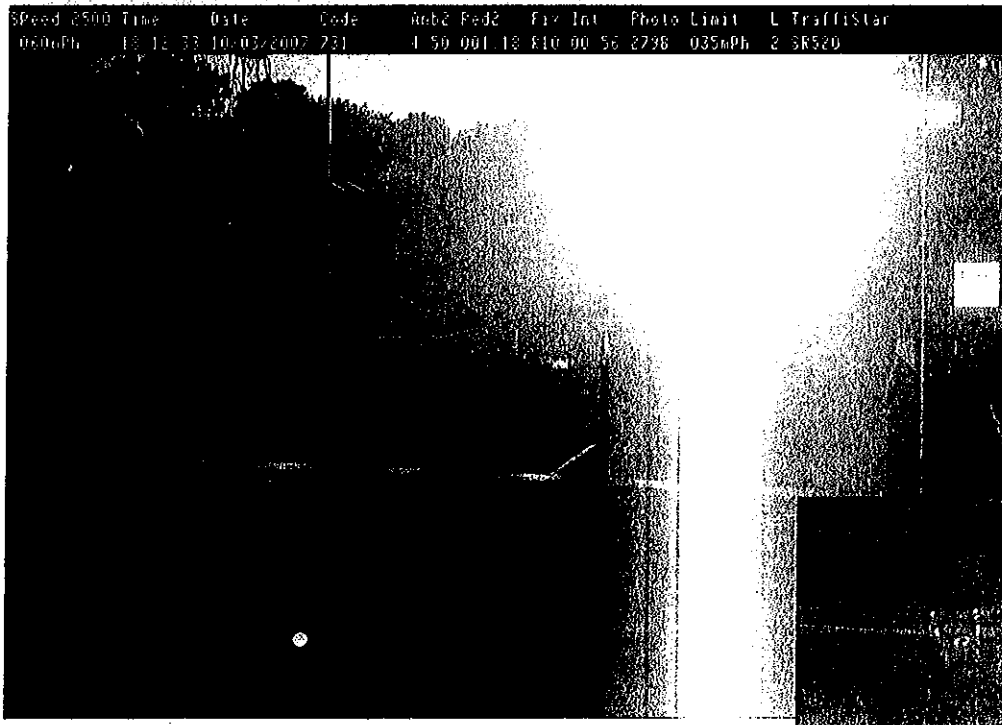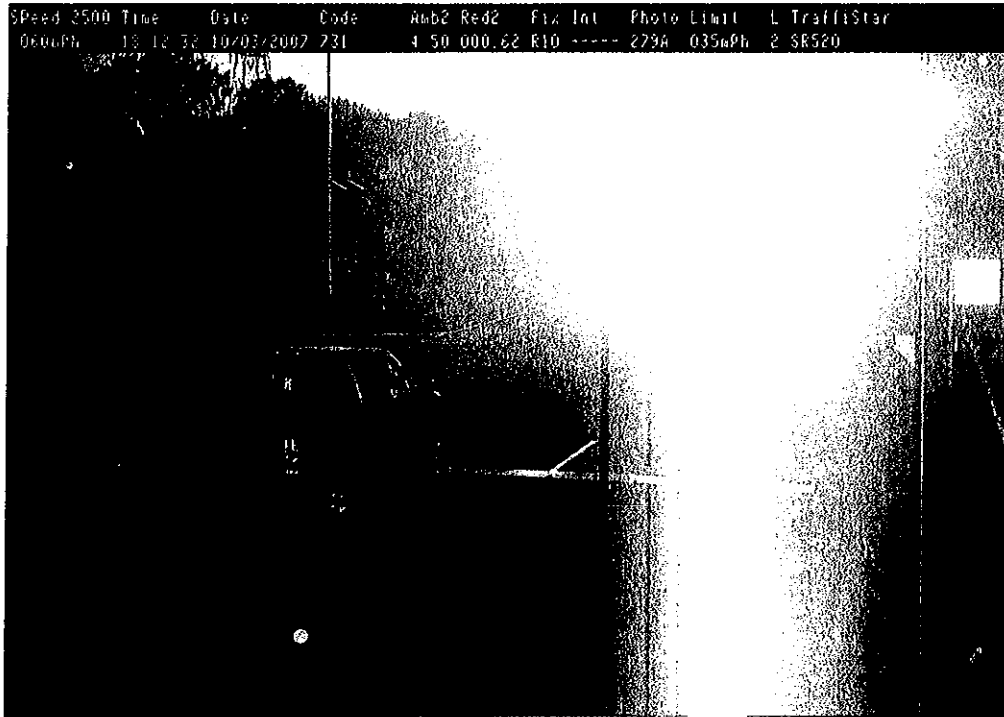
Although the IACP specifications do not require the capturing of multiple violations, as shown below, the Traffipax camera system can effectively capture multiple infractions sequentially in left turn, right turn, and straight directions of travel during the same red signal phase.

On the following pages are samples of multiple, simultaneous infractions demonstrating the expanded capabilities of the Traffipax camera systems.

Multiple Violators – 1st Violator – Photo 209A & 209B
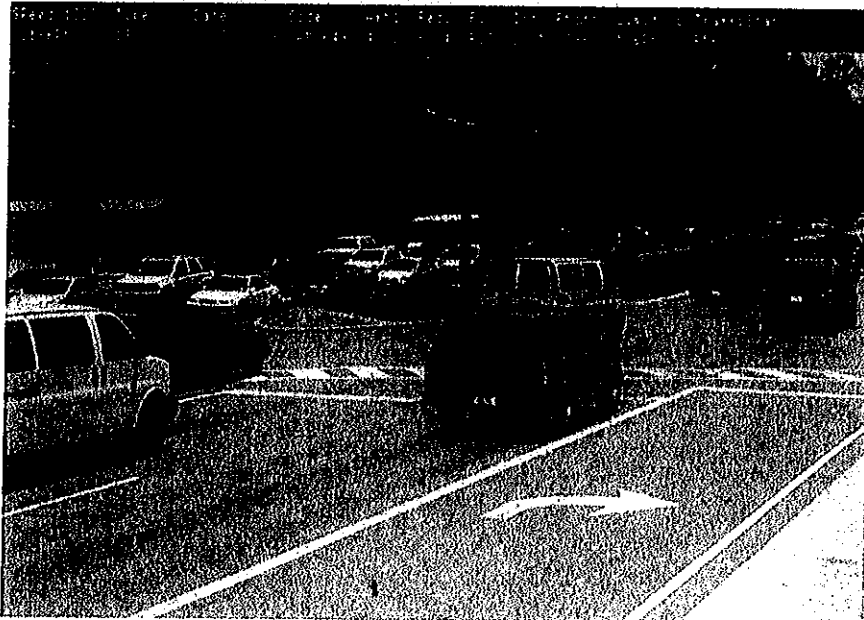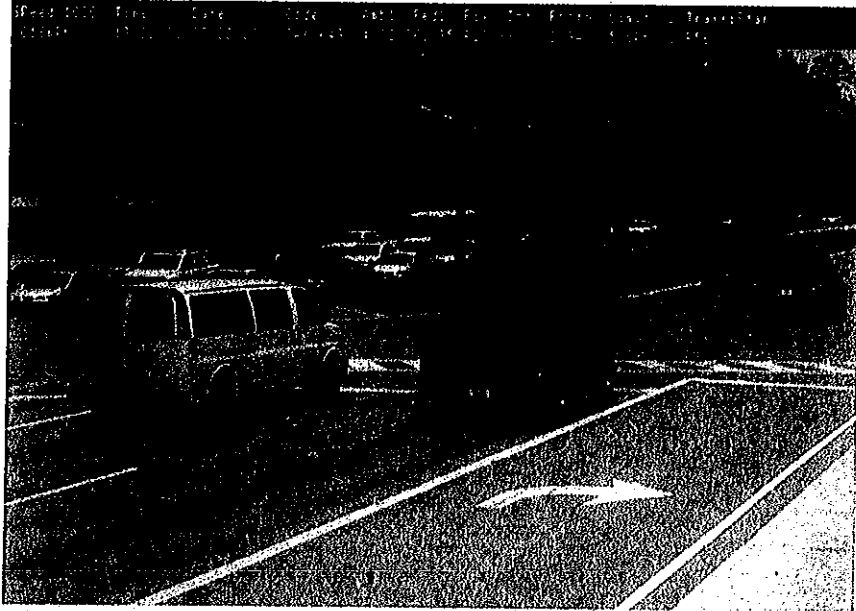
Multiple Violators – 2nd Violator – Photo 210A & 210B
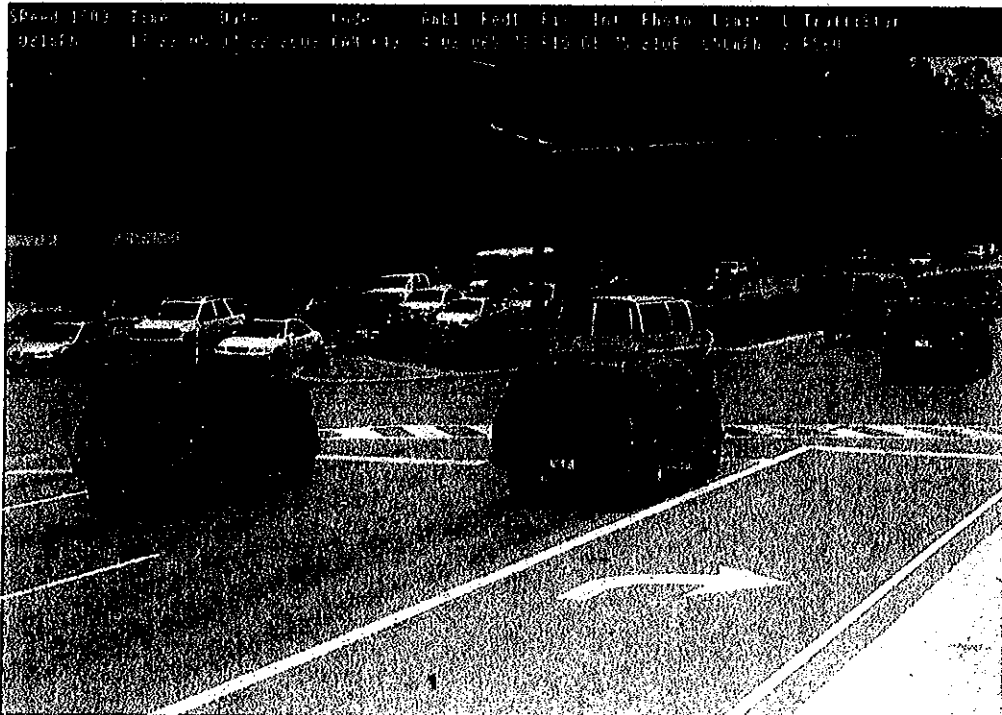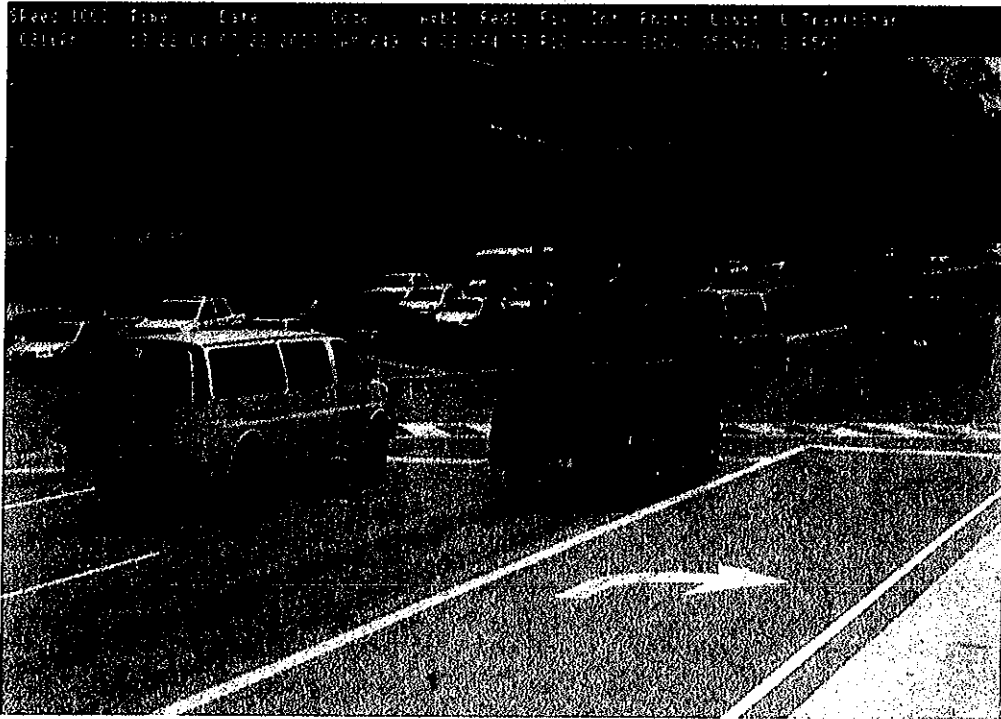
Multiple Violators – 3rd Violator – Photo 211A & 211B
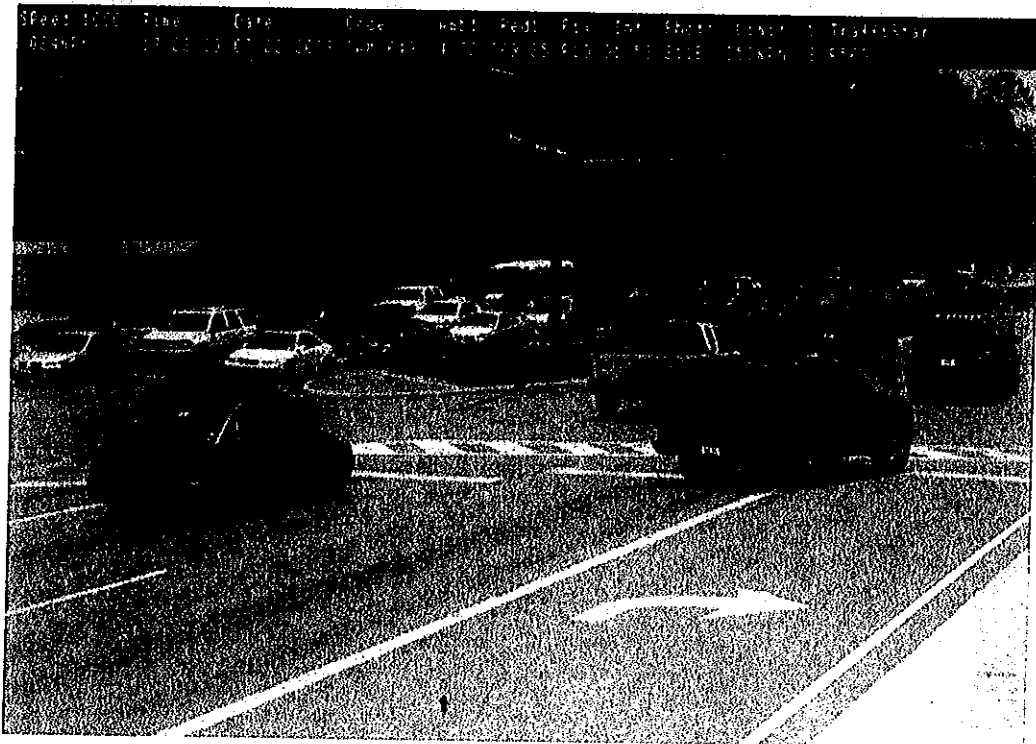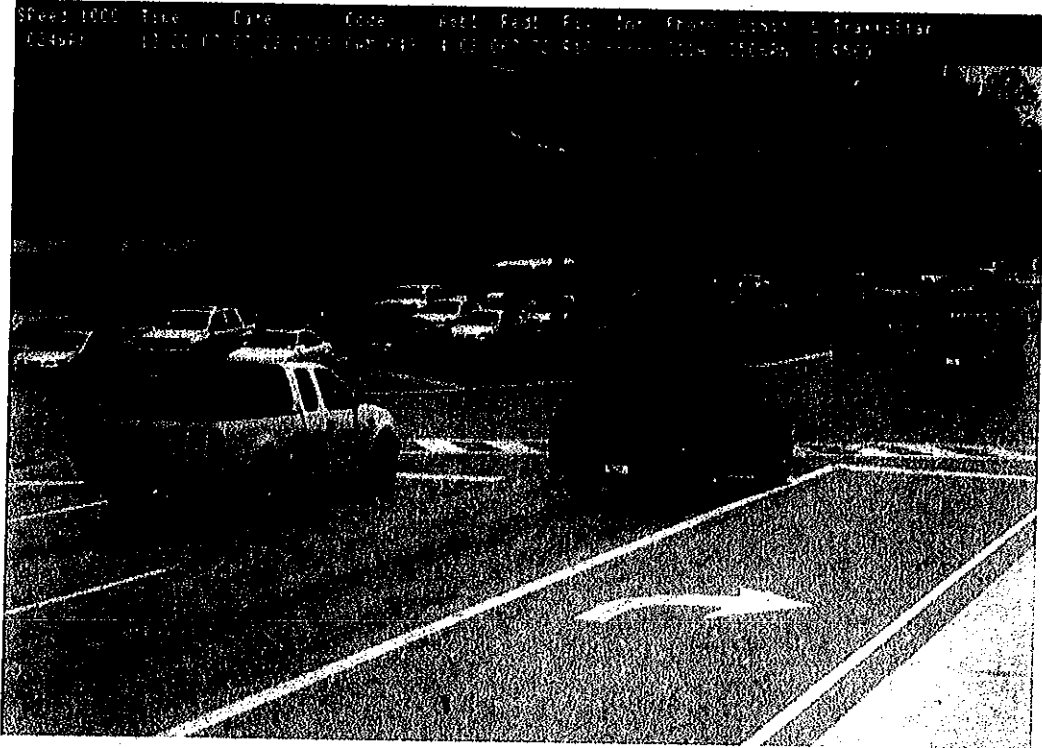
Multiple Violators – 4th Violator – Photo 212A & 212B
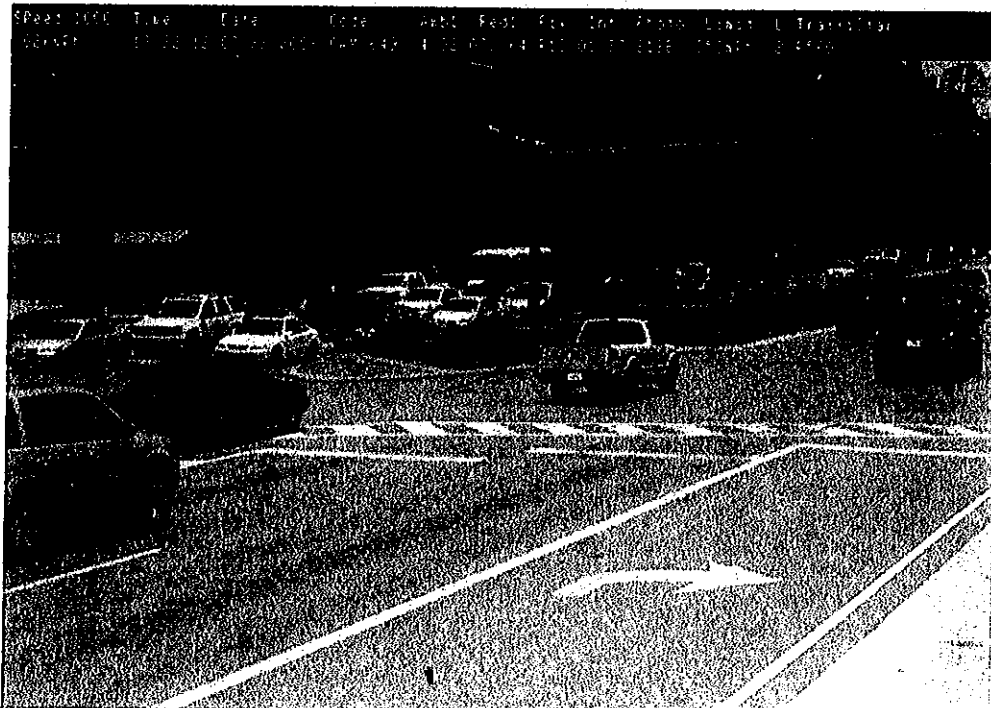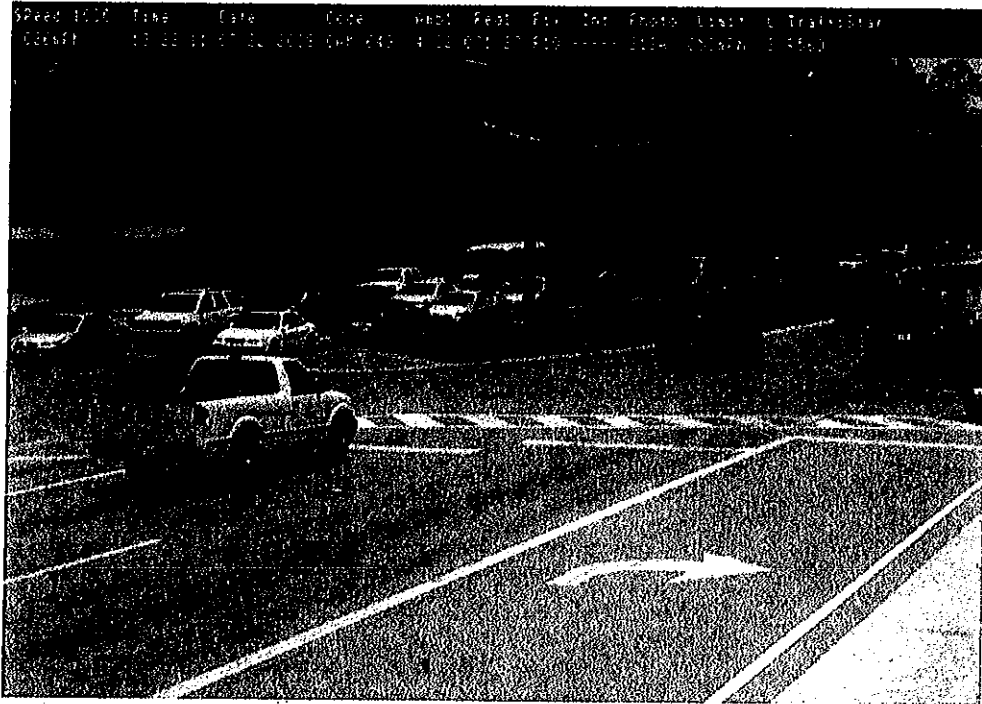
Appendix E – Report Samples

Below is a list of current reports which are parameter driven; many are available in excel format so that the data can be sorted and analyzed in a variety of ways:

- Camera Operability report
  - Number of possible violations
  - Number of citable violations
  - Traffic volumes and violations by site locations
- Payment reports with details on payment type
- Maintenance report by location
  - Equipment hours of service
  - Camera maintenance status and downtime
- Total volume report showing totals for all categories of processing
- Rejection report detailing each rejected camera event, rejection reason and who rejected
  - Number of violations not resulting in citations
  - Breakdown of violation rejection by category and amount
- Payment reconciliation reports
  - Number and dollar amounts of fines collected monthly with totals updated daily
- Over-pay reports
- Out of state report by plate, date of violation, name of violator and amount due
- Aging receivables report
- Breakdown of citations by location
- Number of citations prepared and mailed
- Status of citations issued
- Customer Service inquires and issues
- Adjudication hearings scheduled
- Disposition of adjudication hearings and fines assessed
- Registration flagging information
- Frequent violators by tag and by owner
- Monthly reports by locations

Agreed-upon reporting requirements will be established and reports will be customized per City of Wilmington's request during the business rules requirements meeting following contract award.

Section III, Item 19 required sample reports. A few samples are found below:

Results achieved by each camera by site:

Reports are available through the *TIPS* website to analyze each camera location for:
- Camera Activation
- Statistical Reports
- Performance Percentage Report
- Daily Payment Activity
- Non-Issuance Report
- Batch Activity

trafﬁpax
TRAFFIC SAFETY SYSTEMS

- Image Classification Report

Offenses recorded by site:

The Site Performance Summary (sample below) and Detailed Reports will provide this information at a batch level.

Download spreadsheet PORT RICHEY	Batch code	Violation date	Total incidents	TRAFFIPAX APPROVED	JURISDICTION APPROVED
901	901_011108	2008-11-01	20	20	20
901	901_021108	2008-11-02	19	19	17
901	901_031108	2008-11-03	14	13	13
901	901_041108	2008-11-04	25	18	18
901	901_051108	2008-11-05	23	21	20
901	901_061108	2008-11-06	24	17	16
901	901_071108	2008-11-07	19	17	17
901	901_131108	2008-11-13	11	10	9
901	901_141108	2008-11-14	22	15	15
901	901_151108	2008-11-15	37	33	33
901	901_161108	2008-11-16	23	18	18
901	901_171108	2008-11-17	27	25	24
901	901_181108	2008-11-18	18	18	18
901	901_191108	2008-11-19	25	22	19
901	901_201108	2008-11-20	14	14	11
901	901_211108	2008-11-21	29	25	25
901	901_221108	2008-11-22	22	21	20
901	901_231108	2008-11-23	18	19	17
901	901_241108	2008-11-24	20	17	17
901	901_251108	2008-11-25	22	22	21
901	901_261108	2008-11-26	25	23	22
902	902_011108	2008-11-01	2	1	1

a) Traffic counts by lane, date and hour:

The Traffic Count data is available for uploading into Excel for easy sorting and use of pivot tables:

Image Sensing Systems, Inc. Data Collector File, Version 8.3.1

Detector ID List		116 0	125 1	111 2	113 4	115 5	117 7	118 8	15
CPU Identifier	Autoscope Description	Detector ID	Date	Time	Status	Data Interval	Volume		
04054AFFD9CA3E1A	NB Canton Rd @ Albrecht Ave Ph	130	10/9/2007	1:54:13 PM	207 (ISS(	60 Minutes			
04054AFFD9CA3E1A	NB Canton Rd @ Albrecht Ave Ph	131	10/9/2007	1:54:13 PM	207 (ISS(	60 Minutes			
04054AFFD9CA3E1A	NB Canton Rd @ Albrecht Ave Ph	130	10/9/2007	1:54:13 PM		60 Minutes			
04054AFFD9CA3E1A	NB Canton Rd @ Albrecht Ave Ph	131	10/9/2007	1:54:13 PM		60 Minutes			
04054AFFD9CA3E1A	NB Canton Rd @ Albrecht Ave Ph	130	10/2/2007	2:00:00 PM	72	60 Minutes	241		
04054AFFD9CA3E1A	NB Canton Rd @ Albrecht Ave Ph	131	10/2/2007	2:00:00 PM	72	60 Minutes	204		
04054AFFD9CA3E1A	NB Canton Rd @ Albrecht Ave Ph	130	10/2/2007	3:00:00 PM	100	60 Minutes	393		
04054AFFD9CA3E1A	NB Canton Rd @ Albrecht Ave Ph	131	10/2/2007	3:00:00 PM	100	60 Minutes	305		
04054AFFD9CA3E1A	NB Canton Rd @ Albrecht Ave Ph	130	10/2/2007	4:00:00 PM	100	60 Minutes	378		
04054AFFD9CA3E1A	NB Canton Rd @ Albrecht Ave Ph	131	10/2/2007	4:00:00 PM	100	60 Minutes	278		
04054AFFD9CA3E1A	NB Canton Rd @ Albrecht Ave Ph	130	10/2/2007	5:00:00 PM	100	60 Minutes	384		
04054AFFD9CA3E1A	NB Canton Rd @ Albrecht Ave Ph	131	10/2/2007	5:00:00 PM	100	60 Minutes	281		
04054AFFD9CA3E1A	NB Canton Rd @ Albrecht Ave Ph	130	10/2/2007	6:00:00 PM	100	60 Minutes	392		
04054AFFD9CA3E1A	NB Canton Rd @ Albrecht Ave Ph	131	10/2/2007	6:00:00 PM	100	60 Minutes	316		
04054AFFD9CA3E1A	NB Canton Rd @ Albrecht Ave Ph	130	10/2/2007	7:00:00 PM	100	60 Minutes	357		
04054AFFD9CA3E1A	NB Canton Rd @ Albrecht Ave Ph	131	10/2/2007	7:00:00 PM	100	60 Minutes	269		
04054AFFD9CA3E1A	NB Canton Rd @ Albrecht Ave Ph	130	10/2/2007	8:00:00 PM	100	60 Minutes	286		
04054AFFD9CA3E1A	NB Canton Rd @ Albrecht Ave Ph	131	10/2/2007	8:00:00 PM	100	60 Minutes	207		
04054AFFD9CA3E1A	NB Canton Rd @ Albrecht Ave Ph	130	10/2/2007	9:00:00 PM	100	60 Minutes	216		

Number of infractions recorded:
Below is a sample of the Incidents by Location report:

Incidents By Location
Download spreadsheet

Jurisdiction Name	Location Code	Violation Month	Total Incidents	Total Issuable Citations	Percent Issuable Citations	Controllable Exceptions	Noncontrollable Exceptions	Total Exceptions	Nonissuable Citations	Controllable Incidents	Percent Controllable Citations
CALUMET CITY	731	2007-08	103	76	73.7864	2	24	26	9	79	96.2025
CALUMET CITY	731	2007-09	172	140	81.3953	0	25	25	26	147	95.2381
CALUMET CITY	731	2007-10	148	103	69.5946	1	41	42	25	107	96.2617
CALUMET CITY	731	2007-11	180	135	75.0900	4	40	44	27	140	96.4266
CALUMET CITY	731	2007-12	241	189	78.4232	5	47	52	23	194	97.4227
CALUMET CITY	732	2007-12	52	41	82.0000	0	9	9	4	41	100.0000
CALUMET CITY	731	2008-01	189	145	76.7195	4	40	44	35	149	97.3154
CALUMET CITY	732	2008-01	112	85	75.8929	2	25	27	13	87	97.7011
CALUMET CITY	731	2008-02	270	212	78.5185	2	56	58	19	214	99.0654
CALUMET CITY	732	2008-02	104	78	75.0000	0	26	26	5	78	100.0000
CALUMET CITY	731	2008-03	279	204	73.1183	4	71	75	35	208	98.0769
CALUMET CITY	732	2008-03	112	78	69.6429	5	29	34	7	83	93.9759
CALUMET CITY	731	2008-04	161	128	79.5031	2	31	33	10	130	98.4515
CALUMET CITY	732	2008-04	128	87	67.9688	4	37	41	7	91	95.6044
CALUMET CITY	731	2008-05	185	138	74.5946	5	41	46	17	144	95.8333
CALUMET CITY	732	2008-05	120	81	67.5000	5	34	39	11	86	94.1860
CALUMET CITY	731	2008-06	203	123	60.5911	5	75	80	8	128	96.0938
CALUMET CITY	732	2008-06	104	37	35.5769	2	65	67	19	36	94.8718
CALUMET CITY	731	2008-07	209	141	67.4641	11	57	68	13	152	92.7632
CALUMET CITY	732	2008-07	84	23	27.3810	2	59	61	42	25	92.0000
CALUMET CITY	731	2008-08	224	171	76.3393	9	45	54	7	179	95.5307

Count of infractions where notices not prepared:
Below is a sample of the Non-Issuance report showing citation exceptions:

NON ISSUANCE REPORT
From: 11/01/2008   **To:** 11/30/2008

Jurisdiction: CALUMET CITY ILLINOIS RED LIGHT

Location: RIVER OAKS EB @ ARTHUR ST   **Code:** 732   **Total Incidents:**   42

Non Relevent	Number	Non Issuable Reason
EXCEPTION (s)		
	1	EMERGENCY VEHICLE
	1	NO DMV INFORMATION
	1	PLATE OBSTRUCTED
	1	SECOND FRAME GREEN/AMBER
Total:	4	9.52 %
SPOIL (s)		
	3	VEHICLE NOT REGISTERED
Total:	3	7.14 %

Total Number of Relevent Non Issuable: 7   16.67 %

traffipax
TRAFFIC SAFETY SYSTEMS

WILMINGTON
NORTH CAROLINA

Notices prepared and mailed:
Below is a sample of the Stat Report which can be requested by printed date:

CITATION #	TYPE	CITATION DATE	PRINTED DATE	FINE DUE	LOCATION	LOC CODE	FINE	PENALTY	PAYMENTS	FINE OWED	PENALTY OWED	TOTAL OWED
LF-000023028	RED LIGHT	11-01/2008	11-05/2008	12-05/2008	US 59 & FM 819	641	$ 75.00	$ 0.00	$ 75.00	$ 0.00	$ 0.00	$ 0.00
LF-000023102	RED LIGHT	11-01/2008	11-06/2008	12-06/2008	US 59 & FM 819	641	$ 75.00	$ 0.00	$ 75.00	$ 0.00	$ 0.00	$ 0.00
LF-000023103	RED LIGHT	11-01/2008	11-06/2008	12-06/2008	US 59 & FM 819	641	$ 75.00	$ 25.00	$ 0.00	$ 75.00	$ 25.00	$ 100.00
LF-000023104	RED LIGHT	11-01/2008	11-06/2008	12-06/2008	US 59 & FM 819	641	$ 75.00	$ 0.00	$ 0.00	$ 75.00	$ 0.00	$ 75.00
LF-000023105	RED LIGHT	11-01/2008	11-06/2008	12-06/2008	US 59 & FM 819	641	$ 75.00	$ 0.00	$ 75.00	$ 0.00	$ 0.00	$ 0.00
LF-000023106	RED LIGHT	11-01/2008	11-06/2008	12-06/2008	US 59 & FM 819	641	$ 75.00	$ 0.00	$ 75.00	$ 0.00	$ 0.00	$ 0.00
LF-000023107	RED LIGHT	11-01/2008	11-06/2008	12-06/2008	US 59 & FM 819	641	$ 75.00	$ 0.00	$ 75.00	$ 0.00	$ 0.00	$ 0.00
LF-000023108	RED LIGHT	11-01/2008	11-06/2008	12-05/2008	US 59 & FM 819	641	$ 75.00	$ 0.00	$ 75.00	$ 0.00	$ 0.00	$ 0.00
LF-000023109	RED LIGHT	11-01/2008	11-06/2008	12-06/2008	US 59 & FM 819	641	$ 75.00	$ 0.00	$ 75.00	$ 0.00	$ 0.00	$ 0.00
LF-000023110	RED LIGHT	11-01/2008	11-06/2008	12-06/2008	US 59 & FM 819	641	$ 75.00	$ 25.00	$ 0.00	$ 75.00	$ 25.00	$ 100.00
LF-000023111	RED LIGHT	11-01/2008	11-06/2008	12-06/2008	US 59 & FM 819	641	$ 75.00	$ 25.00	$ 0.00	$ 75.00	$ 25.00	$ 100.00
LF-000023112	RED LIGHT	11-01/2008	11-06/2008	12-06/2008	US 59 & FM 819	641	$ 75.00	$ 0.00	$ 75.00	$ 0.00	$ 0.00	$ 0.00
LF-000023113	RED LIGHT	11-01/2008	11-06/2008	12-06/2008	US 59 & FM 819	641	$ 75.00	$ 0.00	$ 75.00	$ 0.00	$ 0.00	$ 0.00
LF-000023114	RED LIGHT	11-01/2008	11-06/2008	12-06/2008	US 59 & FM 819	641	$ 75.00	$ 0.00	$ 75.00	$ 0.00	$ 0.00	$ 0.00
LF-000023115	RED LIGHT	11-01/2008	11-06/2008	12-06/2008	US 59 & FM 819	641	$ 75.00	$ 0.00	$ 75.00	$ 0.00	$ 0.00	$ 0.00
LF-000023116	RED LIGHT	11-01/2008	11-06/2008	12-06/2008	US 59 & FM 819	641	$ 75.00	$ 25.00	$ 0.00	$ 75.00	$ 0.00	$ 0.00
LF-000023117	RED LIGHT	11-01/2008	11-06/2008	12-06/2008	US 59 & FM 819	641	$ 75.00	$ 0.00	$ 100.00	$ 0.00	$ 0.00	$ 0.00
LF-000023118	RED LIGHT	11-01/2008	11-06/2008	12-06/2008	US 59 & FM 819	641	$ 75.00	$ 25.00	$ 0.00	$ 75.00	$ 25.00	$ 100.00
LF-000023345	RED LIGHT	11-05/2008	11-10/2008	12-10/2008	US 59 & FM 819	641	$ 75.00	$ 0.00	$ 75.00	$ 0.00	$ 0.00	$ 0.00
LF-000023346	RED LIGHT	11-05/2008	11-10/2008	12-10/2008	US 59 & FM 819	641	$ 75.00	$ 25.00	$ 0.00	$ 75.00	$ 25.00	$ 100.00
LF-000023347	RED LIGHT	11-05/2008	11-10/2008	12-10/2008	US 59 & FM 819	641	$ 75.00	$ 25.00	$ 0.00	$ 75.00	$ 25.00	$ 100.00
LF-000023348	RED LIGHT	11-05/2008	11-10/2008	12-10/2008	US 59 & FM 819	641	$ 75.00	$ 25.00	$ 0.00	$ 75.00	$ 25.00	$ 100.00
LF-000023349	RED LIGHT	11-05/2008	11-10/2008	12-10/2008	US 59 & FM 819	641	$ 75.00	$ 25.00	$ 75.00	$ 0.00	$ 25.00	$ 25.00
LF-000023350	RED LIGHT	11-05/2008	11-10/2008	12-10/2008	US 59 & FM 819	641	$ 75.00	$ 25.00	$ 0.00	$ 75.00	$ 25.00	$ 100.00

12/19/08 5:10 PM

Page 1 of 48

Status of notices issued (outstanding, canceled, reissued and so forth):
Below is a sample in Excel of the outstanding citations:

citation_number	vehicle_y dmv_make_desc	tag_exp_date	citation_status_c	violation_datetime	tot_fines	tot_paid	DAYS_PAST
MT-001620022	2000 KIA 4S	11/30/2008	PRINTED	4/24/07 6:44 PM	150.00		22
MT-001620025	2000 CHEV 4S	12/31/2007	PRINTED	4/25/07 12:14 PM	150.00		22
MT-001620000	2007 MERC	11/30/2008	PRINTED	4/25/07 12:45 PM	150.00	0.00	22
MT-001620104	1998 TRAN TL	9/30/2008	PRINTED	4/25/07 3:09 PM	150.00		22
MT-001620027	2001 DODG 4S	8/31/2008	PRINTED	4/25/07 4:35 PM	150.00		22
MT-001620004	2004 FORD SW	12/31/2007	PRINTED	4/25/07 5:57 PM	150.00		21
MT-001620001	1998 OLDS	7/31/2007	PRINTED	4/25/07 6:31 PM	150.00	0.00	21
MT-001620012	1994 OLDS 4S	3/31/2008	PRINTED	4/25/07 8:29 PM	150.00		21
MT-001620002	2004	12/31/2007	PRINTED	4/26/07 6:46 AM	150.00		21
MT-001620166	1995 OLDS 4H	4/30/2008	PRINTED	4/26/07 6:54 AM	150.00		20
MT-001620013	2003 DODG SW	12/31/2008	PRINTED	4/26/07 11:27 AM	150.00		20
MT-001620126	2005 DODG 4S	5/31/2008	PRINTED	4/26/07 12:59 PM	150.00		20
MT-001620033	1998 OLDS 4S	7/31/2008	PRINTED	4/26/07 5:29 PM	150.00		20
MT-001620108	1990 HOND 4S	8/31/2008	PRINTED	4/26/07 5:44 PM	150.00		20
MT-001620015	1999 CHRY 4S	12/31/2002	PRINTED	4/26/07 9:19 PM	150.00		20
MT-001620034	1989 TOYT 4S	5/31/2008	PRINTED	4/26/07 9:24 PM	150.00		20
MT-001620037	1994 FORD SW	5/31/2008	PRINTED	4/27/07 10:04 AM	150.00		20
MT-001620016	1985 GMC TK	9/30/2008	PRINTED	4/27/07 10:14 AM	150.00		20
MT-001620017	2000 DODG TK	4/30/2008	PRINTED	4/27/07 1:09 PM	150.00		20
MT-001620018	1997 FORD SW	3/31/2008	PRINTED	4/27/07 5:22 PM	150.00		19
MT-001620109	2000 FORD 2S	10/31/2008	PRINTED	4/27/07 9:45 PM	150.00		15
MT-001620044	2001 MITS HB	8/31/2008	PRINTED	4/28/07 3:07 PM	150.00		15
MT-001620111	2005 PONT 2S	8/31/2008	PRINTED	4/28/07 8:48 PM	150.00		15
MT-001620019	1989 GRTD TL	1/31/2008	PRINTED	4/28/07 10:02 PM	150.00		15
MT-001620046	2001 HOND 2S	3/31/2008	PRINTED	4/29/07 10:13 AM	150.00		15
MT-001620113	1996 GMC SW	2/28/2008	PRINTED	4/29/07 12:50 PM	150.00		15
MT-001620048	1989 DODG 4S	6/30/2008	PRINTED	4/29/07 1:33 PM	150.00		15
MT-001620114	2005 CHEV SW	2/28/2008	PRINTED	4/29/07 4:02 PM	150.00		15
MT-001620074	1994 PONT SW	12/31/2007	PRINTED	4/29/07 4:10 PM	150.00		15
MT-001620115	1993 FORD SW	8/31/2008	PRINTED	4/29/07 7:00 PM	150.00		15
MT-001620076	2000 PLYM 4S	5/31/2008	PRINTED	4/29/07 9:54 PM	150.00		15
MT-001620134	1997 REIT TL	11/30/2008	PRINTED	4/29/07 10:01 PM	150.00		14

Below is an example of reporting results from our Calumet City, IL program; traffic count statistical information can be added. Agreed-upon reporting requirements will be established and reports will be customized per City of Wilmington's request during the business rules requirements meeting with the City.

PROSECUTABLE IMAGE RATE

	COUNT
Incidents	**1,807**
Non-Violation Incidents	**179**
Violations	**1,628**

		Exception Rate	Issuance Rate
Citations Issued	**1,102**		
Controllable Exceptions	*36*	*2.2%*	*97.8%*
Non-Controllable Exceptions	**493**	**30.3%**	**69.7%**

Within the *TIPS* software a wide range of reports can be accessed covering every aspect of program performance from citation issuance through final disposition. City of Wilmington personnel can access this report module over the Internet 24x7 through our intranet site for client log-on, report access and printing. Alternatively, Traffipax can run and print or email reports to the City. Agreed-upon reporting requirements will be established and reports will be customized per City of Wilmington's request.

ACORD™ CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 9/1/2009

PRODUCER (516)228-1234 FAX: (516)228-1235	THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.	
Foa & Son Corporation 333 Earle Ovington Blvd. PO Box 9349 Uniondale NY 11553-9349	INSURERS AFFORDING COVERAGE	NAIC #
INSURED	INSURER A: Gerling America Insurance	
Traffipax, Inc. 514 Progress Drive Suite D-E Linthicum MD 21090	INSURER B: Sentinel Insurance	11000
	INSURER C: American International	
	INSURER D: Indian Harbor Ins. Co.	
	INSURER E:	

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	ADD'L INSRD	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
A		**GENERAL LIABILITY** [X] COMMERCIAL GENERAL LIABILITY [ ] CLAIMS MADE [X] OCCUR	GLD 11172-00	4/19/2009	1/1/2010	EACH OCCURRENCE	$ 1,000,000
						DAMAGE TO RENTED PREMISES (Ea occurrence)	$ 50,000
						MED EXP (Any one person)	$ 5,000
						PERSONAL & ADV INJURY	$ 1,000,000
						GENERAL AGGREGATE	$ 2,000,000
		GEN'L AGGREGATE LIMIT APPLIES PER: [X] POLICY [ ] PROJECT [ ] LOC				PRODUCTS - COMP/OP AGG	$ 1,000,000
B		**AUTOMOBILE LIABILITY** [X] ANY AUTO [ ] ALL OWNED AUTOS [X] SCHEDULED AUTOS [X] HIRED AUTOS [ ] NON-OWNED AUTOS	12UENIS3199	4/19/2009	1/1/2010	COMBINED SINGLE LIMIT (Ea accident)	$ 1,000,000
						BODILY INJURY (Per person)	$
						BODILY INJURY (Per accident)	$
						PROPERTY DAMAGE (Per accident)	$
		GARAGE LIABILITY [ ] ANY AUTO				AUTO ONLY - EA ACCIDENT	$
						OTHER THAN EA ACC	$
						AUTO ONLY: AGG	$
		EXCESS/UMBRELLA LIABILITY [ ] OCCUR [ ] CLAIMS MADE [ ] DEDUCTIBLE [ ] RETENTION $				EACH OCCURRENCE	$
						AGGREGATE	$
							$
							$
							$
C		**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? If yes, describe under SPECIAL PROVISIONS below	WC 009186436	4/19/2009	1/1/2010	[X] WC STATUTORY LIMITS [ ] OTHER	
						E.L. EACH ACCIDENT	$ 1,000,000
						E.L. DISEASE - EA EMPLOYEE	$ 1,000,000
						E.L. DISEASE - POLICY LIMIT	$ 1,000,000
D		OTHER Crime	8211-4907	2/25/2009	2/25/2010	Limit:	50,000

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/EXCLUSIONS ADDED BY ENDORSEMENT/SPECIAL PROVISIONS

The City of Wilmington is included as an additional insured with respects to the general liability

CERTIFICATE HOLDER	CANCELLATION
The City of Wilmington 305 Chestnut Street Wilmington, NC 28401	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.
	AUTHORIZED REPRESENTATIVE Justin Foa/MLJ

ACORD 25 (2001/08)

© ACORD CORPORATION 1988

This Page Left Intentionally Blank

76 of 83

This Page Left Intentionally Blank

77 of 83

This Page Left Intentionally Blank

78 of 83

STATE OF NORTH CAROLINA
NEW HANOVER COUNTY

AMENDMENT NO: 1
TO CONTRACT NO: S6-0209
CITY OF WILMINGTON, NORTH CAROLINA

AMENDMENT TO CONTRACT

THIS AMENDMENT TO CONTRACT, made and entered into this the __5th__ day of

____October____, 2009, by and between the CITY OF WILMINGTON, NORTH CAROLINA, a

North Carolina municipal corporation (hereinafter called "CITY"); and TRAFFIPAX, INC. (hereinafter

called "CONTRACTOR").

WITNESSETH:

WHEREAS, the CITY and CONTRACTOR entered into Contract No: S6-0209 dated the 1st day
of September, 2009 and

WHEREAS, the CITY and CONTRACTOR now desire to amend such Contract for the purpose
of making a correction to proposed fee schedule required for the project.
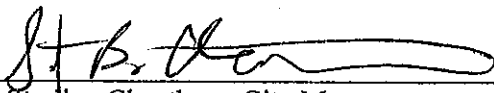
·NOW, THEREFORE, in consideration of the mutual covenants and conditions
contained herein, the Contract is hereby amended as follows:

CONTRACT is amended as described in Attachment "A" and made part of this Amendment.

Except as modified by this Amendment to Contract, all of the terms, conditions, and covenants
set forth in the above mentioned contract shall remain in full force and effect.

IN WITNESS WHEREOF, the CITY has caused this Amendment to Contract to be duly executed in its name and behalf and the CONTRACTOR has caused this Amendment to Contract to be duly executed in its name and behalf and its corporate seal to be hereunto affixed, and attested to.

CITY OF WILMINGTON, NORTH CAROLINA

By: _____

Sterling Cheatham, City Manager

WITNESS:

_____

Daryle L Parker, Purchasing Manager

APPROVED AS TO FORM:

_____

Thomas C. Pollard, City Attorney

CITY ACCOUNTANT'S CERTIFICATION

This instrument has been preaudited in the manner required by the Local Government Budget and Fiscal Control Act this the __9th__ day of __October__, 2009.

_____ For Debra H. Mack

Debra H. Mack, Finance Director

Project No. __08TR10__

Account No. __021-0000-440-3160__

Amount of Amendment __$0.00__

PO# __013826__

Traffipax, Inc, a Delaware corporation

TRAFFIPAX, INC.

By: _Stuart MacKiernan_ (signature)
President/Vice President

STATE OF _Maryland_
COUNTY OF _A.A_

I, _Linda D. Hammond_, a Notary Public, certify that

Stuart MacKiernan, personally came before me this day and acknowledged that

he (she) is President of _Traffipax, Inc_, a corporation, and that by authority

duly given and as the act of the corporation, he(she)executed the foregoing instrument on behalf of the

corporation.

Witness my hand and official seal, this the _5th_ day of _October_, 2009.

My Commission Expires:

_3/12/2013_

Linda D. Hammond (signature)
Notary Public

Section V -Price Proposal Page The detailed cost breakdown on the program is as follows:

	Description	Cost
1	Amount City will pay Contractor for each civil penalty **collected** within thirty (30) days of mailing the citation to vehicle owner. For civil penalties assessed for violations, the amount the City will pay the Contractor for each of the civil penalties that are deposited in a designated City bank account within the "Collection Year." A "Collection Year" shall be the twelve-month period beginning with the date when the first civil penalty is deposited in a designated City bank account and each twelve-month period thereafter.	Cost per paid citation per loc./month Citation 1-100 - $35 Citation 101-200 - $5 Citation 201 & up - $1.
2	Amount of the $50.00 late penalty that City will pay Contractor for each penalty collected thirty (30) days after the citation has been mailed to the registered vehicle owner. For civil penalties assessed for failure to timely pay the initial penalty, the amount the City will pay the Contractor for each penalty deposited in a designated City account.	$3
3	Amount of the $50.00 late penalty that City will pay Contractor for each penalty collected by civil action or collection agency. If such penalties are collected by a collection agency to which the Contractor had referred the penalty or as a result of a filing of a civil action, additional amount the City will pay the Contractor. Any court costs are to be paid by the Contractor and will be repaid by the City upon collection of the debt.	N/A
4	As an alternate, monthly cost per enforced location, paid for complete processing of all violations, including late collections.	$3900 per approach per month
5a	Cost of moving a camera and housing from one designated location to another. This is not the cost of adding additional monitoring sites.	$28,000 per site
5b	Cost of moving camera to a different approach at the same enforced location.	$28,000 per site

All prices must include all costs for the full implementation and operation of the traffic signal violation automated enforcement system. Any stop loss clause to protect the City shall be noted in the contract, please attach the clause to the proposal.

ATS American
Traffic Solutions

To: Mr. Stuart Mackiernan
President, Traffipax, Inc.
514 Progress Dr. Ste D-E
Linthicum, MD 21090

From: Adam Tuton
Executive Vice President and COO, American Traffic Solutions, Inc. (ATS)
7681 E. Gray Road
Scottsdale, Arizona 85260

Date: 5/6/2010

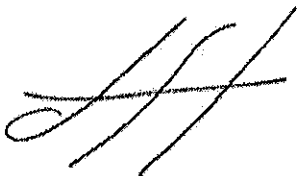**Re:**   Red Light Enforcement Contract No: S6-0209

Dear Mr. Mackiernan:

I would like to inform you that as of 4/26/2010, American Traffic Solutions, Inc. (ATS) has taken over the Wilmington, NC red light enforcement contract from Traffipax Inc. ATS will abide by the terms and conditions outlined in the current contract between Traffipax Inc. and the City of Wilmington.

ATS is headquartered in Scottsdale, Arizona, with satellite offices throughout the United States and has been in the automated traffic enforcement business since 1987, serving more than 200 municipalities and government agencies. ATS currently employs over 800 people in the United States and Canada.

Should you have any questions, please contact me at (480) 596 4701.

Sincerely,

Adam Tuton
Executive Vice President and COO
American Traffic Solutions, Inc.