STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
BUREAU OF ENGINEERING
SUITE 700, JAMES K. POLK BUILDING
505 DEADERICK STREET
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JOHN C. SCHROER
COMMISSIONER

BILL HASLAM
GOVERNOR

TO: Chuck Rychen
Assistant Chief Engineer of Operations

FROM: Brad Freeze, Director of Traffic Operations

SUBJECT: **Proprietary Item Request and Justification**
City of Knoxville

1) **Traffic Signal Controllers and Malfunction Management Units (MMU)**
2) **Traffic Signal Microhard System Spread Spectrum Radio Equipment**
3) **Traffic Signal Traffic Systems Sonem 2000 Emergency Vehicle Preemption Equipment**
4) **Traffic Signal Detection Equipment**

1) **Traffic Signal Controllers and Malfunction Management Units (MMU):** The City of Knoxville is requesting that Naztec Trafficware controllers and the Naztec Malfunction Management Units (MMU) be used in all signalization projects within the City over the next three years where Federal and/or State funding are used. The controller equipment includes Series 900 ATC Model Number 980-B240 and the MMU equipment includes Model Number 516L. The following are justification items for this request:

The City of Knoxville currently operates and maintains Naztec controllers at 120 signalized intersections within the City's jurisdiction. In a competitive bidding process, the City of Knoxville has begun a change out of traffic signal control equipment City-wide. Starting with the 120 intersections, the City expects to have approximately 250 of the 386 signalized intersections operating with the Naztec Trafficware ATC traffic signal controller and approximately 150 Naztec MMUs by the end of calendar year 2017. The City has projects underway that will require this type of controller to insure that we have full functionality of the traffic signal controller and not be limited by the basic NTCIP protocols. This full functionality will be needed in the near future to provide for adaptive signal control as part of our arterial management process, emergency vehicle preemption, and priority vehicle control in conjunction with Knoxville Area Transit. The Naztec MMU is necessary in order that the unit can communicate through the Naztec controller as part of the City's Advanced Traffic Management System. Both of these requests are necessary to maintain synchronization with the existing traffic signal systems.

The City of Knoxville staff has been extensively trained to install, operate, maintain, program, and troubleshoot Naztec controllers. This allows our technicians to quickly diagnose problems with field units which reduces the time required to maintain the system overall and helps keep the system operational during heavy traffic times to insure maximum capacity of the synchronized system. By utilizing the Naztec controller as the standard for the City, there will be a cost savings in stocking replacement equipment which will result in faster and less costly repair.

2) **Traffic Signal Microhard System Spread Spectrum Radio Equipment:** The City of Knoxville is requesting that Microhard System spread spectrum radios be used in all signalization projects within the City over the next three years where Federal and/or State funding are used. The spread spectrum radio equipment includes Microhard System Model Number IPN920T-ENC conflict monitors. The following are justification items for this request:

   The City of Knoxville currently operates and maintains Microhard System spread spectrum radios at 50 signalized intersections within the City's jurisdiction. The City of Knoxville currently has several systems that are using Microhard System spread spectrum radios to communicate from the local controller to the master control in the system. In order for the system to communicate properly the same type of radio needs to be used between these two critical units. As the City expands its spread spectrum communications networks in these areas, we will need to have reliable communications to maintain the coordination along these critical corridors. This will require that the radio communication is of the same type.

   The City of Knoxville staff has been extensively trained to install, operate, maintain, program, and troubleshoot Microhard System spread spectrum radios. This allows our technicians to quickly diagnose problems with field units which reduces the time required to maintain the system overall and helps keep the system operational during heavy traffic times to insure maximum capacity of the synchronized system. By utilizing the Microhard System spread spectrum radios as the standard for the City, there will be a cost savings in stocking replacement equipment which will result in faster and less costly repair.

3) **Traffic Signal Traffic Systems Sonem 2000 Emergency Vehicle Preemption Equipment:** The City of Knoxville is requesting that Traffic Systems Sonem 2000 emergency vehicle preemption equipment be used in all signalization projects within the City over the next three years where Federal and/or State funding are used. The following are justification items for this request:

   The City of Knoxville currently operates and maintains Traffic Systems Sonem 2000 emergency vehicle preemption equipment at 46 signalized intersections within the City's jurisdiction. The City is installing this type of emergency vehicle preemption equipment with new developments and with new City/TDOT funded projects. The City of Knoxville investigated several different types of preemption units (e.g. optically activated units, radio activated units and GPS activated units) and found that Traffic Systems Sonem 2000 emergency vehicle preemption equipment is the most reliable. The major advantage of the siren activated unit is that it requires no additional equipment to be installed on the emergency vehicles as they use the siren system that currently exists on the vehicle. By requiring only the use of the existing vehicle siren to activate the system, there is no additional cost to the stakeholder agencies utilizing the system. The desire of the City is to increase the efficiency of signal system as part of the City wide Advanced Traffic Management System while providing quicker movement of the emergency vehicle through the system when needed.

   The City of Knoxville staff has been extensively trained to install, operate, maintain, and troubleshoot the Traffic Systems Sonem 2000 emergency vehicle preemption equipment. By utilizing this emergency vehicle preemption detection system as the standard for the City, there will be a cost savings in stocking replacement equipment and will result in faster and less costly repair. The City of Knoxville has been extensively trained to install, operate, maintain, program, and troubleshoot Traffic Systems Sonem 2000 emergency vehicle preemption equipment. By utilizing the Traffic Systems Sonem 2000 emergency vehicle preemption equipment as the standard for the City, there will be a cost savings in stocking replacement equipment which will result in faster and less costly repair.

4) **Traffic Signal Detection Equipment:** The City of Knoxville is requesting that Wavetronix traffic signal radar detection equipment be used in all signalization projects within the City over the next three years where Federal and/or State funding are used. The radar detection equipment includes both SmartSensor Matrix for stop bar detection and the SmartSensor Advance for advanced approach detection. This request is based on the necessity to provide highly reliable detection for the synchronization with the existing traffic signal systems operated and maintained by the City. The following are justification items for this request:

   The City of Knoxville currently operates and maintains Wavetronix radar detection at nine signalized intersections within the City's jurisdiction. The City has begun utilizing the Wavetronix radar detection units to replace other technologies due to their unreliability which has resulted in increased efficiency of signalized intersection operations within the City wide Advanced Traffic Management System. Reliable detection is a key component in the City's efforts to provide a more efficient traffic system and to reduce air pollution within the Knoxville Area.

   The City of Crosville staff has been extensively trained to install, operate, maintain, and troubleshoot the Wavetronix detection system. This allows our technicians to quickly diagnose problems with field units which reduces the time required to maintain the system overall and helps keep the system operational during heavy traffic times to insure maximum capacity of the synchronized system. By utilizing Wavetronix traffic signal radar detection equipment as the standard for the City, there will be a cost savings in stocking replacement equipment and will result in faster and less costly repair.

I, Brad Freeze, Director of the Traffic Operations Division of the Tennessee Department of Transportation, do hereby certify that in accordance with the requirements of 23 CFR 635.411(a) (2) that the patented or proprietary items listed above are essential for the synchronization of existing facilities.

Assistant Chief Engineer of Operations	4.25.16 Date

CITY OF KNOXVILLE

Engineering
James R. Hagerman, P.E.
Director of Engineering

April 4, 2016

Stephen K. Bryan, P.E., PTOE
Traffic Operations Division
James K. Polk Bldg., 12th Floor
505 Deaderick St.
Nashville, TN 37243

RE: REQUEST FOR PROPRIETARY TRAFFIC SIGNAL PRODUCTS CERTIFICATION CITY OF KNOXVILLE – TRAFFIC SYSTEMS, LLC SONEM 2000 EMERGENCY VEHICLE PREEMPTION EQUIPMENT

Dear Mr. Bryan:

The Engineering Department of the City of Knoxville would like to request a proprietary product certification for Traffic Systems, LLC Sonem 2000 Emergency Vehicle Preemption Equipment over the next three years. Currently the City is installing this type of emergency vehicle preemption equipment with new development, new City projects and TDOT funded projects for the reasons listed below.

The City of Knoxville in an effort to provide emergency vehicle preemption has utilized Sonem 2000 preemption equipment over the last several years. We currently operate 46 intersections that have Sonem 2000 preemption equipment. We have found the system to be reliable. We have also investigated several different types of preemption units, e.g., optically activated units, radio activated units and GPS activated units and we have found the major advantage of the siren activated unit is that it requires no additional equipment to be installed on the emergency vehicles to utilize the system. The need for emergency vehicle preemption is evident in all emergency response situations where time is of the essence and can mean the difference between life and death. By requiring only the use of the existing vehicle siren to activate the system, there is no additional cost to the agencies utilizing the system and all the equipment maintenance remains the responsibility of the City of Knoxville while allowing the following agencies to use the service, e.g., Law Enforcement, Fire / Rescue, Ambulance Services, etc., on a first come first serve basis. The desire of the City is to increase the efficiency of signal system as part of the City wide Advanced Traffic Management System while providing more efficient movement of the emergency vehicle through the system when needed.

Thank you for consideration of this request.

Sincerely,

James R. Hagerman, P.E.
Engineering Director

City County Building • Room 480 • 400 Main Street. • P.O. Box 1631 • Knoxville, Tennessee 37901
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CITY OF KNOXVILLE

Engineering
James R. Hagerman, P.E.
Director of Engineering

April 4, 2016

Stephen K. Bryan, P.E., PTOE
Traffic Operations Division
James K. Polk Bldg., 12th Floor
505 Deaderick St., Nashville, TN 37243

RE: REQUEST FOR PROPRIETARY TRAFFIC SIGNAL PRODUCTS CERTIFICATION CITY OF KNOXVILLE – MICROHARD SYSTEM INC. (SPREAD SPECTRUM RADIO) MODEL NUMBER IPN920T-ENC

Dear Mr. Bryan:

The Engineering Department of the City of Knoxville would like to request a proprietary product certification for the Microhard System Inc. (Spread Spectrum Radio) Model Number IPN920T-ENC over the next three years. Currently these radios operate at 50 intersections owned by the City of Knoxville.

The City of Knoxville has several systems that are using spread spectrum radio of this type to communicate from the local controller to the master control in the system. In order for the system to communicate properly the same type of radio needs to be used between these two critical units. As the City expands its spread spectrum communications networks in these areas, we will need to have reliable communications to maintain the coordination along these critical corridors. This will require that the radio communication is of the same type.

Also, as part of the City-wide change over to the new traffic signal spread spectrum radio communications system our staff has been exclusively trained on the programming, maintenance, and troubleshooting of these units. Standardizing with these proprietary products the City of Knoxville can better maintain Knoxville's Traffic Management System, reduce system down time and provide quicker response to traffic needs.

Thank you for consideration of this request.

Sincerely,

James R. Hagerman, P.E.
Engineering Director

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CITY OF KNOXVILLE

Engineering
James R. Hagerman, P.E.
Director of Engineering

April 4, 2016

Stephen K. Bryan, P.E., PTOE
Traffic Operations Division
James K. Polk Bldg., 12th Floor
505 Deaderick Street
Nashville, TN 37243

RE: REQUEST FOR PROPRIETARY TRAFFIC SIGNAL PRODUCTS CERTIFICATION
CITY OF KNOXVILLE – CONTROLLERS AND MALFUNCTION MANAGEMENT UNITS, MMU

Dear Mr. Bryan:

The Engineering Department of the City of Knoxville would like to request a proprietary product certification for the Naztec Trafficware Traffic Signal Controller Series 900 ATC Model Number 980-B240 and the Naztec Malfunction Management Unit, Model Number 516L over the next three years. Currently Naztec controllers and monitors operate at 120 intersections owned by the City of Knoxville.

The City of Knoxville in a competitive bidding process has begun a change out of traffic signal control equipment City-wide. At this point the City has 120 traffic signal controllers changed out to the Naztec ATC Traffic Signal Controller and Naztec MMU Model. The City expects to have approximately 250 of the 386 signalized intersections operating with the Naztec Trafficware ATC traffic signal controller and approximately 150 Naztec MMUs by the end of calendar year 2017. The City has projects underway that will require this type of controller to insure that we have full functionality of the traffic signal controller and not be limited by the basic NTCIP protocols. This full functionality will be needed in the near future to provide for adaptive signal control as part of our arterial management process, emergency vehicle preemption, and priority vehicle control in conjunction with Knoxville Area Transit. The reason for our request for the Naztec MMU is the City wants to have a unit that can communicate through the controller as part of the City's Advanced Traffic Management System. This allows our technicians to diagnose problems with field units prior to leaving our shops which reduces the time required to maintain the system overall and helps keep the system operational during heavy traffic times to insure maximum capacity of the synchronized system.

Also, as part of the City-wide change over to the new traffic signal control equipment our staff has been exclusively trained on the programming, maintenance, and troubleshooting of the Naztec ATC traffic signal controller and the Naztec MMU. Standardizing with these proprietary products the City of Knoxville can better maintain Knoxville's Traffic Management System and reduce system down time.

Thank you for consideration of this request.

Sincerely,

James R. Hagerman, P.E.
Engineering Director

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CITY OF KNOXVILLE

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James R. Hagerman, P.E.
Director of Engineering

April 4, 2016

Stephen K. Bryan, P.E., PTOE
Traffic Operations Division
James K. Polk Bldg., 12th Floor
505 Deaderick St.
Nashville, TN 37243

RE: REQUEST FOR PROPRIETARY TRAFFIC SIGNAL PRODUCTS CERTIFICATION CITY OF KNOXVILLE – WAVETRONIX RADAR DETECTION UNITS

Dear Mr. Bryan:

The Engineering Department of the City of Knoxville would like to request a proprietary product certification for Wavetronix Radar Detection Units over the next three years. Currently the City is installing this type of detection with new development, new City projects, and TDOT funded projects for the following:

The City of Knoxville over the last several years has had experience with in-ground detection loops, video detection technology, and radar detection technology. The most reliable system we have utilized is the Wavetronix Radar Detection System. We have 9 intersections operating with Wavetronix Radar Detection Systems within the City. The need for reliability in vehicle, bicycle and pedestrian detection directly relates to the overall capacity of intersections under traffic signal control and the problems associated with the detection reliability can reduce the overall intersection capacity by as 50% or more (ITE, The Traffic Detector Handbook). The result is longer delays and increased stop time for vehicles both along the corridor and on the side streets. These delays and stop times cause increased fuel consumption and emissions along these corridors resulting in increased levels of air pollution. The desire of the City is to increase the efficiency of signalized intersections as part of the City wide Advanced Traffic Management System. Reliable detection is a key component in the City's efforts to provide a safer, more efficient traffic system and to reduce air pollution within the Knoxville Area.

Thank you for consideration of this request.

Sincerely,

James R. Hagerman, P.E.
Engineering Director

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