

POLICE

DESCRIPTION.

Furnish Police Officers and marked Police Vehicles to direct traffic in accordance with the plans and specifications.

CONSTRUCTION METHODS.

Utilize Police Officers who are outfitted with police uniforms.

Utilize marked Police Vehicles, which are equipped with police lights mounted on top of the vehicle, and police vehicle emblems.

Utilize Police Officers and marked Police Vehicles to direct or control traffic as required by the plans or by the Engineer.

METHOD OF MEASUREMENT.

The quantity of Police Officers and marked Police Vehicles to be paid for will be the actual number of hours that each Police Officer/marked Police Vehicle is provided during the life of the project as approved by the Engineer.

There will be no direct payment for marked Police Vehicles as they are considered incidental to the pay item in this special provision.

BASIS OF PAYMENT.

The quantity of Police Officers and marked Police Vehicles measured as provided above, will be paid for at the contract unit price per hour for "Police".

Payment will be made under:

Police.....Hour

Tip #: R-2552AA&AB
DATE: February 2, 2005
Revised Date:

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TRANSFER AND TRANSPORT VEHICLE FOR MOVABLE CONCRETE BARRIER

DESCRIPTION.

Furnish, maintain and operate a Transfer And Transport Vehicle For Movable Concrete Barrier (MCB) in accordance with the plans and specifications.

MATERIALS.

Provide Transfer and Transport Vehicle which is compatible with movable concrete barrier (MCB) utilized on the project.

CONSTRUCTION METHODS.

Provide Transfer and Transport Vehicle which is able to pick up and move continuous lengths of movable concrete barrier across the roadway in accordance with manufacturer specifications.

METHOD OF MEASUREMENT.

The quantity of Transfer and Transport Vehicles to be paid for will be the actual number of vehicles used on the project.

BASIS OF PAYMENT.

The quantity of Transfer And Transport Vehicles, measured as provided above, will be paid for at the contract unit price per each "Transfer and Transport Vehicle for Movable Concrete Barrier" on the following schedule:

- 70% of the unit bid price upon placing the unit in service.
- 20% of the unit bid price when the project is 50% complete.
- 10% of the unit bid price when the project is 100% complete.

Payment will be made under:

Transfer and Transport Vehicle for
Movable Concrete Barrier Each

DEPARTMENT FURNISHED MOVABLE CONCRETE BARRIER

DESCRIPTION.

Obtain, install, secure, maintain, refurbish, remove, and return Department Furnished Movable Concrete Barrier in accordance with the plans and specifications.

MATERIALS.

Movable Concrete Barrier will be provided by the Department.

CONSTRUCTION METHODS.

(A) General:

Obtain and return Department Furnished Movable Concrete Barrier at the location(s) specified in the plans.

Engineer will inspect Movable Concrete Barrier prior to the Contractor accepting responsibility of the barrier. Contractor is fully responsible for any damage or theft after acceptance.

Transport Movable Concrete Barrier to the project and provide necessary storage area for the barrier at no cost to the Department.

Refurbish and maintain barrier in good operational condition. Return barrier in good operational condition including all manuals, maintenance records, special tools, hardware, parts, etc. Properly pack and label all spare parts and hardware

(B) Stockpiling:

Stockpile Movable Concrete Barrier in accordance with Section 1170-3, (D) of the 2002 Standard Specifications.

(C) Barrier Delineators:

Furnish delineators for Movable Concrete Barrier which meet the requirements of Section 1088-2 and Section 1170-3, (E) of the 2002 Standard Specifications.

TIP #:R-2552AA&AB
Date: February 2, 2005
Revised Date:March 29, 2005

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MAINTENANCE.

Maintain Movable Concrete Barrier in accordance with Section 1105-4 of the 2002 Standard Specifications.

METHOD OF MEASUREMENT.

The method of measurement will be in accordance with Section 1170-05 of the 2002 Standard Specifications.

There will be no measurement made of barrier delineators as they are considered incidental to the other pay items in this special provision.

BASIS OF PAYMENT.

The quantity of Department Furnished Movable Concrete Barrier, measured as provided above, will be paid at the contract unit price per linear foot (linear meter) for "Department Furnished Movable Concrete Barrier".

There will be no direct payment for barrier delineators as they are considered incidental to the other pay items in this special provision.

Payment will be made under:

Department Furnished Movable
Concrete Barrier Linear Foot (Linear Meter)

Project Special Provision 'Smart Zone' Work Zone System

A. Description:

This item shall consist of furnishing, installing, relocating, operating and maintaining an automated, portable, real-time work zone system meeting the requirements noted herein, and providing the maintenance of the system during the duration of the project. Included in the operational responsibilities is the assuming of all communication costs such as cellular telephone, satellite and Internet subscription charges. In addition to these requirements, the Contractor shall assume all responsibility for any damaged equipment due to crashes, vandalism, adverse weather, etc. that may occur during the systems deployment.

The goal of this system is to monitor deteriorating traffic conditions on and along I-40 in Wake and Johnston Counties created by the work zone located between Milepost 308 and 311. Traffic conditions will deteriorate due to backups caused by high traffic volumes, work zone vehicle interference, weather, etc. This project will require a 'SMART ZONE' work zone system company to contract with the Contractor to supply the necessary equipment to monitor traffic conditions. The NCDOT prequalified 'SMART ZONE' work zone system companies are as follows:

- 1) IRD Inc.
- 2) HIS Inc.
- 3) United Rentals
- 4) Scientex Inc.
- 5) PDP Associates
- 6) ASTI
- 7) AADCO

The 'SMART ZONE' company which is selected by the Contractor shall attend the Preconstruction Conference to be held at the Division Office in Wilson, NC. The date and time of the Preconstruction Conference will be determined by the Engineer.

This project will require the "SMART ZONE" work zone system to integrate with the following:

-Highway Advisory Radios (HAR) and flashing advisory sign shown on the plans (TCP-45 to TCP-47). The HAR and signs will be installed along I-40 by the State Forces prior to construction. The "SMART ZONE" work zone system will be required to activate preprogrammed messages on the HAR and flashing beacons on the signs as required by the plan.

- Dynamic Message Signs (DMS) along I-95 and I-40 as shown on the plans (TCP-46) using NTCIP compliant software. The "SMART ZONE" work zone system will be required to activate preprogrammed messages. The Incident Management office in Wilson and the ITS Operations Unit in Raleigh will have the ability to override the "SMART ZONE" work zone system in case other emergencies come up which require different type of messages on the subject DMSs.

This project will require the “SMART ZONE” work zone system to notify the Incident Management Staff in Division 4 and 5, Resident Engineer’s office, and Traveler Information Management System (TIMS) once the delay along I-40 exceeds 25 minutes or a mutually agreed upon delay. The contact Incident Management contact in Division 4 is Brian Purvis at 252 296-3543 and in Division 5 is Archie Wells at 919 233-9331. The contact person at the Resident Engineer’s office in Selma is Mike McKeel (MMcKeel@dot.state.nc.us) at 919 934-5863. Contact JoAnn Oerter at 919 233-9331 ext. 233 for integration of SMARTZONE data with the Traveler Information Management System (TIMS).

B. ‘SMART ZONE’ Work Zone system Requirements

The ‘SMART ZONE’ work zone system shall consist of but, not limited to the following (as a minimum): (See Traffic Control Plans, sheet TCP-45 – TCP-47).

The exact locations of all devices shall be submitted to the Resident’s Office for approval prior to installing the system.

- 7 portable changeable message signs remotely controlled via a computer station.
- 10 portable traffic sensors linked to a computer station.
- 4 temporary Closed Circuit Television Cameras (CCTV) be link to the computer station and to the Triangle Regional Traffic Management Center (TRTMC) in Raleigh and the website. These cameras shall provide continuous streaming video imaging at a minimum rate of 10 frames/sec. The DEPARTMENT’s authorized staff shall be able to control the cameras through a full function of pan/tilt/zoom via the projects dedicated website.
- 1 computer station equipped with appropriate software and either wireless or dedicated phone line communications to “link” with the ‘SMART ZONE’ work system.
- 12 pagers to provide notification to designated personnel in the Selma Resident Engineer’s Office (3), Contractors Office (2), SMART ZONE Contractor (1), TRTMC (2), Incident Management Offices in Division 4 and 5 (2), and Traveler Information Management System (TIMS) (2). If personnel prefers, connect to an existing pager.
- Provide a database of accurate real-time data that is accessible to the DEPARTMENT by a secure connection for integration into the www.ncsmartlink.org traveler information website. The database should include, but is not limited to, messages being displayed on portable Changeable Message Signs (CMS), images from the temporary Closed Circuit Television Cameras (CCTV), average travel speed and lane occupancy from the portable detector stations. Coordinate for the integration into www.ncsmartlink.org with Jeffery Dale at 919 715-8628 and David Alford at 919 250-4177.
- Provide a project specific, secure web site for the DEPARTMENT that allows for operation of the equipment included in the SMART WORK ZONE. This web site will provide tiered access that allows the user functions that include, but are not limited to,

pan-tilt-zoom control of the portable CCTV, full messaging control of the portable CMS, and monitoring capabilities of the detection equipment.

- For quality assurance purposes, the 'SMART ZONE' work zone system shall be capable of providing current operational status (i.e. current traffic data and messages, communications system, signs and sensors) via the internet to a dedicated password protected project web-site established for the purpose of monitoring the corridor and the 'SMART ZONE' work zone system equipment.
- The web-site shall have the capability of providing a password protected "link" for approved personnel to have access to retrieve the volume and speed data the system is collecting.
- The website for the monitoring of the 'SMART ZONE' work zone system shall be capable of verifying and validating the real-time messages on the Changeable Message Boards for password approved personnel.
- The 'SMART ZONE' work zone system software shall be configured so that appropriate personnel are notified by pager and email once a malfunction has occurred in the system. The software shall be configured to assess any type of malfunction that has occurred. This assessment includes communication disruption between any device in the system configuration, changeable message board malfunctioning, speed sensor malfunction, etc. The 'SMART ZONE' work zone system shall be capable of notifying the Resident Engineer's office and both the Contractor and SMART ZONE representative about any system malfunction.

C. Materials

All materials used shall meet the manufacturer's specifications and recommendations.

D. Construction Methods

The provisions of Article 1105-3 in the North Carolina Standard Specifications for Roads and Structures (2002) will be applicable to the work covered by this section. In addition, the below requirements are to be met.

- The 'SMART ZONE' work zone system shall utilize North Carolina approved portable Changeable Message Signs (CMS) to convey real-time traffic condition information to motorists.
- The 'SMART ZONE' work zone system shall operate continuously (24 hours, 7 days a week) when deployed on the project. It shall be in the "data collection" mode when the queue sensors aren't activated.
- The "real time" delay information displayed on the CMS's is to be updated every minute.
- To support incident management, the 'SMART ZONE' work zone system shall allow the Division 4 and 5 Incident Management staff to manually override motorists information messages for a user-specified duration, after which automatic operation will resume with display of messages appropriate to the prevailing traffic conditions.

- Critical system operator control functions shall be password protected.
- The 'SMART ZONE' work zone system shall be capable of providing current operational status (i.e. current traffic data and messages, communications system, signs and sensors) via the dedicated project web-site.
- The 'SMART ZONE' work zone system shall be capable of acquiring traffic volume and speed data and selecting motorist information messages automatically without operator intervention after system initialization.
- The dedicated project web-site shall provide a full color map depicting the project area with locations of traffic sensors, CMS's and cameras.
- Using color-coding, the Map shall reflect the current traffic conditions at each traffic sensor and display the entire information message being shown by each CMS.
- The web-site delay information is to be updated simultaneously with the delay information displayed on the Changeable Message Signs

'SMART ZONE' Traffic Data Acquisition

Each traffic sensor shall activate the appropriate CMS whenever the prevailing traffic speed slows to 60 miles per hour. Once activated, the preprogrammed messages shall be automatically displayed on the CMS as shown on the attached drawings.

Records of all motorist information messages displayed by the 'SMART ZONE' system shall be recorded in log files with time and date stamps. This information shall be provided to the DEPARTMENT on disk at the completion of the project.

All traffic data acquired by the 'SMART ZONE' shall be archived in log file with time and date stamps. At the completion of the project, the 'SMART ZONE' vendor shall provide the DEPARTMENT this logged information on disk.

The 'SMART ZONE's traffic sensors shall be of a type whose accuracy is not degraded by inclement weather of degraded visibility conditions including precipitation, fog, darkness, excessive dust, and road debris.

The 'SMART ZONE' shall be capable of acquiring traffic data from up to four lanes of traffic in multiple directions.

'SMART ZONE' Motorist Information Messages

The 'SMART ZONE' shall be capable of providing speed, delay, length of traffic queue, and lane closure advisories to motorists. The primary system messaging will be providing the number of minutes of delay to the end of the work zone from each portable changeable message sign.

The 'SMART ZONE' shall be capable of calculating and having "real time" delay information displayed on the portable CMS's. This "real time" delay shall be calculated and displayed on the portable CMS's to the nearest minute for delays up to 15 minutes after the initial 5-minute delay. For delays exceeding 15 minutes, the delay information displayed on the CMS's shall be rounded to the nearest 5-minute increment.

System must have capacity to preset up to 10 different default or automatic advisory messages for each CMS, for a total capacity of at least 80 different default and automatic messages.

Default and advisory message content shall be programmable from the project's dedicated web-site.

The 'SMART ZONE' system shall be capable of storing messages created by an authorized user in overriding any default or automatic advisory message.

System communications

Communications with roadside equipment (sensors, signs, and cameras) shall use proven communication methods. Redundancies shall be incorporated into the system that prevents erroneous information being prorogated throughout the system once a malfunction has occurred.

The 'SMART ZONE' communication system shall incorporate an error detection/correction mechanism to insure the integrity of all traffic conditions data and motorist information messages.

Any required configuration of the 'SMART ZONE' communications system shall be performed automatically during system initialization.

Changeable Message Signs

The approximate location of portable changeable message signs and traffic sensors for the various construction phases will be as shown on the attached drawings. However, all final locations will be verified by the Resident Engineer.

All displayed messages are to be center justified, no exceptions. Messages should comply with the DEPARTMENT's Dynamic Message Sign Policy.

All Time Information displayed on the CMS is to be synchronized on each CMS so that accurate time is shown according to official Eastern Standard Time. In no case shall any displayed time differ more than 5 minutes from official E.S.T. Also, the time information is to be synchronized so that the time information is displayed the same on each CMS until a further update is executed.

The portable changeable message signs shall be on the North Carolina approved products list and have the following features:

-Remote operation of the Changeable Message Signs to be made through the project website.

-Messages to be displayed shall have the capability to be timed to changes at various times of the day and days of the week.

-Any request to change the messages on the Changeable Message Signs has to be approved by the DEPARTMENT.

Temporary Closed Circuit Television Cameras (CCTV) for Video Surveillance

The Contractor shall provide 4 cameras to provide live video feed of the subject location. These cameras shall provide continuous streaming video imaging for the duration of the project. The Contractor will be responsible for providing the platform, power source and communications for these temporary CCTV cameras.

The traffic video surveillance cameras shall be an "IP" based system with wireless communication media. The Contractor will be responsible for hosting the server for this "IP" based camera system.

The Contractor is to provide standard software that enables approved DOT users to access the cameras through the project web site. This software is to be configured such that a camera icon (with password protection) appears on the project web site. When initialized, this icon will provide a GUI or a "point and click" windows application that allows the user to view the images of the 4 cameras. Upon "clicking" of the individual camera, the computer screen is to show the video imaging as well as a "pop-up" type window that provides the user with full pan-tilt-zoom control of the camera.

A secure connection will be provided that allows sharing of the CCTV images through the project web site, www.ncsmartlink.org, and the Triangle Regional Traffic Management Center (TRTMC).

Approved DEPARTMENT personnel are to have unlimited durational access to the camera images. The public will have access to view the images through the www.ncsmartlink.org website. The system shall be constructed to accept 100 simultaneous hits without image degradation or system malfunction.

The captured images provided to the secure database shall be updated at a rate no less than every 30 seconds in order to provide the most up-to-date information to the public.

As a minimum, the CCTV cameras shall provide an update rate of 10 frames/sec.

As long as the required site distance is achieved, the CCTV cameras may be temporarily mounted on poles or mounted on portable trailers and shall have PTZ (Pan/Tilt/Zoom) capabilities.

System Performance

To ensure a prompt response to incidents involving the integrity of the 'SMART ZONE' devices and changeable message signs, the 'SMART ZONE' Contractor will be required to make all necessary corrections to the essential components of the system within 24 hours of notification by the DEPARTMENT. If all corrections are made within this 24 period and the system is brought back on-line, no monetary penalty will occur. Essential components are the Portable Changeable Message Signs, Communications Equipment, and Speed and Volume Sensors, Computer hardware and software required to place the real time information on the signs. Non-essential components of this system are the dedicated project web-site and video cameras.

Method of Measurement

The quantity for the 'SMART' Work Zone System, to be paid for, will be the required and satisfactorily installed system as described in the "System Requirements and Description" Sections of this Special Provision and shown on the Traffic Control Plans (TCP-45 - TCP-47). 'SMART' Work Zone System includes providing SMARTZONE equipment for East and Westbound I-40, including mobilization. Once this equipment has initially arrived, any relocation along the project or removal of this equipment from the project will be incidental to the contract unit price for 'SMART' Work Zone System.

The quantity for any additional Portable 'SMART' Work ZONE Video Camera will be the 'SMART' Work Zone video cameras system satisfactorily installed on I-40 and will be paid for at the contract unit price per each on monthly basis for Portable 'SMART' Work Zone Video Cameras Supplemental (each).

The quantity for any additional 'SMART' Work ZONE Changeable Message Sign (CMS), will be SMART' Work Zone Changeable Message Sign satisfactorily installed on I-40 and will be paid for at the contract unit price per each on monthly basis for the 'SMART' Work ZONE Changeable Message Sign (CMS) Supplemental (each).

The quantity for any additional 'SMART' Work ZONE Sensors, will be SMART' Work Zone Sensors satisfactorily installed on I-40 and will be paid for at the contract unit price per each on monthly basis for the 'SMART' Work ZONE Sensor Supplemental (each).

Basis of Payment

Payment for 'SMART' Work Zone System will be full compensation for all work covered by this provision and attached plans including but not limited to furnishing, installing, relocating, operating, maintaining, and removing the system, including sensors, cameras, and changeable message signs, at the discretion of the DEPARTMENT.

Payment will be made as follow:

- 10% of the lump sum price upon 1st estimate
- 50% of lump sum price on system deployment
- 20% of lump sum price when project is 50% complete
- 20% of lump sum price when project is 100% complete

Payment will be made under:

- 'SMART' Work Zone System Lump Sum

If additional equipment is needed to supplement these provisions and attached plans, payment as described in the Method of Measurement Section will be made under:

- Additional Portable 'SMART' Work Zone Video Cameras Per Each
- Additional 'SMART' Work Zone Changeable Message Sign Per Each
- Additional 'SMART' Work Zone Sensor.....Per Each