MDOT Use Only

Checked _____

Loaded _____

Keyed _____

SM No. CSP0017000011

PROPOSAL AND CONTRACT DOCUMENTS

FOR THE CONSTRUCTION OF

(EXEMPT)

7
Installation of a Traffic Management System, known as State Project No. SP-0017-00(001) / 104589301, in the County of Desoto, State of Mississippi and County of Shelby, State of Tennessee.
Project Completion: December 29, 2009

NOTICE

BIDDERS MUST PURCHASE A BOUND PROPOSAL FROM MDOT CONTRACT ADMINISTRATION DIVISION TO BID ON THIS PROJECT.

Electronic addendum updates will be posted on www.goMDOT.com

SECTION 900

OF THE CURRENT
(2004) STANDARD SPECIFICATIONS
FOR ROAD AND BRIDGE CONSTRUCTION
MISSISSIPPI DEPARTMENT OF TRANSPORTATION

JACKSON, MISSISSIPPI

BIDDER CHECK LIST
(FOR INFORMATION ONLY)

_____ All unit prices and item totals have been entered in accordance with Subsection 102.06 of the Mississippi Standard Specifications for Road and Bridge Construction.

_____ If the bid sheets were prepared using MDOT's Electronic Bid System, proposal sheets have been stapled and inserted into the proposal package.

_____ First sheet of SECTION 905--PROPOSAL has been completed.

_____ Second sheet of SECTION 905--PROPOSAL has been completed and signed.

_____ Addenda, if any, have been acknowledged. Second sheet of Section 905 listing the addendum number has been substituted for the original second sheet of Section 905. Substituted second sheet of Section 905 has been properly completed, signed, and added to the proposal.

_____ DBE/WBE percentage, when required by contract, has been entered on last sheet of the bid sheets of SECTION 905 - PROPOSAL.

_____ Form OCR-485, when required by contract, has been completed and signed.

_____ The last sheet of the bid sheets of SECTION 905--PROPOSAL has been signed.

_____ Combination Bid Proposal of SECTION 905--PROPOSAL has been completed for each project which is to be considered in combination (See Subsection 102.11).

_____ Equal Opportunity Clause Certification, when included in contract, has been completed and signed.

_____ The Certification regarding Non-Collusion, Debarment and Suspension, etc. has been executed in duplicate.

_____ A certified check, cashier's check or bid bond payable to the State of Mississippi in the principal amount of 5% of the bid has been included with project number identified on same. Bid bond has been signed by the bidder and has also been signed or countersigned by a Mississippi Resident Agent for the Surety with Power of Attorney attached.

_____ Non-resident Bidders: ON STATE FUNDED PROJECTS ONLY, a copy of the current laws regarding any preference for local Contractors from State wherein domiciled has been included. See Subsection 103.01, Mississippi Standard Specifications for Road and Bridge Construction, and Section 31-7-47, MCA, 1972 regarding this matter.

Return the proposal and contract documents in its entirety in a sealed envelope. DO NOT remove any part of the contract documents; exception - an addendum requires substitution of second sheet of Section 905. A stripped proposal is considered as an irregular bid and will be rejected.

Failure to complete any or all of the applicable requirements will be cause for the proposal to be considered irregular.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

TABLE OF CONTENTS

PROJECT: SP-0017-00(001) / 104589301 -- Desoto County

901--Advertisement

904--Notice to Bidders:
- Governing Specs. - # 1
- On-The-Job Training Program - # 777
- Payroll Requirements - # 883
- Errata & Modifications to 2004 Standard Specifications - #1405
- Status of Right-of-Way, Utility Adjustments and Potentially Contaminated Sites Tanks, W/Attachments - # 1903
- Non-Quality Control / Quality Assurance Concrete - # 1922
- Federal Bridge Formula - # 1928
- Cabinet Modifications - # 1970
- DMS Communication Interface Equipment - # 1971
- Traffic Management Center Modifications - # 1972
- Contract Time - #1998
- Pre-Bid Conference - #2002
- Lane Closure Restrictions - #2003

907-105-3: Cooperation By Contractors, W/Supplement
907-107-1: Liability Insurance, W/Supplement
907-107-3: Contractor's Protection Plan
907-107-6: Legal Relations & Responsibility to Public, W/Supplement
907-108-11: Prosecution and Progress, W/Supplement
907-108-15: Cessation of Contract Time
907-109-3: Partial Payment, W/Supplement
907-619-1: Changeable Message Sign
907-630-4: Contractor Designed Overhead Sign Supports
907-637-1: ITS Equipment Cabinets
907-639-2: ITS Equipment Poles
907-641-2: Radar Detection System (RDS)
907-642-2: Solid State Traffic Actuated Controllers
907-650-1: On-Street Video Equipment
907-656-2: Dynamic Message Sign
907-657-2: Fiber Optic Cable (OSP)
907-658-1: Hardened Network Switch
907-659-2: Traffic Management Center Modifications
907-662-1: Video Communication Equipment

-CONTINUED ON NEXT PAGE-

907-713-1: Admixtures for Concrete
907-714-4: Miscellaneous Materials
907-804-8: Concrete Bridges and Structures

906-3: MDOT On-the-Job Training Program
906-6: MDOT On-the-Job Training Program - Alternate Program

SECTION 905 - PROPOSAL, PROPOSAL SHEET NOS. 2-1 THRU 2-4
COMBINATION BID PROPOSAL,
STATE BOARD OF CONTRACTORS REQUIREMENTS
NON-COLLUSION CERTIFICATE,
SECTION 902 - CONTRACT FORM, AND SECTION 903 - CONTRACT BOND FORM,
MAINTENANCE BOND
FORM -- OCR-485,
HAUL PERMIT FOR BRIDGES WITH POSTED WEIGHT LIMITS.

(REVISIONS TO THE ABOVE WILL BE INDICATED ON THE SECOND SHEET OF SECTION 905 AS ADDENDA)

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 901 - ADVERTISEMENT

Sealed bids will be received by the Mississippi Transportation Commission in the Office of the Contract Administration Engineer, Room 1013, Mississippi Department of Transportation Administration Building, 401 North West Street, Jackson, Mississippi, until 9:30 o'clock A.M., Tuesday, June 24, 2008; thereafter, bids will be received in the First Floor Auditorium of the Mississippi Department of Transportation Administration Building, Jackson, Mississippi, until 10:00 o'clock A.M., Tuesday, June 24, 2008, and shortly thereafter publicly opened for:

Installation of a Traffic Management System, known as State Project No. SP-0017-00(001) / 104589301, in the County of Desoto, State of Mississippi and County of Shelby, State of Tennessee.

The attention of bidders is directed to the predetermined minimum wage rate set by the U. S. Department of Labor under the Fair Labor Standards Act.

The Mississippi Department of Transportation hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, sex, age, disability, religion or national origin in consideration for an award.

Plans and specifications are on file in the offices of the Mississippi Department of Transportation.

Bid proposals must be acquired from the MDOT Contract Administration Division. These proposal are available at a cost of Ten Dollars ($10.00) per proposal. Specimen proposals are also available at the MDOT Contract Administration Division at a cost of Ten Dollars ($10.00) per proposal, or can be viewed or downloaded at no cost at www.gomdot.com.

Plans may be acquired on a cost per sheet basis from MDOT Plans Print Shop, Room 1100, MDOT Administration Building, 401 North West Street, Jackson, Mississippi, 39201, Telephone (601) 359-7460 or e-mail at plans@mdot.state.ms.us or FAX (601) 359-7461. Plans will be shipped upon receipt of payment.

Bid bond, signed or countersigned by a Mississippi Resident Agent, with Power of Attorney attached or on file with the Contract Administration Engineer of the Department, a Cashier's check or Certified Check for five (5%) percent of bid, payable to STATE OF MISSISSIPPI, must accompany each proposal.

The attention of bidders is directed to the provisions of Subsection 102.07 pertaining to irregular proposals and rejection of bids.

LARRY L. "BUTCH" BROWN
EXECUTIVE DIRECTOR

(SPWP)

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 1 **CODE: (IS)**

DATE: **05/03/2004**

SUBJECT: **Governing Specifications**

The current (2004) Edition of the Standard Specifications for Road and Bridge Construction adopted by the Mississippi Transportation Commission is made a part hereof fully and completely as if it were attached hereto, except where superseded by special provisions, or amended by revisions of the Specifications contained herein. Copies of the specification book may be purchased from the MDOT Construction Division.

A reference in any contract document to controlling requirements in another portion of the contract documents shall be understood to apply equally to any revision or amendment thereof included in the contract.

In the event the plans or proposal contain references to the 1990 Edition of the Standard Specifications for Road and Bridge Construction, it is to be understood that such references shall mean the comparable provisions of the 2004 Edition of the Standard Specifications.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 777 **CODE: (IS)**

DATE: 04/13/2006

SUBJECT: On-The-Job Training Program

Payment for training hours will be handled as outlined in Special Provision 906-6. A pay item for trainees will not be included in individual construction projects. Payment for training individuals will be processed in accordance with the conditions in MDOT's ON-THE-JOB TRAINING PROGRAM (Special Provision 906-6).

On Federal-Aid projects, failure on the part of the Contractor to carryout the terms of the Alternate Training Special Provision (Special Provision 906-6) will be considered grounds to preclude the Contractor from participating in the Alternate On-The-Job Training Program. In the event the Department is required to preclude the Contractor from participating in the program, the Contractor will be required to adhere to the requirements of the Training Special Provision (Special Provision 906-3), for which purpose the special provision is also made a part of this proposal.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 883 **CODE: (IS)**

DATE: **04/28/2006**

SUBJECT: **Payroll Requirements**

Bidders are hereby advised that the Contractor and Subcontractor(s) are required to submit payroll information to the Project Engineers on a weekly basis.

On Federal-Aid Projects, CAD-880, CAD-881 and certified payroll submissions are required each week the Contractor or a Subcontractor performs work on the project. This is addressed in Section V, page 6 of Form FHWA-1273.

On State-Funded Projects, CAD-880 is required each week the Contractor or a Subcontractor performs work on the project.

When no work is performed on either Federal-Aid and State-Funded Projects, the Contractor should only submit CAD-880 showing no work activities.

The Contractor shall make all efforts necessary to submit this information to the Project Engineer in a timely manner. The Engineer will have the authority to suspend the work wholly or in part and to withhold payments because of the Contractor's failure to submit the required information. Submission of forms and payrolls shall be current through the first full week of the month for the estimate period in order for the Project Engineer to process an estimate.

Bidders are advised to review the requirements regarding payroll submissions in Section 110 of the Standard Specifications.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 1405 **CODE: (IS)**

DATE: **03/15/2007**

SUBJECT: ERRATA AND MODIFICATIONS TO THE 2004 STANDARD SPECIFICATIONS

Page	Subsection	Change
101	201.01	In the second sentence of the first paragraph, change “salvable” to “salvageable”.
107	202.04	In the fourth sentence of the fourth paragraph, change “yard” to “feet”.
107	202.05	In the list of units measurements for 202-B, add “square foot”.
132	211.03.4	In the second sentence of the second paragraph, change “planted” to “plated”.
192	306.02.4	In the first line of the first paragraph, delete the word “be”.
200	307.03.7	In the fourth sentence of the second paragraph, change “lime-fly ash” to “treated”.
236	401.01	Change the header from “Section 403” to “Section 401”.
242	401.02.3.2	In the first sentence of the third full paragraph, add “1/8” in the blank before the inch mark.
250	401.02.6.3	In the second sentence of the first paragraph on page 250, change “rutting over ” ” to “rutting over 1/8" ”.
253	401.02.6.4.2	In the paragraph preceding the table, change “91.0” to “89.0”.
259	401.03.1.4	In the first paragraph, change “92.0 percent” to “the specified percentage (92.0 or 93.0)”.
269	403.03.2	In the table at the top of page 269, change the PI requirement from “ = ” to “ $\leq$ ”.

278	404.04	In the second sentence, change the subsection from "401.04" to "403.04".
283	409.02.2	Change "PG 64-22" to "PG 67-22".
294	413.02	In the first sentence of the second paragraph, change "707.02.1.3" to "Subsection 707.02.1.3".
340	511.04	In the second sentence of the second paragraph, change "412" to "512".
349	601.03.3	In the first sentence, change "804.03.2" to "804.03.5".
355	603.02	Change the subsection reference for Joint mortar from "707.03" to "714.11".
369	604.04	In the first sentence, change "601.04" to "Subsection 601.04".
427	619.04	Delete the second paragraph.
442	625.04	In the third paragraph, change "626.04" to "Subsection 626.04".
444	626.03.1.2	Delete the third sentence of the first paragraph.
464	631.02	Change the subsection reference for Water from "714.01.0" to "714.01.1".
570	682.03	Change the subsection number from "682-03" to "682.03".
575	683.10.4	Change the subsection number from "683.10.4" to "683.04".
575	683.10.5	Change the subsection number from "683.10.5" to "683.05".
596	701.02	In the table under the column titled "Cementations material required", change Class F, FA" to "Class F FA,".
603	702.11	In the first sentence, change "702.12" to "Subsection 702.12".
612	703.04.2	In the fifth paragraph, delete "Subsection 703.11 and".
616	703.07.2	In the Percentage By Weight Passing Square Mesh Sieves table, change the No. 10 requirement for Class 7 material from "30 - 10" to "30 - 100".

618	703.13.1	In the first sentence of the first paragraph, change "703.09" to "703.06".
618	703.13.2	In the first sentence, change "703.09" to "703.06".
671	712.06.2.2	In the first sentence, change "712.05.1" to "Subsection 712.05.1".
689	714.11.2	In the first sentence, change "412" to "512".
709	715.09.5	In the first sentence of the first paragraph, change "guage" to "gauge".
717	717.02.3.4	In the top line of the tension table, change "1 1/2" to "1 1/8" and change "1 1/8" to "1 1/2".
741	720.05.2.2	In the last sentence of this subsection, change "720.05.2.1" to "Subsection 720.05.2.1".
827	803.03.2.3.7.5.2	In the first sentence of the second paragraph, change "803.03.5.4" to "803.03.2.3.4".
833	803.03.2.6	In the first sentence, change "803.03.7" to "803.03.2.5".
854	804.02.11	In the last sentence of the first paragraph, change "automatically" to "automatic".
859	804.02.13.1.3	In the last sentence, change Subsection "804.02.12.1" to "804.02.12".
879	804.03.19.3.2	In the first sentence of the third paragraph, change "listed on of Approved" to "listed on the Approved".
879	804.03.19.3.2	In the last sentence of the last paragraph, change "804.03.19.3.1" to "Subsection 804.03.19.3.1".
962	814.02.3	In the first sentence, change "710.03" to "Subsection 710.03".
976	820.03.2.1	In the first sentence, change "803.02.6" to "803.03.1.7".
976	820.03.2.2	In the first sentence, change "803.03.9.6" to "803.03.1.9.2".
985	Index	Change the subsection reference for Petroleum Asphalt Cement from "702.5" to "702.05".

985	Index	Change the subsection reference for the Definition of Asphaltic Cement or Petroleum Asphalt from "700.2" to "700.02".
985	Index	Change the subsection reference for Automatic Batchers from "501.03.2.4" to "804.02.10.4".
986	Index	Delete "501.03.2" as a subsection reference for Batching Plant & Equipment.
988	Index	Change the subsection reference for the Central Mixed Concrete from "501.03.3.2" to "804.02.11".
988	Index	Change the subsection reference for the Concrete Batching Plant & Equipment from "501.03.2" to "804.02.11".
999	Index	Delete "501.03.3.3" as a subsection reference for Truck Mixers.
1001	Index	Change the subsection reference for Edge Drain Pipes from "605.3.5" to "605.03.5".
1002	Index	Change the subsection reference for Metal Posts from "713.05.2" to "712.05.2".
1007	Index	Change the subsection reference for Coarse Aggregate of Cement Concrete Table from "703.3" to "703.03".
1007	Index	Change the subsection reference for Composite Gradation for Mechanically Stabilized Courses Table from "703.8" to "703.08".
1009	Index	Delete "501.03.3.3" as a subsection reference for Truck Mixers and Truck Agitators.
1010	Index	Delete reference to "Working Day, Definition of".

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 1903 **CODE: (IS)**

DATE: **02/26/2008**

SUBJECT: **Status of Right-of-Way, Utility Adjustments and Potentially Contaminated Sites**

Although it is desirable to have acquired all rights-of-way and completed all utility adjustments and work to be performed by others prior to receiving bids, sometimes it is not considered to be in the public interest to wait until each and every such clearance has been obtained. The bidder is hereby advised of possible unacquired rights-of-way, relocatees and utilities which have not been completed.

The status of right-of-way acquisition, utility adjustments, and potentially contaminated sites are set forth in attachments to this Notice to Bidders entitled "Status of Right-of-Way", "Status of Utility Adjustments" and "Status of Potentially Contaminated Sites."

In the event right of entry is not available to ALL parcels of right-of-way and/or all work that is to be accomplished by others on the date set forth in the contract for the Notice to Proceed is not complete, the Department will issue a restricted Notice to Proceed.

STATUS OF RIGHT-OF-WAY
SP-0017-00(001)
104589/301000
DESOTO COUNTY
February 25, 2008

All necessary rights of way have been acquired or legal rights of entry obtained, **except:**

NONE.

ASBESTOS CONTAMINATION STATUS OF BUILDINGS
TO BE REMOVED BY THE CONTRACTOR
104589-301000
SP-0017-00(001)
DESOTO COUNTY
February 19, 2008

Reference is made to notices to bidders entitled "Asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP)" and "Removal of Obstructions".

The following pertinent information is furnished concerning asbestos containing materials (ACMs), if any, found in buildings to be removed by the Contractor.

There is no Right of Way required for this project. There are no buildings to be removed by the contractor.

STATUS OF POTENTIALLY CONTAMINATED SITES
104589-301000
SP-0017-00(001)
DESOTO COUNTY
February 19, 2008

THERE IS NO RIGHT OF WAY REQUIRED FOR THIS PROJECT. NO INITIAL SITE ASSESSMENT WILL BE PERFORMED. IF CONTAMINATION ON EXISTING RIGHT OF WAY IS DISCOVERED, IT WILL BE HANDLED BY THE DEPARTMENT.

UTILITY STATUS REPORT

SP-0017-00(001) / 104589301

Desoto County

2/15/2008

No conflict with Contractor’s operations is anticipated.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 1922 **CODE: (SP)**

DATE: **03/31/2008**

SUBJECT: **Non-Quality Control / Quality Assurance Concrete**

Bidders are advised that the following pay items will not be accepted based on the Quality Control / Quality Assurance (QC/QA) requirements of Section 804 of the specifications. The acceptance of these pay items will be based on sampling and testing at the project site by MDOT forces. The Contractor is required to submit mix designs to accomplish this work in accordance with Section 804 and perform normal Quality Control functions at the concrete plant. Acceptance will be in accordance with the requirements of 907-601, Structural Concrete, and TMD-20-04-00-000. At the discretion of the Engineer, the Contractor may request that the concrete be accepted based on QC/QA requirements.

Pay Item	Description
221	Paved Ditches
601	Structural Concrete, Minor Structures - manholes, inlets, catch basins, junction boxes, pipe headwalls, and pipe collars.
606	Guardrail Anchors
607	Fence Post Footings
608	Sidewalks
609	Curb and Gutter
614	Driveways
616	Median and Island Pavement
630	Sign Footings, except Overhead Sign Supports

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 1928 **CODE: (IS)**

DATE: **04/14/2008**

SUBJECT: **Federal Bridge Formula**

Bidders are hereby advised that Federal Highway Administration Publication No. FHWA-MC-94-007, **BRIDGE FORMULA WEIGHTS**, dated January 1994, is made a part of this contract when applicable.

Prior to the preconstruction conference, the Contractor shall advise the Engineer, in writing, what materials, if any, will be delivered to the jobsite via Interstate route(s).

Copies of the **BRIDGE FORMULA WEIGHTS** publication may be obtained by contacting:

Federal Highway Administration
400 7th Street, SW
Washington, DC 20590
(202) 366-2212

or

http://ops.fhwa.dot.gov/freight/sw/brdgcalc/calc_page.htm

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 1970 **CODE: (SP)**

DATE: **5/23/2008**

SUBJECT: **Cabinet Modifications**

PROJECT: **SP-0017-00(001) / 104589301 -- Desoto County**

Bidders are hereby advised that the following additional requirements for Cabinet Modifications shall be required on this project and shall be included in the price bid for Pay Item Number 907-642-B.

Cabinet Modifications: All work done under this NTB as cabinet modifications will include but not be limited to work, installation, equipment and cabling necessary in the existing cabinets identified and as stated in this NTB to add, modify, interconnect and integrate the equipment as specified to be able to communicate on the fiber backbone to the Southhaven Regional Traffic Management Center. No work or additions will be made to replace or upgrade the existing controllers. Cabinet modifications shall be made at the following locations as indicated:

Traffic Signal Controller Cabinets Modifications adding Fiber Interconnect (3 Locations): Existing Traffic Signal Controller Cabinets located at the intersections of Stateline Road and Northwest Drive, Stateline Road and I-55 interchange, and Stateline Road and Hamilton Road shall be modified to install and connect a fiber drop cable as shown in the plans from the existing fiber trunk on Stateline Road. All labor, equipment and materials necessary to provide the physical entrance for fiber drop cable into each cabinet, whether via existing spare conduit or with a new and separate conduit entrance, shall be included in the bid price for Pay Item Number 907-642-B, unless specifically identified for separate payment in the Plans. Materials and construction methods for all cabinet entrances shall conform to details shown in the Plans and all other requirements set forth in the Plans and specifications.

Installation and Configuration: The Contractor shall install the drop cable, provide and connect the fiber patch cables, connect the fiber patch cables as necessary to the traffic signal controller, and configure the traffic signal controller to communicate with the existing Actra Server in the Regional TMC. The Contractor shall splice trunk fibers 1 and 2 (blue and orange fibers on the blue buffer tube) that are running in the west direction along Stateline road to ports 1 and 2 in the patch tray in the cabinet attached to the drop cable. Ports 3 and 4 shall be spliced to trunk fibers 1 and 2 (blue and orange fibers on the blue buffer tube) that are running in the east direction along Stateline road.

All work, equipment, configuration, and incidental cabling to modify the cabinet signal to communicate and be integrated with the Actra Server in the TMC equipment room will be considered incidental.

Any equipment, cords, cables or configuration required at the existing traffic control cabinets to connect the new fiber to equipment at existing locations shall be considered incidental and shall be included in the cost of Pay Item Number 907-642-B.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 1971 **CODE: (SP)**

DATE: **05/23/2008**

SUBJECT: **Dynamic Message Sign Communications Interface Equipment**

PROJECT: **SP-0017-00(001) / 104589301 -- Desoto County**

Bidders are hereby advised that the following Dynamic Message Sign (DMS) communications interface equipment and related items will be required on this project.

Dynamic Message Sign Communications Interface Equipment

This project requires additional communications interface equipment for the Dynamic Message Sign location described below.

DMS Site #1: The DMS located at Station 572+30 as shown on the Plans shall connect to proposed MDOT fiber optic cable that shall be routed to the Northwest Mississippi Regional TMC. In addition to the items described in Special Provision 907-656-1 the DMS pay item at this site shall also include furnishing, installing, configuring and testing the following communications equipment:

Hardened Network Switch, Type A, installed in the DMS Roadside Cabinet that meets the requirements outlined in Special Provision 907-658-1.

Cost of Equipment: As noted previously, no additional payment will be made for the equipment listed in this Notice to Bidders. All equipment shall be included in the bid price for the Dynamic Message Sign, 907-656-A.

Training: 16 hours of training and assistance shall be provided for operations, testing, and maintenance of the Dynamic Message Signs. Training will be measured for separate payment under Item No. 907-656-B.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 1972 **CODE: (SP)**

DATE: **5/23/2008**

SUBJECT: **Traffic Management Center (TMC) Modifications**

PROJECT: **SP-0017-00(001) / 104589301 -- Desoto County**

Bidders are hereby advised that the following Traffic Management Center (TMC) Modifications will be required for this project.

MDOT TMC Modifications SITE #1

The Southaven Combined TMC is located at 8791 Northwest Drive, Southaven, Mississippi (Police Department).

Software: The Contractor shall initially use vendor supplied software to test the Dynamic Message Signs (DMS), Radar Detection Systems (RDS), and CCTV and demonstrate full compliance with the contract requirements. A minimum of two (2) licenses of each system of the vendor supplied software must be provided to MDOT upon completion of the testing for each component.

In addition to the vendor supplied software, MDOT currently has the 360 Surveillance ITS Software Suite installed at the Southaven Regional TMC. The software is currently configured for controlling cameras only, but the contractor shall be required to configure the software to utilize and operate the DMS, RDS, and CCTV once this project is complete.

The Contractor is required to fully configure the existing 360 Surveillance software for operation of the DMS, RDS, and CCTV that are installed on this project. At a minimum, this shall include:

- Update and configure the existing map to show the locations of the DMS, RDS, and CCTV with dynamic icons.
- Install and configure all DMS, RDS, and CCTV into the software's database.
- Configure a database of up to 20 preprogrammed messages provided by the MDOT Statewide TMC Manager into the 360 software for the DMS.

The Contractor is required to arrange for the 360 surveillance vendor to be on-site to complete this configuration and provide the required testing to show that the software is fully functioning for each dynamic message sign, radar detection station, and CCTV.

The Contractor is required to reconfigure the existing Actra Server System in the Regional TMC to fully integrate the signalized controllers that this project is required to interconnect on the fiber located at the intersections of Stateline Road and Northwest Drive, Stateline Road and I-55 interchange, and Stateline Road and Hamilton Road.

Equipment:

- Trunk Fiber Installation:
  The Contractor shall be required to route the two (2) backbone 72 single mode fiber cables from the pullbox outside the TMC as located in the plans, into the building and into the TMC equipment room.
  The Contractor is required to route the fiber cables from the pullbox outside the building through the building overhead in the ceiling through 2 inch diameter rigid steel conduit according to NEC guidelines and end in the TMC equipment room.
  Each of the two trunk cables shall be terminated as required in the fiber special provisions in a termination cabinet to be located in the equipment rack provided by the contractor. The Contractor will be required to provide a minimum of twenty four (24) duplex 3 meter fiber patch cables that meet the requirements of the fiber special provisions and type connectors of the patch panels provided.

- Two video decoders will be required to be provided and installed in the TMC equipment room racks as and shall be 100% compatible with and from the same manufacturer as the encoders provided on this project for the CCTV field locations. The decoders must be compliant with all requirements set forth in Section 907-662 of these Specifications. The decoders shall be configured by the Contractor to receive the streams from the field encoders installed on this project. All cables required for installation shall be considered incidental.

- Switch Upgrades:
  The Contractor shall be responsible to provide, install, configure, and integrate two (2) fiber optic Gbics into the existing Cisco 6500 located in the TMC equipment room that will interface to the Type A hardened field switches over the single mode fiber network. The GBICs must be compatible with the Type A field switch fiber ports to type and wavelength. The Contractor is responsible to provide GBICs to meet distance budgets between the TMC switch and the field switches. The Contractor shall be responsible to provide any needed Cisco 6500 interface cards to support the additional GBICs.

- The Contractor shall provide all work, equipment, configuration, and incidental cabling to interconnect the fiber from the signalized controllers listed in this NTB to the port server attached to the Actra Server in the TMC equipment room to communicate and be integrated with the signalized controllers and will be considered incidental to TMC modifications.

- A single free standing equipment rack will be provided by the contractor to be placed in the TMC equipment room > The Rack shall be a 19 inch rack with four legs and mounting in front and back. The rack provided by the Contractor shall be a minimum 72 inches tall and a minimum of 30 inches deep.

- An Uninterruptible Power Supply (UPS) APC model Smart-UPS 2200, 19 inch rack mount and 120v version, shall be provided and installed in the new equipment rack.

Testing: The Contractor shall submit a proposed test plan for review and approval by MDOT. The Test plan shall demonstrate full compliance with all requirements in the plans and specifications.

Training: 4 hours of training and assistance shall be provided for operations, testing, and maintenance of the TMC Systems provided on this contract.

MDOT TMC Modifications SITE #2

The MDOT TMC is located at 2567 North West Street, Jackson, MS, 39216. The Center is in the MDOT Shop Complex, Building A, on the 3rd Floor.

Software: MDOT currently has the 360 Surveillance ITS Software Suite installed at the Statewide TMC. The Contractor shall be required to configure the software at the Statewide center to utilized and operate the DMS, RDS, and CCTV once this project is complete to work from the Regional and Statewide systems.

The Contractor is required to fully configure the existing 360 Surveillance software at the statewide TMC for operation of the DMS, RDS, and CCTV that are installed on this project. At a minimum, this shall include:

- Update and configure the existing map to show the locations of the DMS, RDS, and CCTV with dynamic icons.
- Install and configure all DMS, RDS, and CCTV into the software's database.
- Configure a database of up to 20 preprogrammed messages provided by the MDOT Statewide TMC Manager into the 360 software for the DMS.

The Contractor is required to arrange for the 360 surveillance vendor to be on-site to complete this configuration and provide the required testing to show that the software is fully functioning for each dynamic message sign, radar detection station, and CCTV.

The Contractor is required to reconfigure the existing Actra Server System in the Statewide TMC to fully integrate the signalized controllers that this project is required to interconnect on the fiber located at the intersections of Stateline Road and Northwest Drive, Stateline Road and I-55 interchange, and Stateline Road and Hamilton Road.

Equipment:

- Two video decoders will be required to be provided and installed in the TMC equipment room racks as and shall be 100% compatible with and from the same manufacturer as the encoders provided on this project for the CCTV field locations. The decoders must be compliant with all requirements set forth in Section 907-662 of these Specifications The decoders shall be configured by the Contractor to receive the streams from the field encoders installed on this project. All cables required for installation shall be considered incidental.

Testing: The Contractor shall submit a proposed test plan for review and approval by MDOT. The Test plan shall demonstrate full compliance with all requirements in the plans and specifications.

Training: 4 hours of training and assistance shall be provided for operations, testing, and maintenance of the 360 Software for DMS, RDS, and CCTV Systems provided on this contract.

Payment: All work, software, equipment, testing, and training covered in this NTB will be paid under TMC Modifications pay items 907-659-A and 907-659-C.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 1998 **CODE: (SP)**

DATE: **05/16/2008**

SUBJECT: **Contract Time**

PROJECT: **SP-0017-00(001) / 104589301 -- Desoto County**

The calendar date for completion of work to be performed by the Contractor for this project shall be **December 29, 2009** which date or extended date as provided in Subsection 108.06 shall be the end of contract time. It is anticipated that the Notice of Award will be issued by not later than July **8, 2008.** The date for the Notice to Proceed / Beginning of Contract Time will be simultaneous with the execution of the contract.

A progress schedule as referenced to in Subsection 108.03 will not be required for this contract.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 2002 **CODE: (SP)**

DATE: **May 28, 2008**

SUBJECT: **Pre-Bid Conference**

PROJECT: **SP-0017-00(001) / 104589301- Desoto County**

A Pre-Bid meeting will be held in the Conference Room of the Mississippi Department of Transportation's Batesville District Office located at 150 Hwy 51 North, Batesville, Mississippi at 9:30 A.M. on Wednesday, June 11, 2008.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 2003 **CODE: (SP)**

DATE: **May 28, 2008**

SUBJECT: **Lane Closure Restrictions**

PROJECT: **SP-0017-00(001) / 104589301- Desoto County**

Lane closures resulting in less than the full travel lanes indicated in the contract and on the Traffic Control sheets of the plans will not be permitted under any circumstances during the time periods shown below unless specifically directed by the Engineer in writing:

I-55 NORTHBOUND: Monday thru Friday from 6:00 A.M. to 6:00 P.M.

I-55 SOUTHBOUND: Monday thru Friday from 6:00 A.M. to 6:00 P.M.

ALL ROADWAYS WITHIN THE PROJECT LIMITS: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day and the day preceding each holiday. For Thanksgiving Day, lane closures will not be allowed the Wednesday preceding through the Sunday following the holiday. No lane closures will be permitted on the preceding Friday from 6:00 A.M. until Tuesday 7:00 P.M. if a State Holiday occurs or is observed on Monday, and no lane closures permitted on the preceding Thursday from 6:00 A.M. until Monday Morning at 7:00 A.M. if a holiday is observed on Friday. No lanes closures will also be permitted on any other "SPECIAL EVENT" days as directed by the Engineer. All lane closures shall be approved by the Engineer.

During these time periods no excuses will be accepted by the Department, and the Contractor will be assessed a lane rental fee of $2000.00 per closure for each full or partial five (5) minute period during which less than the current full travel lanes indicated on the Traffic Control Sheets of the plans are available to the traveling public.

Lane closure resulting in less than the full travel lanes indicated in the contract and on the Traffic Control Sheets of the plans, in any direction of travel, will be permitted at all times other than those listed above. For any section of roadway that has more than two (2) lanes as indicated in the contract and/or on the Traffic Control Sheets of the plans the Contractor will be allowed to close only one (1) lane for a given direction of travel. Work requiring a lane closure shall begin within two (2) hours of the closure set-up. The Contractor will be assessed a lane rental fee of $2000.00 per closure for each full or partial five (5) minute period should failure to begin work within the allotted time occur.

For purposes of this contract, official time is considered to be the announced time available at Southaven Area telephone number (662) 895-5527.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SUPPLEMENT TO SPECIAL PROVISION NO. 907-105-3

DATE: 03/31/2008

SUBJECT: Cooperation By Contractor

Delete the first sentence of the first paragraph inder 907-105-05 on page 1, and substitute the following:

On projects that include erosion control pay items, the Contractor shall also designate a responsible person whose primary duty shall be to monitor and maintain the effectiveness of the erosion control plan, including NPDES permit requirements.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-105-3 **CODE: (IS)**

DATE: **02/14/2006**

SUBJECT: **Cooperation By Contractor**

Section 105, Control of Work, of the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is modified as follows:

907-105.05--Cooperation by Contractor. In the third sentence of the second paragraph of Subsection 105.05 on page 35, change "Notice to Proceed" to "Notice of Award".

Delete the fourth paragraph of Subsection 105.05 on page 35, and substitute the following.

The Contractor shall also designate a responsible person whose primary duty shall be to monitor and maintain the effectiveness of the erosion control plan, including NPDES permit requirements. This responsible person must be a Certified Erosion Control Person certified by an organization approved by the Department. Prior to or at the pre-construction conference, the Contractor shall designate in writing the Certified Erosion Control Person to the Project Engineer. The designated Certified Erosion Control Person shall be assigned to only one (1) project. When special conditions exist, such as two (2) adjoining projects or two (2) projects in close proximity, the Contractor may request in writing that the State Construction Engineer approve the use of one (1) Certified Erosion Control Person for both projects. The Contractor may request in writing that the Engineer authorize a substitute Certified Erosion Control Person to act in the absence of the Certified Erosion Control Person. The substitute Certified Erosion Control Person must also be certified by an organization approved by the Department. A copy of the Certified Erosion Control Person's certification must be included in the Contractor's Protection Plan as outlined in Subsection 907-107.22.1. This in no way modifies the requirements regarding the assignment and availability of the superintendent.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SUPPLEMENT TO SPECIAL PROVISION NO. 907-107-1

DATE: 03/21/2006

SUBJECT: Liability Insurance

In the first sentence of the first paragraph of Subsection 907-107.14.2.1 on page 1, change "$300,000 each occurrence" to "$500,000 each occurrence".

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-107-1 **CODE: (IS)**

DATE: **05/03/2004**

SUBJECT: **Liability Insurance**

Section 107, Legal Relations and Responsibility to Public, of the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows:

907-107.14.2--Liability Insurance. Delete in toto Subsection 107.14.2 beginning on page 60 and substitute:

907-107.14.2.1--General. The Contractor shall carry Contractor's liability, including subcontractors and contractual, with limits not less than: $300,000 each occurrence; $1,000,000 aggregate; automobile liability - $500,000 combined single limit - each accident; Workers' Compensation and Employers' Liability - Statutory & $100,000 each accident; $100,000 each employee; $500,000 policy limit. Each policy shall be signed or countersigned by a Mississippi Resident Agent of the insurance company.

The Contractor shall have certificates furnished to the Department from the insurance companies providing the required coverage. The certificates shall be on the form furnished by the Department and will show the types and limits of coverage.

907-107.14.2.2--Railroad Protective. The following provisions are applicable to all work performed under a contract on, over or under the rights-of-way of each railroad shown on the plans.

The Contractor shall assume all liability for any and all damages to work, employees, servants, equipment and materials caused by railroad traffic.

Prior to starting any work on railroad property, the Contractor shall furnish satisfactory evidence to the Department that insurance of the forms and amounts set out herein in paragraphs (a) and (b) has been obtained. Also, the Contractor shall furnish similar evidence to the Railroad Company that insurance has been obtained in accordance with the Standard Provisions for General Liability Policies and the Railroad Protective Liability Form as published in the Code of Federal Regulations, 23 CFR 646, Subpart A. Evidence to the Railroad Company shall be in the form of a Certificate of Insurance for coverages required in paragraph (b), and the original policy of the Railroad Protective Liability Insurance for coverage required in paragraph (a).

All insurance herein specified shall be carried until the contract is satisfactorily complete as evidenced by a release of maintenance from the Department.

The Railroad Company shall be given at least 30 days notice prior to cancellation of the Railroad Protective Liability Insurance policy.

For work within the limits set out in Subsection 107.18 and this subsection, the Contractor shall provide insurance for bodily injury liability, property damage liability and physical damage to property with coverages and limits no less than shown in paragraphs (a) and (b). Bodily injury shall mean bodily injury, sickness, or disease, including death at anytime resulting therefrom. Property damage shall mean damages because of physical injury to or destruction of property, including loss of use of any property due to such injury or destruction. Physical damage shall mean direct and accidental loss of or damage to rolling stock and their contents, mechanical construction equipment or motive power equipment.

(a) **Railroad Protective Liability Insurance** shall be purchased on behalf of the Railroad Company with limits of $2,000,000 each occurrence; $6,000,000 aggregate applying separately to each annual period for lines without passenger trains. If the line carries passenger train(s), railroad protective liability insurance shall be purchased on behalf of the Railroad Company with limits of $5,000,000 each occurrence; $10,000,000 aggregate applying separately to each annual period.

Coverage shall be limited to damage suffered by the railroad on account of occurrences arising out of the work of the Contractor on or about the railroad right-of-way, independent of the railroad's general supervision or control, except as noted in paragraph 4 below.

Coverage shall include:

(1) death of or bodily injury to passengers of the railroad and employees of the railroad not covered by State workmen's compensation laws,

(2) personal property owned by or in the care, custody or control of the railroads,

(3) the Contractor, or any of the Contractor's agents or employees who suffer bodily injury or death as a result of acts of the railroad or its agents, regardless of the negligence of the railroads, and

(4) negligence of only the following classes of railroad employees:

(i) any supervisory employee of the railroad at the job site

(ii) any employee of the railroad while operating, attached to, or engaged on, work trains or other railroad equipment at the job site which are assigned exclusively to the Contractor, or

(iii) any employee of the railroad not within (i) or (ii) above who is specifically loaned or assigned to the work of the Contractor for prevention of accidents or protection or property, the cost of whose services is borne specifically by the Contractor or Governmental authority.

(b) **Regular Contractor's Liability**, including subcontractors, XCU and railroad contractual with limits of $1,000,000 each occurrence; $2,000,000 aggregate. **Automobile** with limits of $1,000,000 combined single limit any one accident; **Workers' Compensation and Employer's Liability** - statutory and $100,000 each accident; $100,000 each employee; $500,000 policy limit. **Excess/Umbrella Liability** $5,000,000 each occurrence; $5,000,000 aggregate. All coverage to be issued in the name of the Contractor shall be so written as to furnish protection to the Contractor respecting the Contractor's operations in performing work covered by the contract. Coverage shall include protection from damages arising out of bodily injury or death and damage or destruction of property which may be suffered by persons other than the Contractor's own employees.

In addition, the Contractor shall provide for and on behalf of each subcontractor by means of a separate and individual liability and property damage policy to cover like liability imposed upon the subcontractor as a result of the subcontractor's operations in the same amounts as contained above; or, in the alternative each subcontractor shall provide same.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-107-3 **CODE: (IS)**

DATE: **02/14/2006**

SUBJECT: **Contractor's Protection Plan**

Section 107, Legal Relations and Responsibility to Public, of the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows:

907-107.22.1--Contractor's Protection Plan. After item number 3 in Subsection 107.22.1 on page 65, add the following:

4. A copy of the certification for the Contractor's Certified Erosion Control Person for monitoring and maintaining the effectiveness of the erosion control plan, including NPDES permit requirements.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SUPPLEMENT TO SPECIAL PROVISION NO. 907-107-6

DATE: 11/16/2007

SUBJECT: Legal Relations and Responsibility to Public

After Subsection 907-107.15 on page 1, add the following:

907-107.17--Contractor's Responsibility for Work. Delete the fifth sentence of the fifth paragraph of Subsection 107.17 on page 63 and substitute the following:

The eligible permanent items shall be limited to traffic signal systems, changeable message signs, roadway signs and sign supports, lighting items, guard rail items, delineators, impact attenuators, median barriers, bridge railing or pavement markings. The eligible temporary items shall be limited to changeable message signs, guard rail items, or median barriers.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-107-6 **CODE: (IS)**

DATE: **07/03/2007**

SUBJECT: **Legal Relations and Responsibility to Public**

Section 107, Legal Relations and Responsibility to Public, of the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows:

907-107.02--Permits, Licenses and Taxes. Delete in toto Subsection 107.02 on page 49 and substitute the following:

The Contractor or any Subcontractor shall have the duty to determine any and all permits and licenses required and to procure all permits and licenses, pay all charges, fees and taxes and issue all notices necessary and incidental to the due and lawful prosecution of the work. At any time during the life of this contract, the Department may audit the Contractor's or Subcontractor's compliance with the requirements of this section.

The Contractor or any Subcontractor is advised that the "Mississippi Special Fuel Tax Law", Section 27-55-501, et seq. and the Mississippi Use Tax Law, Section 27-67-1, et seq., and their requirements and penalties, apply to any contract or subcontract for construction, reconstruction, maintenance or repairs, for contracts or subcontracts entered into with the State of Mississippi, any political subdivision of the State of Mississippi, or any Department, Agency, Institute of the State of Mississippi or any political subdivision thereof.

The Contractor or any Subcontractor will be subject to one or more audits by the Department during the life of this contract to make certain that all applicable fuel taxes, as outlined in Section 27-55-501, et seq., and any sales and/or use taxes, as outlined in Section 27-67-1, et seq. are being paid in compliance with the law. The Department will notify the Mississippi State Tax Commission of the names and addresses of any Contractors or Subcontractors.

907-107.15--Third Party Beneficiary Clause. In the first sentence of the first paragraph of Subsection 107.15 on page 61, change "create the public" to "create in the public".

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SUPPLEMENT TO SPECIAL PROVISION NO. 907-108-11

DATE: 03/31/2008

SUBJECT: Contract Time Assessment

Delete the first sentence of the first paragraph of Subsection 907-108.06.1.2 on page 1, and substitute the following:

When the physical features of the controlling phase(s) have not been satisfactorily completed, beginning on December 1 the miscellaneous phase will be shown as the only active phase during the months of December, January, and February.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-108-11 **CODE: (IS)**

DATE: **04/21/2006**

SUBJECT: **Prosecution and Progress**

Section 108, Prosecution and Progress, of the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows:

907-108.01--Subletting of Contract.

907-108.01.1--General. At the end of the last paragraph of Subsection 108.01.1 on page 73, add the following:

The Engineer will have the authority to suspend the work wholly or in part and to withhold payments because of the Contractor's failure to make prompt payment within 15 calendar days as required above, or failure to submit the required OCR-484 Form, Certification of Payments to Subcontractors, which is also designed to comply with prompt payment requirements.

907-108.02--Notice To Proceed. Delete the fourth paragraph of Subsection 108.02 on page 75 and substitute the following:

Upon written request from the Contractor and if circumstances permit, the Notice to Proceed may be issued at an earlier date subject to the conditions stated therein. The Contractor shall not be entitled to any monetary damages or extension of contract time for any delay claim or claim of inefficiency occurring between the early issuance Notice To Proceed date and the Notice to Proceed date stated in the contract.

907-108.06.1.2--Contract Time Assessment. At the end of the eighth paragraph of Subsection 108.06.1.2 on page 81, add the following:

When the approved progress schedule indicates that a controlling phase(s) is to be completed prior to December 1 and the physical features of the phase(s) have not been satisfactorily completed, beginning on December 1 the miscellaneous phase will be shown as the only active phase during the months of December, January, and February. Under this condition, time units, monthly time units divided by monthly calendar days, will be assessed in accordance with the applicable column in the TABLE OF TIME UNITS. If the physical features of the phase(s) have not been completed by March 1, the phase will resume as a controlling phase and time assessment will be made accordingly.

Delete the fourth and fifth sentence of the thirteenth paragraph of Subsection 108.06.1.2 on page 82, and substitute the following:

In the event mutual agreement cannot be reached, the Contractor will be allowed a maximum of 25 calendar days following the Contractor's receipt of the monthly report in question to file a protest Notice of Claim in accordance with the provisions of Subsection 105.17. Otherwise, the Engineer's assessment shall be final unless mathematical errors of assessment are subsequently found to exist.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-108-15 **CODE: (SP)**

DATE: 09/20/2007

SUBJECT: Cessation of Contract Time

Section 108, Prosecution and Progress, of the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows:

907-108.06--Determination and Extension of Contract Time.

907-108.06.2--Based on Calendar Date Completion. After Subsection 108.06.2.1 on page 85, add the following:

907-108.06.2.2--Cessation of Contract Time. When the Engineer by written notice schedules a final inspection, time will be suspended until the final inspection is conducted and for an additional 14 calendar days thereafter. If after the end of the 14-day suspension all necessary items of work have not been completed, time charges will resume. If the specified completion date had not been reached at the time the Contractor called for a final inspection, the calendar day difference between the specified completion date and the date the Contractor called for a final inspection will be added after the 14-day period before starting liquidation damages. If a project is on liquidated damages at the time a final inspection is scheduled, liquidated damages will be suspended until the final inspection is conducted and for seven (7) calendar days thereafter. If after the end of the 7-day suspension all necessary items of work have not been completed, liquidated damages will resume. When final inspection has been made by the Engineer as prescribed in Subsection 105.16 and all items of work have been completed, the daily time charge will cease.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SUPPLEMENT TO SPECIAL PROVISION NO. 907-109-3

DATE: 11/21/2006

SUBJECT: Changes in Material Costs

After the last paragraph of Subsection 907-109.06.1 on page 1, add the following:

907-109.07--Changes in Material Costs. Delete the second sentence of the first paragraph of Subsection 109.07 on page 95, and substitute the following:

When a pay item on the bid sheets indicate that an adjustment is allowed and when a notice to bidders is included in the contract showing current monthly base prices, an adjustment will be provided as follows:

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-109-3 **CODE: (IS)**

DATE: 04/21/2006

SUBJECT: Partial Payment

Section 109, Measurement and Payment, of the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows:

907-109.04--Extra and Force Account Work. Delete the first sentence of the second paragraph of Subsection 109.04 under (d) on page 92 and substitute the following:

In the event an agreement cannot be reached for a particular piece of equipment, the book entitled "Rental Rate Blue Book For Construction Equipment" as published by EquipmentWatch® and is current at the time the force account work is authorized will be used to determine equipment ownership and operating expense rates.

907-109.06--Partial Payment.

907-109.06.1--General. Delete the fourth and fifth sentences of the third paragraph of Subsection 109.06.1 on page 94, and substitute the following:

In the event mutual agreement cannot be reached, the Contractor will be allowed a maximum of 25 calendar days following the Contractor's receipt of the monthly estimate in question to file in writing, a protest Notice of Claim in accordance with the provisions Subsection 105.17. Otherwise, the Engineer's estimated quantities shall be considered acceptable pending any changes made during the checking of final quantities.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-619-1 **CODE: (SP)**

DATE: 06/02/2004

SUBJECT: Changeable Message Signs

Section 619, Traffic Control for Construction Zones, of the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows:

907-619.02--Material Requirements. After Subsection 619.02.13 on page 424, add the following:

907-619.02.12--Changeable Message Sign. The changeable message sign shall be trailer-mounted, full size, LED, full matrix, solar powered, portable changeable message sign. The sign shall be capable of on-site operation via onboard keyboard/keypad, and when specified, remote operation via software compatible with Windows 2000 / Windows XP operating system. The entire sign assembly shall be designed and constructed to withstand and operate during a minimum of 75 MPH wind gusts with all outriggers and/or leveling jacks in place. The entire sign assembly, including each component exposed to weather, shall be sealed and water-proofed to prevent water penetration when subjected to rain and gusting winds of 75 MPH. If more than one changeable message sign is specified, they shall all be of the same model and from the same manufacturer. All parts and materials used to construct the changeable message sign shall be new.

When specified, each sign shall be provided either with or without the necessary hardware to control the sign remotely. If provided without the hardware, the sign shall be constructed with wiring in place to provide the connections for the necessary onboard hardware to control the sign remotely. The manufacturer shall supply a serial and/or USB connection within the sign control cabinet so that a laptop computer using the remote software can communicate directly with the sign CPU.

When specified, the sign shall be capable of displaying dynamic, in-situ traffic speeds through the use of an optional traffic radar transducer. The sign shall also be capable of radar interrupt. This option shall interrupt the original user-specified sequence of messages to display the approaching vehicle speeds and/or an alternate sequence of messages as determined by the user. This option shall also have the functionality to display the speeds of the approaching vehicles as a stand-alone sequence.

When specified, each sign shall be NTCIP compliant/compatible.

When specified, each sign shall be provided either with or without the necessary hardware to operate a Highway Advisory Radio (HAR) system. If provided without the hardware, the sign shall be constructed to provide the required connections to easily add the necessary onboard hardware to operate the HAR.

General. The sign shall be mounted on a portable trailer containing the necessary solar panels, deep-cycle heavy-duty batteries, and battery charger. When specified, gel-type batteries shall be a replacement for deep-cycle heavy-duty batteries. In the event of prolonged lack of sufficient sunlight, the sign batteries shall be capable of being charged while the sign is operating by the use of a standard 120 Volt AC generator. The sign shall be equipped with a male plug-in and a 50-foot long extension cord constructed of a minimum 12-guage wire for this purpose. This plug-in shall also be capable of charging the sign batteries using standard 120 Volt AC current when the sign is not in use.

When specified, the sign shall be supplied with either the necessary onboard hardware to control the sign remotely, or the required connections to easily add the necessary onboard hardware to control the sign remotely. This hardware shall consist of, but is not limited to, a cellular telephone capable of operating in digital mode, and/or analog mode when specified, the necessary external antenna, communications cables, and the necessary modem for communicating with the sign operating software. The sign shall also be supplied with the necessary software to control the sign from a remote location. This software shall be Windows 2000 / Windows XP operating system compatible for use on any desktop or laptop equipped with a Hayes Compatible Modem, and any necessary software which must be installed on the sign for communication with a remote computer. The cell phone and/or modem shall be capable of communication using the MDOT cell service provider and it shall be the responsibility of the manufacturer/contractor to demonstrate this service. The sign shall be capable of data communications at a minimum transmission speed of 40 kilobytes per second. The sign shall not be dependent on cellular digital packet data type technology for wireless communications.

The software for controlling the sign and sign messages shall be password protected to safeguard against unauthorized use. There shall be a minimum of three (3) levels of password protection. The most restrictive level shall allow an operator to select a preprogrammed sequence of messages for display while restricting access to the computer's sign and sequence programming. The next restrictive level shall allow the operator to access the sign's primary controls such as sign brightness, message and sequence editing, and establishing schedules. The least restrictive level shall allow full access to all controls, passwords, signs parameter display, and diagnostic display.

Sign diagnostics shall include, but not be limited to, LED brightness controls, internal operating temperature, sign status, communications status, radar status and solar status via onboard display and/or when specified, remote software. The sign status shall provide information on the sign operation that includes CPU inputs and outputs, battery voltage, 110 VAC service indicator, low voltage indicator, and photocell ambient light level. The solar status shall provide information on voltage level from the batteries, voltage level for the LED display, sign brightness level, percent of maximum brightness for LED's, and photocell ambient light level.

The sign software shall be capable of scheduling predetermined sequences of messages based on a programmed time and date.

There shall be a minimum of 180 pre-stored, standard signs and messages as detailed in the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD), all capable of being displayed. There shall also be storage space provided for an additional 150 user-programmed signs and/or messages. Each sign CPU shall have the capacity to store a minimum of 150 programmable sequences. Each sequence shall be capable of displaying up to six (6) programmed signs, symbols, or messages. There shall also be provided, as stored data, and capable of being displayed, all graphical symbols of regulatory and warning symbols detailed in the latest edition of the MUTCD.

The sign display shall be capable of displaying both static and dynamic graphics/messages. The sign display shall also be capable of displaying messages in full size to utilize the maximum area of display. It shall also be capable of displaying conventional one, two, or three-line messages for display with a choice of a minimum of nine (9) font sizes.

At least two copies of user manuals shall be provided with each sign. Each manual shall include all operational functions and software required to operate the sign on site and remotely. This manual shall include all wiring diagrams, parts lists, and sign specifications as well as component warranty information. Each copy shall be bound and shall contain laminated sheets.

Trailer Control Cabinet. The control cabinet shall be constructed of aluminum and shall receive an automotive grade protective coating as should the rest of the trailer. The sign cabinet shall be manufactured to withstand all types of adverse weather conditions and shall have screens or filters installed to keep insects out. This control cabinet shall be lockable, internally illuminated, and house the keyboard terminal and control panel. Lighted keys and terminal displays are acceptable. This control cabinet shall be manufactured in accordance with the latest NEMA 3R/4 standards. The control cabinet shall contain all controls and the necessary gauges for monitoring sign activity. All controls shall be labeled using engraved laminated plastic that is a minimum of 1/16-inch thick. These gauges shall include, but are not limited to, a voltmeter, which indicates current battery charge status, and an amp meter, which indicates current/charging status. The provision of this information via digital readout on a control console or panel is acceptable.

Sign Display. The sign display housing shall be constructed of aluminum and shall be composed of a full matrix of LED's. The sign display housing shall be manufactured in accordance with the latest NEMA 3R/4 standards. The sign shall be comprised of easily interchangeable modules that may be individually replaced in the event of failure or damage. The sign display shall have the minimum capability of displaying three lines of 18-inch nominal high text with eight characters per line. The sign display shall be capable of displaying preprogrammed Manual on Uniform Traffic Control Devices (MUTCD) symbolic messages and standard arrows. This sign shall be a full matrix type, not a fixed matrix type. The sign display shall also be capable of displaying user-defined custom messages and graphics. These messages shall be capable of saving for later recall and use. The sign shall be capable of displaying a preprogrammed default message, or no message at all, in the event of a power failure. When displaying text messages, the spacing between lines of text shall be a minimum of six (6) inches and the inter-character spacing shall be a minimum of three (3) inches. The sign shall be capable of shutting down its LED display if internal cabinet temperatures reach a level that is determined

unsafe by the manufacturer. The LED's shall be ITE amber wide angle for both daytime and nighttime viewing at an angle of 17 degrees, shall be rated for a service life of 100,000 hours, and shall have an operating temperature range of between -22°F to +165°F. The associated electronics for operation of display power supply shall be fully operational in the temperature range of -30°F to +165°F. The sign display shall be protected by a non-glaring polycarbonite material of at least ¼ inch thickness. The display shall provide easy access to all components contained within the display housing.

LED Brightness Control. The sign shall be equipped with both automatic and manual controls to adjust the brightness of the LEDs. The automatic control shall be capable of varying the LED brightness by sensing the ambient light level using photocells. The manual brightness control shall be password protected to safeguard against unauthorized use. LED brightness control shall also be contained within the remote operational software.

Sign Trailer. The trailer shall be equipped with a minimum of two wheels with heavy-duty radial tires. It shall be constructed using a minimum of ASTM A36, 3-inch by 3-inch and 3-inch by 5-inch steel tubing both with a minimum of 3/16-inch wall thickness. Each wheel shall be equipped with one locking lug nut. A minimum of four keys for the locking lug nuts shall be supplied for each trailer. The trailer spring leafs shall be rated for 3500 pounds. The wheels shall be 15-inch steel wheels with five lug bolts per wheel. The wheels shall each be fitted with new P 205-75-15B rated tires.

The trailer shall be provided with a minimum of four outriggers or leveling jacks. One outrigger or leveling jack shall be mounted near each corner of the trailer. The length of the leveling jacks shall be such that when the trailer is level, all four jacks and the tongue jack can be lowered into the vertical position. The trailer shall also be provided with a trailer stand mounted on the tongue of the trailer. The trailer stand shall be a corrosion resistant, screw type jack stand which provides up to a 25-inch lift with a pull-pin swivel release that enables the jack to swing up to a horizontal position for towing. The stand shall also include a 6-inch wheel that allows horizontal positioning of the trailer. The jack stand shall be welded, not bolted, to the tongue of the trailer. The trailer shall be provided with legal tail/brake lights, signals, and license plate mounting bracket. The trailer shall be provided with a 2-inch "hammer blow coupler" style hitch capable of being reversible with a 2½-inch Pintle ring. The trailer shall contain the batteries, solar panels, display lift, and control console.

The trailer shall be equipped with an electric or hydraulic lift, or combination thereof, for the sign display. The sign shall also be equipped with a manual backup lift. The display lift shall raise the sign to a minimum of seven feet above the roadway surface. The sign display shall be capable of rotating and locking at any selected angle up to 360 degrees. A positive brake assembly with lockable control arm shall be provided to position the sign display in the desired position. A mast safety pin shall be provided to prevent the sign display from falling in the event of an electric or hydraulic system failure.

All welding shall be performed by certified welders and in accordance to applicable American Welding Society standards. All metal surfaces shall receive a protective coating such as powder

coating, two coats of primer and two coats of finish/color. The finished coating shall be automotive grade.

All cabinets, display cases, battery cabinets and connections shall be NEMA 3R/4 compliant. All cabinets must be completely encased and lockable with a standard padlock. A lockable storage cabinet shall be provided to house various accessories.

The trailer shall have a 6,000-pound capacity hydraulic surge brake system along with a breakaway latch.

Radar. When specified, the sign shall be equipped with a traffic radar operating in the "K" band, in an "approach only" mode. In conjunction with the radar, the sign shall be capable of displaying dynamic, in-situ vehicle speeds. The radar shall be able to interface directly with the CPU and operational software for applications such as vehicle speeds. The unit shall be programmable to allow the interruption of user-defined messages to display vehicle speed and/or alternate messages whenever a settable speed threshold is exceeded. The radar unit shall be encased in an aluminum enclosure with a polycarbonate lens, and the metal portion shall receive the same protective coating, priming, and painting as the rest of the sign.

907-619.03--Construction Requirements. After Subsection 619.03.9 on page 427, add the following:

907-619.03.10--Changeable Message Sign. Each changeable message sign shall be installed and continuously operated at the location selected by the Engineer on State right-of-way. The Contractor is advised that selected locations may be outside the planned indicated limits of the project. The Contractor shall perform all work necessary for preparation of the site selected and approved by the Engineer, to insure maximum safety for and sign visibility of the traveling public; and may be required to remove any temporary work at a later date as directed by the Engineer. The Contractor will also place a minimum of two plastic drums in advance of the sign and one beside the sign as long as it is in use. The Contractor shall be required to move the sign to a new location if directed by the Engineer.

The Contractor may be permitted to bring electric power from outside the normal right-of-way for operation of the equipment if the Department determines that the installation operation will not be hazardous to the traveling public. The Contractor will be required to secure a permit from the Department prior to any work by the power company on the right-of-way. The entire cost of providing electrical service, power to operate the equipment, and removal of the power source from the right-of-way shall be borne by the Contractor.

The changeable message sign(s) will remain the property of the Contractor after the Engineer determines that there is no further need for the sign(s) on the project.

907-619.04--Method of Measurement. After the last paragraph of Subsection 428 on page 619-7, add the following:

Changeable message signs, as described above, will be measured by the unit. When directed, separate measurements will be made for items included in the contract and required for temporary site preparation for the sign as referenced in Subsection 907-619.03.10. Materials for which no pay items are included in the contract will not be measured for separate payment. Separate measurements will not be made for moving the changeable message sign to a new location, but materials used for which pay items are included in the contract and are necessary for repositioning the sign as directed by the Engineer will be measured for separate payment. Removal of materials used for site preparation for changeable message signs will not be measured for separate payment.

907-619.05--Basis of Payment. After the second paragraph of Subsection 619.05 on page 428, add the following:

Payment for items required by the Engineer for temporary location of the changeable message sign, and for which pay items are included in the contract, will be made by the individual pay item. No additional payment will be made for having to work outside the planned indicated project limits.

Payment for removal of materials used for site preparation at changeable message sign locations shall be included in the contract bid price for Maintenance of Traffic.

Between pay item nos. 619-E2 and 619-F1 on page 429, insert the following:

907-619-E3: Changeable Message Sign (____*____) - per each

* Indicate when the sign is "With Remote" and/or "With Radar"

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-630-4 **CODE: (SP)**

DATE: 08/14/06

SUBJECT: Contractor Designed Overhead Sign Supports

Section 630, Traffic Signs and Delineators, of the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows:

907-630.01--Description. Delete the last two paragraphs of Subsection 630.01 on page 454 and substitute the following:

The Contractor shall submit to the Bridge Engineer a design using steel. The design shall be a rectangular box truss connected at both the top and bottom to the vertical support posts. With the exception of cantilever mounts, overhead support structures shall have two vertical support posts at each end of the truss. Design drawings, calculations and other necessary supporting data shall be submitted as soon as possible after the Pre-Construction Conference. The design shall be prepared by a Professional Engineer registered in the State of Mississippi proficient in the design of overhead sign structures.

The design wind speed shall be as shown in the design specifications with a minimum of 90 mph. In addition to the loads required in the design specifications, overhead sign supports shall be designed to support a uniform load of 40 pounds per linear foot applied to the vertical truss to which the signs are attached, extending along the truss across the roadway below from points four feet outside each outer edge of pavement, unless otherwise specified. Appropriate damping or energy absorbing devices shall be installed in the event that an overhead structure is erected without installation of the permanent sign panels or if the area of permanent sign panels installed is not sufficient to prevent detrimental wind-induced vibration.

The larger of the following sign configurations shall be used in the design of overhead sign support structures:

1) The sign dimensions and configuration shown in the contract plans
2) Sign Height: 20 feet; Sign Width: Pavement Edge to Pavement Edge plus 16 feet
3) Sign Height: 20 feet; Sign Width: Post to Post Clear Spacing minus 44 feet

The sign widths in configurations 2) and 3) should be located symmetrically about the center of the truss.

901-630.01.1--Dynamic Message Sign Supports. In addition to the requirements above, supports for Dynamic Message Signs (DMS) shall also meet the following requirements.

The sign structure manufacturer shall consider truck induced wind loading in deflection calculations. The natural frequency response of the structure to truck induced wind loads when span type DMS structure are used shall be considered. More information can be obtained on this subject in the Transportation Research Board (National Research Council) "Truck Induced Wind Loads on Variable Message Signs", Research Record No. 1594, published in 1997.

The Contractor shall be responsible for the complete design of the structure, catwalk, footing, median barrier replacement, DMS attachments and all other related hardware.

Each structure shall be fully warranted for but not limited to rust, corrosion and structural failure as a complete assembly by the manufacturer.

The Contractor shall determine the actual span length and the actual length of support columns for all sign structures on the basis of existing field conditions and detailed survey completed by the Contractor.

All DMS over the roadway sign structures shall include a catwalk. The Contractor shall be responsible for the catwalk design and shall submit the design calculations to the Bridge Engineer for approval. For over the roadway signs, the catwalk shall span from the outside edge of the shoulder to the door o the DMS. The bottom of the catwalk shall be covered with a heavy galvanized wire mesh which shall have openings no larger than ¼".

All parts of the structure shall be designed using a wind velocity of 90 mph.

All pedestal mounted DMS sign structures shall consist of a single steel pole with the DMS centered over the front face of the pole. The top of the pole shall not extend above the top of the DMS.

The Contractor shall be responsible for performing soil borings at each location to be used in the design of the foundations and sign supports. If soil conditions required the use of any shoring, casings, or sonotube for proper installation of the foundations, the cost of the shoring, casings or sonotube shall be included in the price of the structure.

907-630.04--Method of Measurement. After the last paragraph of Subsection 630.04 on page 463, add the following:

Pedestal Sign Supports will be measured per lump sum for each specific assembly.

907-630.05--Basis of Payment. After the first paragraph of Subsection 630.05 on page 463, add the following:

Pedestal Sign Supports will be paid for at the contract bid price per lump sum, which price shall include the support structure, foundations, catwalk, connection hardware, conduit on the structure and foundation, soil borings, sign and footing design, connections to the support structure, median barrier repair, required repaving around median barrier foundations and all

work, equipment and appurtenances as required to have the structure complete, in place and ready for use. This price shall be full compensation for all labor, tools, materials, equipment and incidentals necessary to complete the work.

Add the "907" prefix to pay item nos. 630-I and 630-J on page 463.

After the last pay item listed on page 463, add the following:

907-630-M: Pedestal Sign Support, Assembly No. ____,
Contractor Designed - lump sum

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-637-1 **CODE: (SP)**

DATE: **5/23/2008**

SUBJECT: **ITS Equipment Cabinets**

Section 637, Equipment Cabinets, of the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows:

Delete in total Section 637 beginning on page 479, and substitute the following:

SECTION 907-637--ITS EQUIPMENT CABINETS

907.637.01--Description. This Section specifies the minimum requirements for equipment cabinets furnished and installed for Mississippi Intelligent Transportation Projects. The cabinet will provide a protective outdoor housing enclosure in which to install field hardware required for ITS devices. Major elements of the equipment cabinet include the cabinet housing and equipment mounting hardware, interior wiring and termination facilities, power supplies, electrical accessories, and field installation.

907-637.02--Materials.

907-637.02.1--General.

907-637.02.2--Furnish Only New Equipment And Materials.

1) Furnish equipment cabinets and integral materials recommended by the manufacturers for outside plant use and the intended application. This requirement includes wiring and electrical materials and configurations (including connector pin-outs) that are wholly or partially related to the field device applications (CCTV, RDS, etc.).
2) Furnish and configure equipment cabinets to be installed at locations as shown in the Plans. Furnish and configure all equipment and materials for each specific location as shown in the Plans.
3) Provide electrical system and components with UL-listings.
4) Unless otherwise specified, provide wire and cable with stranded copper conductors, 75°/90° Celsius wet/dry rated insulation, and sized for the maximum voltage and current in the circuit.

907-637.02.3--Components Specified As Rail-Mounted Shall Be Compliant As Follows:

1) DIN EN 50022 (NS35) component rails.
2) Component rails shall be the perforated type and of sufficient length as to protrude beyond the mounted components for fastening to cabinet panels as specified herein.
3) UL 1059.
4) UL 486E.

5) NEMA ISC-4.
6) Alternate Rail configurations may be submitted to the Engineer for consideration and approval.

907-637.02.4--Terminal Blocks And Component Terminals.

1) Shall be nickel-plated copper, copper alloy or brass.
2) Terminal blocks shall have voltage and current ratings greater than the ratings of the wires that are terminated, be able to terminate wires from #8 AWG to #1/0 AWG wiring and shall be assembled into housing enclosures such that all exposed surfaces are touch-safe. Conductor fastening screws shall be captive. Terminal block housings shall be colored as follows:
   a. 120 VAC line/hot: black
   b. 120 VAC neutral: white
   c. 24 VDC positive: red
   d. 24 VDC negative: gray
   e. RS485 communications: orange
   f. Ground: green or green/yellow

907-637.02.5--Door Locks.

1) Provide door locks for all cabinet doors, keyed to MDOT standard Corbin No. 15481RS lock keyed to be operated with a traffic industry conventional No. 2 Key, Corbin No. 1R6380 made from heavy-duty blanks.
2) Provide two keys with each cabinet.

907-637.02.6--Labels.

Provide agency name, device name and ID labels on all cabinets. Labels shall meet the following minimum requirements:

1) Labels shall be flat black lettering on a reflective white background. Lettering shall be a minimum of 1 inch in height.
2) Labels shall be manufactured from pre-coated adhesive backed reflective sheeting material meeting the minimum requirements of AASHTO M268 Type 1.
3) The agency name labels shall be "MDOT ITS" in one continuous adhesive sheet.
4) The device ID labels shall include the device name as an acronym and a hyphen, and shall be one continuous adhesive sheet. Device name acronyms are "CCTV-", "RDS-", "VDS-"or "DMS-".
5) The device ID shall be numerals corresponding to the location and shall be installed adjacent to the acronym sheet. Multiple device IDs of the same type shall be on the same line separated with a space. Examples: "CCTV-73", "RDS-219 220", "VDS-303 304".
6) Labels shall be installed along the top of the cabinet door (front cabinet door on Type B cabinets), with MDOT ITS label at the top and the device ID labels immediately underneath.

Provide a voltage label on all cabinets or enclosures in accordance with the NEC labeling requirements. Voltage labels shall meet the following minimum requirements:

1) Labels shall be flat black lettering on a reflective yellow background. Lettering shall be a minimum of 1 inch in height.
2) Labels shall be manufactured from pre-coated adhesive backed reflective sheeting material meeting the minimum requirements of AASHTO M268 Type 1.
3) Labels shall include the voltages entering the cabinet and shall be one continuous adhesive sheet. Examples are "120VAC" or "24VDC".
4) Labels shall be installed on all cabinet doors.

907-637.02.7--Type A Cabinet.

1) All Type A cabinets shall be identical in manufacture and assembly, capable of supporting Radar Detection System units.
2) Provide a Type A cabinet intended for outdoor use with a minimum NEMA 3R rating.
3) The cabinet enclosure shall be manufactured from 0.125-inch aluminum.
4) The cabinet shall provide a minimum of one ventilation louver on at least two sides. Any louver opening greater than 3/16 inch in any dimension shall be screened to prevent insect entry.
5) The cabinet shall be intended for strapped pole-mounting; provide all mounting hardware necessary including ½-inch stainless steel mounting straps.
6) Provide a Type A cabinet enclosure with dimensions of 18 inches (H) by 14 inches (W) by 8 inches (D) with a tolerance of +/- 0.25 inches.
7) Cabinet door shall reveal the entire front opening of the cabinet for accessibility. The hinge shall be designed to prevent the door from sagging.
8) Include a single-piece 0.125-inch aluminum back panel covering no less than 90% of the cabinet back wall. Back panel shall be affixed to the enclosure with threaded fasteners and shall be removable from the enclosure with hand tools only and without requirement to remove the cabinet door, mounting straps, or any other components other than communications or device wiring.
9) The cabinet shall be furnished with doorstops, which retain the doors open in a 90 degree and 120 degree positions.
10) Provide on the back panel a grounding lug directly bonded to the back panel capable of terminating #6 AWG wire.

907-637.02.7.1--RDS Communications Wiring.

1) Component rail physically and electrically fastened to the cabinet back panel.
2) Strain relief brackets for the RDS comm. cable(s) and the RDS unit harness cables.
3) Parallel-connection single-stage surge suppressors for the three wire RS-232 data signal for the RDS units with integral or separate terminals for a minimum of three RDS comm. Cables.
4) Parallel-connection zero-power dissipation surge suppressor for the 12-24VDC power supply for the RDS units with integral or separate terminals for a minimum of three RDS comm. cables and two RDS unit harness cables.
5) Connection/jumper wiring between the surge suppressors and the local/remote communications disconnect module(s) shall be of the same conductor size, type, and insulation color as in the RDS comm. cable.

907-637.02.8--Type B Cabinet.

1) All Type B cabinets (except those at solar power locations) shall be identical in manufacture and assembly, capable of supporting two RDS units, one CCTV location, one Type A network switch, one video encoder, one Type A radio/antenna, RDS comm. cable and fiber drop panel terminations, regardless of the devices shown in the Plans at a specific location.
2) A complete Type B cabinet shall be an assembly consisting of a cabinet housing and electrical subsystems.
3) Provide a Type B cabinet housing that conforms to the standards for a Type 170 336S (approximate exterior dimensions 46 inches (H) x 24 inches (W) x 23 inches (D)), including standard EIA 19-inch rack cabinet cage, as defined in the latest version of the Caltrans Transportation Electrical Equipment Specifications (TEES). The minimum clear vertical inside dimension of the 19-inch rack for equipment mounting shall be 39.5 inches. Standard cabinet accessories for traffic signal operations, such as controller, power distribution assembly, input/output file and termination panels, and the police panel, are not required as part of this cabinet assembly.

907-637.02.8.1--Hardware.

1) Provide all mounting hardware necessary including 3/4-inch stainless steel mounting straps.
2) Include hooks, welded to the inside of each cabinet door, for hanging a side-opening, resealable, opaque, heavy-duty plastic documentation pouch with metal or hard-plastic reinforced holes for the door hooks. Provide one pouch with each cabinet.
3) Include a rack-mounted cabinet sliding storage drawer in accordance with the following:
   a. Approximate exterior dimensions 1.75 inches (H) x 16 inches (W) x 14 inches (D).
   b. Telescoping drawer guides to allow full extension from the rack cage.
   c. Opening storage compartment lid to access storage space for cabinet documentation and other items.
   d. Supports a weight of 25 lb when extended.
   e. Non-slip plastic laminate surface attached to the compartment lid which covers a minimum of 90% of the surface area of the lid.
   f. Mounted in the rack cage with the bottom surface approximately 9 inches above the bottom of the rack cage.
   g. Includes side panels within the two sides of the rack cabinet cage, inserted and fastened from the inside of the cage. Use side panels fabricated from 0.125 inch 5052 sheet aluminum alloy and sized to the full inside dimensions of the rack cabinet cage. Side panel surfaces for equipment mounting are denoted by cabinet side, with the "right" side being the support pole side, and by upper or lower as related to the sliding storage drawer. Upper right side panel (support pole side of cabinet, above the drawer) and lower left side panel (opposite side from the support pole, below the drawer) are example side panel surface names.
   h. Includes a 12-inch long DIN rail (for future components) mounted in the horizontal and vertical center of the lower left side panel.

907-637.02.8.2--Electrical Subsystems.

Provide Type B cabinet electrical subsystems meeting the following requirements (Note: Type B Cabinets at Solar Power Locations are not required to meet Section 637.05.02 requirements):

1) Includes an electrical distribution module comprised of the following DIN rail-mounted components:
2) Service entrance terminal block with positions for 120VAC line, neutral, and ground and capable of terminating minimally #6 through #8 AWG wire, located at one end of the mounting rail with an approximately 0.75 inch blank spacer module adjacent to the main cabinet breaker.
3) Main cabinet automatic overcurrent 15A circuit breaker that is UL-listed and of the mechanical-magnetic type rated for use from -18° C to 50° C minimum.
4) Main cabinet surge suppressor for single-phase 120VAC service entrance, parallel wired with a clamp voltage of approximately 280V and capable of a surge current of at least 20,000 amps.
5) Main cabinet filter for power line noise and switching transient suppression, integral to, or separate from and wired to, the main cabinet surge suppressor.
6) Electrical distribution terminal block for line and neutral conductors parallel wired to the main cabinet surge suppressor but non-filtered, with a minimum terminating capability of six conductors of #10 to #18 AWG. Label the terminal block as "ACCY POWER".
7) Electrical distribution terminal block for line and neutral conductors for circuits on the load/equipment side of the power line filter, with a minimum terminating capability of six conductors of #10 to #18 AWG. Label the block as "EQUIP POWER".
8) Electrical distribution terminal block for grounding and bonding conductors located on the same rail but separate from the service entrance terminal block and connected to the entrance ground with a #6 AWG green insulated wire. The grounding block shall have a minimum terminating capability of two #6 AWG conductors and ten #10 to #18 AWG conductors.
9) Ground fault interrupt duplex receptacle (NEMA 5-15R) with 2.5A circuit breaker connected to the ACCY POWER distribution block. Permanently affixed to the receptacle, provide two red, orange or green/yellow labels with minimum 0.25 inch lettering with the legend "300 WATTS MAX". This receptacle is for technician use only and shall not be used to power equipment.
10) Include two duplex non-GFCI equipment power receptacles (NEMA 5-15R) connected to the EQUIP POWER distribution block mounted on the upper rear corner of the cabinet upper right side panel. Permanently affixed to the receptacle, Provide two red, orange or green/yellow labels with minimum 0.25 inch lettering with the legend "75 WATTS MAX" permanently affixed to the receptacle.
11) Interconnection wiring between all electrical distribution module components and the other systems included in or housed in the Type B cabinet.

907-637.02.8.3--Lighting Subsystem.

Include a cabinet lighting subsystem comprised of the following components:

1) One fluorescent lighting fixture, minimum 15 watt, mounted on the inside top front portion of the cabinet, with a cool white lamp with shatter-proof cover and operated by a normal power factor UL listed ballast.

2) A resistor-capacitor network noise suppressor installed across the light fixture power terminals.
3) Two door-actuated switches installed to turn on the cabinet light when either door is opened.
4) Powered from the ACCY POWER distribution block.

907-637.02.8.4--RDS Communications Subsystem.

Include DIN rail-mounted components, that includes the following:

1) Nominal 24VDC output power supply, capable of user setting between 23 and 28VDC minimum, with minimum 1A output rating and minimum operating temperature range of -25° C to +70° C. Power supply shall provide terminal facilities for a minimum of three sets of #14 AWG conductors (in the RDS comm cable). Maximum size of the power supply shall be 1 inch (W) X 7 inches (H) X 7 inches (D). Connect the power supply to the EQUIP POWER distribution block for 120VAC input.
2) Surge suppressor for a RS232 data signal, wired between the video encoder and the RDS units. The surge suppressor shall protect the 4-wire RS232 data signal with hybrid multi-stage suppression components including gas tube and silicon avalanche diode. The surge suppressor shall have a response time no greater than 1 nanosecond. The surge suppressor shall provide terminal facilities for a minimum of four two-pair cables of #22 AWG conductors (in the RDS comm cable.

Include interconnection wiring between the RDS communications subsystem and the Terminal Server.

907-637.02.8.5--CCTV Subsystem. The requirements listed in Subsection 650.2.12 shall be met by installing the required CCTV support equipment in the Type B Cabinet.

907-637.03--Installation Requirements.

907-637.03.1--General.

1) Install and configure cabinets as shown in the Plans, including installations and dimensions given for pole-mounting in relationship to the surrounding grade.
2) Bond all cabinets to the pole grounding lug with minimum #6 AWG stranded copper bare or green-insulated cabinet grounding wire. Alternately on existing poles only, bond the cabinet grounding wire to an existing pole grounding wire with a cast brass or copper alloy threaded compression connector within 4 inches of the existing pole grounding lug.
3) Do not install electrical service or electronic devices in the cabinet or connect to the cabinet until ground testing for the pole or structure has been successfully completed and accepted, and the cabinet ground connection has been installed.

907-637.03.2--Type B.

1) Install and configure equipment in the Type B cabinet in accordance with the requirements for that equipment, including RDS units, CCTV, Type A network switches, video

encoders, Type A radio/antennas, RDS comm. cables and/or fiber distribution or drop panels.

2) Do not install electronic devices in the cabinet until electrical service has been installed and activated, and the cabinet ventilation fan is operational.
3) Install Type A network switches and video encoders in the top most area of the cabinet rack. Use the equipment receptacles for power.
4) Install supporting equipment/electronics for CCTV on the lower area of the cabinet upper left side panel. Ensure there is no physical or access conflict with the network switch and video encoder. Use the EQUIP POWER distribution block for the power source.
5) Install fiber drop panels in a vertical configuration on the lower rear edge of the cabinet upper right side panel.

907-637.03.3--Testing.

1) The Contractor shall conduct a project testing program for all equipment cabinets. The project testing program shall include but is not limited to the specific requirements in this subsection.
2) All test results shall confirm physical and performance compliance with this Special Provision.
3) Submit all test results documentation to the Engineer within 14 days of completion of the tests. The Engineer will review test documentation.

907-637.03.3.1--Standalone Acceptance Test (SAT).

1) Perform a SAT on all equipment cabinets on this project after field installation is complete, including but not limited to all field devices (RDS, CCTV, communications electronics, etc.) to be installed in or connected to that given cabinet.
2) A SAT for a given equipment cabinet shall only be performed in conjunction with the SAT for all devices installed in or connected to that given cabinet.
3) Visual inspection of installation.
4) Inspection of cabinet documentation (Type B).
5) Functional test of all cabinet equipment, including circuit breaker, receptacles, fan and thermostat, and lights and door switches.
6) Measurement of DC power supply operating under full load.

907-637.04--Method of Measurement. Equipment Cabinet of the type specified will be measured per each.

Equipment Cabinet will be measured for payment as follows:

1) 40% of the contract unit price for delivery of the cabinet housings.
2) Additional 40% of the contract unit price for complete installation of equipment cabinet and all interior components, electrical service feed (activated), interior cabinet components, all conduit entrances, grounding connection, and testing.
3) Additional 10% of the contract unit price for completion of Stand Alone Site Test of all field devices housed or connected to the equipment cabinet.
4) Final 10% of the contract unit price upon Final System Acceptance.

907-637.05--Basis of Payment. Equipment Cabinet, measured as prescribed above, will be paid for at the contract price per each, which price shall include furnishing and installing the equipment cabinet and all related material and equipment specified in the Plans and this TSP, and all labor, system integration, testing, system documentation and miscellaneous materials necessary for a complete and accepted installation. The unit price shall also include but is not limited to the cabinet and all interior materials, mounting hardware foundations, external conduit entrances including conduit bodies and nipples, electrical service and pole grounding terminations. This price shall be full compensation for all labor, tools, materials, equipment and incidentals necessary to complete the work.

Payment will be made under:

907-637-A: Equipment Cabinet, Type __ -per each

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-639-2 **CODE: (SP)**

DATE: 5/23/2008

SUBJECT: ITS Equipment Poles

Section 639, Traffic Signal Equipment Poles, of the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows:

Delete in total Section 639 beginning on page 481, and substitute the following:

SECTION 907-639--ITS EQUIPMENT POLES

907-639.01--Description. This Section specifies the minimum requirements for equipment poles and foundations furnished and installed to support Intelligent Transportation Systems (ITS) equipment. This work shall consist of assembling, constructing, erecting and installing galvanized steel camera poles with foundations, in conformity with these specifications and in accordance with the design(s) shown on the plans or as directed.

907-639.02--Materials. The materials used in this construction shall conform with the general requirements of these specifications and the specific requirements set out hereunder.

907-639.02.1--Galvanized Steel Poles for Cameras. Camera poles and foundations, conduits, connections, clamps, anchor bolts, shoe bases and all other members shall be designed and fabricated in accordance with the standards and requirements listed below. Design and materials documentation shall be furnished as part of the approval request submittal. Certifications will be furnished upon request by the Engineer.

1) Poles shall be designed in accordance with the AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals", current edition, including all interims and updates. Design life shall be 50 years for all poles. Poles shall be designed to withstand the specified forces including those produced by a 100 mph wind with a 1.14 gust effect factor.
2) The Contractor shall submit manufacturer's shop drawings, layout drawings and specifications for equipment and appurtenances for approval by the Engineer no later than ninety (90) days after notice to proceed.
3) Pole fabricator shall be certified under Category I, "Conventional Steel Structures" as set forth by the American Institute of Steel Construction Quality Certification Program. Proof of this certification will be required.
4) All welding shall be in accordance with Sections 1 through 8 of the American Welding Society (AWS) DI. 1 Structural Welding Code. Tackers and welders shall be qualified in accordance with the American Welding Society Structural Welding code. Tube longitudinal seam welds shall be free of cracks and excessive undercut, performed with automatic processes, and be visually inspected. Longitudinal welds suspected to contain

defects shall be magnetic particle inspected. All circumferential butt welded pole and arm splices shall be ultrasonically and radio graphically inspected. All inspection records will be furnished to the Engineer.

5) Camera pole system shall consist of a pole, anchor bolts, base plate, ground rod array, communication and power conduits to nearest pull box, grounding conduit, spare conduit and foundation.

6) Design computations for the camera poles shall be complete and shall include but not be limited to the following:
   a. Consideration shall be given for all parts of the structure.
   b. Consideration shall be given for all possible loading combinations including wind and ice loads.
   c. Computations shall include design stresses and allowable stresses for all components which comprise the proposed structure.
   d. Top of pole deflection shall not exceed 1 inch deflection from center (2 inch deflection diameter) due to 30 mph (non-gust) winds for the 50 foot poles.
   e. All complete shop drawings and design computations shall bear the stamp of a Professional Engineer registered in the State of Mississippi.
   f. Shop drawings shall be approved by the Engineer prior to fabrication. Approval of the shop drawings does not relieve the Contractor of responsibility for the design, fabrication and erection of the structure.
   g. The Engineer reserves the right to reject a pole design if the calculated deflection exceeds that specified herein.
   h. The foundation design shall be based on actual soil conditions from soil borings conducted by the Contractor. The cost of the soil borings shall be included in the cost of the pole.
   i. The calculations shall include a pole, base plate, and anchor bolt analysis. The pole calculations shall be analyzed at the pole base, 5 foot pole intervals, and at each slip joint splice.

7) For each pole shown in the Plans, the following information shall be given:
   a. The pole's diameter, thickness, section modulus, moment of inertia, and cross sectional area.
   b. The centroid, weight, projected area, drag coefficient, velocity pressure, and wind force of each trapezoidal pole segment.
   c. The axial force, shear force, primary moment, total moment, axial stress, bending stress, allowable axial stress, allowable bending stress, and combined stress ratio (CSR) at each elevation.
   d. The pole's angular and linear deflection at each elevation.

8) Pole Mounted Cabinet Access Conduit Nipple:
   a. Each pole will be manufactured with a 2" diameter rigid threaded nipple for conduit connection to a pole-mounted cabinet.
   b. The height of this nipple above the base of the pole shall be such that a cabinet mounting height of 3 feet above ground can be provided.

9) Hand Holes:
   a. Hand hole openings shall be reinforced with 2" wide hot rolled steel bar. The opening shall be rectangular and 5" x 8" nominal.

b. The cover shall be 11-gauge steel and shall be secured to a clip-on lock with a tamper-proof screw.
c. The reinforcing rim shall be provided with a ½" tapped hole and ½" hex head cap screw for grounding.
d. Hand holes on poles with pole-mounted cabinets and transformers shall be placed toward oncoming traffic. For all other poles, hand holes shall face away from traffic.

10) Cable Supports (J-Hooks & Eyelets): Top and bottom J-hooks and eyelets shall be located within the pole directly aligned with each other.

11) Base Plate:
a. Base plates shall conform to ASTM A572.
b. Plates shall be integrally welded to the tubes with a telescopic welded joint or a full penetration butt weld with backup bar.
c. Plates shall be hot dip galvanized.

12) Anchor Bolts:
a. Anchor bolts shall conform to the requirements of AASHTO M314-90 (105 ksi min. yield.) The upper 12" of the bolts shall be hot dip galvanized per ASTM A153.
b. Each anchor bolt shall be supplied with two (2) hex nuts and two (2) hardened washers.
c. The strength of the nuts shall equal or exceed the proof load of the bolts.
d. The top nut shall be torqued so as to produce 60% yield stress of anchor bolt.
e. The Contractor shall not grout between bottom of base plate and top of concrete foundation.

13) Pole heights shall be as indicated on the plans.

907-639.02.2--Galvanized Steel Poles for Detectors. Detector poles and foundations, conduits, connections, clamps, anchor bolts, shoe bases and all other members shall be designed and fabricated in accordance with the standards and requirements listed below. Design and materials documentation shall be furnished as part of the approval request submittal. Certifications will be furnished upon request by the Engineer.

1) Poles shall be designed in accordance with the AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals", current edition, including all interims and updates. Design life shall be 50 years for all poles. Poles shall be designed to withstand the specified forces including those produced by a 100 mph wind with a 1.14 gust effect factor.

2) The Contractor shall submit manufacturer's shop drawings, layout drawings and specifications for equipment and appurtenances for approval by the Engineer no later than ninety (90) days after notice to proceed.

3) Pole fabricator shall be certified under Category I, "Conventional Steel Structures" as set forth by the American Institute of Steel Construction Quality Certification Program. Proof of this certification will be required.

4) Poles shall be formed from a single sheet of hot rolled weldable grade steel, galvanized in accordance with ASTM Designation: A 123.
Unless otherwise noted on the plans, poles shall be made from steel meeting the requirements of ASTM Designation: A 572 Grade 55, or A 595 Grade A. Minimum yield strength shall be 48,000 psi after fabrication. Design wind loading shall be as indicated on the plans. The pole shall meet design wind loading with detector(s) installed.

5) Poles shall have a constant taper of 0.14 inch nominal per foot.
6) All poles shall be equipped with a breakaway device which conforms to the latest AASHTO and FHWA requirements, which have been approved by same. The Contractor shall submit a manufacturer's certification with the pole shop plans stating that the device meets, or exceeds, these standards.
7) Pole heights shall be as indicated on the plans.
8) Detector pole system shall consist of, but not be limited to a pole, anchor bolts, breakaway base, base plate, ground rod array, communication and power conduit to nearest pull box, grounding conduit, spare conduit and foundation as shown on the Plans.
9) Anchor bolts, washers and hex nuts shall be made of steel in accordance with ASTM Designation: F 1554, Grade 55, and shall be galvanized as per ASTM Designation: A 153. Anchor bolts shall be provided for each pole with two (2) hex nuts and washers per bolt. Anchor bolts shall be "L" shaped; minimum yield strength shall be 50,000 psi. A bolt layout template shall be provided by the manufacturer for proper bolt installation. The number of anchor bolts and design yield strength shall be as recommended by the manufacturer.

907-639.02.3--Foundations. Cast-in-place foundations for steel poles shall be as specified on plans, and shall be cast of reinforced Class "B" Concrete conforming to the requirements of Sections 601 and 602. Anchor bolts, washers and hex nuts for use in the foundation shall conform to Subsections 907-639.02.1 and 907-639.02.2. Conduit for electric cable and and fiber optic cable shall comply with the requirements for such materials as set out in Subsection 722.05.

907-639.03--Construction Requirements. All equipment shall be installed according to the manufacturer's recommendations. Materials and associated accessories/adapters shall not be applied contrary to the manufacturer's recommendations and standard practices. Camera and detector pole systems shall be installed as indicated on the Plans and shall conform to the following requirements:

1) All poles shall be installed in accordance with the National Electric Safety Code and the latest AASHTO standards.
2) Foundations:
   a. The Contractor shall submit a design for each pole foundation that has been sealed by a Professional Engineer registered in the State of Mississippi.
   b. Excavation for concrete foundations shall be opened vertically in accordance with the methods of Section 206 with a tolerance of plus two inches from neat lines and grades as shown on the Plans or required by local conditions. Adjacent earth shall be compacted sufficiently to withstand the loadings set out in Subsections 907-639.02.1 and 907-639.02.2.
   c. If soil conditions require the use of any shoring, casings, or sonotube for proper installation of the foundations, the cost of the shoring, casings or sonotube shall be included in the cost of the pole and foundation.
   d. Before placing concrete, the Contractor shall place reinforcing bars, conduit and anchor bolts, all in accordance with plan details, and held rigidly in place by approved methods.

e. Concrete foundations shall be formed, cast and cured in accordance with the provisions of Section 601. The top surface shall be finished smooth, and sloped to drain.
f. Concrete shall cure a minimum of 7 days before any load is applied to the foundation.
g. Conduit shall be installed in the pole foundation for access and includes conduit to the nearest pull box as shown in the Plans.
h. A minimum of one 2-inch spare conduit shall be installed in all pole foundations as shown in the Plans. Spare conduits in pole foundations shall be sealed with blank duct plugs.

3) Grounding System:
   a. The Contractor shall supply and install a grounding system with ground rod array at the base of all poles as shown on the Plans.
   b. The ground rod array system shall be connected to the pole through an appropriate ground clamp.
   c. A #6 AWG copper stranded bonding wire shall be installed between the pole and the field cabinet providing a common ground system for each site.
   d. All ground bonding wires shall be un-spliced.
4) The installation method for the CCTV poles and cameras shall be such that the camera can be rotated as needed around the pole for optimum placement.

907-639.04--Method of Measurement.

907-639.04.1--Camera Pole with Foundation. Camera pole with foundation will be measured as a unit quantity per each. Such measurement shall include but is not limited to a steel pole, foundation, conduit inside foundation and to nearest pull box as indicated on the Plans, wiring between camera and field cabinet, connections to support structures, satisfactory completion of testing and training requirements, and all work, equipment and appurtenances as required to effect the full operation including remote and local control of the camera site complete in place and ready for use.

907-639.04.2--Detector Pole with Foundation. Detector pole with foundation will be measured as a unit quantity per each. Such measurement shall include but is not limited to a steel pole, breakaway base, foundation, conduit inside foundation and to nearest pull box as indicated on the Plans, wiring between detector and field cabinet, connections to support structures, satisfactory completion of testing and training requirements, and all work, equipment and appurtenances as required to effect the full operation including remote and local control of the detector site complete in place and ready for use.

Progress payments may be measured in accordance with the following:

1) 25% of the contract unit price upon complete installation of foundations;

2) Additional 45% of the contract unit price upon delivery of poles or structure to the site; and

3) Final 30% of the contract unit price upon complete installation of pole system.

907-639.05--Basis of Payment. Camera pole with foundation and detector pole with foundation, measured as provided in above, will be paid for at the contract unit price per each, which price shall be full compensation for furnishing all materials, for excavating, backfilling, replacing sod, and for all constructing, placing, curing, erecting, installing, connecting and testing; for foundations, poles, pole bases, caps, covers, ground wire, ground rods, hardware and for all equipment, tools, labor and incidentals necessary to complete the work.

Payment will be made under:

907-639-E: Camera Pole with Foundation, ___' Pole - per each

907-639-F: Detector Pole with Foundation, ___' Pole - per each

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-641-2 **CODE: (SP)**

DATE: **5/23/2008**

SUBJECT: **Radar Detection System (RDS)**

Section 907-641, Radar Detection System (RDS), is hereby added to and becomes a part of the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction as follows:

SECTION 907-641--RADAR DETECTION SYSTEM (RDS)

907-641.01--Description. This special provision specifies the minimum requirements for Radar Detection Systems (RDS) furnished and installed on this project. The work shall consist of providing all labor, materials, equipment, and incidentals necessary to furnish, install, test, train and operate the RDS.

The RDS will provide roadway monitoring capabilities via microwave radar detectors. The data provided includes, but is not limited to, speeds, volume, lane occupancy and classification.

907-641.02--Materials.

907-641.02.1--Microwave Transmission. The microwave radar detector shall transmit on a frequency band of 10.50 GHz ±25 MHz or another approved spectral band. It shall comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. The RDS shall not interfere with any known equipment.

907-641.02.2--Area of Coverage. The RDS's field of view shall cover an area with a minimum detection range of 10 feet from the RDS and a maximum detection range of 200 feet from the RDS.

907-641.02.3--Detection Zones. The minimum number of detection zones defined shall be no less than eight (8). The range limits of each zone shall be user defined within the area of coverage limits described above.

907-641.02.4--Capabilities. The RDS shall be a true presence detector. It shall be suitable for mounting on roadside poles or on overhead structures and provide the following:

1. Presence indication of moving or stopped vehicles in its detection zones, provided by contact closure to existing controllers.

2. Traffic data, periodically accumulated over user defined time intervals in a 10 to 600 sec range, shall be transmitted to the TMC via the communications network.

3. Traffic data shall be available simultaneously with detection zone contact closures and serial communications.

4. Side-fired configuration data shall include the following in each of up to eight (8) detection zones (lanes): Volume, lane occupancy, and average speed, as well as vehicle classification by length in up to 3 user defined classes.

5. RDS in forward-looking configuration shall monitor traffic in one lane and be capable of providing the following data: Volume, occupancy, average speed and travel direction in the lane.

6. Furnish the unit with the required software for data collection, processing, configuration and set-up, and data logging and retrieval. An operator shall be able to use the software to set detector count periods, sensitivities, and other operational features and parameters. The software must be capable of providing both manual and automatic setup and calibration.

907-641.02.5--Measurement Accuracy. The following error levels shall be achievable and demonstrated during testing:

Parameter	Error Percentage
Volume	±8%
Average Speed	±10% or ±5 mph
Lane Occupancy	±10%

907-641.02.6--Environmental Conditions and Protection. Except as stated otherwise herein, the equipment shall meet all its specified requirements during and after subjecting to any combination of the following:

1. Ambient temperature range of -37° to +74°C
2. Relative humidity from 5 to 95 percent, non-condensing
3. Winds up to 90 mph (sustained) with a 30% gust factor
4. Rain and other precipitation up to 3.5 inches/hour
5. Power surge that meets the EN 61000-4-5 standards shall be included.

907-641.02.7--Mechanical. The microwave radar detector shall be enclosed in a rugged weatherproof box and sealed to protect the unit from wind up to 90 mph, dust and airborne particles, and exposure to moisture (NEMA Type 3R or NEMA 250 Standard enclosure).

The mounting assembly shall have all coated steel, stainless steel, or aluminium construction, and shall support a load of 20 pounds. The mounting assembly shall be constructed in a manner to provide the necessary degrees of rotation to ensure proper installation.

907-641.02.8--Electrical. The RDS unit and power supply shall operate on 120 VAC input voltage. The AC to DC power converter shall be provided in the cabinet. The actual RDS shall consume less than 10 Watts with a DC input between 12VDC and 28VDC.

The RDS unit shall include a Low-Voltage disconnect feature for battery protection.

Surge Suppression shall be provided to protect the equipment from surges on the RDS power supply and the RS 232 communications wiring. Surge suppression shall meet all manufacturer recommendations.

907-641.02.9--RDS Comm Cables. The RDS Comm Cable shall be the connection between the RDS and the cabinet equipment. The RDS Comm Cable shall be included with the RDS.

Cable connectors and termination pin-out on all cables shall be in accordance with the manufacturer's recommendations.

Connection between the RDS and the cabinet equipment shall be provided by a single RDS Comm Cable meets all manufacturer's recommendations.

At a minimum, the RDS Comm Cable shall be outdoor wet/dry rated UV-resistant and provide multiple twisted pairs of stranded AWG #20 or #22 wire with a common shield rated at 300V with a temperature rating of 105°C.

The MS connector pins must be crimped to the cable conductors and assembled and tested by the manufacturer prior to installation and pulling of cable on site.

907-641.02.10--Electrical Isolation and Surge Protection. All power lines, contact closures and the serial port shall be surge protected within the unit. Contact closures and the serial port shall be isolated.

907-641.02.11--Data Interface. Data communications shall be full duplex asynchronous, configurable as:

1. The RDS shall include an Opto-isolated RS-232 port.
2. Serial data format shall be standard binary NRZ 8 bits data, 1 stop bit, No parity.
3. Both point-to-point and multi-dropped configurations shall be supported.

907-641.03--Construction Requirements. The RDS shall be mounted in side-fired configuration on poles as shown in the Plans, using mounting brackets. The brackets shall be attached with approved 3/4-inch wide stainless steel bands.

The Contractor shall install the detector unit on a pole at the manufacturers recommended height above the road surface so that the masking of vehicles is minimized and that all detection zones are contained within the specified elevation angle as suggested by the manufacturer.

When installing a detector near metal structures, such as building, bridges, or sign supports, the sensor shall be mounted and aimed so that the detection zone is not under and does not pass through any structure to avoid distortion and reflection.

The RDS mode of operation, detection zones and other calibration and set up will be performed using a MS-Windows-based software and a Notebook PC. The software shall allow verification of correct setup and diagnostics. It shall include facilities for saving verification data and collected data as well as saving and retrieving sensor setup from disk file.

Unused conductors in the RDS Comm Cable shall be grounded or terminated in the cabinet in accordance with the manufacturer's recommendations. Terminated conductors shall be individually doubled back and taped, then loosely bundled and secured.

907-641.03.1--RDS Test Requirements. The Contractor shall conduct a Project Testing Program as required below. All costs associated with the Project Testing Program shall be included in overall contract prices; no separate payment will be made for any testing.

The Contractor is responsible for planning, coordinating, conducting and documenting all aspects of the Project Testing Program. The Project Engineer and/or the Project Engineer's representatives are only responsible for attending and observing each test, and reviewing and approving the Contractor's test results documentation. The Project Engineer and/or the Project Engineer's representatives reserve the right to attend and observe all tests.

Each test shall fully demonstrate that the equipment being tested is clearly and definitely in full compliance with all project requirements. Test procedures shall be submitted and approved for each test as part of the project submittals. Test procedures shall include every action necessary to fully demonstrate that the equipment being tested is clearly and definitively in full compliance with all project requirements. Test procedures shall cross-reference to these Special Provisions or the Project Plans. Test procedures shall contain documentation regarding the equipment configurations and programming.

No testing shall be scheduled until approval of all project submittals and approval of the test procedures for the given test.

The Contractor shall provide all ancillary equipment and materials as required in the approved test procedures.

The Contractor shall request in writing the Project Engineer's approval for each test occurrence a minimum of 14 days prior to the requested test date. Test requests shall include the test to be performed and the equipment to be tested. The Project Engineer reserves the right to reschedule test request if needed.

All tests shall be documented in writing by the Contractor in accordance with the test procedure and submitted to the Project Engineer within seven (7) days of the test. Any given test session is considered incomplete until the Project Engineer has approved the documentation for that test session.

All tests deemed by the Project Engineer to be unsatisfactorily completed shall be repeated by the Contractor. In the written request for each test occurrence that is a repeat of a previous test, the Contractor shall summarize the diagnosis and correction of each aspect of the previous test that

was deemed unsatisfactory. The test procedures for a repeated test occurrence shall meet all the requirements of the original test procedures, including review and approval by the Project Engineer and ITS Manager.

The satisfactory completion of any test shall not relieve the Contractor of responsibility to provide a completely acceptable and operating system that meets all requirements of this project.

907-641.03.2--Standalone Acceptance Test (SAT). The Contractor shall perform a complete SAT on all equipment and materials associated with the field device site, including but not limited to electrical service, conduit, pull boxes, communication links (fiber, leased copper, wireless), control cables, poles, etc. An SAT shall be conducted at every field device site. Where applicable, a SAT shall be conducted for a fully installed and completed connection to the designated Traffic Management Center (TMC) or central data/video collection site.

The SAT shall demonstrate that all equipment and materials are in full compliance with all project requirements and fully functional as installed and in final configuration. The SAT shall also demonstrate full compliance with all operational and performance requirements of the project. All SATs will include a visual inspection of the cabinet and all construction elements at the site to ensure they are compliant with the specifications.

907-641.03.3--Warranty. The Radar Detection System shall be warranted to be free of manufacturer defects in materials and workmanship for a period of one year from the date of Final Acceptance. Equipment covered by the manufacturer's warranties shall have the registration of that component placed in MDOT's name prior to Final Inspection. The Contractor is responsible for ensuring that the vendors and/or manufacturers supplying the components and providing the equipment warranties recognize MDOT as the original purchaser and owner/end user of the components from new. During the warranty period, the supplier shall repair or replace with new or refurbished material, at no additional cost to the State, any product containing a warranty defect, provided the product is returned postage-paid by the Department to the supplier's factory or authorized warranty site. Products repaired or replaced under warranty by the supplier shall be returned prepaid by the supplier.

During the warranty period, technical support shall be available from the supplier via telephone within four hours of the time a call is made by the Department, and this support shall be available from factory certified personnel. During the warranty period, updates and corrections to control unit software shall be made available to the Department by the supplier at no additional cost.

907-641.03.4--MDOT Employee Training. The supplier of the Radar Detection System shall, at a minimum, provide a 2-hour operations and maintenance training class with suitable documentation for up to eight (8) persons selected by the Department. The training must include both classroom style training and hands-on training in the field of the maintenance and troubleshooting procedures required for the system. The training should also consist of a hands-on demonstration of all software configuration and functionality where applicable. The operations and maintenance class shall be scheduled at a mutually acceptable time and location.

907-641.03.5--Maintenance and Technical Support. The supplier shall maintain an adequate inventory of parts to support maintenance and repair of the Radar Detection System. The manufacturer of the Radar Detection System must provide, and have a parts support system capable of providing parts for a period of five (5) years from the date of system acceptance. Spare parts shall be available for delivery within 30 days of placement of an acceptable order at the supplier's then current pricing and terms of sale of said spare parts.

The suppliers shall maintain an ongoing program of technical support for the Radar Detection System. This technical support shall be available via telephone or via personnel sent to the installation site upon placement of an acceptable order at the supplier's then current pricing and terms of sale of said technical support services.

907-641.04--Method of Measurement. The Radar Detection System provided, constructed and installed as specified in the Plans will be measured in units of each, which shall include furnishing, installing, system integration and testing and training of a complete RDS including the unit, the RDS Comm Cable, Communication Converters (if required), all conduit, risers and weatherhead between the RDS and the cabinet, interconnection wiring, power supply, surge suppression, connections to support structures (includes all incidental components, attachment hardware, mounting brackets, mounting arms, bolts, or any other items to mount the RDS as intended), satisfactory completion of testing and training requirements and all work, equipment and appurtenances as required to effect the full operation including remote and local control of the RDS site complete in place and ready for use. The price bid shall also include all system documentation including: shop drawings, operations and maintenance manuals, wiring diagrams, block diagrams and other material necessary to document the operation of the RDS.

The Radar Detection System will be measured for payment on a per each basis as follows:

- 30% of the contract unit price upon delivery to the site. Delivery cannot be more than 60 days before anticipated installation.
- 70% of the contract unit price upon complete installation and Stand Alone testing of the Radar Detection System
- 90% of the contract upon Conditional System acceptance.
- 100% of the contract unit price upon Final System Acceptance.

907-641.05--Basis of Payment. Radar Detection System, measured and prescribed above, will be paid for at the contract unit price bid per each, which price shall be full compensation for furnishing all materials, construction installation, connecting, testing, for all equipment, tools, labor, and incidentals required to complete the work.

Payment will be made under:

907-641-A: Radar Detection System - per each

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-642-2 **CODE: (SP)**

DATE: **08/24/2007**

SUBJECT: **Solid State Traffic Actuated Controllers**

PROJECT: **SP-0017-00(001) / 104589301 -- Desoto County**

Section 642, Solid State Traffic Actuated Controllers, of the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows:

907-642.01--Description. After the first paragraph of Subsection 642.01 on page 484, add the following:

This work also includes making modifications to a solid state traffic actuated signal controller(s) in accordance with the plans and contract documents.

907-642.04--Method of Measurement. After the first paragraph of Subsection 642.04 on page 506, add the following:

Solid state traffic actuated signal controller modifications, complete in place and accepted, will be measured as unit quantities per each for a complete and operable unit in accordance with the contract provisions.

907-642.05--Basis of Payment. After the first paragraph of Subsection 642.05 on page 506, add the following:

Solid state traffic actuated controller assemblies, measured as prescribed above, will be paid for at the contract unit price bid per each; which price shall be full compensation for any foundation construction, cabinets, relays, terminals, circuit breakers, controller units and conflict monitors, any communications devices and/or video facilities, connectors, load switches, mounting material, all other materials for constructing, installing, connecting, testing and final cleanup; and for all equipment, labor, tools and incidentals necessary to complete the work in accordance with the contract documents.

Add the last pay item listed on page 506, add the following:

907-642-B: Solid State Traffic Actuated Controller Modification, * - per each

* Optional Supplemental Description

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-650-1 **CODE: (SP)**

DATE: **5/20/2008**

SUBJECT: **On-Street Video Equipment**

PROJECT: **SP-0017-00(001) / 104589301 -- Desoto County**

Section 650, On-Street Video Equipment, of the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows:

Delete in total Section 650 beginning on page 537, and substitute the following:

907-650.01--Description. This Section specifies the minimum requirements for CCTV Camera Systems furnished and installed on this project. The CCTV Camera System will provide TMC personnel with live streaming video of the roadway network via CCTV Camera Systems installed at locations shown in the Plans. The CCTV Camera System will include both fixed and PTZ Dome cameras as called for on the Plans.

907-650.02--Materials. All materials furnished, assembled, fabricated or installed shall be new, corrosion resistant and in strict accordance with all of the details shown in the Plans and described in this Special Provision.

Support equipment for the CCTV Camera Systems shall be provided in a Type B ITS Equipment Cabinet as described in Section 637 of these specifications.

The CCTV Camera System shall comply with the following minimum materials specifications:

907-650.02.1--General Capabilities and Performance Requirements. Overall CCTV Camera System capabilities and performance requirements include the following:

1) CCTV Dome Cameras shall be placed at fixed locations as shown on the Plans to provide full coverage within the project limits including mainline travel lanes and shoulders.
2) CCTV Fixed Cameras shall be placed at fixed locations as shown on the Plans to provide coverage of the mainline travel lanes. The cameras shall be provided with a varifocal lens which shall be adjusted by the Contractor for the desired view of the mainline. At major intersections additional fixed cameras shall be adjusted to the desired view of the surface streets. The Contractor shall record the adjusted views for five minutes and submit to the Engineer for approval. This recording shall be in a format playable with Windows Media Player.
3) The CCTV Camera System components shall be compatible with each other and be of rugged design and suitable for reliable operation when mounted in the configuration as specified in this TSP and the Plans.
4) The CCTV cameras shall be Analog or Internet Protocol as specified in the plans.

5) The CCTV Camera System shall be capable of attended and unattended, continuous 24 hours per day operation at the sites as shown on the Plans.
6) The Contractor shall ensure that the installed equipment provides unobstructed video of the roadway, traffic, and other current conditions around a roadside CCTV field site; that it responds to camera control signals from an operator of the system; and that the video images can be transmitted to remote locations interfaced to the system for observation.
7) The CCTV Dome Cameras shall be capable of being remotely controlled and programmed.
8) All enclosures shall be provided with the ability to be pressurized for environmental protection.
9) The Dome camera shall be mounted together with the zoom lens and integrated into the pan and tilt device within the dome enclosure forming a totally integrated, easily removable assembly.
10) All cameras shall include a high quality integrated camera/lens combination.
11) The camera shall also be equipped with an auto-iris lens capability compatible with the zoom lens supplied.
12) Iris capability shall include a provision for manual override via software.
13) The Dome camera shall be capable of auto-focus during zoom-in or zoom-out, with provisions for override via software.
14) Overexposure protection shall be provided - the camera shall not be degraded or damaged under normal reasonable operating conditions.
15) The capability for local control of pan, tilt and zoom functions shall be provided at the roadside cabinet using vendor-supplied software installed on a laptop computer.
16) CCTV cameras shall support the NTCIP 1205 v1.08 communication protocol.

907-650.02.2--Analog Camera Unit. The minimum Camera Unit requirements include:

1) The camera unit shall incorporate solid-state design and provide digital signal processing (DSP) capable of providing clear and low-bloom color video pictures during daylight hours and monochrome video at night when the roadway is illuminated with minimal roadway lighting.
2) The Analog Camera shall be fully compliant with all aspects of the National Television Standards Committee (NTSC) specification, and produce NTSC compatible video.
3) The Analog camera shall operate over wide dynamic light conditions ranging from low light/dusk to full sunlight having day (color)/night (monochrome) switchover and iris control, with user-selectable manual and automatic control capabilities.
4) The camera unit shall be equipped with a low light level sensor to automatically switch the camera to Black and White mode.
5) The camera unit shall be equipped with an override capability to allow the camera to be manually switched via software to turn off the automatic low light level sensor switch feature for Color or Monochrome operation.
6) Image sensor: 1/3 inch charge-coupled device (CCD) employing digital video signal processing (DSP) technology with a minimum Effective Picture Elements of 768 horizontal x 494 vertical pixels.
7) Sensitivity: The camera shall maintain usable video under both day and nighttime lighting conditions. The Contractor shall provide an explanation of how their proposed camera equipment will provide usable video meeting the performance requirements specified

herein. This explanation shall take into account as a minimum, the following parameters: usable video level (full video), reflectance (day and night scenarios), F-Stop, AGC and Shutter Speed.

8) Video output synchronization shall be 2 to 1 interlace and will observe the NTSC (color) and EIA RS-170 (black and white) standards.
9) Resolution: 470 lines horizontal and 350 TV lines vertical, NTSC equivalent.
10) Signal-to-noise ratio: 48 dB, minimum with AGC off, un-weighted, and 4.5MHz filter.
11) Video Signal Format: National Television Standards Committee (NTSC) composite video output of 1 $Volt_{p-p}$ at 75 ohms, unbalanced.

907-650.02.3--Internet Protocol IP Camera Unit. The minimum IP Camera Unit requirements include:

1) Power over Ethernet (IEEE802.3af) or 24 VAC Power Input.
2) Open Architecture.
1) 3 Simultaneous Video Streams.
   a. Dual MPEG-4 (30 ips)
   b. Scaleable MJPEG
2) Internet Protocols: TCP, UDP (Unicast, Multicast IGMP), UPnP, DNS,
3) DHCP, RTP, NTP
4) Multilevel Password Protection.
5) EDR (Extended Dynamic Range).
6) C/CS Lens Mount.
7) Backlight Compensation.
8) Horizontal Resolution of 480 TV Lines.
9) Low Profile Top/Bottom Mount.
10) BNC Service Connector.
11) Resolution: 470 lines horizontal and 350 TV lines vertical, NTSC equivalent.

907-650.02.4--Dome Camera Lens. The minimum camera lens requirements include:

1) The camera lens shall have a minimum F-Stop of 1.4 to 1.6.
2) Optical and Digital Zoom: Shall provide an optical zoom of 23X and a digital zoom of 8X, minimum.
3) Zoom Control: The zoom magnification shall be fully controllable via the remote PTZ mechanism. The time to pass through the full range of movement of Iris, Zoom and Focus shall in no case exceed 10 seconds.
4) Iris and Focus: Support automatic iris and focus control with manual override capability. The iris shall be in a closed position when there is no power.
5) White or Color Balance: Support automatic or set to yield optical results under various outdoor lighting conditions.
6) Shutter Speed: Support automatic or set to yield optimal results under low lighting conditions without blooming or smearing, auto-iris on. Provide electronic shutter that is selectable in steps.
7) The lens shall be equipped for continuous remote control of zoom, focus and iris.

8) Mechanical or electrical means shall be provided to protect motors from overrunning in extreme positions.
9) The zoom lens shall be an integrated camera/lens combination.
10) Vibration or ambient temperature changes shall not affect the automatic iris function, focus mechanism and zoom mechanism.
11) The lens shall be optically clear, impact resistant and acrylic. The acrylic lens shall not yellow and shall not introduce appreciable light loss or geometric distortion over a 10-year service life when exposed to the environment.
12) The zoom mechanism shall be designed for maintenance-free operations. All gearing and bearings shall be self-lubricating with lubrication and gearing tolerances compatible with the environmental specifications contained herein.

907-650.02.5--Character Generator. The minimum character generator requirements include:

1) The capability of generating and superimposing lines of English language text on the video image/stream shall be provided.
2) A minimum of 20 characters per line that are between 10 and 30 horizontal TV lines in height shall be provided.
3) Control (enable, disable and edit) of this feature shall be available remotely and at the field site using a laptop computer.
4) The text messages shall be stored in non-volatile memory.
5) Characters shall be white with a black border to ensure legibility in varied scenes.
6) The following minimum text insertion requirements shall be provided with the ability to individually turn each one on or off:
   a. Camera ID
   b. Sector Message
   c. Alarm Messages
   d. Pan/Tilt Azimuth/Elevation
   e. Compass Direction in 8 discreet zones

907-650.02.6--Dome Enclosure. The minimum dome enclosure requirements include:

1) Sealed, pressurized dome enclosure that provides complete protection for the camera and lens assembly from moisture and airborne contaminants.
2) Environmental resistant and tamper proof meeting NEMA 4X or IP-67 rating requirements.
3) The dome enclosure shall be constructed in such a way that unrestricted camera views can be obtained at all camera and lens positions.
4) Dome environmental control shall be provided by nitrogen pressurization with a Schrader Valve for pressurization and purging. The enclosure shall be designed to be pressurized at 5 PSI of dry nitrogen. The notation “CAUTION – PRESSURIZED” shall be permanently printed on the rear plate of the enclosure and shall be clearly visible and readable.
5) An alarm shall be displayed under low-pressure conditions and displayed on the camera video. The low-pressure alarm shall be on/off selectable by the operator at the TMC.

6) The dome enclosure shall consist of a two-piece (upper and lower half) dome. The bottom half of the dome shall be attached to the upper half with a plastic-coated safety cable to prevent the lower half from falling to the ground.
7) A harness and cables shall be provided with each enclosure to extend the video, power and data from the CCTV Camera System to the field cabinet. No harness shall be exposed. All entry points shall have gaskets to prevent moisture entry. A sealed connector shall be at the top of the dome.
8) The dome enclosure shall assist in preventing lens fogging and effectively reduce internal temperatures.
9) The enclosure shall minimize glare and provide overexposure protection for the camera when pointed directly at the sun.
10) The enclosure shall be equipped with a heater, a defroster and a thermostat.
11) The camera equipment inside the dome enclosure shall meet all its specified requirements when operating under the following conditions:
    a. Ambient Temperatures: -34ºC to +74ºC (-30ºF to +165ºF). A heater/blower shall be used to maintain internal dome temperatures within the manufacturer required operating temperatures for their equipment.
    b. Relative Humidity: 5% and 95%, non-condensing.
12) Total weight of CCTV cameras (including the housing, sunshield, and all internal components shall be less than 18 pounds.
13) Dome enclosure shall be secured with a mounting plate/attachment designed to withstand a 90mph sustained wind speed with a 30% gust factor.

907-650.02.7--Pan and Tilt Unit (PTU). The minimum pan and tilt unit requirements include:

1) The motorized, remotely controlled Pan/Tilt unit shall be mounted within the dome enclosure. The unit shall be integrated with the CCTV control system.
2) The unit shall provide continuous tilt (vertical) movement of 90 degrees from horizontal and continuous pan (horizontal) movement of 360 degrees.
3) Tilt speed shall be variable from zero up to 40 degrees per second, minimum, and the pan speed shall be variable from zero up to 80 degrees per second, minimum.
4) The unit shall be capable of simultaneous pan, tilt movements and zoom on one camera
5) Drive motors shall be capable of instantaneous reversing, be corrosion resistant, not require lubrication, and have overload protection.
6) Braking shall be provided in both pan and tilt movements to enable fast stop and reversal and to prevent drifting.
7) The viewing limits shall be set by a minimum of 8 discreet privacy zones that are software selectable.

907-650.02.8--Camera Control Receiver – Driver. The minimum camera control receiver-driver requirements include:

1) The camera control receiver shall provide a single point interface for control, power and video communications.
2) The camera control receiver-driver shall be included within the dome enclosure and control the camera, pan/tilt and lens functions at each CCTV site.

3) The unit shall provide alphanumeric generation for on-screen titles.
4) The unit shall provide the ability to display diagnostic information on the screen in response to user commands.
5) The diagnostic information shall include current pan, tilt, zoom and focus positions, and error codes for power, communication, position and memory problems.
6) The capability for programmed tours shall be provided.
7) The camera control receiver shall use non-volatile memory to store the required information for presets, camera ID and sector text.
8) Presets shall meet the following requirements:
   a. A minimum of 64 presets shall be supported. Each preset shall consist of pan, tilt, zoom and focus positions.
   b. The Contractor shall develop and install ten (10) presets for each camera. The Contractor shall submit the preset locations to the Department for review and approval.
9) Protocols: CCTV cameras shall support the NTCIP 1205 v1.08 communication protocol. No camera control receiver-driver shall use non-published protocols. The Contractor shall provide protocol documentation.
10) Communications Interface: The communications interface shall support communications compliant with RS-422 and/or 485 (user selectable).
11) The communications interface shall be compatible with the Video Encoder serial port as defined in Section 16 of this TSP.
12) Connectors: Standard connectors compatible with communications and interface equipment/cables shall be provided.
13) The video input and output connections shall be the BNC type.
14) Connector(s) shall also be used for connecting the control outputs from the control receiver-driver unit to the camera, lens and pan/tilt mechanisms.

907-650.02.9--Fixed Camera Lens.

1)	Type:	Varifocal
2)	Format Size:	1/3 Inch
3)	Mount Type:	CS
4)	Focal Length:	5-50
5)	Zoom Ratio:	1.4 -360
6)	Relative Aperture (F):	1.6-360
7)	Iris:	Auto (Direct Drive)
8)	Focus:	Manual
9)	Zoom:	Manual
10)	Minimum Object Distance:	0.5 m
11)	Back Focal Length:	10.05 mm

12) The camera lens shall have a minimum F-Stop of 1.4 to 1.6.
13) Shall provide a varifocal zoom of 5-50 mm.
14) Iris: Support automatic iris control with manual override capability. The iris shall be in a closed position when there is no power.
15) White or Color Balance: Support automatic or set to yield optical results under various outdoor lighting conditions.

16) Shutter Speed: Support automatic or set to yield optimal results under low lighting conditions without blooming or smearing, auto-iris on. Provide electronic shutter that is selectable in steps.
17) Vibration or ambient temperature change shall not affect the automatic iris function, focus mechanism or zoom mechanism.
18) The lens shall be optically clear, impact resistant and acrylic. The acrylic lens shall not yellow and shall not introduce appreciable light loss or geometric distortion over a 10-year service life when exposed to the environment.

907-650.02.10--Fixed Camera Enclosure.

1) Designed for Outdoor Applications
2) Maintenance access for servicing
3) The minimum fixed enclosure requirements include:
4) Sealed, pressurized enclosure that provides complete protection for the camera and lens assembly from moisture and airborne contaminants.
5) Environmental resistant and tamper proof meeting NEMA 4X or IP-67 rating requirements.
6) Environmental control shall be provided by nitrogen pressurization with a Schrader Valve for pressurization and purging. The enclosure shall be designed to be pressurized at 5 PSI of dry nitrogen. The notation “CAUTION – PRESSURIZED” shall be permanently printed on the rear plate of the enclosure and shall be clearly visible and readable.
7) An alarm shall be displayed under low-pressure conditions and displayed on the camera video. The low-pressure alarm shall be on/off selectable.
8) A harness and cables shall be provided with each enclosure to extend the video, power and data from the CCTV Camera System to the field cabinet. No harness shall be exposed. All entry points shall have gaskets to prevent moisture entry. A sealed connector shall be at the top of the dome.
9) The enclosure shall assist in preventing lens fogging and effectively reduce internal temperatures.
10) The enclosure shall minimize glare and provide overexposure protection for the camera when pointed directly at the sun.
11) The enclosure shall be equipped with a heater, a defroster and a thermostat.
12) The camera equipment inside the dome enclosure shall meet all its specified requirements when operating under the following conditions:
13) Ambient Temperatures: -34ºC to +74ºC (-30ºF to +165ºF). A heater/blower shall be used to maintain internal dome temperatures within the manufacturer required operating temperatures for their equipment.
14) Relative Humidity: 5% and 95%, non-condensing.
15) Total weight of CCTV cameras (including the housing, sunshield, and all internal components shall be less than 18 pounds.

The enclosure shall be secured with a mounting plate/attachment designed to withstand a 90mph sustained wind speed with a 30% gust factor.

907-650.02.11--Electrical. The minimum electrical requirements include:

1) The CCTV Camera System shall be furnished with any and all equipment required for a fully functional system, including all appropriate power and communications cables as defined by the manufacturer.
2) The power cables shall be sized to meet the applicable National Electrical Code (NEC) requirements.
3) Total power consumption shall not exceed 125 watts.
4) All devices supplied as system components shall accept, as a primary power source, 120 volts of alternating current (VAC) at an input of 60 hertz. Any device that requires source input other than 120 VAC at 60 hertz, such as cameras, PTUs, receiver/drives and dome heaters/blowers that operate at 24 volts or other, shall be furnished with the appropriate means of conversion.

907-650.02.12--Coaxial Cabling. The minimum coaxial interconnect cable requirements include:

1) The coaxial cable from the CCTV Camera System to the equipment cabinet shall be Belden 8281 or approved equivalent.
2) RG 59/U, 20AWG, bare copper conductor, polyethylene insulation.
3) 98% tinned copper, double braid shield, black polyethylene jacket.
4) Characteristic Impedance: 75 ohms (Ω), nominal.
5) Capacitance (conductor to shield): 21pF/ft; Inductance: 0.131uH/ft, nominal.

907-650.02.13--Surge Protection. All CCTV Camera System electrical interconnects shall be protected from voltage surges caused by lightning and external electromagnetic fields. The minimum surge protection requirements include:

1) Surge protectors shall be furnished for all non-dielectric cable and conductors (video, data/signal and device/assembly power) between the CCTV Camera System and the equipment cabinet.
2) The surge protectors shall have leads that are kept to a minimum length as recommended by the surge device manufacturer.
3) All surge protection devices shall be designed to meet the temperature and humidity requirements expected in this type of outdoor application.
4) All Surge protectors shall be U.L. listed (UL 1449, UL 497, 497A, 497B, etc., as appropriate) and bonded to the same single-point ground point.
5) Coaxial Cable Surge protectors for coaxial cable shall meet/provide the following functionality:
   a. Attenuation: 0.1dB @10 MHz, typical
   b. Input/Output Impedance: 75 ohms nominal
   c. Operating Voltage of the surge protector shall match characteristics of the ITS device/assembly
   d. Peak Surge Current: 5,000-amperes for an 8x20 microsecond waveform
   e. Response Time: 1 nanosecond or less

6) Low Voltage/Signal Cable Surge protectors for data/signal/control cable shall meet/provide the following functionality:
   a. Peak Surge Current: 10,000-amperes for an 8x20 microsecond waveform
   b. Response Time: 1 nanosecond or less
   c. Life Expectancy: Capable of surviving at a minimum of 25 occurrences at 2000-amperes
7) CCTV power surge protectors for power from equipment cabinet power distribution to the CCTV Camera System shall meet/provide the following functionality:
   a. Frequency: DC to 10MHz
   b. Clamping Voltage: < 30VAC (rms) or 42VDC
   c. Insertion Loss: < 0.2dB
   d. Input/Output Impedance: 75 ohms, typical
   e. Peak Surge Current: 3000-amperes
   f. Response Time: 1 nanosecond or less

907-650.03--Installation Requirements. All equipment shall be installed according to the manufacturer's recommendations, the Plans and as follows:

1) Materials and associated accessories/adapters shall not be applied contrary to the manufacturer's recommendations and standard practices.
2) Shall include all materials needed to permanently mount the CCTV camera to the support structure as indicated in the plans.
3) Furnish and install power, video, and data cables, and any and all ancillary equipment required to provide a complete and fully operational CCTV system site.
4) Verify all wiring meets NEC requirements where applicable.
5) All above requirements apply to both new CCTV sites as well as sites where an existing CCTV is being replaced under the contract.

907-650.04--Method of Measurement. On-Street Video Equipment will be measured per each camera installation. Such measurement shall be inclusive of camera unit, housing, pan/tilt drive, receiver/driver, mounting hardware and any enclosures necessary. It shall also include any items necessary to mount the camera unit from a mast arm pole, steel strain pole, pole extension pipe, etc.

The On-Street Video System will be measured for payment per each as follows:

1) 50% of the contract unit price upon approval of Bench Test Component, Bench Test System and Pre-Installation test results.

2) Additional 20% of the contract unit price upon approval of Stand Alone Site Test results.

3) Additional 20% of the contract unit price upon approval of Conditional System Acceptance Test results.

4) Final 10% of the contract unit price upon Final System Acceptance.

907-650.05--Basis of Payment. On-Street Video Equipment, measured as prescribed above, will be paid for at the contract unit price bid per each, which price shall be full compensation for furnishing all materials, for all installing, connecting, cutting, pulling and testing and for all equipment, tools, labor and incidentals necessary to complete the work. Required cabinet facilities, including transformer and/or disconnects, will not be measured for separate payment.

Payment will be made under:

907-650-A: On-Street Video Equipment * - per each

* Type may be specified as an option

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-656-2 **CODE: (SP)**

DATE: 5/23/2008

SUBJECT: Dynamic Message Sign

Section 907-656, Dynamic Message Sign, is hereby added to and made a part of the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction as follows:

SECTION 907-656--DYNAMIC MESSAGE SIGN

907-656.01--Description. This Special provision describes furnishing, installing and integrating a stationary electronic Dynamic Message Sign (DMS) assembly. The Contractor shall supply a complete operating Light Emitting Diode (LED) sign including the sign housing, sign controller unit (SCU), roadside DMS controller cabinet, all cabling, conduits, electrical service, surge suppression and all hardware associated with a complete installation as required by these Special Provisions.

The DMS assemblies will provide MDOT personnel with a means to visually communicate with motorists regarding any incidents, accidents, special events, travel times, etc., that may impact travel on the roadway network.

907-656.02--Materials.

907-656.02.1--Types of DMS. Each DMS shall be one of the following types:

1) DMS Type 1 shall meet the following requirements:
   a) Shall be full matrix sign with a minimum of 125-pixel column and 27-pixel rows.
   b) Pixel spacing shall be such that three lines of text (7x5 font characters) shall each have a nominal height of 18 inches.
   c) The signs housing shall be a walk-in enclosure.
2) DMS Type 2 shall meet the following requirements:
   a) Shall be full matrix sign with a minimum of 125-pixel column and 27-pixel rows.
   b) Pixel spacing shall be such that three lines of text (7x5 font characters) shall each have a nominal height of 18 inches.
   c) The signs housing shall be either a front access or rear access enclosure. A walk-in enclosure is not required for a Type 2 DMS but is allowed if preferred by the vendor.
3) DMS Type 3 shall meet the following requirements:
   a) Shall be full matrix sign with a minimum of 75-pixel columns and 18-pixel rows.
   b) Pixel spacing shall be such that three lines of text (7x5 font characters) shall each have a nominal height of 12 inches.
   c) The signs housing shall be either a front access or rear access enclosure. A walk-in enclosure is not required for a Type 3 DMS but is allowed if preferred by the vendor.

907-656.02.2--DMS Components. Each DMS shall include the following main components:

1) Sign Housing (walk-in or front access).
2) LED Modules.
3) LED Drivers.
4) Power Supplies
5) Roadside DMS Cabinet.
6) Sign Controller
7) Transient Voltage Surge Suppression (TVSS)

907-656.02.3--References. These Special Provisions incorporate nonnative references to other standards as listed below. If a conflict between the standards referenced and this Special Provision, this Special Provision shall govern.

1) NEMA TS-4: NEMA TS4-2004, Hardware Standards for Dynamic Message Signs (DMS) with NTCIP Requirements. For this special provision only NEMA TS-4 requirements that apply to fixed signs locations shall be used.
2) NTCIP

907-656.02.4--Glossary of DMS Terms. The definitions of the terms used within this special provision are those terms defined in NEMA TS-4.

907-656.02.5--Environmental Requirements. Each DMS shall meet all of the performance and testing requirements as outline in Section 2 of NEMA TS-4 standard in addition to the following requirements:

1) TVSS shall be installed at each of the following locations:
   a) AC power service entrance into the DMS Cabinet before the main cabinet breaker.
   b) AC power out to the DMS housing after the branch breaker.
   c) AC power entrance into the DMS Housing before the main housing breaker.
2) The TVSS shall be designed meet IEEE C62.41 C3 conditions.
3) Each TVSS as a complete unit shall meet the following minimum electrical requirements:
   a) Maximum Single Pulse Surge Current (8x20µs): 150kA (L-N), 150kA (L-G), 150kA (N-G)
   b) UL 1449 SVR: 400v pk L-N and N-G.

907-656.02.6--Mechanical Construction. Each DMS shall meet all of the performance and testing requirements as outline in Section 3 of NEMA TS-4 standard in addition to the following requirements:

907-656.02.6.1--Vents and Filters. Each DMS vent and air filters shall meet the following requirements:

1) Air filters shall be installed between the intake vent and the fan.
2) Air filters must be replaceable, industrial grade, and pleated.
3) Shall completely cover the vent opening area.

4) Shall be manufactured per ASHRAE Standard 52.2P or Standard 52.1.
5) Shall be of fire retardant and water resistant construction, able to withstand temperatures up to 300° F.
6) Filter replacement is to be accomplished without tools with easy access.

907-656.02.6.2--Ventilation System. Each DMS shall incorporate a ventilation system meeting the following requirements:

1) The electric fans shall be designed for continuous duty.
2) Sign housing venting fan(s) shall have a minimum combined capacity to keep the signs housing internal temperature to a maximum of thirty (30) degrees Fahrenheit above external ambient temperature under the following conditions:
   a) All pixels are on at maximum illumination level.
   b) Maximum solar loading for the state of Mississippi.
   c) Worse case humidity for the State of Mississippi.
3) LED cooling fans shall be provided to vent the air between the display module and the sign face cover.
4) Sufficient LED cooling fans shall be provided to keep the air surrounding the LEDs to a maximum temperature not exceeding the rated temperature for the LEDs.
5) Provide sign housing ventilation calculations and LED cooling calculations to show sufficient air circulation is provided to meet the special provision requirements.
6) The fan(s) shall be mounted within the housing.
7) The fan(s) shall be down stream from the air filters.
8) The sign housing venting fan(s) shall blow the air into the sign housing.
9) The DMS manufacturer shall determine the number, placement, and size of the electric fans to meet the requirements listed in this subsection.
10) The fans shall be thermostatically controlled.
11) The thermostat shall have a minimum adjustable range between 77° to 122°F (25° to 50°C).

907-656.02.6.3--Sign Face Material. The sign face material shall be replaceable from within the sign housing.

907-656.02.6.4--Sign Housing Construction. The DMS housing shall meet the following requirements:

1) Engineer shall approve sign housing dimensions.
2) The sign housing shall present a clean, unbroken, neat appearance.
3) The sign housing shall not have any visible text or logos on it.
4) The angular alignment of the sign housing shall be adjusted in the vertical direction down by three (3) degrees.
5) The sign housing shall be constructed of aluminum sheeting to be 5052-H32 and structural members to be 6061-T6, per ASTM Specifications.
6) Aluminum sheeting shall be not less than 1/8 inch thick with all seams continuously welded by MIG (metal inert gas) welding or other approved method of similar strength.
7) The front of the sign housing shall have a flat black matte finish.

8) All other surfaces shall have a bare aluminum mill finish.
9) Weep holes shall be provided to allow moisture to escape.
10) The sign housing shall have an interior, non-skid walkway where the walkway shall extend the entire length of the sign housing.

907-656.02.6.5--Access Door. Walk in DMS housing shall include an access door meeting the following requirements:

1) Access to the interior of the sign case shall be via a gasketed door.
2) Gasketing shall be provided on all door openings and shall meet the following requirements:
   a) Be dust-tight.
   b) Meet NEMA 3R requirements
   c) Permanently bonded to the door metal.
   d) Shall not stick to the mating metal surface.
3) A gasket top channel shall be provided to support the top gasket on the door (in order to prevent gasket gravitational fatigue).
4) When the door is closed and latched, the door shall be locked. The lock shall meet the following requirements:
   a) The lock and lock support shall be rigidly mounted on the door.
   b) In the locked position, the bolt throw shall extend a nominal 0.25-inch into the latch cam area.
   c) A lid or seal shall be provided to prevent dust or water entry through the lock opening.
   d) The locks shall be Corbin # type and shall match the master number of the existing signs.
   e) Two keys shall be supplied with each lock.
   f) The keys shall be removable in the locked position only.
   g) The locks shall have rectangular, spring loaded bolts.

907-656.02.7--Controller to Sign Interface. Each DMS shall meet all of the performance and testing requirements as outline in Section 4 of NEMA TS-4 standard.

907-656.02.8--Display Properties. Each DMS shall meet all of the performance and testing requirements as outline in Section 5 of NEMA TS-4 standard for outdoor sign using light emitting yellow color pixels in addition to the following requirements:

Pixels. Each pixel shall meet the following requirements:

1) DMS pixel shall be manufacture using Light Emitting Diodes (LED).
2) Pixels shall be replaceable either individually or in groupings. Groupings with three or more pixels shall be permitted only if bench level repairs and replacements to individual pixels are possible.
3) The failure of an LED in one string within a pixel shall not affect the operation of any other string or pixel.
4) Pixel power shall not exceed 1.5 watts per pixel, including the driving circuitry.

907-656.02.9--Optical Components. Each DMS shall meet all of the performance and testing requirements as outline in Section 6 of NEMA TS-4 standard in addition to the following requirements:

LED Technology. LEDs used to form each pixel shall meet the following minimum requirements:

1) The discrete, LED shall be a untinted, non-diffused, solid-state lamp that use Aluminum Indium Gallium Phosphide (AlInGap) technology manufactured by Avago Technologies (formerly Agilent Technologies), Toshiba Corporation, Nichia Corporation, or functional equivalent.
2) LED lenses shall be UV light resistant.
3) Each LED pixel shall be water resistant.
4) The manufacturer shall be the same for all LED's in all signs.
5) The LED's shall display an amber color at a wavelength of 590 nm (±7 nm).
6) The LED shall have a 15° viewing angle with the half-power viewing angle defined such that at a given distance from the LED, luminous intensity measured at any point at an angle of 7.5 degrees from the LED's center axis is no less than half the luminous intensity measured directly on the LED's center axis.
7) All LEDs used in all DMS provided for this contract shall be from the same manufacturer and of the same part number, except for the variations in the part number due to the intensity and color bins.
8) LED life shall be nominally rated for 100,000 hours of operation under field conditions, which shall include operating temperatures between -22° and + 185° F (-30° and +85°C). LED life shall be defined as time it takes for the LED light output to degrade to half of the LED's initial light output.

907-656.02.10--DMS Controller Cabinet. Each DMS shall meet all of the performance and testing requirements as outline in Section 7 of NEMA TS-4 standard.

907-656.02.11--Electronics and Electrical. Each DMS shall meet all of the performance and testing requirements as outline in Section 8 of NEMA TS-4 standard in addition to the following requirements:

907-656.02.11.1--Communication Interfaces. The DMS controller shall support two Central Communication Ports (CCPs). One CCP shall be an Ethernet port, an the second CCP shall be a serial RS232 port.

907-656.02.11.2--Brightness Controls. The DMS light sensing and dimming control shall meet the following minimum requirements:

1) Sixteen (16) user selectable brightness levels shall be provided.
2) The controller shall monitor ambient light levels through a photo sensor assembly that senses the ambient illumination level using three (3) photodiodes oriented as follows:
   a) Cell 1 - Monitors the change from "day" to "night".
   b) Cell 2 - Facing towards oncoming traffic; monitors prevailing ambient light levels in

the upstream traffic.

c) Cell 3 - Facing passed traffic; monitors prevailing ambient light levels in the downstream traffic.

907-656.02.11.3--NTCIP Protocol and Command Sets. As a minimum, the DMS hardware and software shall support the following NTCIP objects:

1) This specification references several standards through their NTCIP designated names and numbers. Each NTCIP Component covered by these project specifications shall implement the most recent version of the standard that is available as of project advertisement date, including any and all prepared Amendments to these standards as of the same date
2) Profile Implementation Conformance Specifications (PICS) for each NTCIP standard required shall be submitted for review and approval to the Department.

907-656.02.11.3.1--Ethernet Interface. Communication interfaces using Ethernet shall conform at a minimum with all mandatory objects of all mandatory Conformance Groups of the following standards:

1) 1101 -NTCIP Simple Transportation Management Framework (STMF)
2) 1203 -NTCIP Object Definition for Dynamic Message Signs
3) 2301 -NTCIP AP-STMF
4) 2202 -NTCIP TP-Internet
5) 2104 -NTCIP SP-Ethernet

907-656.02.11.3.2--RS-232 Interface. Communication interfaces using RS-232 shall conform at a minimum with all standards:

1) 1101 -NTCIP Simple Transportation Management Framework (STMF)
2) 1203 -NTCIP Object Definition for Dynamic Message Signs
3) 2301 -NTCIP AP-STMF
4) 2201 -NTCIP TP-Transportation Transport Profile
5) 2104 -NTCIP SP-PMPP/RS232

907-656.02.11.3.3--Subnet Level. For each communication interface, the Subnet Level shall meet the following minimum requirements:

1) NTCIP Components may support additional Subnet Profiles at the manufacturer's option.
2) At anyone time, only one Subnet Profile shall be active on a given communication interface.
3) The NTCIP Component shall be configurable to allow the field technician to activate the desired Subnet Profile.

907-656.02.11.3.4--Transport Level. For each communication interface, the Transport Level shall meet the following minimum requirements:

1) Communication interfaces may support additional Transport Profiles at the manufacturer's

option.
2) Response datagrams shall use the same Transport Profile used in the request.
3) Each communication interface shall support the receipt of diagrams conforming to any of the identified Transport Profiles at any time.

907-656.02.11.3.5--Application Level. For each communication interface, the Application Level shall meet the following minimum requirements:

1) All communication interfaces shall comply with NTCIP 1101 and shall meet the requirements for Conformance Level 1 (NOTE -See Amendment to standard).
2) Optionally, the NTCIP Component may support SNMP traps.
3) A communication interface may support additional Application Profiles at the manufacturer's option.
4) Responses shall use the same Application Profile used by the request.
5) Each communication interface shall support the receipt of Application data packets at any time allowed by the subject standards.

907-656.02.11.3.6--Information Level. All communication interfaces Information level protocol shall meet the following minimum requirements:

1) All communication interfaces shall provide Full, Standardized Object Range Support of all objects required by these procurement specifications unless otherwise indicated below.
2) The maximum Response Time for any object or group of objects shall be 200 milliseconds.
3) All communication interfaces shall implement all mandatory objects of all mandatory Conformance Groups as defined in NTCIP 1203 and their respective Amendments.
4) Table 1 indicates the modified object requirements for these mandatory objects.
5) Table 2 shows the required minimum support of messages that are to be stored in permanent memory.
6) The sign shall blank if a command to display a message contains an invalid Message CRC value for the desired message.
7) Table 3 specifies the support of the required MULTI tags and their ranges.
8) Shall also implement all mandatory objects of the following optional conformance groups of NTCIP 1201.
   a) Time Management Conformal Group
   b) Report Conformal Group. Table 4 indicates the modified object requirements.
9) Implement all objects of the Font Configuration Conformance Group, as defined in NTCIP 1203. Table 5 indicates the modified object requirements for this conformance group.
10) Implement all objects of the DMS Configuration Conformance Group, as defined in NTCIP 1203.
11) Implement all objects of the Multi Configuration Conformance Group, as defined in NTCIP 1203. Table 6 indicates the modified object requirements for this conformance group.
12) Implement all objects of the Multi Error Configuration, as defined in NTCIP 1203.
13) Implement all objects of the Illumination/Brightness.

14) Sign Status, as defined in NTCIP 1203.
15) Status Error, as defined in NTCIP 1203.
16) Pixel Error Status, as defined in NTCIP 1203.
17) Since the display of graphics is currently not defined within the NTCIP Standards or their amendments, the vendor shall propose, and provide detailed documentation (i.e., interface protocol description level), how the specified graphical shapes can be displayed.
18) Implement the optional objects listed in Table 7.

Table 1: Modified Object Ranges for Mandatory Objects

Object	Reference	Project Requirement
ModuleTableEntry	NTCIP 1201 Clause 2.2.3	Shall contain at least one row with moduleType equal to 3 (software). The moduleMake shall specify the name of the manufacturer, the moduleModel shall specify the manufacturer's name of the component and the modelVersion shall indicate the model version number of the component.
MaxGroupAddresses	NTCIP 1201 Clause 2.7.1	Shall be at least 1
CommunityNamesMax	NTCIP 1201 Clause 2.8.2	Shall be at least 3
DmsNumPermanentMsg	NTCIP 1203 Clause 2.6.1.1.1.1	Shall be at least 1*
DmsMaxChangeableMsg	NTCIP 1203 Clause 2.6.1.1.1.3	Shall be at least 60. Each message shall support at least 3 pages per message.
DmsFreeChangeableMemory	NTCIP 1203 Clause 2.6.1.1.1.4	Shall be at least 20 when no messages are stored.
DmsMessageMultiString	NTCIP 1203 Clause 2.6.1.1.1.8.3	The DMS shall support any valid MULTI string containing any subset of those MULTI tags listed in Table 4.
DmsControlMode	NTCIP 1203 Clause 2.7.1.1.1.1	Shall support at least the following modes: ▪ local ▪ external ▪ central ▪ centralOverride

Table 2: Content of Permanent Messages

Perm.. Msg. Num.	Section 12 Description
1	Permanent Message #1 shall blank the display (i.e., command the sign to use dmsMessageType 7). It shall have a run-time priority of 50.

Table 3: Required MULTI Tags

Code	Feature
f1	Field 1 - time (12hr)
f2	Field 2 - time (24hr)
f8	Field 8 - day of month
f9	Field 9 - month
f10	Field 10 - 2 digit year
f11	Field 11 - 4 digit year
Fl (and /fl)	flashing text on a line by line basis with flash rates controllable in 0.5 second increments.
Fo	Font
J12	justification - line - left
J13	justification - line - center
J14	justification - line - right
J15	justification - line - full
Jp2	justification - page - top
Jp3	justification - page - middle
Jp4	justification - page - bottom
Mv	moving text
Nl	New line
Np	New page, up to 2 instances in a message (i.e., up to 4 pages/frames in a message counting first page)
Pt	page times controllable in 0.5 second increments.

Table 4: Modified Object Ranges for the Report Conformance Group

Object	Reference	Project Requirement
maxEventLogConfigs	NTCIP 1201 Clause 2.5.1	Shall be at least 50
eventConfigurationMode	NTCIP 1201 Clause 2.4.3.1	The NTCIP Component shall support the following Event Configuration Modes: ▪ onChange ▪ greaterThanValue ▪ smallerThanValue
maxEventLogSize	NTCIP 1201 Clause 2.5.3	Shall be at least 200
maxEventClasses	NTCIP 1201 Clause 2.5.5	Shall be at least 16

Table 5: Modified Object Ranges for the Font Configuration Conformance Group

Object	Reference	Project Requirement
numfont	NTCIP 1203 Clause 2.4.1.1.1.1	Shall be at least 4*
maxFontCharacters	NTCIP 1203 Clause 2.4.1.1.1.3	Shall be at least 127**

* Upon delivery, the first font shall be a standard 18" font. The second font shall be a double- stroke 18" font. The third font shall be a 28" font. The fourth font shall be empty.

** Upon delivery, the first three font sets shall be configured in accordance with the ASCII character set for the following characters:

a) "A" thru "2" - All upper case letters.
b) "a" thru "z" - All lower case letters.
c) "0" thru "9" - All decimal digits.
d) Space (i.e., ASCII code 0x20).
e) Punctuation marks shown in brackets [. , ! ? - ‘ ’ “ ” / ( )]
f) Special characters shown in brackets [# & * + < >]

Table 6: Modified Object Ranges for the MULTI Configuration Conformance Group

Object	Reference	Project Requirement
defaultBackgroundColor	NTCIP 1203 Clause 2.5.1.1.1.1	The DMS shall support the following background colors: ▪ black
defaultForegroundColor	NTCIP 1203 Clause 2.5.1.1.1.2	The DMS shall support the following foreground colors: ▪ amber
defaultJustificationLine	NTCIP 1203 Clause 2.5.1.1.1.6	The DMS shall support the following line justification: ▪ Left ▪ Center ▪ Right ▪ Full
defaultJustificationPage	NTCIP 1203 Clause 2.5.1.1.1.7	The DMS shall support the following forms of page justification: ▪ Top ▪ Middle ▪ Bottom
defaultPageOnTime	NTCIP 1203 Clause 2.5.1.1.1.8	The DMS shall support the full range of these objects with step sizes no larger than 0.5 seconds
defaultPageOffTime	NTCIP 1203 Clause 2.5.1.1.1.9	The DMS shall support the full range of these objects with step sizes no larger than 0.5 seconds
defaultCharacterSet	NTCIP 1203 Clause 2.5.1.1.1.10	The DMS shall support the following character sets: ▪ eightBit

Table 7: Optional Object Requirements

Object	Reference	Project Requirement
globalSetIDParameter	NTCIP 1201 Clause 2.2.1	
eventConfigLogOID	NTCIP 1201 Clause 2.5.2.7	
eventConfigAction	NTCIP 1201 Clause 2.5.2.8	
eventClassDescription	NTCIP 1201 Clause 2.5.6.4	
defaultFlashOn	NTCIP 1203 Clause 2.5.1.1.1.3	The DMS shall support the full range of these objects with step sizes no larger than 0.5 seconds
defaultFlashOff	NTCIP 1203 Clause 2.5.1.1.1.4	The DMS shall support the full range of these objects with step sizes no larger than 0.5 seconds
dmsSWReset	NTCIP 1203 Clause 2.7.1.1.1.2	
dmsMessageTimeRemaining	NTCIP 1203 Clause 2.7.1.1.1.4	
dmsShortPowerRecoveryMessage	NTCIP 1203 Clause 2.7.1.1.1.8	
dmsLongPowerRecoveryMessage	NTCIP 1203 Clause 2.7.1.1.1.9	
dmsShortPowerLossTime	NTCIP 1203 Clause 2.7.1.1.1.10	
dmsResetMessage	NTCIP 1203 Clause 2.7.1.1.1.11	
DmsCommunicationsLossMessage	NTCIP 1203 Clause 2.7.1.1.1.12	
dmsTimeCommLoss	NTCIP 1203 Clause 2.7.1.1.1.13	
dmsEndDurationMessage	NTCIP 1203 Clause 2.7.1.1.1.15	
dmsMemoryMgmt	NTCIP 1203 Clause 2.7.1.1.1.16	The DMS shall support the following Memory management Modes:

		▪ normal ▪ clearChangeableMessage ▪ clearVolatileMessages
dmsMultiOtherErrorDescription	NTCIP 1203 Clause 2.7.1.1.1.20	If the vendor implements any vendor-specific MULTI tags, the DMS shall be provided with documentation that includes meaningful error messages within this object whenever one of these tags generates an error.
dmsIllumLightOutputStatus	NTCIP 1203 Clause 2.8.1.1.1.9	
watchdogFailureCount	NTCIP 1203 Clause 2.11.1.1.1.5	
dmsStatDoorOpen	NTCIP 1203 Clause 2.11.1.1.1.6	
fanFailure	NTCIP 1203 Clause 2.11.2.1.1.8	
fanTestActivation	NTCIP 1203 Clause 2.11.2.1.1.9	
tempMinCtrlCabinet	NTCIP 1203 Clause 2.11.4.1.1.1	
tempMaxCtrlCabinet	NTCIP 1203 Clause 2.11.4.1.1.2	
tempMinSignHousing	NTCIP 1203 Clause 2.11.4.1.1.5	
tempMaxSignHousing	NTCIP 1203 Clause 2.11.4.1.1.6	

907-656.02.11.4--NTCIP Compliance Documentation. Software shall be supplied with full documentation, including 3.5" floppy disk(s) and a CD-ROM containing ASCII versions of the following Management Information Base (Mill) files in Abstract Syntax Notation 1 (ASN.1) format:

1) The relevant version of each official standard Mill Module referenced by the device functionality.
2) If the device does not support the full range of any given object within a Standard Mill Module, a manufacturer specific version of the official Standard Mill Module with the supported range indicated in ASN.1 format in the SYNTAX and/or DESCRIPTION fields

of the associated OBJECT TYPE macro. The filename of this file shall be identical to the standard MIB Module, except that it will have the extension ".man".

3) A MIB Module in ASN.l format containing any and all manufacturer-specific objects supported by the device with accurate and meaningful DESCRIPTION fields and supported ranges indicated in the SYNTAX field of the OBJECT-TYPE macros.
4) A MIB containing any other objects supported by the device.
5) Additionally, the manufacturer shall provide a test procedure that demonstrates how the NTCIP compliance of both, the data dictionaries (NTCIP 1201, 1203, and their amendments) and the communications protocols have been tested.
6) The manufacturer shall allow the use of any and all of this documentation by any party authorized by the Procuring Agency for systems integration purposes at any time initially or in the future, regardless of what parties are involved in the systems integration effort.

907-656.02.12--Performance Monitoring. Each DMS shall meet all of the performance and testing requirements as outline in Section 9 of NEMA TS-4 standard.

907-656.02.13--Power Requirements. Each DMS shall meet all of the performance and testing requirements as outline in Section 10 of NEMA TS-4 standard.

907-656.03--Construction Requirements.

907-656.03.1--Certified Installation. Installation of the Dynamic Message Signs shall be performed by the supplier or a Contractor trained and certified by the supplier. If a certified Contractor performs the installation and configuration, supplier factory representative shall supervise and assist a Contractor during installation and configuration

907-656.03.2--Conformance / Testing. Each DMS shall undergo testing to verify conformance to special provision as follows. The Contractor shall conduct a Project Testing Program as required below. All costs associated with the Project Testing Program shall be included in overall contract prices; no separate payment will be made for any testing.

907-656.03.2.1--General Requirements.

a) The Contractor is responsible for planning, coordinating, conducting and documenting all aspects of the Project Testing Program. The Project Engineer and/or the Project Engineer's representatives are only responsible for attending and observing each test, and reviewing and approving the Contractor's test results documentation. The Project Engineer and/or the Project Engineer's representatives reserve the right to attend and observe all tests.
b) Each test shall fully demonstrate that the equipment being tested is clearly and definitely in full compliance with all project requirements.
c) Test procedures shall be submitted and approved for each test as part of the project submittals. Test procedures shall include every action necessary to fully demonstrate that the equipment being tested is clearly and definitively in full compliance with all project requirements. Test procedures shall cross-reference to these specifications or the project plans. Test procedures shall contain documentation regarding the equipment configurations and programming.

d) No testing shall be scheduled until approval of all project submittals and approval of the test procedures for the given test.
e) The Contractor shall provide all ancillary equipment and materials as required in the approved test procedures.
f) The Contractor shall request in writing the Project Engineer's approval for each test occurrence a minimum of 14 days prior to the requested test date. Test requests shall include the test to be performed and the equipment to be tested. The Project Engineer reserves the right to reschedule test request if needed.
g) All tests shall be documented in writing by the Contractor in accordance with the test procedure and submitted to the Project Engineer within seven (7) days of the test. Any given test session is considered incomplete until the Project Engineer has approved the documentation for that test session.
h) All tests deemed by the Project Engineer to be unsatisfactorily completed shall be repeated by the Contractor. In the written request for each test occurrence that is a repeat of a previous test, the Contractor shall summarize the diagnosis and correction of each aspect of the previous test. The Contractor shall summarize the diagnosis and correction of each aspect of the previous test that was deemed unsatisfactory. The test procedures for a repeated test occurrence shall meet all the requirements of the original test procedures, including review and approval by the Project Engineer and ITS Manager.
i) The satisfactory completion of any test shall not relieve the Contractor of responsibility to provide a completely acceptable and operating system that meets all requirements of this project.

907-656.03.2.2--DMS Factory Acceptance Test (FAT). The Contractor shall perform FAT on the DMS prior to shipping from the factory. The goal of the DMS FAT is to verify that the DMS meets the requirements of this special provision.

Factory Acceptance Tests shall be conducted at the Manufacturer or Contractor facility or at a facility acceptable to all parties. All equipment to be utilized for this project shall be subject to tests that demonstrate the suitability of the design and compliance with the contract requirements, unless an exception for an equipment item is granted by the Project Engineer. The tests shall be performed on production units identified to be delivered under this contract.

The FAT procedure shall demonstrate all requirements defined in these specifications are met, including, but not limited to: functional/system performance requirements, electrical requirements, data transmission/communication requirements, safety/password requirements, environmental requirements, and interface requirements with other components of the project system.

The Project Engineer reserves the right to waive FATs which are deemed to be unnecessary and reserves the right to witness all FATs that are determined to be critical to the project. At a minimum, the Project Engineer and/or the Project Engineer's representative, will be in attendance at the FAT for the first three (3) units tested. The FAT for the first three (3) units shall be conducted during the same period. The Project Engineer shall be notified a minimum of forty- five (45) calendar days in advance of such tests. Salary and travel expenses of the Project Engineer and the Project Engineer representatives will be the responsibility of MDOT. In case

of equipment or other failures that make a retest necessary, travel expenses of the Project Engineer and the Project Engineer's representatives shall be the responsibility of the Contractor. This shall include all costs including, but not limited to, airfare, automobile rental, lodging, and per diem. These costs, excluding airfare shall not exceed $500.00, per representative, per day. These costs shall be deducted from payment due or charged to the withholding account of the Contractor when the project is terminated.

The vendor must complete the FAT on all remaining units on their own and submit documentation to the Project Engineer that the FATs were completed. The Project Engineer reserves the right to randomly attend those FAT tests.

No equipment for which a FAT is required shall be shipped to the project site without successful completion of factory acceptance testing as approved by the Project Engineer and the Engineer's approval to ship.

907-656.03.2.3--DMS Pre-Installation Test (PIT). The Contractor shall perform PIT on the DMS as they arrive from the factory. The goal of the DMS PIT is to verify that the DMS were not damaged during shipping. The PIT shall test or inspect the following DMS components:

1) External or internal visible damage
2) DMS display damage
3) Verify all pixels are operational
4) Verify the ventilation system works
5) Verify all equipment is secured
6) Verify sign configurations

907-656.03.2.4--DMS Stand Alone Test (SAT). The Contractor shall perform SAT on the DMS as they arrive from the factory. The goal of the SAT is to verify that the DMS has been properly installed and commissioned according to the manufacturer requirements. The SAT shall include at minimum the following tests and inspections:

1) Verify the signs have been attached properly to the structure.
2) Verify the sign case and roadside cabinet have been grounded.
3) Verify the sign has been properly to the power.
4) Verify the sign case has no structural damage of deformities.
5) Verify all pixel are operational
6) Verify local sign control through the serial port
7) Verify local sign control through the Ethernet port.

907-656.03.2.5--DMS Sub-System Test (SST). The Contractor shall perform SST on the DMS to very that the sign is operational from central. The goal of the SST is to verify that all remote DMS functions and alarms are operational.

907-656.03.2.6--Conditional System Acceptance Test (CSAT). The Contractor shall perform a complete conditional system acceptance test on all equipment and materials in the project. The Contractor shall not request the conditional system acceptance test for a phase until the SATs

have been satisfactorily completed, all as-built documentation has been submitted and approved, and all other project work has been completed to the satisfaction of the Engineer. Prior to a Conditional System Acceptance Test, the Contractor shall provide advance notice of and written test results documentation that the Contractor has performed a dry-run of the conditional system acceptance test, and the Engineer reserves the right to require attendance of a dry-run test session.

The Contractor shall test all project systems simultaneously from the TMC in a manner equivalent to the normal day-to-day operations of the system. The Conditional System Acceptance Test shall demonstrate that all equipment and materials in the network are in full compliance with all project requirements and fully functional as installed and in final configuration, communicating with and being controlled through the control center at the TMC. Upon completion and full approval of the Conditional System Acceptance Test for all equipment, Conditional System Acceptance will be given and the Burn-in Period will begin.

907-656.03.2.7--Burn-In Period. Following the Engineer's written notice of successful completion of the Conditional System Acceptance Test, the entire newly installed system must operate successfully for a six (6) month burn-in period. During this burn-in period the Contractor shall be responsible for the full maintenance of the newly installed equipment. However, no separate payment will be made for the burn-in period activities and shall be included in the cost of other items. Successful completion of the burn-in period will occur at the end of six complete months of operation without a major system failure attributable to hardware, software or communications components. Each system failure during the burn-in period will require an additional month of successful operation prior to being eligible for Final Acceptance. (i.e., if there are two system failures during the initial six month period, the burn-in period would be increased to 8 months.)

Burn-In General Requirements

- Determination of a system failure shall be at the sole discretion of the Engineer. System failure is defined as a condition under which the system is unable to function as a whole or in significant part to provide the services as designed. While a single component failure will not constitute a system failure, chronic failure of that component or component type may be sufficient to be considered a system failure. Chronic failure of a component or component type is defined as 3 or more failures for the same component during the burn-in period.
- Components are defined as contract items or major material elements in a contract item. For electrical and electronic contract items, components are defined as the complete assembly of materials that makes up the contract item.
- Specifically exempted as system failures are failures caused by accident, acts of God, or other external forces that are beyond the control of the Contractor. However, failure of the contractor to respond to the repair request for that failure within 24 hours may be considered a system failure.
- The Department will advise the Contractor in writing when it considers that a system failure has occurred or chronic failure exists.

- If multiple system and/or chronic failures continue to occur throughout the burn-in period due to a single component type, the Contractor may be required to replace all units of that component type with a different model or manufacturer.
- The Contractor shall document all failures and subsequent diagnosis and repair. The repair documentation shall include as a minimum:
    - Description of the problem
    - Troubleshooting and diagnosis steps
    - Repairs made
    - List of all equipment and materials changed including serial numbers.
    - Update of the equipment inventory where needed.
- The Contractor shall provide the repair documentation to the Engineer within 2 days of completing the repair; failure to provide acceptable documentation as required shall be reason to not approve the repair as complete. The Engineer will provide acceptance or rejection of the repair and documentation within seven (7) days.
- The Engineer reserves the right to require, at no additional expense to the State, the presence of a qualified technical representative of the equipment and/or software manufacturers as related to the diagnosis and/or repair of any system failure.
- During the burn-in period the Contractor shall perform incidental work such as touching up, cleaning of exposed surfaces, leveling and repair of sites, sodding/grassing and other maintenance work as may be deemed necessary by the Engineer to insure the effectiveness and neat appearance of the work sites.
- During the burn-in period the Engineer shall maintain a "burn-in period punch list" that contains required Contractor actions but that the Engineer does not define as a system failure. Each burn-in period punch list action item shall be completed by the Contractor to the Engineer's satisfaction within seven (7) days of Contractor notification of the action item.
- During the burn-in period the Contractor is required to meet the following response times once notified there is a problem. A response is defined as being on-site to begin diagnosing the problem.
    - Monday thru Friday: The Contractor shall respond no later than 9:00 a.m. the following morning after being notified.
    - Weekends: If the Contractor is notified on Friday afternoon or during the weekend, the Contractor shall response by 9:00 a.m. on Monday morning.
- During the burn-in period the Contractor shall provide all labor, materials, equipment and replacement parts to completely maintain, troubleshoot and repair all items installed under this contract. No separate payment will be made for any labor, materials, equipment or replacement parts needed during the burn-in period.
- The overall burn-in period will be considered complete upon the successful completion of the burn-in time periods, the Engineer's acceptance of all repairs and repair

documentation, completion of all burn-in period punch list actions and a final inspection as described below.

907-656.03.2.8--DMS Final Inspection. Upon successful completion of the burn-in period, the project shall be eligible for the DMS final inspection. The DMS final inspection will be conducted provided the burn-in period has demonstrated the entire system is operating successfully. The DMS final inspection shall include but is not limited to;

- monitoring of all system functions at the TMC to demonstrate the overall system is operational
- a field visit to each site to ensure all field components are in their correct final configuration
- verification that all burn-in punch list items have been completed
- verification that all final cleanup requirements have been completed
- approval of final as-built documentation

Prior to conducting the DMS final inspection, the burn-in period shall demonstrate that all requirements defined in this Special Provision have been met.

The Contractor shall request in writing the Engineer's approval to start the DMS final inspection a minimum of 14 days prior to the requested start date. The Engineer reserves the right to reschedule the start date if needed. The start date for the DMS final inspection cannot be prior to the successful completion of the overall burn-in period.

An unsuccessful or incomplete DMS final inspection shall require a new DMS final inspection after the Contractor has made the necessary corrections. Up to 14 days shall be allowed for the Engineer to conduct a DMS final inspection.

The Engineer reserves the right to require, at no additional expense to the State, the attendance of a qualified technical representative of the equipment and/or software manufacturers to attend a portion of a DMS final inspection.

The Contractor shall be responsible for the full maintenance of all project equipment and materials during the entire time period from the successful completion of the burn-in period until Final System Acceptance is granted.

907-656.03.2.9--Final System Acceptance Upon successful completion of the DMS final inspection, the Engineer will conduct a project final inspection in accordance with Subsection 105.16.2 of the Standard Specifications.

907-656.03.3--Documentation. DMS documentation shall meet all of the performance and testing requirements as outline in Section 12 of NEMA TS-4 standard.

907-656.03.4--Warranty. The DMS shall be warranted to be free of manufacturer defects in materials and workmanship for a period of one year from the date of Final Acceptance. Equipment covered by the manufacturer's warranties shall have the registration of that

component placed in MDOT's name prior to Final Inspection. The Contractor is responsible for ensuring that the vendors and/or manufacturers supplying the components and providing the equipment warranties recognize MDOT as the original purchaser and owner/end user of the components from new. During the warranty period, the supplier shall repair or replace with new or refurbished material, at no additional cost to the State, any product containing a warranty defect, provided the product is returned postage-paid by the Department to the supplier's factory or authorized warranty site. Products repaired or replaced under warranty by the supplier shall be returned prepaid by the supplier. During the warranty period, technical support shall be available from the supplier via telephone within four hours of the time a call is made by the Department, and this support shall be available from factory certified personnel. During the warranty period, updates and corrections to control unit software shall be made available to the Department by the supplier at no additional cost.

907-656.03.5--MDOT Employee Training. The Contractor shall submit to the Project Engineer for approval a detailed Training Plan including course agendas, detailed description of functions to be demonstrated and a schedule. The Contractor must also submit the Trainer's qualifications to the Project Engineer for approval prior to scheduling any training. The training must include both classroom style training and hands-on training in the field of the maintenance and troubleshooting procedures required for each component. The training should also consist of a hands-on demonstration of all software configuration and functionality where applicable.

The supplier of the DMS shall, at a minimum, provide a sixteen-hour operations and maintenance training class with suitable documentation for up to eight (8) persons selected by the Department. The operations and maintenance class shall be scheduled at a mutually acceptable time and location.

907-656.03.6--Maintenance and Technical Support. The supplier shall maintain an adequate inventory of parts to support maintenance and repair of the DMS. Spare parts shall be available for delivery within 30 days of placement of an acceptable order at the supplier's then current pricing and terms of sale of said spare parts.

The suppliers shall maintain an ongoing program of technical support for the video detection system. This technical support shall be available via telephone or via personnel sent to the installation site upon placement of an acceptable order at the supplier's then current pricing and terms of sale of said technical support services.

907-656.04--Method of Measurement. Dynamic Message Sign will be measured in units of each.

Dynamic message sign shall be measured for payment as follows:

1) 20% of the contract unit price upon completion of the Factory Acceptance Test and Pre-Installation Test.
2) 40% of the contract price upon delivery to the site. Delivery cannot be more than 60 days before anticipated installations.
3) 90% of the contract unit price upon complete installation and stand alone testing of the

dynamic message sign.

4) 100% of the contract unit price upon Final System Acceptance.

907-656.05--Basis of Payment. Dynamic Message Sign, measured as prescribed above, will be paid for at the contract unit price per each, which shall include furnishing, installing, system integration and testing of the complete dynamic message sign including the sign case, light sources, display apparatus, wiring, controller, roadside DMS cabinet, communications interface, wiring between the sign case and DMS cabinet, structure mounted conduit, fittings, and junction boxes, sign case support connections to the sign support structure, satisfactory completion of testing and training requirements and all work, equipment and appurtenances as required to effect the full operation including remote and local control of the sign complete in place and ready for use. The price bid shall also include all system documentation including: shop drawings, operations and maintenance manuals, wiring diagran1s, block diagrams, and other material necessary to document the operation of the DMS. This price shall be full compensation for all labor, tools, materials, equipment, and incidentals necessary to complete the work for a complete and functional DMS.

This work does not include the sign support structure.

Payment will be made under:

907-656-A:	Dynamic Message Sign *	- per each
907-656-B:	Dynamic Message Sign Training	- lump sum

* Type may be specified

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-657-2 **CODE: (SP)**

DATE: **5/20/2008**

SUBJECT: **Fiber Optic Cable (OSP)**

PROJECT: **SP-0017-00(001) / 104589301 -- Desoto County**

Section 657, Fiber Optic Cable (OSP), of the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows:

Delete in total Section 657 beginning on page 541, and substitute the following:

SECTION 907-657 -- FIBER OPTIC CABLE (OSP)

907-657.01--Description. The work shall consist of the construction of the infrastructure required to install fiber optic cable. The infrastructure shall include all necessary conduits, pull boxes, pole line hardware, building entries, risers and fiber cable to make a complete system.

907-657.02--Materials.

907-657.02.1--Fiber Optic Cable (FO Cable). The Contractor shall provide 72-count fiber optic cable that meets the following requirements:

- All-dielectric, outside plant, loose tube cable with central strength/anti-buckling member
- Dry water blocking materials and construction
- Reverse oscillating "SZ" stranded buffer tube construction
- High tensile strength yarn
- Medium density polyethylene outer jacket
- 72-fiber cable with six (6) active buffer tubes and 12 individual stranded fibers per buffer tube
- Cable construction design that allows no more than six (6) buffer tube positions
- Maximum diameter 0.48 inches
- Maximum weight 0.07 pounds per foot.

The Contractor shall provide a Corning ALTOS All-Dielectric, Pirelli FlexLink, OFS MiDia, or approved equivalent cable. This cable shall be designated as a trunk cable.

The Contractor shall ensure that the cable can withstand a maximum pulling tension of 600 pounds (lbf) during installation and 180 pounds (lbf) installed long term (at rest).

The cable shall have a shipping, storage and operating temperature range of -30°C to +70°C and installation temperature range of -30°C to +60°C.

The Contractor shall provide cable with outer jacket marking using the following template:

Manufacturer's Name -"Optical Cable" - Month/Year of Manufacture -Telephone Handset Symbol - "MDOT" - "72F SM"

The Contractor shall include in the outer jacket marking the cable sequential length in accordance with the following:

- In English units every two (2) feet
- Within -0/+1% of the actual length of the cable
- In contrasting color to the cable jacket
- Marking font height no less than 0.10 inch
- On any single length of cable on a reel, the sequential length markings do not run through "00000"

907-657.02.2--Fiber Optic Cable Indoor/Outdoor Riser Rated. The Contractor shall provide fiber optic plenum rated cable that meets the following requirements when called for on the plans:

- All-dielectric, inside plant, loose tube central core cable
- High tensile strength yarn surrounding the central tube core
- Dry water blocking materials and construction
- 72-fiber cable with six (6) active buffer tubes and 12 individual stranded fibers per buffer tube
- Corning Freedm LST All-Dielectric, Pirelli CentraLink, or approved equivalent cables shall be provided. This cable shall be designated as the building entry cable.

The Contractor shall ensure that the cable can withstand a maximum pulling tension of 300 pounds (lbf) during installation.

The cable shall have a shipping, storage and operating temperature range of -30°C to +70°C and an installation temperature range of -10°C to +60°C shall be provided.

The Contractor shall provide cable with outer jacket marking using the following template:

Manufacturer's Name - "Optical Cable" - Month/Year of Manufacture - Telephone Handset Symbol - "MDOT" - "72F SM"

The Contractor shall include in the outer jacket marking the cable sequential length in accordance with the following:

- English units every two (2) feet.
- Within -0/+1% of the actual length of the cable
- Contrasting color to the cable jacket
- Marking font height no less than 0.10 inch
- The sequential length markings do not run through "00000" on any single length of cable

on a reel

907-657.02.3--Fiber Optic Drop Cable (FO Drop Cable). The Contractor shall provide 12-Fiber, Pre-Terminated Drop Cable Assemblies. These assemblies shall be employed when connecting a camera, traffic controller, DMS or other device to the main cable.

Assemblies shall be factory assembled and terminated on one end with ceramic ferrule, ST compatible, heat cured epoxy connectors with an operational temperature of -40°C to +70°C. Each connector shall have a minimum of a 1-inch strain relief boot.

Insertion loss for each connector shall not exceed 0.30 dB.

Return loss for single mode connectors shall be >-45 dB.

Each assembly shall be fully tested and those test results placed on a test tag for each assembly.

Each assembly shall be individually packaged within a box or reel, with the submitted manufacturer's part number marked on the outside of the package.

Individual 250-µm coated fibers shall be up-jacketed to 1/8-inch using fan-out tubing. This tubing shall contain a 900-µm Teflon inner tube, aramid yam strength members and an outer jacket.

The fan-out tubing shall be secured to the cable in a hard epoxy plug transition. Length of the individual legs shall be a minimum of three feet with the length difference between the shortest and longest legs of the assembly being no more than two inches.

The 12-Fiber, Pre-terminated Drop Cable Assemblies provided shall meet the following minimum requirements:

- All-dielectric, outside plant, loose tube central core cable shall be used
- High tensile strength yarn surrounding the central tube core
- Dry water blocking materials and construction
- Twelve (12) individual stranded fibers contained within the central tube core
- Corning Freedm LST All-Dielectric, Pirelli CentraLink, or approved equivalent cables shall be used. This cable shall be designated as the drop cable

The Contractor shall ensure that the cable can withstand a maximum pulling tension of 300 pounds (lbf) during installation.

The cable shall have a shipping, storage and operating temperature range of -30°C to +70°C and an installation temperature range of -10°C to +60°C.

The Contractor shall provide cable with outer jacket marking using the following template:

Manufacturer's Name - "Optical Cable" - Month/Year of Manufacture - Telephone Handset Symbol - "MDOT" - "12F SM"

The Contractor shall include in the outer jacket marking the cable sequential length in accordance with the following:

- English units every two (2) feet
- Within -0/+1% of the actual length of the cable
- Contrasting color to the cable jacket
- Marking font height no less than 0.10 inch
- The sequential length markings do not run through "00000" on any single length of cable on a reel

907-657.02.4--Plenum Rated Nonmetallic Corrugated Raceway. The Contractor shall provide plenum rated nonmetallic corrugated raceway inside buildings when cable is not in rigid conduit when called for on the plans.

The installation shall conform to NEC articles 770 and 800.

Raceway shall meet UL Standards 910 and 2024.

The Contractor shall provide 2-inch diameter raceway unless larger is called for in the plans.

The Contractor shall provide Fiber Optic Fusion Splice (FO Splice Fusion) for splicing of all fibers with a fully automatic portable fusion splicer that provides consistent low loss (max 0.10 dB) splices.

Splicer shall provide three-axis fiber core alignment using light injection and loss measurement techniques.

The fusing process shall be automatically controlled.

The splicer shall provide splice loss measurements on an integral display, as well as a magnified image of the fiber alignment.

The Contractor shall retain ownership of the fusion splicer.

907-657.02.5--Fiber Optic Connectors. The Contractor shall provide fiber optic connectors for all fiber optic infrastructures including but not limited to fiber optic termination cabinets, fiber optic drop panels, and fiber optic patch cords.

The Contractor shall provide only factory-installed keyed ST compatible connectors for all fiber optic infrastructures.

The Contractor shall provide only factory-installed connectors of a type other than ST when required by the Network Switches Type A.

Field-installed connectors shall not be used.

Adapter couplers shall not be used to change connector types.

Ceramic ferule connectors, factory-installed, with a thermal-set heat-cured epoxy and machine polished mating face shall be used.

Connectors shall be installed as per manufacturer application and recommendations, including proper termination to the outer-tubing (900-micron tubing, 3-mm fan out tubing, etc.) required for the application.

Connectors rated for an operating temperature of -40°C to +75 °C shall be used.

Simplex connectors for all male ST connectors shall be used and a latching cover for two male connectors being used in a duplex configuration shall be provided. Female couplers may be duplex but must allow simplex mating connectors.

Dust caps shall be provided for all exposed male connectors and female couplers at all times until permanent connector installation.

907-657.02.6--Fiber Optic Termination Cabinet (FO Termination Cabinet). Fiber optic termination cabinets shall be provided in communications hubs, field junctions, and the MDOT Traffic Management Center (TMC) as shown in the Plans for termination of 72-fiber outside plant (OSP) cable.

The Contractor shall provide wall/shelf mount 12-fiber distribution cabinet equipped with fiber optic connector modules in a 12-fiber configuration. These will be used in field equipment and communication cabinet locations.

Termination cabinets with cable management features included shall be provided.

The Contractor shall use termination cabinets that are fully compatible with all components of the fiber optic infrastructure as specified, including, but not limited to, fiber optic cable, fiber optic fusion splices and fiber optic connectors.

The Contractor shall provide rack-mount termination cabinets designed to fit standard 19-inch EIA equipment racks.

The Contractor shall provide all mounting hardware and supports to mount the termination cabinets in the locations shown in the Plans.

The Contractor shall provide fiber optic termination cabinets providing 72-fiber connectors and capable of storing 72 fusion splices in splice trays.

The Contractor shall provide termination cabinets that integrate the splice trays and connector modules into one compartment within one cabinet, or houses the splice trays and connector modules in separate compartments integrated into one cabinet.

The maximum dimensions of a complete termination cabinet shall be 7-rack units, 12.25 inches

high by 16 inches deep.

Fiber optic termination cabinets shall be fully enclosed metallic construction with a protective hinged front cover for the connector ports.

The cabinet shall have cable access on all sides of the enclosed area behind the connector port panel.

The Contractor shall provide sufficient splice trays for storing 72 fusion splices in 12 or 24-splice increments.

The Contractor shall provide termination cabinets with fiber optic connector modules in a 12 fiber configuration of six (6) rows of one (1) duplex connector couplers. Connector modules shall mount vertically in the termination cabinet front panel.

Connector modules shall include clearly legible and permanent labeling of each of the 12 fiber connector couplers, and shall be labeled and identified as shown in the Plans.

The Contractor shall provide factory-assembled 12-fiber termination interconnect cables (pigtail cables) to be fusion spliced to the outside plant or indoor cable and connected to the rear of the connector modules.

Termination interconnect cables shall be all-dielectric, single jacketed cable with high tensile strength yarn surrounding 12 individual 900-micron fibers following EIA/TIA-598B color identification with factory-installed connectors.

The Contractor shall provide all incidental and ancillary materials including but not limited to grommets, cable strain relief and routing hardware, blank connector panels and labeling materials.

The cable shall be new (unused) and of current design and manufacture.

907-657.02.7--OSP Closures for Aerial, Pole Mount, Pedestal and Hand Hold Environments. OSP closures for aerial, pole mount, pedestal and hand hold shall be capable of accepting up to eight cables. The closures shall be capable of storing up to eight 90-inch lengths of expressed buffer tubes and up to 96 splices.

Assembly shall be accomplished without power supplies, torches, drill kits or any special tools. Re-entry shall require no additional materials.

Sealing shall be accomplished by enclosing the splices in a polypropylene case that is clamped together with a stainless steel latch and sealed with an O-ring.

Closure shall be capable of strand mounting with the addition of a strand mounting bracket.

Splice case shall be non-filled, non-encapsulate to prevent water intrusion, and shall allow re-entry without any special tools.

The closure shall be capable of preventing a 10-foot water head from intruding into the splice compartment for a period of seven (7) days.

It is the responsibility of the Contractor to ensure that the water immersion test has been performed by the manufacturer or an independent testing laboratory, and the appropriate documentation has been submitted to the Engineer.

907-657.02.8--OSP Closures for Drop Cable Splice Points. OSP closures for aerial, pole mount, pedestal and hand hold shall be capable of accepting the trunk cable and two drop cables. The closures shall be capable of storing up to eight 90-inch lengths of expressed buffer tubes and up to 48 splices.

Assembly shall be accomplished without power supplies, torches, drill kits or any special tools. Re-entry shall require no additional materials.

Sealing shall be accomplished by enclosing the splices in a polypropylene case that is clamped together with a stainless steel latch and sealed with an O-ring.

Closure shall be capable of strand mounting with the addition of a strand mounting bracket.

Splice case shall be non-filled, non-encapsulate to prevent water intrusion, and shall allow re-entry without any special tools.

The closure shall be capable of preventing a 10-foot water head from intruding into the splice compartment for a period of seven days.

It is the responsibility of the Contractor to ensure that the water immersion test has been performed by the manufacturer or an independent testing laboratory, and the appropriate documentation has been submitted to the Engineer.

907-657.02.9--Patch Cords and Jumper Cables. Any patch cords or jumper cables required to connect the new fiber and equipment at existing locations shall be considered incidental and shall be included in the cost of pay items 907-657-A and 907-657-B.

Any patch cords used for system configuration shall be compatible with fiber types and connectors specified herein.

Single-mode patch cords shall be yellow in color.

Jacketing material shall conform to the appropriate NEC requirement for the environment in which installed.

All cordage shall incorporate a 900-µm buffered fiber, aramid yam strength members and an outer jacket.

Patch cords may be simplex or duplex, depending on the application.

Attenuation shall be less than 1.0 dB/km @ 1310 nm, 0.75 dB/kin @ 1550.

907-657.02.10 Cable Labels. The Contractor shall provide cable labels that meet the following requirements:

- Self-coiling wrap-around type
- PVC or equivalent plastic material with UV and fungus inhibitors
- Base materials and graphics/printing inks/materials designed for underground outside plant use including solvent resistance, abrasion resistance and water absorption
- Minimum size of 2.5 inches wide by 2.5 inches long
- Minimum thickness of 0.010 inches
- Orange label body with pre-printed text in bold black block-style font with minimum text height of 0.375 inches
- The Contractor shall pre-print the following text legibly on labels used for all fiber optic trunk cables:

  Caution Fiber Optic Cable Mississippi Department of Transportation (601) 359-1454

- The Contractor shall pre-print the following text legibly on labels used or all fiber optic drop cables (FO Drop Cable):

  Caution Fiber Optic Drop Cable Mississippi Department of Transportation (601) 359-1454

- On all cable labels, the Contractor shall print the text specified above twice on the label with the text of the second image inverted. The end result shall be text which "reads correctly" when the label is coiled onto a cable.

907-657.02.11--Cable Markers. The Contractor shall provide low profile soil cable markers which meet the following requirements:

- 3.5 inches in diameter
- UV stabilized for Maximum fade resistance
- Durable and abrasion resistant
- Lawn mower resistant
- Orange in color
- Printed Legend:

Fiber Optic Cable
Mississippi Department of Transportation
Traffic Engineering Division (601)359-1454

The Contractor shall install cable markers with a 13-inch nylon stake every 500 feet along the fiber run.

907-657.02.12--Conduit Detection Wire. Conduit detection wire shall be #10 AWG stranded copper, orange-insulated, THHN -THWN conductor.

The Contractor shall furnish and install a detection wire surge protection system. The Contractor shall ensure that detection wires are attached to a surge protection system designed to dissipate high transient voltages or other electrical surges.

The Contractor shall ensure that the detection wire surge protection system is grounded to a driven rod within 10 feet of the system using AWG #6 single conductor wire. Grounding must be done through a stand alone system not connected to power or ITS device grounding.

The Contractor shall ensure that the surge protection system normally allows signals generated by locate system to pass through the protection system without going to ground.

907-657.02.13--Project Submittal Program Requirements. The Contractor shall provide project submittals for all fiber optic infrastructures. The project submittals for fiber optic infrastructure shall include all items in this provision and any additional requirements included in any Notice to Bidders.

The Contractor shall provide project submittals including manufacturer recommended operations, maintenance and calibration procedures for the following equipment:

- Fiber optic installation and testing tools
- Fusion splicers
- Cable pulling strain dynamometers and breakaway links
- Cable air jetting/blowing systems
- OTDRs
- Optical attenuation testers (light sources and power meters)

The Contractor shall submit documentation and proof of manufacturer recommended operator training and certification for the following equipment:

- Fusion splicers
- Cable air jetting/blowing systems
- OTDRs
- Optical attenuation testers (light sources and power meters)

907-657.03--Construction Requirements.

907-657.03.1--General. The Contractor shall install all fiber optic infrastructures according to the manufacturer's recommended procedures and specifications.

The Contractor shall provide all necessary interconnections, services and adjustments required for a complete and operable data transmission system.

All pole attachments, service loops and conduit risers shall be placed to minimize the possibility of damage as well as to facilitate future expansion or modernization.

The cable shall be installed in continuous runs as indicated on the plans. Splices shall be allowed only at drop points or reel end points specified in the plans.

At drop locations only, those fibers necessary to complete the communication path shall be spliced. Other fibers in the cable(s) shall be left undisturbed, with a minimum of five feet of buffer tube coiled inside the closure.

Sufficient slack shall be left at each drop point to enable access of the cable components and splicing to occur on the ground. This is typical two times the pole height plus 15 feet.

For aerial installations, the following minimum slack requirements shall apply:

- For aerial slack storage at splice points, a radius controlling device, commonly referred to as a SNO-SHOE, shall be used for securing resulting cable slack at aerial splice points and shall be mounted directly to the strand.

- For aerial cable runs exceeding 6-pole spans between splice points as indicated on the plans, two opposing SNO-SHOES shall be placed on the span 50 feet apart to provide for a 100-foot service loop for future drops and for slack for repair and pole relocations.

Drop cable shall be routed to the controller cabinets via conduit risers as illustrated in the plans. The cable entrance shall be sealed with a duct plug designed for fiber optic cable to prevent water ingress.

The minimum requirement for fiber protection outside a fiber optic enclosure in ALL cases shall be 1/8-inch fan-out tubing, containing a hollow 900-µm tube, aramid strength members and an outer jacket, and shall be secured to the cable sheath.

The minimum requirement for fiber protection inside wall mount or rack mount fiber enclosure shall be 900-µm buffering, intrinsic to the cable in the case of tight buffered fibers, or in the case of 250-µm coated fibers, a fan-out body and 900-µm tubing secured to the buffer tube(s).

During installation, even if the tension specifications for the cable are not exceeded, the first ten feet shall be discarded.

Warning tape shall be placed 12 inches above the cable not to deviate ±18 inches from the centerline of the optical cable. Warning tape shall be at least two inches wide and colored orange.

907-657.03.2--Cable Shipping and Delivery. The cable shall be packaged on reels for shipment. Each package shall contain only one continuous length of cable. The packaging shall be constructed as to prevent damage to the cable during shipping and handling.

Both ends of the cable shall be sealed to prevent the ingress of moisture.

A weatherproof reel tag shall be attached to each reel identifying the reel and cable so that it can be used by the manufacturer to trace the manufacturing history of the cable and the fiber. A cable data sheet shall be included with each reel containing the following information:

- Manufacturer name
- Cable part number
- Factory order number
- Cable length.
- Factory measured attenuation of each fiber

The Contractor shall cover the cable with a protective and thermal wrap.

The outer end of the cable shall be securely fastened to the reel head so as to prevent the cable from becoming loose in transit. The inner end of the cable shall be projected a minimum of 6.5 feet into a slot in the side of the reel, or into housing on the inner slot of the drum, in such a manner as to make it available for testing.

Each reel shall be plainly marked to indicate the direction in which it is to be rolled to prevent loosening of the cable on the reel.

907-657.03.3--Cable Handling and Installation. The Contractor shall not exceed the maximum recommended pulling tension during installation as specified by the cable manufacturer.

The Contractor shall continuously monitor pulling tensions with calibrated measuring devices, such as a strain dynamometer.

All pulled installations shall be protected with calibrated breakaway links.

The Contractor shall ensure that the minimum recommended bend radius is not exceeded during installation as specified by the cable manufacturer. Unless the manufacturer's recommendations are more stringent, the following guidelines shall be used for minimum bend radius:

- 20 X Cable Diameter Short Term - During Installation
- 10 X Cable Diameter Long Term - Installed

Before cable installation, the cable reels and reel stands shall be carefully inspected for imperfections or faults such as nails that might cause damage to the cable as it is unreeled.

All necessary precautions shall be taken to protect reeled cable from vandals or other sources of possible damage while unattended. Any damage to reeled cable or the reel itself shall necessitate replacement of the entire cable section at no additional cost to the State.

Whenever unreeled cable is placed on the pavement or surface above a pull box, the Contractor shall provide means of preventing vehicular or pedestrian traffic through the area in accordance with the safe maintenance of traffic provisions.

The cable shall be kept continuous throughout the pull. Cable breaks and reel end splices are permitted only as shown in the Plans.

Where a cable ends in an underground fiber optic closure, all unused fibers and buffer tubes shall be secured and stored in splice trays in preparation for future reel end splicing and continuation.

907-657.03.4--Cable Storage. The Contractor shall properly store all cable to minimize susceptibility to damage. The proper bend radius shall be maintained, both short and long term, during cable storage.

Storage coils shall be neat in even length coils, with no cross over or tangling.

Storage coils of different cables shall be kept completely separate except when the cables terminate in the same splice closure.

Storage coils shall be secured to cable racking hardware with tie wraps, Velcro straps, or non-metallic cable straps with locking/buckling mechanism. No adhesive or self-adhering tapes, metal wires and straps, or rope/cord shall be used to secure coils.

Unless otherwise noted on the plans, the following are the requirements for cable storage for underground applications:

- Trunk cable in Type 4 pull box ..... 25 feet
- Trunk cable in Type 5 pull box ..... 200 feet
- Drop cable in Type 4 pull box ..... 10 feet
- Drop cable in Type 5 pull box, not terminated in a splice closure ..... 10 feet
- Drop cable in Type 5 pull box, terminated in a splice closure with the trunk cable ..... 100 feet
- Trunk cable end in Type 5 pull box ..... 200 feet
- Drop cable terminated in same splice closure as trunk cable end ..... 200 feet

The Contractor shall label each pull box with a numbered disk obtained from the traffic engineering department. The disk shall be installed in accordance with the manufactures specification on the lid of each pull box. Numbers shall be noted on the As-Built plans for each pull box.

No slack cable shall be stored inside the communications hub building or Control Center.

907-657.03.5--Cable Labels. Cable labels shall be installed on all trunk and drop fiber optic cables. The installed cable shall be cleaned of all dirt and grease before applying any label.

The Contractor shall label all cables in or at every location where the cable is exposed outside of a conduit, innerduct or pole using the cable IDs for trunk cables or the device number for drop cables.

As a minimum, cable labels shall be installed in the following locations:

- Within 12 inches of every cable entry to a pull box, equipment cabinet, communications hub, or the TMC
- Within 12 inches of the exterior entry point of every fiber optic splice closure, termination cabinet and drop panel
- Every 30 feet for the entire length of cable in any storage coil in pull boxes
- Within one (1) foot of every pole attachment
- On every riser
- On every splice enclosure

907-657.03.6--Conduit Detection Wire. The Contractor shall install one conduit detection wire in all conduit banks. Conduit detection wire is required in all conduit banks installed by any installation method, including trenching, directional boring or plowing.

Only one conduit detection wire is required per installed conduit bank regardless of the number of conduits installed in that segment. Conduit detection wire shall be installed inside the conduit.

Conduit detection wire is not required for structure mounted conduit, except where underground segments of structure mounted conduit are greater than 20 feet in length.

The conduit detection wire shall be continuous and unspliced between pull boxes and shall enter the pull boxes at the same location as the conduit with which it is installed, entering under the lower edge of the pull box.

Four (4) feet of conduit detection wire shall be coiled and secured in each pull box or vault.

When two or more detection wires are in any pull box, the Contractor shall mechanically splice all detection wire together.

Conduit detection wire is required in drop cable conduits.

A detection wire surge protection system shall be furnished and installed. Detection wires shall be attached to surge protection systems designed to dissipate high transient voltages or other electrical surges. The detection wire surge protection system shall be grounded to a driven rod within 10 feet of the system using AWG #6 single conductor wire. Grounding shall be done through a stand alone system not connected to power or ITS device grounding. The surge protection system shall normally allow signals generated by locate system to pass through the protection system without going to ground.

907-657.03.7--Splicing into Existing Fiber Optic Cable. At some locations, the Contractor may be required to splice new drop cable into existing fiber optic cable at existing pull boxes. The Contractor is responsible to protect all existing fiber during this work. No separate payment shall be made for splicing into the existing fiber. The cost for all fiber optic work and equipment shall be included in the bid price for pay items 907-657-A and 907-657-B.

907-657.03.8--Fiber Optic Connections at Existing OTN Node Huts. In some locations, the Contractor shall be required to pull new fiber optic cable into an existing communications huts.

No separate payment will be made for this work. The cost for pulling the fiber into the hut, providing and installing the termination equipment, and terminating all the fibers shall be included in the cost of pay items 907-657-A and 907-657-B.

907-657.03.9--Drop and Insert Applications. The signal from the TMC to local controllers, cameras, and/or dynamic message signs will be conveyed via the backbone and branch cables.

The appropriate closure (Subsection 907-657.02.8) shall be used.

A 12-port fiber distribution cabinet and appropriate jumper shall be installed within the cabinet at locations approved by the Engineer.

At each device, the applicable fibers will be routed in and out of the equipment cabinet using a pre-terminated drop cable.

Only fibers required for the drop and insert shall be cut, no other fibers in the cable shall be cut without the approval of the Engineer.

The fibers shall be connected to the transmission equipment via ST/ST fiber optic patch cables.

The drop cable shall be routed in a position that will allow access to all installed components without movement of the cable.

In traffic signal control boxes the drop cable shall be routed up the left rear corner to a shelf mounted fiber optic termination cabinet.

In ITS equipment or communication cabinets the cable shall be routed neatly allowing for service of all installed components.

907-657.03.10--Testing Requirements.

907-657.03.10.1--General. The project testing program for fiber optic infrastructure shall include but is not limited to the specific requirements in this subsection.

All test results shall confirm physical and performance compliance with this TSP including but not limited to optical fibers and fusion splices. No event in any given fiber may exceed 0.10 dB. Any event measured above 0.10 dB shall be replaced or repaired at the event point.

The Contractor shall provide the tentative date, time and location of fiber optic infrastructure testing no less than seven (7) days in advance of the test. The Contractor shall provide confirmed date, time and location of fiber optic infrastructure testing no less than 48 hours before conducting the test.

The Contractor shall provide test results documentation in electronic format (3 copies) and printed format (3 copies). Electronic formats shall be readable in Microsoft Excel or other approved application. Printed copies shall be bound and organized by cable segment.

- One set is for the Traffic Engineering ITS Department
- Three sets are for the Engineer

All test results shall be provided in English units of measure of length.

All test results documentation shall be submitted to the Engineer within 14 days of completion of the tests.

907-657.03.10.2--Pre-Installation Test (PIT). The Contractor shall perform a PIT on all FO Cable prior to any cable removal from the shipping reels.

The Contractor shall perform a PIT on each cable reel delivered to the job site.

The PIT for FO Cable shall include but is not limited to:

- A visual inspection of each cable and reel
- An OTDR Test and documentation as required in the Standalone Acceptance Test (SAT) for three randomly selected fibers from each buffer tube

An Optical Attenuation Test is not required. However, if the Contractor decides to perform one of these tests for his or her own protection, it should be documented and provided to the Engineer.

907-657.03.10.3--Standalone Acceptance Test (SAT). The Contractor shall perform an SAT on all fiber optic infrastructures on this project after field installation is complete, including but not limited to all splicing and terminations. All fiber in pull boxes shall be in its final position mounted to the racks prior to the start of testing.

An SAT for each fiber in each cable shall include OTDR Tests and Optical Attenuation Tests.

For the Attenuation Tests, all fibers in all FO Cables and FO Drop Cables shall be tested from termination point to termination point, including:

- Fibers from FO Termination Cabinet to FO Termination Cabinet
- Fibers from FO Termination Cabinet to FO Drop Panel
- Fibers from FO Drop Panel to FO Drop Panel
- Fibers from FO Termination Cabinet to the end of the cable run in the last FO closure

All test results shall confirm compliance with this TSP including but not limited to optical fibers and fusion splices. No event in any given fiber may exceed 0.10 dB. Any event measured above 0.10 dB shall be replaced or repaired at the event point.

Test documentation shall include but is not limited to:

- Cable & fiber identification
- Cable & fiber ID and location - Physical location (device ID and station number of FO

Termination Cabinet, FO Drop Panel, or cable end FO closure), fiber number, and truck or drop cable ID for both the beginning and end point

- Operator name
- Engineer's representative
- Date & time
- Setup and test conditions parameters
- Wavelength
- Pulse width Optical Time Domain Reflectometer (OTDR)
- Refractory index (OTDR)
- Range (OTDR)
- Scale (OTDR)
- Ambient temperature
- Test results for OTDR test (each direction and averaged)
- Total fiber trace (miles)
- Splice loss/gain (dB)
- Events > 0.05 dB
- Measured length (cable marking)
- Total length (OTDR measurement)
- Test results for attenuation test (each direction and averaged)
- Measured cable length (cable marking)
- Total length (OTDR measurement from OTDR test)
- Number of splices (determined from as-builts)
- Total link attenuation

The OTDR Test shall be conducted using the standard operating procedure and recommended materials as defined by the manufacturer of the test equipment.

The Contractor shall use a factory patch cord ("launch cable") of a length equal to the "dead zone" of the OTDR to connect the OTDR and the fiber under test.

Bi-directional OTDR tests shall be conducted and bi-directional averages calculated for each fiber.

All tests shall be conducted at 1310 and 1550 nm for single mode cable.

The Contractor shall conduct the Optical Attenuation Test using the standard operating procedure and recommended materials as defined by the manufacturer of the test equipment.

Bi-directional Optical Attenuation tests shall be conducted and bi-directional averages calculated for each fiber.

A continuity or tone test shall be performed after installation to confirm that a continuous run of conduit detection wire was installed between pull boxes or vaults.

The Contractor shall prepare a test plan, supply equipment, conduct the test and document the results.

The test plan shall be submitted at least 15 working days prior to the desired testing date.

Testing shall not begin until the Engineer has approved the test plan, and all tests shall be conducted in the presence of the Engineer. The Traffic Engineering ITS Department representative shall be notified of the testing dates and invited to observe all testing.

The Traffic Engineering ITS Department may perform additional testing of any and all infrastructure using their own equipment. The Contractor may observe this testing.

The burn in period can not start until the Traffic Engineering ITS Department is satisfied with the installation.

907-657.03.11--Documentation - As-Built Plans. The Contractor shall provide GPS locations of all pull boxes, splices, termination equipment cabinets, DMS, CCTV, Detectors and all pole locations.

The Contractor shall record the sequential footage markers from the fiber optic trunk and drop cables for each GPS location.

The Contractor shall provide scanned PDF files of all plan sheets with pen and ink markups.

The Contractor shall also provide MDOT with an electronic file containing all of the data and test reports required above in a format that is compatible with Microsoft Excel.

A copy of all documentation shall be provided to the MDOT Traffic Engineering ITS Department and Project Office

The Contractor shall provide a site location inventory of ITS devices to include manufacturer model, serial numbers, and quantity. It shall also include the following:

- OTN Nodes and OTN Cards
- Fiber modems
- Video Encoders and Decoders
- Cameras
- Dome Camera housings
- DMS Signs
- Any other serial numbered devices installed

907-657.03.12--Training and Equipment. After the installation is complete, the Contractor shall provide formal classroom training and "hands-on" operations training for proper operation and maintenance of the fiber optic plant. The training shall be provided for up to six personnel designated by the Engineer and shall be a minimum of one day in duration. The training shall cover as a minimum preventive maintenance, troubleshooting techniques, fault isolation and OTDR trace analysis. All training materials shall be provided by the Contractor.

A Training Plan shall be submitted within 90 days of the Notice-to-Proceed. Approval of the

Plan shall be obtained from the Engineer and the Traffic Engineering ITS Department. A detailed explanation of the contents of the course and the time schedule of when the training shall be given shall be included in the Training Plan.

Prior to training, the Contractor shall submit resume and references of the training instructor(s) along with an outline of the training course in a Training Plan. Training instructor(s) shall be manufacturer-certified, experienced in the skill of training others. The training shall be conducted by a trainer with a minimum of four years of experience in training personnel on the operation and maintenance of fiber optic systems.

The Contractor shall furnish all handouts, manuals and product information for the training. The same models of equipment furnished for the project shall be used in the training. The Contractor shall furnish all media and test equipment needed to present the training. Training shall be conducted in the Jackson area.

907-657.04--Method of Measurement. Fiber optic cable of the type specified will be measured by the linear foot, measured horizontally along the conduit or aerially along the messenger cable. No differentiation will be made for cable installed underground or aerially.

Fiber optic drop cable and of the type specified will be measured by the linear foot from the trunk line to the controller cabinet.

All required cabinet facilities shall not be measured for separate payment. All standard or special fiber optic modems, fan out boxes, splicing devices, splicing, detection wire, warning tape, above ground markers, backplane facilities, twisted pair communications cable interface devices, etc., and any other cabinet modifications required for the fiber optic system shall be included in the price bid for other items of work.

907-657.05--Basis of Payment. Fiber optic cable, fiber optic drop cable, and fiber optic video drop cable, measured as prescribed above, will be paid for at the contract unit price bid per linear foot, which price shall be full compensation for furnishing all materials, for all installing, connecting, cutting, pulling and testing and for all equipment, tools, labor and incidentals necessary to complete the work.

Payment will be made under:

907-657-A:	Fiber Optic Cable, 72 SM	- per linear foot
907-657-B:	Fiber Optic Drop Cable, 12 SM	- per linear foot

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-658-1 **CODE: (SP)**

DATE: **5/20/2008**

SUBJECT: **Hardened Network Switch**

PROJECT: **SP-0017-00(001) / 104589301 -- Desoto County**

Section 658, Hardened Network Switch, is hereby added to and becomes part of the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction as follows:

SECTION 907-658 -- HARDENED NETWORK SWITCH

907-658.01--Description. This section specifies the minimum requirements for network switches furnished and installed. Switches will be in support of Intelligent Transportation Elements deployed on arterial streets and the highway system. Elements include but are not limited to traffic signals, dynamic message signs, surveillance cameras, and vehicle detection systems. This Section also specifies the minimum requirements for Terminal Servers furnished and installed on this project. The work shall consist of providing all labor, materials, equipment and incidentals necessary to furnish, install and test Terminal Servers. The Terminal Server device, also commonly referred to as a Port Server device, will be used to communicate bi directionally between IP-based Ethernet network systems and existing field devices that communicate or are controlled via a full-duplex serial interface.

907-658.02--Materials. Network Switches Type A and Type B, Terminal Servers and associated cabling will be placed in the field device cabinets and shall meet the following requirements:

907-658.02.1--Type A Network Switch.

1) Minimum of six 10/100 Base-TX ports. Each port shall connect via RJ-45 connector.
2) Minimum of two 1000 Base Long Reach optical ports with the following optical requirements:
3) The minimum optical budget between transmit and received ports shall be 19dB.
4) Shall include ST SC and LC connector options.
5) Optical receiver maximum input power level shall not be exceeded.
6) Optical attenuators shall be added as needed; fiber optic attenuator patch cords shall be in accordance with Section 657 of the Mississippi Standard Specifications for Road and Bridge Construction It is the Contractor's responsibility to determine where attenuators are needed and shall be included in the cost of the switch.
7) Rack, shelf or DIN Rail mountable. If shelf mounted, the Contractor must furnish and install a shelf if shelf space is not available in the facility. Any shelf used shall be ventilated as per the Network Switch manufacturer recommendation.
8) Operate between -34 to +74 degree Celsius, including power supply.

9) Operate from 100 VAC to 200 VAC.
10) Operate from 10% to 90% non-condensing humidity.
11) Meet the IEEE 802.3 (10Mbps Ethernet) standard.
12) Meet the IEEE 802.3u (Fast Ethernet 100 Mbps) standard.
13) Meet the IEEE 802.3x (Full Duplex with Flow Control) standard.
14) Meet the IEEE 802.1p (Priority Queuing) standard.
15) Meet the IEEE 802.1Q (VLAN) standard per port for up to four VLAN's.
16) The switch shall meet the IEEE 802.1D (Spanning Tree Protocol) and IEEE 802.1w (Rapid Spanning Tree Protocol) standards.
17) Meet the IEEE 802.3ad (Port Trunking) standard for a minimum of two groups of four ports.
18) Capable of mirroring any port to any other port within the switch.
19) Password manageable through:
    a. SNMP
    b. Telnet/CLI
    c. HTTP (Embedded Web Server) with Secure Sockets Layer (SSL)
20) Full implementation of SNMPv1 and SNMPv2c.
21) Full implementation of RMON I and RMON II.
22) Full implementation of GVRP (Generic VLAN Registration Protocol).
23) Full implementation of IGMP and IGMP snooping.
24) Minimum MTBF of 100,000 hrs using Bellcore TS-332 standard.
25) Full implementation of RFC 783 (TFTP) to allow remote firmware upgrades.
26) UL approved.
27) All power transformers provided shall be "fastening mechanism" type. No plug-in types shall be permitted. All corded transformers shall be mountable with the ability to neatly secure power cords.
28) The field switch shall provide status indicators as follows: 1) power on an off, 2) network status per port (transmit, receive, link, speed), and 3) status indicators shall be LED.
29) Unused ports (copper and optical) shall be covered with rubber or plastic dust caps/cover.

907-658.02.3--Type B Network Switch.

1) Minimum of twelve 10/100 Base-TX ports. Each port shall connect via RJ-45 connector.
2) Minimum of two 1000 Base Long Reach optical ports with the following optical requirements:
3) The minimum optical budget between transmit and received ports shall be 19dB.
4) Shall include ST SC and LC connector options
5) Optical receiver maximum input power level shall not be exceeded.
6) Optical attenuators shall be added as needed; fiber optic attenuator patch cords shall be in accordance with Section 657 of the Mississippi Standard Specifications for Road and Bridge Construction It is the Contractor's responsibility to determine where attenuators are needed and shall be included in the cost of the switch.
7) Rack, shelf or DIN Rail mountable. If shelf mounted, the Contractor must furnish and install a shelf if shelf space is not available in the facility. Any shelf used shall be ventilated as per the Network Switch manufacturer recommendation.
8) Operate between -34 to +74 degree Celsius, including power supply.

9) Operate from 100 VAC to 200 VAC.
10) Operate from 10% to 90% non-condensing humidity.
11) Meet the IEEE 802.3 (10Mbps Ethernet) standard.
12) Meet the IEEE 802.3u (Fast Ethernet 100 Mbps) standard.
13) Meet the IEEE 802.3x (Full Duplex with Flow Control) standard.
14) Meet the IEEE 802.1p (Priority Queuing) standard.
15) Meet the IEEE 802.1Q (VLAN) standard per port for up to four VLAN's.
16) The switch shall meet the IEEE 802.1D (Spanning Tree Protocol) and IEEE 802.1w (Rapid Spanning Tree Protocol) standards.
17) Meet the IEEE 802.3ad (Port Trunking) standard for a minimum of two groups of four ports.
18) Capable of mirroring any port to any other port within the switch.
19) Password manageable through:
20) SNMP
21) Telnet/CLI
22) HTTP (Embedded Web Server) with Secure Sockets Layer (SSL)
23) Full implementation of SNMPv1 and SNMPv2c.
24) Full implementation of RMON I and RMON II.
25) Full implementation of GVRP (Generic VLAN Registration Protocol).
26) Full implementation of IGMP and IGMP snooping.
27) Minimum MTBF of 100,000 hrs using Bellcore TS-332 standard.
28) Full implementation of RFC 783 (TFTP) to allow remote firmware upgrades.
29) UL approved.
30) All power transformers provided shall be "fastening mechanism" type. No plug-in types shall be permitted. All corded transformers shall be mountable with the ability to neatly secure power cords.
31) The field switch shall provide status indicators as follows: 1) power on an off, 2) network status per port (transmit, receive, link, speed), and 3) status indicators shall be LED.
32) Unused ports (copper and optical) shall be covered with rubber or plastic dust caps/cover.

907-658.02.3--Terminal Server.

1) 10/100 Base-T Ethernet port connection
2) RJ-45/DB9 Serial port connection
3) RS-232/422/485 selectable serial connections
4) Baud rates up to 230 Kbps
5) Full Modem and hardware flow control
6) TCP/UDP Socket Services
7) UDP Multicast
8) Telnet and Reverse Telnet
9) Modem emulation
10) SNMP (Read/Write)
11) PPP
12) Port buffering
13) HTTP
14) Remote management
15) DHCP/RARP/ARP-Ping for IP address assignment

16) LED status for link and power
17) The Terminal Server shall support a minimum of Four (4) bi-directional serial communications over Ethernet 10/100 Base-TX.
18) Each Terminal Server shall have a minimum of four (4) EIA-232/422/485 serial interface ports. These ports shall be individually and independently configurable, directly or over the network, to EIA-232/422/485 mode of operation as defined by the EIA for data format, data rate and data structure (e.g., the number of bits, parity, stop bits, etc.). Each serial port shall support up to 230 Kbps.
19) Each serial port shall support IP addressing and socket number selection.
20) The equipment shall provide the capability to establish an IP connection directly from a workstation to any encoder IP address and socket number transport serial data.
21) Each Terminal Server shall have an Ethernet Interface (10/100Base-TX protocol, Full/Half-Duplex, Auto Sense (802.3), RJ-45).

907-658.02.4--Cat 6 Patch Cords. The Cat 6 Patch Cords shall be furnished and installed as needed to connect the Network Switches with other equipment. Cat 6 Patch Cords shall be considered an incidental component for this project and furnished and installed as needed to provide a functional system. Cat 6 Patch Cords shall meet the following minimum requirements:

1) All patch cords shall be from the same manufacturer.
2) Shall incorporate four (4) pair 24 AWG stranded PVC Category 6.
3) Shall be factory made; contractor or vendor assembled patch cords are not permitted.
4) Shall be TIA/EIA 568-B.2-1 compliant. Patch Cords shall be compliant to T568B pin configuration (which ever is used).
5) Certified by the manufacturer for Category 6 performance criteria.
6) Length as needed. Excessive slack is not permitted.

907-658.02.5--Project Submittal Program Requirements. The Contractor shall provide project submittals for network switches including scheduling requirements. The project submittals for network switches and terminal servers shall include but are not limited to the specific requirements in this subsection.

1) The Contractor shall submit detailed cut sheets which document compliance with all parameters required in this section. If a parameter is not covered in the cut sheet a signed statement from the manufacturer on letterhead shall be submitted as an attachment. Failure to address all requirements will result in rejection of the submittal.
2) The Contractor shall submit documentation and proof of manufacturer-recommended training and certification for the installation and configuration of network switches.
3) The Contractor shall submit technical specifications for the minimum transmitter port to receiver port optical attenuation required for the switches to function in accordance with this specification for the optical links shown on the plans.

907-658.03--Construction Requirements. The Contractor shall adhere to the following installation requirements:

1) Network switches shall only be configured and installed by the switch manufacturer trained personnel.

2) Network switches shall be installed in accordance with manufacturer's guidelines and requirements.
3) The Contractor shall request from the Department, switch configuration information (such as IP address, VLAN Tag values, etc.) not more than 30 days after the switch submittals have been approved.
4) The Contractor shall provide as needed the necessary Cat 6 patch cords and fiber optic patch cords for a complete and functional installation.
5) The Contractor shall provide training for proper management of the equipment installed. This training should cover daily operation as well as maintenance and configuration of the switching equipment installed as part of this project and meet the requirements of subsection 658.03.3 of this document.

907-658.03.1--Switch Configuration Requirements. The Contractor shall configure Network Switch as follows:

1) All 100 Base-TX ports shall be configured as follows:
   a. RSTP/STP – Off.
   b. Unused TX ports shall be disabled.
   c. Operating TX ports shall be programmed to filter only for the MAC address of the connected device.
2) All 1000 Base-FX ports shall be configured as follows:
   a. RSTP/STP – On.
   b. IGMP Snooping – On.
3) All network switches shall be installed and configured with the same firmware configuration. The optimum settings shall be used consistently system-wide. Any locations that require different settings for optimum performance shall be approved by the Engineer.
4) The Contractor may submit an alternate switch configuration to the Engineer for review and approval; The Engineer will review alternate switch configuration documentation. The goal of the switch configuration is to reduce the network delay, as well as provide network redundancy.

907-658.03.2--Documentation. The Contractor shall submit documentation and proof of manufacturer-recommended training and certification for the installation and configuration of network switches.

As-built Plans showing switch configuration and connections.

907-658.03.3--Training and Equipment. After the installation is complete, the Contractor shall provide formal classroom training and "hands-on" operations training for proper operation and maintenance of the network switch. The training shall be provided for up to six personnel designated by the Engineer and shall be a minimum of four hours in duration. The training shall cover as a minimum preventive maintenance, troubleshooting techniques, fault isolation and circuit analysis. All training materials shall be provided by the Contractor.

1) Prior to training, submit resume and references of instructor(s). Also submit an outline of the training course in a Training Plan. Submit the Training Plan within 90 days of Contract Notice-to-Proceed. Obtain approval of the Plan from the Engineer and the Traffic Engineering ITS Department. Explain in detail the contents of the course and the time schedule of when the training will be given.
2) Furnish all handouts, manuals and product information.
3) For the training, use the same models of equipment furnished for the project. Furnish all media and test equipment needed to present the training.
4) Training shall be conducted in the Jackson area.
5) Training instructor(s) shall be manufacturer-certified, experienced in the skill of training others.
6) The training shall be conducted by a trainer with a minimum of four years of experience in training personnel on the operation and maintenance of fiber optic systems.

907-658.04--Method of Measurement. Hardened Network Switch of the type specified will be measured per each. Terminal Server will be measured in units of each

907-658.04--Basis of Payment. Hardened Network Switch, measured as prescibed above, will be paid for at the contract price per each, which price shall include furnishing, installing, system integration and testing of a Network Switch including all chassis, modules, power cables, power supplies, software, license, fiber optic patch cords, fiber optic attenuator patch cords, Cat 6 patch cords, media converters (if needed), and all incidental components, attachment hardware, mounting shelf and hardware, testing and training requirements, and all work, equipment and appurtenances as required to provide a fully functional switch ready for use. The price bid shall also include all system documentation including: shop drawings, operations and maintenance manuals, wiring diagrams, block diagrams, and other material necessary to document the operation of the switch and network. This price shall be full compensation for all labor, tools, materials, equipment and incidentals necessary to complete the work.

Terminal Server, measured as prescribed above, will be paid for at the contract price per each, which price bid shall include furnishing, installing, system integration and testing of a Terminal Server including all incidental components, attachment hardware, mounting shelf and hardware, testing and training requirements, and all work, equipment and appurtenances as required to provide a fully functional Terminal Server ready for use. This price shall be full compensation for all labor, tools, materials, equipment and incidentals necessary to complete the work.

Payment will be made under:

907-658-A: Hardened Network Switch, Type __ -per each

907-658-B: Terminal Server - per each

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-659-2 **CODE: (SP)**

DATE: 06/01/2007

SUBJECT: Traffic Management Center (TMC) Modifications

Section 907-659, Traffic Management Center (TMC) Modifications, is hereby added to and becomes part of the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction as follows:

SECTION 907-659 -- TRAFFIC MANAGEMENT CENTER (TMC) MODIFICATIONS

907-659.01--Description. The MDOT Central Traffic Management Center (TMC) is located in the Traffic Engineering Division in the MDOT Shop Complex at 2567 North West Street, Jackson, Mississippi. Regional and City Traffic Management Centers may be located statewide. The following is a list of existing/planned centers and their addresses:

City of Jackson TMC – 300 North State Street, Jackson, Mississippi (basement)
Southaven Combined TMC – 8791 Northwest Drive, Southaven, Mississippi (Police Department)
City of Ridgeland TMC – 304 Hwy 51, Ridgeland, Mississippi (City Hall)
Oxford Combined TMC – 715 Mollybarr Road, Oxford, Mississippi (Oxford Police Department)
Hattiesburg Regional TMC/EOC – 6356 Hwy 49N, Hattiesburg, Mississippi (MDOT District 6 Headquarters)
Batesville Regional TMC/EOC – 150 Hwy 51N, Batesville, Mississippi (MDOT District 2 Headquarters)
Natchez Combined TMC – 233 Devereaux Drive, Natchez, Mississippi (Police Department)
Gulf Coast TMC – 16499 Hwy 49, Saucier, Mississippi (MDOT Lyman Project Office)

Additional Traffic Management Centers may be added as needed.

907-659.02--Materials.

907-659.03--Construction and Operation Requirements.

907-659-03.1--TMC Modifications. The MDOT TMC modifications required to integrate and operate the traffic systems and devices shall be provided. These include, but are not limited to, expanding the central video management system, interconnecting the appropriate number of video interfaces to the TMC video management systems, expanding the MSTraffic backbone network through radio communications, wireless communications, T1 lines or fiber communications, expanding the Advanced Central Traffic Response Algorithm (ACTRA) signal system, expanding the Automated Traffic Management System (ATMS), and integrating all the existing computing facilities. All TMC modifications must meet U.S. Department of Transportation Intelligent Transportation System (ITS) Standards, Policies, and Architectures.

907-659.03.2--TMC Modifications - Monitor Systems. Roadway traffic monitor locations shall provide local control functions related to traffic slowdowns and other congestion monitors as defined by MDOT Traffic Engineering. Additionally, the traffic monitor systems shall provide on-line data for use by the existing MDOT ATMS for engineering, operations, planning, incident, and mstraffic.com purposes. This data shall include, but is not limited to, per vehicle data raw data which shall be transmitted to and stored and managed by the ATMS. The traffic monitor systems shall be capable of utilizing both or either loop, microloop, radar, and/or video detection information. The system shall provide a consistent communication and management system regardless of detection methods used. All Traffic Monitoring Systems must meet U.S. Department of Transportation Intelligent Transportation System (ITS) Standards, Policies, and Architectures.

907-659.03.3--TMC Modifications – Installation & Training. Installation of all equipment and software shall be included. The Contractor must provide the MDOT ITS Manager with an Installation Schedule. The Installation Schedule must be approved by the State Traffic Engineer. All equipment and software must be fully functional and pass a Final Inspection by the ITS Manager and Project Engineer before being accepted by MDOT.

Training shall be provided covering the system architecture, operations, and maintenance of the TMC systems. If training requirements include travel on the part of training participants then the cost of travel shall be included.

907-659.04--Method of Measurement. Traffic Management Center Modifications, Traffic Management Center Modifications – Monitor Systems, and Traffic Management Center Modifications – Training, complete in place, tested and accepted, will be measured on a lump sum basis.

907-659.05--Basis of Payment. Traffic Management Center Modifications, Traffic Management Center Modifications – Monitor Systems, and Traffic Management Center Modifications - Training, measured as prescribed above, will be paid for at the contract lump sum price, which price shall be full compensation for furnishing all materials for all installing, connecting, cutting, pulling and testing and for all equipment, tools, labor and incidentals necessary to complete the work.

Payment will be made under:

907-659-A:	Traffic Management Center Modifications	- lump sum
907-659-B:	Traffic Management Center Modifications – Monitor Systems	- lump sum
907-659-C:	Traffic Management Center Modifications – Training	- lump sum

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-662-1 **CODE: (SP)**

DATE: **5/23/2008**

SUBJECT: **Video Communication Equipment**

PROJECT: **SP-0017-00(001) / 104589301 -- Desoto County**

Section 907-662, Video Communication Equipment, is hereby added to and made a part of the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction as follows:

907-662.01--Description. This Section specifies the minimum requirements for video communications equipment furnished and installed on this project. The work shall consist of providing all labor, materials, equipment, and incidentals necessary to furnish, install, and test a Video Communications System for this project.

The Video Communication equipment will transport digitized video signals and data communications for the CCTV Camera System over the IP-based Ethernet network utilizing video encoders and decoders, via a full duplex serial interface.

The Contractor shall supplied, install, test and integrate the video equipment as indicated in the Contract Documents and Plans as specified in this section.

907-662.02--Materials. All proposed encoding and decoding equipment and software shall comply with the following minimum requirements:

907-662.02.1--General Requirements. All digital Video Encoders (VE) and Video Decoders (VD) provided on this project shall support the following general requirements:

1) New VE and VD shall be provided under this Contract and shall be from the same manufacturer and be fully compatible and interoperable with each type provided, the network equipment and the MDOT central video control system.
2) Interoperability: The VE shall fully interoperate with the VD (hardware and/or software) as defined in these Special Provisions.
3) Mean Time Between Failures (MTBF): The VE shall have a minimum MTBF of 20,000 hours
4) Latency: The end-to-end system latency between the VE appliance and the VD appliance shall be no more than 300 msec, not including network delays. The VE shall support various frame adjustments to minimize latency.
5) Remote Control: VE shall be remotely adjustable via a video management system or command set so that a technician can adjust image quality controls for contrast, brightness, hue and color levels.

6) Decoding: The Contractor shall provide encoders from a manufacturer that also has hardware and software products capable of auto-detecting the compression, resolution and bit rate and capable of decoding the encoded digitized video signal .
7) Video equipment shall support the NTSC signal format.

907-662.02.2--Type A – Video Encoder/Decoder Requirements. The minimum Type A – Video Encoder (VE) and Video Decoder (VD) requirements are as follows:

907-662.02.2.1--Video and Data Requirements. The Type A VE/VD shall meet the following minimum video and data requirements:

1) Video Compression Technology: Moving Picture Experts Group (MPEG-4).
2) VE shall be a hardware-based network device able to accept a minimum of one analog National Television System Committee (NTSC) video input and digitize it for transport across IP networks.
3) VE and VD shall be specifically designed for network operation, and adhere to ISO/14496-2:1999 standard for MPEG-4 technology.
4) VE MPEG-4 video streams shall be compatible with Jupiter Video wall controller MPEG IV video cards or as approved by the Intelligent Transportation Systems Program Manager.
5) Support the following minimum encoded resolutions:
   a. NTSC - Full D1
   b. CIF/SIF
   c. QCIF/QSIF
6) Dynamic bandwidth control: Provide up to 3 Mbps or greater rates (The data rate shall be defined as the maximum committed bandwidth to be utilized, which includes data bursting.).
7) Bandwidth increments shall be user configurable via the network. The minimum bandwidth setting shall be 56Kbs or less.
8) The default bandwidth for the VE as furnished shall be set to 2Mbps,.
9) Provide on-board buffered video memory for protection against potential network disruptions.

907-662.02.2.2--Serial Data Interface Requirements. The Type A VE/VD shall meet the following minimum serial data interface requirements:

1) The VE/VD shall provide bi-directional serial communications over Ethernet 10/100 Base-TX via the following methods:
   a. VE serial port to VD serial port data stream.
   b. IP socket to VE/VD serial port by TCP protocol.
   c. The serial interface shall be transparent to the device (i.e. no additional or special protocols shall be used to communicate between the CCTV control interface).
2) Category 5e patch cords shall be used between VE/VD and the network device (i.e., Ethernet switch/router, etc.).
3) The video equipment shall provide the ability to establish an IP connection directly from an Operator Workstation to any VE IP address and socket number transport serial data.
4) Each VE/VD shall have a minimum of one serial port that can be configured to provide EIA-232/422/485 serial interface port.

5) Each serial port shall provide full-duplex serial interface and data rates up to 115.2 Kbps (minimum).
6) Serial port shall be software configurable, locally or over the network, to EIA-232/422/485 mode of operation as defined by the EIA for data format, data rate, and data structure (e.g., baud rate, the number of bits, parity, stop bits, flow control, etc.) via the management software provided.
7) No serial adaptors or interface converters shall be permitted.
8) Each VE shall provide encapsulation of the video streams in a UDP packet for network transmission.
9) Each VE shall use the serial interface port to support PTZ camera control functions.
10) VE serial port shall provide IP addressing and socket number selection.
11) The video equipment shall provide the capability to establish an IP connection directly from an Operator Workstation to any VE IP address and socket number to transport serial data, independent of whether or not the video stream for that VE is being viewed.

907-662.02.2.3--Network Requirements. The Type A VE/VD shall meet the following minimum network requirements:

1) Network connection shall be Ethernet Compliant IEEE 802.3, 802.3u, and 802.3x; 10/100 Mbps, auto sensing full/half-duplex operations.
2) Each VE shall provide encapsulation of the video streams in a UDP packet for network transmission.
3) For network transport comply with Internet Streaming Media Alliance (ISMA) for MPEG-4 video streams.
4) The VE/VD shall connect to a network device (i.e., media converter, Ethernet switch/router, IP wireless device, etc.) via a RJ-45 connector through Category 5e patch cords.
5) All Category 5 ports shall be standard EIA/TIA-568-A pin-outs and shall be rated at 10/100Mbps.
6) The 10/100Base-TX, as required in the IEEE 802.3 standards and amendments shall be the network connection to the network devices with Type RJ-45 connectors.
7) All VE and VD included within this project shall be fully interoperable without customization or the addition of appliances within either the remote or primary communications network. All devices shall be fully interoperable with the backbone communications network.
8) Static IP Addressing (class A, B, and C).
9) RTP, UDP, Unicast and IP Multicast (Internet Group Multicast Protocol / IGMP V2) features for digital video transmission.

907-662.02.2.4--Physical and Environmental Requirements. The Type A VE/VD shall meet the following minimum physical and environmental requirements:

1) The Video Encoder/Decoder shall have the following ports:
   a. Network: 10/100 Mbps RJ-45 or as directed by MDOT.
   b. Video Connector: BNC
   c. Serial Data Interface: One (1) RJ-45 ports/connector. Serial port may utilize D-sub connectors or screw terminals as approved by the MDOT.

2) The video input performance measures shall comply with NTSC and EIA requirements, including the EIA-170 standard, with a nominal composite video of 1 volt peak-to-peak (Vp-p). The equipment shall have an electrical impedance of 75 ohms
3) The VE at field locations shall operate in outdoor weatherproof field cabinets where the inside cabinet temperature range is -20ºC to +70ºC (-4ºF to +158ºF), and the relative humidity is between 10% and 90% non-condensing.
4) VE shall be installed in a field cabinet with protection from moisture and airborne contaminants, blowing rain, wind, blowing sand, blowing dust, humidity, roadside pollutants, vandalism, and theft.
5) The VE shall be resistant to vibration and shock, and conforms to Sections 2.1.9 and 2.1.10, respectively, of the NEMA TS 2 standard.
6) The VD shall operate in the following minimum environment: Temperature ranging from 0ºC to +50ºC (+32ºF to +122ºF), and the relative humidity is between 10% to 90% non-condensing.
7) VE shall be PCB conformal coated to provide a level of protection from humidity, contaminants, dust, pollution, etc.
8) VE/VD shall provide a local status display capability for video, data, network interfaces and power. Status indicators shall be LED.
9) Cable connections (Cat-5e/coaxial/power) shall require no tools for installation or removal and be designed with positive locking devices such that they will not vibrate loose.
10) Provide external markings for all connectors and indicators. Replaceable components shall be permanently marked and traceable to the supplied documentation, including schematics and parts list. The external markings shall include the product function name, model number, serial number, and manufacturer's name.
11) All parts required for a completed video system shall be made of corrosion-resistant materials, such as stainless steel, anodized aluminum, brass, or gold-plated metal.
12) All VE shall be shelf or rack/module mountable. Other mounting options may be submitted for review and approval by the Engineer.

907-662.02.2.5--On-Screen Display Requirements. The minimum on-screen text insertion and display requirements include:

1) VE / VD shall support a static text insertion capability and shall be capable of inserting a minimum of one (1) user configurable text messages of up to 20 characters in length.
2) VE / VD shall be able to generate a date and time stamp in the video stream and shall be synchronized to a time-server on the network.
3) VE / VD shall be able to display camera title in the video stream.
4) VE / VD shall have the option to display or not display the on-screen text.

907-662.02.2.6--Management Requirements. The minimum management system requirements shall include:

1) The VE/VD shall be manageable through SNMP (v2), HTTP, FTP/TFTP, and/or Telnet/CLI.
2) The management system shall be provided to remotely configure and diagnose the VE/VD.
3) Have capability to reset/reboot and firmware upload via the methods listed above.

4) The Contractor shall work with the MDOT to provide graphical icons of video devices and groups of devices, which can be displayed on a GIS map and accessed and provide real-time color-coded status information.
5) Have the capability to remotely change any of the device configuration settings including bit rates, image resolution and compression settings and serial interface type.
6) Provide for screen text insertion of user messages.
7) Provide pre-defined optimized MPEG settings for various bit rates.
8) Provide update capability for the firmware in the VE from the central site. Ability to access the serial number, firmware number, IP address and equipment configuration. Have the capability to upload firmware to multiple units automatically.
9) Provide ability for remote firmware upgrades.
10) Provide a browser based software video decoding capability as part of the overall hardware management software.

907-662.02.2.7--Electrical Requirements. The minimum electrical/power requirements include:

1) Power: nominal input voltage of 120 VAC, 60 Hz. ±3 Hz
2) The equipment shall operate within a voltage range of 89 VAC to 135 VAC.
3) If the device requires operating voltages of less than 120 VAC, supply the appropriate voltage converter. All voltage conversion devices shall also be temperature hardened as specified herein for location (field or central).
4) Power Consumption shall not exceed 30 Watts for each video device.
5) The VE/VD shall provide for automatic recovery from an over or under voltage condition when prime power has returned to the tolerance values specified herein. All configuration parameters shall be stored in non-volatile memory and no reprogramming or manual adjustments shall be required upon power recovery.
6) The VE/VD shall be provided with surge protection for a 100% over voltage condition for a 10 ms duration and with a response time of 1 ps or less.
7) Plug type transformer/power supplies shall be provided with a fastening device that shall securely attach the unit to the power outlet. No plug-in types will be accepted without a fastening mechanism. All corded transformers shall be mountable with the ability to neatly secure power cords.
8) Include UL listing.

907-662.03--Installation Requirements. All video equipment shall be installed according to the manufacturer's recommendations, the Plans and as follows:

1) The Contractor shall furnish and install auxiliary video equipment in support of a communications network that will transport video as specified in the Special Provisions.
2) Materials and associated accessories/adapters shall not be applied contrary to the manufacturer's recommendations and standard practices.
3) All VE supplied under this contact shall be delivered with the same firmware version and revision and shall be fully compatible with existing system elements. In the event that the firmware has been changed or upgraded by the manufacturer the Contractor shall test the new software revision with the existing system. The proper operation of the new revision shall be reviewed by the Engineer and if acceptable, approved for use in the system. Non

compliant firmware shall be replaced by the Contractor with a compatible version at no cost to the Department.

4) The Contractor shall furnish all tools, equipment, materials, supplies, and manufactured hardware, and shall perform all operations and equipment integration necessary to provide complete, fully operational video equipment as specified herein, within the Plan set, and/or in the Contract Documents.
5) The Contractor shall provide the MDOT with a written inventory of items received and the condition in which they were received. Once received, the equipment becomes the Contractor's responsibility. The Contractor shall provide all labor and equipment necessary to move inventory out of the designated storage facility and to transport it to the installation location. All equipment shall be installed according to the manufacturer's recommendations or as directed by the MDOT.

907-662.03.1--Testing Requirements. Testing shall include, but not be limited to, the following:

907-662.03.1.1--Testing General Requirements. The Contractor shall conduct a project testing program for all VE and VD provided on this project. The project testing program for VE/VD shall include but is not limited to the specific requirements in this subsection.

All test results shall confirm physical and performance compliance with these Special Provisions.

Submit all test results documentation to the Engineer for review within 14 calendar days of completion of the tests.

All test results shall be reviewed and approved prior to continuing with further tests and deployment activities.

907-662.03.1.2--Stand Alone Acceptance Test (SAT). The Contractor shall perform a complete SAT on all video equipment and materials associated with the field device site, including but not limited to electrical service, fiber optic infrastructure, cable, etc. A SAT shall be conducted at every field device site with video equipment.

The SAT shall demonstrate that all video equipment and materials are in full compliance with all MDOT project requirements and fully functional as installed and in final configuration. The SAT shall demonstrate full compliance with all operational and performance requirements of the project requirements including communications and control from the TMC. All SATs also include a visual inspection of the cabinet and all construction elements at the site to ensure they are compliant with the Special Provisions. The SATs for each site type shall include but are not limited to the following:

1) Verify that physical construction has been completed as detailed in the plans.
2) Inspect the quality and tightness of ground and surge protector connections.
3) Verify proper voltages for all power supplies and related power circuits.
4) Connect devices to the power sources.
5) Verify all connections, including correct installation of communication and power cables.

6) Verify video image is present and free from over-saturation and any other image defect in both color and monochrome mode.
7) Verify network connection to the VE through ping and telnet session from a remote PC.
8) Verify serial data transmission (for Type A devices) through the VE serial ports.
9) Verify support of unicast, multicast and network management features.

907-662.03.2--Warranty. Minimum warranty requirements are as follows:

1) All warranties and guarantees shall be assigned to the Mississippi Department of Transportation.
2) The warranty shall be a minimum of one (1) on-site warranty for VE and VD and all other installed and/or attached appurtenances.
3) The warranty period begins upon final acceptance of the video subsystem.
4) During the warranty period, the Contractor shall repair or replace with new or refurbished material, at no additional cost to the State, any product containing a warranty defect, provided the product is returned postage-paid by the Department to the manufacturer's factory or authorized warranty site.
5) Products repaired or replaced under warranty by the manufacturer shall be returned prepaid by the manufacturer.
6) During the warranty period, technical support shall be available from the Contractor via telephone within four (4) hours of the time a call is made by the Department, and this support shall be available from factory certified personnel.
7) During the warranty period, updates and corrections to hardware, software and firmware shall be made available to the Department by the Contractor at no additional cost.

907-662.04--Method of Measurement. Video Encoders and Decoders will be measured in units of each.

907-662.05--Basis of Payment. Video Encoders and Decoders, measured as prescribed above, will be paid for at the contract price per each, which price shall include furnishing, installing, warranties, full operation and configuring the Video Encoder and Video Decoder in accordance with applicable Standards, Specifications, and requirements. The price bid shall also include the mounting hardware, Cat-5e patch cords, power cable, user manuals, testing, warranties, serial cable/port converters as necessary, and any and all other equipment required to complete installation of the unit. This price shall be full compensation for all labor, tools, materials, equipment and incidentals necessary to complete the work.

Payment will be made under:

907-662-A: Video Encoder, Type A - per each

907-662-B: Video Decoder, Type A - per each

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-701-3 **CODE: (IS)**

DATE: 11/30/2007

SUBJECT: Hydraulic Cement

Section 701, Hydraulic Cement, of the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows:

Delete Subsection 701.01 on pages 595 & 596, and substitute the following:

907-701.01--General. The following requirements shall be applicable to hydraulic cement:

Only hydraulic cements conforming to Section 701 shall be used. Hydraulic cements shall not be listed or designated as meeting more than one AASHTO or Department type.

Different brands of hydraulic cement, or the same brand of hydraulic cement from different mills, shall not be mixed or used alternately in any one class of construction or structure, without written permission from the Engineer; except that this requirement will not be applicable to hydraulic cement treatment of design soils, or bases.

The Contractor shall provide suitable means for storing and protecting the hydraulic cement against dampness. Hydraulic cement, which for any reason, has become partially set or which contains lumps of caked hydraulic cement will be rejected. Hydraulic cement salvaged from discarded or used bags shall not be used.

The temperature of bulk hydraulic cement shall not be greater than l65°F at the time of incorporation in the mix.

Acceptance of hydraulic cement will be based on the certification program as described in the Department's Materials Division Inspection, Testing, and Certification Manual and job control sampling and testing as established by Department SOP.

Retests of hydraulic cement may be made for soundness and expansion within 28 days of test failure and, if the hydraulic cement passes, it may be accepted. Hydraulic cement shall not be rejected due to failure to meet the fineness requirements if upon retests after drying at 212°F for one hour, it meets such requirements.

Delete Subsection 701.02 on page 596, and substitute the following:

907-701.02--Portland Cement.

907-701.02.1--General.

907-701.02.1.1--Types of Portland Cement. Portland cement (cement) shall be either Type I or Type II conforming to AASHTO Designation: M85 or Type I(MS), as defined by the description below Table 1. Type III cement conforming to AASHTO Designation: M85 or Type III(MS), as defined by the description below Table 1, may be used for the production of precast or precast-prestressed concrete members.

907-701.02.1.2--Alkali Content. All cement types in this Subsection shall meet the Equivalent alkali content requirement for low-alkali cements listed in AASHTO Designation: M85, Table 2.

907-701.02.2--Replacement by Other Cementitious Materials. The maximum replacement of cement by weight is 25% for fly ash or 50% for ground granulated blast furnace slag (GGBFS). The minimum tolerance for replacement shall be 5% below the maximum replacement content. Replacement contents below this minimum tolerance by fly ash or GGBFS may be used, but shall not be given any special considerations, like the maximum acceptance temperature for Portland cement concrete containing pozzolans. Special considerations shall only apply for replacement of cement by fly ash or GGBFS.

907-701.02.2.1--Portland Cement Concrete Exposed to Soluble Sulfate Conditions or Seawater. When Portland cement concrete is exposed to moderate or severe soluble sulfate conditions, or to seawater, cement types and replacement of cement by Class F fly ash, GGBFS, metakaolin, or silica fume shall be as follows in Table 1.

Table 1- Cementitious Materials for Soluble Sulfate Conditions

Sulfate Exposure	Water-soluble sulfate (SO4) in soil, % by mass	Sulfate (SO4)in water, ppm	Cementitious material required*
Moderate and Seawater	0.10 - 0.20	150 - 1,500	Type II **, ***, **** cement, or Type I cement with one of the following replacements of cement by weight: 25% Class F fly ash, 50% GGBFS, 10% metakaolin, or 8% silica fume
Severe	0.20 - 2.00	1,500 - 10,000	Type II ** cement with one of the following replacements of cement by weight: 25% Class F fly ash, 50% GGBFS, 10% metakaolin, or 8% silica fume

* The values listed in this table for replacement of Portland cement by the cementitious materials listed are maximums and shall not be exceeded. The minimum tolerance for replacement shall be 0.5% below the maximum replacement content. Replacement contents below this minimum tolerance by the cementitious materials listed in this table do not meet the requirements for the exposure conditions listed and shall not be allowed.

** Type I cement conforming to AASHTO Designation: M85 with a maximum 8% tricalcium aluminate (C3A) may be used in lieu of Type II cement; this cement is given the designation "Type I(MS)". Type III cement conforming to AASHTO Designation: M85 with a maximum 8% tricalcium aluminate (C3A) may be used in lieu of Type II cement as allowed in Subsection 907-701.02.1; this cement is given the designation "Type III(MS)".

*** Blended cement meeting the sulfate resistance requirements of Subsection 907-701.04 may be used in lieu of Type II as allowed in Subsection 907-701.04. No additional cementitious materials shall be added to or as a replacement for blended cement.

**** Class F fly ash or GGBFS may be added as a replacement for cement as allowed in Subsection 907-701.02.2.

Class C fly ash shall not be used as a replacement for cement in any of the sulfate exposure conditions listed above.

907-701.02.2.2--Cement for Soil Stabilization Exposed to Soluble Sulfate Conditions or Seawater. When Portland cement for use in soil stabilization is exposed to moderate or severe soluble sulfate conditions, or to seawater, cement types and replacement of cement by Class F fly ash or GGBFS shall meet the requirements of Subsection 907-701.02.2.1. Neither metakaolin nor silica fume shall be used to bring the cementitious materials into compliance with the requirements of Table 1.

Delete Subsection 701.03 on page 596, and substitute the following:

907-701.03--Masonry Cement. Masonry cement shall conform to ASTM Designation: C 91 and shall only be used in masonry applications.

Delete Subsection 701.04 on page 596, and substitute the following:

907-701.04--Blended Hydraulic Cement.

907-701.04.1--General.

907-701.04.1.1--Types of Blended Cement. Blended hydraulic cements (blended cements) shall be of the following types and conform to AASHTO Designation: M 240:

Type I(SM) – Slag-modified Portland cement
Type IS – Portland blast-furnace slag cement
Type I(PM) – Pozzolan-modified Portland cement
Type IP – Portland-pozzolan cement

Blended cement for use in Portland cement concrete or soil stabilization exposed to the moderate soluble sulfate condition or exposure to seawater as defined in Table 1 shall meet the Sulfate resistance requirement listed in AASHTO Designation: M 240, Table 2 and the "(MS)" suffix shall be added to the type designation.

907-701.04.1.2--Alkali Content. All blended cement types in this Subsection shall meet the Mortar expansion requirements listed in AASHTO Designation: M 240, Table 2.

907-701.04.2--Replacement by Other Cementitious Materials. No additional cementitious materials, such as Portland cement, performance hydraulic cement, fly ash, GGBFS, metakaolin, or others, shall be added to or as a replacement for blended cement.

907-701.04.3--Exposure to Soluble Sulfate Conditions or Seawater. When Portland cement concrete or blended cement for soil stabilization is exposed to moderate soluble sulfate conditions or to seawater, where the moderate soluble sulfate condition is defined in Table 1, the

blended cement shall meet the sulfate resistance requirement listed in AASHTO Designation: M 240, Table 2.

When Portland cement concrete or blended cement for soil stabilization is exposed to severe soluble sulfate conditions, where the severe soluble sulfate condition is defined in Table 1, blended cements shall not be used.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-713-1 **CODE: (IS)**

DATE: 12/11/2007

SUBJECT: Admixtures for Concrete

Section 713, Concrete Curing Materials and Admixtures, of the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows:

After the second paragraph of Subsection 713.01.2 on page 676, add the following.

Type 1-D compound may be used on bridge rails, median barriers, and other structures requiring a spray finish. When Type 1-D compound is used, it will be the Contractor's responsibility to assure that the compound has dissipated from the structure prior to applying the spray finish and that the spray finish adheres soundly to the structure.

Delete Subsection 713.02 on pages 676 & 677, and substitute the following:

907-713.02--Admixtures for Portland Cement Concrete. Admixtures shall only be approved by the Department for classification as a single type following the applicable types from AASTHO Designation: M 154 or M 194, or the definition of a mid-range water reducer listed below with the following exception: when requested by the manufacturer the Department will consider classifying an admixture as both a Type A and a Type D. Admixtures shall only be used in accordance with the manufacturer's recommended dosage range for that type. Where an admixture is classified as both a Type A and Type D, the dosage range for use as a Type A shall not overlap the dosage range for use as a Type D.

Air-entraining admixtures shall comply with AASHTO Designation: M 154. Set-retarding, accelerating, and/or water-reducing admixtures shall comply with AASHTO Designation: M 194. Mid-range water-reducers are classified as water-reducing admixtures that reduce the mix water a minimum of 8% when compared to a control mix with no admixtures when tested in accordance with the requirements in AASHTO Designation: M 194. The type designation for admixtures approved by the Department and classified as meeting the requirements of a mid-range water-reducer shall be "MR".

907-713.02.1--Source Approval. In order to obtain approval of an admixture, the Producer/Suppliers shall submit to the State Materials Engineer the following for review: certified test reports, made by an acceptable independent laboratory regularly inspected by the Cement and Concrete Reference Laboratory of the National Institutes of Standards and Technology, which show that the admixture meets all the requirements of the applicable AASHTO or Department Specification for the specific type and the dosage range for the specific type of admixture.

907-713.02.2--Specific Requirements. Admixtures containing chlorides will not be permitted.

907-713.02.3--Acceptance. The Department reserves the right to sample, for check tests, any shipment or lot of admixture delivered to a project.

The Department reserves the right to require tests of the material to be furnished, using the specific cement and aggregates proposed for use on the project, as suggested in AASHTO Designation: M 154 and outlined in AASHTO Designation: M 194.

Failure to maintain compliance with any requirement of these specifications shall be cause for rejection of any previously approved source or brand of admixture.

With each new lot of material shipped the Contractor shall submit to the State Materials Engineer, a notarized certification from the manufacturer showing that the material complies with the requirements of the applicable AASHTO or Department Specification.

When an admixture is used, it shall be the responsibility of the Contractor to produce satisfactory results.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-714-4 **CODE: (IS)**

DATE: **05/08/2007**

SUBJECT: **Miscellaneous Materials**

Section 714, Miscellaneous Materials, of the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows:

907-714.05--Fly Ash. Delete Subsections 714.05.1 & 714.05.2 on pages 680 & 681, and substitute the following:

907-714.05.1--General. The fly ash source must be approved for listing in the Department's "Approved Sources of Materials" prior to use. The acceptance of fly ash shall be based on certified test reports, certification of shipment from the supplier, and tests performed on samples obtained after delivery in accordance with the Department's Materials Division Inspection, Testing, and Certification Manual and Department SOP.

Different classes of fly ash or different sources of the same class shall not be mixed or used in the construction of a structure or unit of a structure without written permission from the Engineer.

The Contractor shall provide suitable means for storing and protecting the fly ash from dampness. Separate storage silos, bins, or containers shall be provided for fly ash. Fly ash which has become partially set or contains lumps of caked fly ash shall not be used.

The temperature of the bulk fly ash shall not be greater than 165°F at the time of incorporation into the work.

All classes of fly ash shall meet the supplementary option chemical requirement for available alkalies listed in AASHTO Designation: M 295, Table 2.

The replacement of Portland cement with fly ash shall be in accordance with the applicable replacement content specified in Subsection 907-701.02.2.

In addition to these requirements, fly ash shall meet the following specific requirements for the intended use.

907-714.05.2--Fly Ash for Use in Concrete. When used with Portland cement in the production of concrete or grout, the fly ash shall meet the requirements of AASHTO Designation: M 295, Class C or F, with the following exceptions:

The loss on ignition shall not exceed 6.0 percent.

The strength activity index with Portland cement shall be at least 55 percent of the control

mix at seven days.

No additional cementitious materials, such as blended hydraulic cement, GGBFS, metakaolin, or others, shall be added to or as a replacement for Portland cement when used with fly ash.

907-714.06--Ground Granulated Blast Furnace Slag (GGBFS). Delete Subsection 714.06.1 on page 681, and substitute the following:

907-714.06.1--General. The GGBFS source must be approved for listing in the Department's "Approved Sources of Materials" prior to use. The acceptance of GGBFS shall be based on certified test reports, certification of shipment from the supplier, and tests performed on samples obtained after delivery in accordance with the Department's Materials Division Inspection, Testing, and Certification Manual and Department SOP.

The Contractor shall provide suitable means for storing and protecting the GGBFS against dampness and contamination. Separate storage silos, bins, or containers shall be provided for GGBFS. GGBFS which has become partially set, caked or contains lumps shall not be used.

The State Materials Engineer shall be notified in writing of the nature, amount and identity of any processing or other additions made to the GGBFS during production.

GGBFS from different mills shall not be mixed or used alternately in any one class of construction or structure without written permission from the Engineer; except that this requirement will not be applicable to cement treatment of design soils or bases.

No additional cementitious materials, such as blended hydraulic cement, fly ash, metakaolin, or others, shall be added to or as a replacement for Portland cement when used with GGBFS in the production of concrete. The replacement of Portland cement with GGBFS shall be in accordance with the applicable replacement content specified in Subsection 907-701.02.2.

Delete Subsection 714.07 on page 682, and substitute the following:

907-714.07--Additional Cementitious Materials.

907-714.07.1--Metakaolin.

907-714.07.1.1--General. Metakaolin shall only be used as a supplementary cementitious material in Portland cement concrete for compliance with the requirements for cementitious materials exposed to soluble sulfate conditions. Metakaolin from different sources shall not be mixed or used alternately in any one class of construction or structure without written permission from the Engineer. No additional cementitious materials, such as blended hydraulic cement, fly ash, GGBFS, or others, shall be added to or as a replacement for Portland cement when used with metakaolin in the production of concrete.

The State Materials Engineer shall be notified in writing of the nature, amount and identity of any processing, or other additions made to the metakaolin during production.

907-714.07.1.2--Source Approval. The approval of each metakaolin source shall be on a case by case basis as determined by the State Materials Engineer. In order to obtain approval of a metakaolin source, the Producer/Suppliers shall submit to the State Materials Engineer the following for review: certified test reports, made by an acceptable, independent laboratory regularly inspected by the Cement and Concrete Reference Laboratory of the National Institutes of Standards and Technology, which show that the metakaolin meets all the requirements of AASHTO Designation: M295, including the Effectiveness in contributing to sulfate resistance, Procedure A, listed in AASHTO Designation: M295, Table 4 for Supplementary Optional Physical Requirements, and other requirements listed herein.

In order to demonstrate effectiveness in contributing to sulfate resistance, included in this test data shall be results of metakaolin from the proposed source tested in accordance with ASTM Designation: C 1012. There shall be two sets of test specimens per the following:

a. One set of test specimens shall be prepared using a Type I Portland cement meeting the requirements of AASHTO Designation: M85 and having a tricalcium aluminate (C_3A) content of more than 8.0%,

b. One set of test specimens shall be prepared using a Type II Portland cement meeting the requirements of AASHTO Designation: M85.

c. The proposed metakaolin shall be incorporated at the rate of 10% cement replacement in each set of test specimens and shall meet both of the acceptance criteria listed below for source approval.

The requirement for acceptance of the test sample using Type I Portland cement is an expansion of 0.10% or less at the end of six months. The requirement for acceptance of the test sample using Type II Portland cement is an expansion of 0.05% or less at the end of six months.

907-714.07.1.3--Storage. The Contractor shall provide suitable means for storing and protecting the metakaolin against dampness and contamination. Metakaolin which has become partially set, caked, or contains lumps shall not be used.

907-714.07.1.4--Specific Requirements. Metakaolin shall meet the requirements of AASHTO Designation: M 295, Class N with the following modifications:

1. The sum of $SiO_2 + Al_2O_3 + Fe_2O_3$ shall be at least 85%. The Material Safety Data Sheet shall indicate that the amount of crystalline silica, as measured by National Institute of Occupation Safety and Health (NIOSH) 7500 method, after removal of the mica interference, is less than 1.0%.
2. The loss on ignition shall be less than 3.0%.
3. The available alkalies, as equivalent Na_2O, shall not exceed 1.0%.
4. The amount of material retained on a No. 325 mesh sieve shall not exceed 1.0%.
5. The strength activity index at seven (7) days shall be at least 85%.

907-714.07.1.5--Acceptance. With each new lot of material shipped the Contractor shall submit to the State Materials Engineer a certified test report from the manufacturer showing that the material meets the requirements AASHTO Designation: M295, Class N and the requirements of this Subsection.

The Department reserves the right to sample, for check tests, any shipment or lot of metakaolin delivered to a project.

907-714.07.2--Silica Fume.

907-714.07.2.1--General. Silica fume shall only be used as a supplementary cementitious material in Portland cement concrete for compliance with the requirements for cementitious materials exposed to soluble sulfate conditions. Silica fume from different sources shall not be mixed or used alternately in any one class of construction or structure without written permission from the Engineer. No additional cementitious materials, such as blended hydraulic cement, performance hydraulic cement, fly ash, GGBFS, or others, shall be added to or as a replacement for Portland cement when used with silica fume in the production of concrete.

The State Materials Engineer shall be notified in writing of the nature, amount and identity of any processing, or other additions made to the silica fume during production.

907-714.07.2.2--Source Approval. The approval of each silica fume source shall be on a case by case basis as determined by the State Materials Engineer. In order to obtain approval of a silica fume source, the Producer/Suppliers shall submit to the State Materials Engineer the following for review: certified test reports, made by an acceptable, independent laboratory regularly inspected by the Cement and Concrete Reference Laboratory of the National Institutes of Standards and Technology, which show that the silica fume meets all the requirements of AASHTO Designation: M307, Table 3, including the Sulfate resistance expansion, listed in the table for Optional Physical Requirements, and other requirements listed herein.

In order to demonstrate effectiveness in contributing to sulfate resistance, included in this test data shall be results of silica fume from the proposed source tested in accordance with ASTM Designation: C 1012. There shall be two sets of test specimens per the following:

a. One set of test specimens shall be prepared using a Type I Portland cement meeting the requirements of AASHTO Designation: M85 and having a tricalcium aluminate (C_3A) content of more than 8.0%,

b. One set of test specimens shall be prepared using a Type II Portland cement meeting the requirements of AASHTO Designation: M85.

c. The proposed silica fume shall be incorporated at the rate of 8% cement replacement in each set of test specimens and shall meet both of the acceptance criteria listed below for source approval.

The requirement for acceptance of the test sample using Type I Portland cement is an expansion of 0.10% or less at the end of six months. The requirement for acceptance of the test sample using Type II Portland cement is an expansion of 0.05% or less at the end of six months.

907-714.07.2.3--Storage. The Contractor shall provide suitable means for storing and protecting the silica fume against dampness and contamination. Silica fume which has become partially set, caked, or contains lumps shall not be used.

907-714.07.2.4--Acceptance. With each new lot of material shipped, the Contractor shall submit to the State Materials Engineer a certified test report from the manufacturer showing that the material meets the Chemical and Physical Requirements of AASHTO Designation: M307.

The Department reserves the right to sample, for check tests, any shipment or lot of silica fume delivered to a project.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-804-8 **CODE: (IS)**

DATE: **02/05/2008**

SUBJECT: **Concrete Bridges And Structures**

Section 804, Concrete Bridges And Structures, of the 2004 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows:

907-804.02-- Materials.

907-804.02.1--General. Add the following materials to the list of materials in Subsection 804.02.1 on page 847.

Blended Cement ..... 907-701.01 and 907-701.04
Ground Granulated Blast Furnace Slag (GGBFS) 907-714.06
Metakaolin 907-714.07
Silica Fume 907-714.07.2

907-804.02.8--Laboratory Accreditation. In Table 1 of Subsection 804.02.8 on page 849, substitute AASHTO: R 39 - Making and Curing Concrete Test Specimens in the Laboratory for AASHTO: T 126 - Making and Curing Concrete Test Specimens in the Laboratory.

907-804.02.9--Testing Personnel. Delete Table 2 in this subsection and replace it with the following.

Table 2

Concrete Technician's Tasks	Test Method Required	Certification Required**
Sampling or Testing of Plastic Concrete	AASHTO Designation:T 23, T 119, T 121, T 141, T 152, T 196, and ASTM Designation: C 1064	MDOT Class I certification
Compressive Strength Testing of Concrete Cylinders	AASHTO Designation: T 22 and T 231	MDOT Concrete Strength Testing Technician certification
Sampling of Aggregates	AASHTO Designation: T 2	Work under the supervision of an MDOT Class II certified technician
Testing of Aggregates	AASHTO Designation: T 19, T 27, T 84, T 85, T 248, and T 255	MDOT Class II certification
Proportioning of Concrete Mixtures*	AASHTO Designation: M 157 and R 39	MDOT Class III
Interpretation and Application of Maturity Meter Readings	AASHTO Designation: T 325 and ASTM Designation: C 1074	MDOT Class III or Two hours maturity method training

* Technicians making concrete test specimens for meeting the requirements of Subsection 804.02.10.1.2 shall be MDOT Class I certified and under the direct supervision of an MDOT Class III certified technician.

** MDOT Class I certification encompasses the same test procedures and specifications as ACI Concrete Field Testing Technician Grade I. MDOT Class II certification encompasses the same test procedures and specifications as ACI Aggregate Testing Technician - Level 1. MDOT Concrete Strength Testing Technician encompasses the same test procedures and specifications as ACI Concrete Strength Testing certification.

For specifics about the requirements for each level of certification, please refer to the latest edition of the Department's *Concrete Field Manual*. Technicians holding current MDOT Class I, MDOT Class II and/or MDOT Class III certifications shall be acceptable until those certifications expire. Upon a current certification expiration, recertification with the certifications listed in Table 2 shall be required. Technicians currently performing either specific gravity testing of aggregates or compressive strength tests shall be required to either:

- have the required MDOT certification listed in Table 2, or
- have a current MDOT Class III certification or work under the direct supervision of current MDOT Class III technician, and have demonstrated the specific gravity and/or compressive strength test during the inspection of laboratory equipment by the Materials Division, Concrete Section.

907-804.02.10--Portland Cement Concrete Mix Design. Delete the Notes under Table 3 of Subsection 804.02.10 on pages 850 & 851, and substitute the following:

* Maximum size aggregate shall conform to the concrete mix design for the specified aggregate.

** The replacement limits of Portland cement by weight by other cementitious materials (such as fly ash, GGBFS, metakaolin, silica fume, or others) shall be in accordance with the values in Subsection 907-701.02. Other hydraulic cements may be used in accordance with the specifications listed in Section 701.

*** The slump may be increased up to six (6) inches with an approved mid-range water reducer or up to eight (8) inches with an approved type F or G high range water reducer, in accordance with 907-713.02. Minus slump requirements shall meet those set forth in Table 3 of AASHTO M157 specifications.

**** Entrained air is not required except for concrete exposed to seawater. For concrete exposed to seawater, the total air content shall be 3.0 % to 6.0%. For concrete not exposed to seawater, the total air content shall not exceed 6.0%.

***** Class DS Concrete for drilled shafts shall have an 8±1-inch slump.

Delete the last paragraph of Subsection 804.02.10 on page 851 and substitute the following:

Either Type A, D, F, G or mid-range chemical admixture, shall be used in all classes of concrete. Any combinations of water reducing admixtures shall be approved by the Engineer before their use.

907-804.02.10.1.1--Proportioning on the Basis of Previous Field Experience of Trial Mixtures. Delete the first sentence of the first paragraph of Subsection 804.02.10.1.1 on page 851, and substitute the following:

Where a concrete production facility has a record, based on at least 10 consecutive strength tests from at least 10 different batches within the past 12 months from a mixture not previously used on Department projects, the standard deviation shall be calculated.

907-804.02.10.3--Field Verification of Concrete Mix Design. Delete the third sentence of the third paragraph of Subsection 804.02.10.3 on page 853, and substitute the following:

If the requirements of yield, slump, or total air content are not met within three (3) production days after the first placement, subsequent field verification testing shall not be permitted on department projects, and the mix design shall not be used until the requirements listed above are met

907-804.02.10.4--Adjustments of Mixture Proportions. Delete the paragraph in Subsection 804.02.10.4 on page 854, and substitute the following:

The mixture may be adjusted by the Class III Certified Technician representing the Contractor in accordance with the allowable revisions listed in the Department's Concrete Field Manual, paragraph 5.7. Written notification shall be submitted to the Engineer a minimum of seven (7) days prior to any source or brand of material change, aggregate size change, allowable material type change, or decrease in any cementitious material content. Any adjustments of the concrete mixture design shall necessitate repeat of field verification procedure as described in Subsection 804.02.10.3 and approval by the Engineer.

907-804.02.11--Concrete Batch Plants. Delete the first three paragraphs of Subsection 804.02.11 on page 854, and substitute the following:

The concrete batch plant shall meet the requirements of the National Ready Mixed Concrete Association *Quality Control Manual, Section 3, Plant Certification Checklist* as outlined in the latest edition of the Department's *Concrete Field Manual*. The Contractor shall submit a copy of the approved checklist along with proof of calibration of batching equipment, i.e., scales, water meter, and admixture dispenser, to the Engineer 30 days prior to the production of concrete.

For large volume projects the concrete batch plant shall meet the requirements for an automatic system capable of recording batch weights. It shall also have automatic moisture compensation for the fine aggregate. For small volume projects, the concrete batch plant can be equipped for manual batching with a fine aggregate moisture meter visible to the plant operator.

The concrete batch plant shall have available adequate facilities to cool concrete during hot weather.

Mixer trucks to be used on the project are to be listed in the checklist and shall meet the requirements of the checklist.

907-804.02.12--Contractor's Quality Control. Delete the fourth paragraph of Subsection 804.02.12 on page 854 & 855, and substitute the following:

The Contractor's Quality Control program shall encompass the requirements of AASHTO Designation: M 157 into concrete production and control, equipment requirements, testing, and batch ticket information. The requirement of AASHTO Designation: M 157, Section 11.7 shall

be followed except, on arrival to the job site, a maximum of 1½ gallons per cubic yard is allowed to be added. Water shall not be added at a later time. If the maximum permitted slump is exceeded after the addition of water at the job site, the concrete shall be rejected.

907-804.02.12.3--Documentation. After the second sentence of the second paragraph of Subsection 804.02.12.3 on page 856, add the following:

Batch tickets and gradation data shall be documented in accordance with Department requirements. Batch tickets shall contain all the information in AASHTO Designation: M157, Section 16 including the additional information in Subsection 16.2 with the following exception: the information listed in paragraphs 16.2.7 and 16.2.8 is not required. Batch tickets shall also contain the concrete producer's permanent unique mix number assigned to the concrete mix design.

907-804.02.12.5--Non-Conforming Materials. In Table 4 of Subsection 804.02.12.5 on page 857, delete "/ FM" from the requirements on line B.3.a.

907-804.02.13--Quality Assurance Sampling and Testing. In Table 5 of Subsection 804.02.13 on page 858, delete "and FM" from the requirements on line A.3.

907-804.02.13.1.4--Temperature. Delete the first paragraph of Subsection 804.02.13.1.4 on pages 859 & 860, and substitute the following:

Cold weather concreting shall follow the requirements of Subsection 907-804.03.16.1. Hot weather concreting shall follow the requirements of Subsection 804.03.16.2 with a maximum temperature of 95°F for Class DS concrete or for concrete mixes containing cementitious materials meeting the requirements of Subsection 907-701.02.2 as a replacement of Portland cement. For other concrete mixes, the maximum concrete temperature shall be 90°F. Concrete with a temperature more than the maximum allowable temperature shall be rejected and not used in Department work.

907-804.03--Construction Requirements.

907-804.03.15--Removal of Falsework, Forms, and Housing. Delete the first sentence of the second paragraph of Subsection 804.03.15 on page 871, and substitute the following:

Concrete in the last pour of a continuous superstructure shall have attained a compressive strength of 2,400 psi, as determined by cylinder tests or maturity meter probe, prior to striking any falsework.

Delete the first sentence of the third paragraph of Subsection 804.03.15 on page 871, and substitute the following:

At the Contractor's option and with the approval of the Engineer, the time for removal of forms may be determined by cylinder tests, in accordance with the requirements listed in Table 6, in which case the Contractor shall furnish facilities for testing the cylinders.

Delete the fourth and fifth paragraphs of Subsection 804.03.15 on pages 871 & 872, and substitute the following:

The cylinders shall be cured under conditions which are not more favorable than those existing for the portions of the structure which they represent.

Delete the table in Subsection 804.03.15 on page 872, and substitute the following:

Table 6
Minimum Compressive Strength Requirements for Form Removal

Forms:

Columns	1000 psi
Side of Beams	1000 psi
Walls not under pressure	1000 psi
Floor Slabs, overhead	2000 psi
Floor Slabs, between beams	2000 psi
Slab Spans	2400 psi
Other Parts	1000 psi

Centering:

Under Beams	2400 psi
Under Bent Caps	2000 psi

Limitation for Placing Beams on:

Pile Bents, pile under beam	2000 psi
Frame Bents, two or more columns	2200 psi
Frame Bents, single column	2400 psi

In lieu of using concrete strength cylinders to determine when falsework, forms, and housings can be removed, an approved maturity meter may be used to determine concrete strengths by inserting probes into concrete placed in a structure. The minimum number of maturity meter probes required for each structural component shall be in accordance with Table 7. Falsework, forms, and housings may be removed when maturity meter readings indicate that the required concrete strength is achieved. Procedures for using the maturity meter and developing the strength/maturity relationship shall follow the requirements of AASHTO Designation: T 325 and ASTM Designation: C 1074 specifications. Technicians using the maturity meter or calculating strength/maturity graphs shall be required to have at least two hours of training prior to using the maturity equipment.

Table 7
Requirements for use of Maturity Meter Probes

Structure Component	Quantity of Concrete	No. of Probes
Slabs, beams, walls, & miscellaneous items	0 - 30 yd^3	2
	> 30 to 60 yd^3	3
	> 60 to 90 yd^3	4
	> 90 yd^3	5
Footings, Columns & Caps	0 - 13 yd^3	2
	> 13 yd^3	3
Pavement, Pavement Overlays	1200 yd^2	2
Pavement Repairs	Per repair or 900 yd^2 Whichever is smaller	2

907-804.03.16--Cold or Hot Weather Concreting.

907-804.03.16.1--Cold Weather Concreting. After the third paragraph of Subsection 804.03.16.1 on page 873, add the following:

In lieu of the protection and curing of concrete in cold weather, at the option of the Contractor with the approval of the Engineer, when concrete is placed during cold weather and there is a probability of ambient temperatures lower that 40°F, an approved maturity meter may be used to determine concrete strengths by inserting probes into concrete placed in a structure. The minimum number of maturity meter probes required for each structural component shall be in accordance with Table 7. An approved insulating blanketing material shall be used to protect the work when ambient temperatures are less than 40°F and shall remain in place until the required concrete strength in Table 6 is achieved. Procedures for using the maturity meter and developing the strength/maturity relationship shall follow the requirements of AASHTO Designation: T 325 and ASTM Designation: C 1074 specifications. Technicians using the maturity meter or calculating strength/maturity graphs shall be required to have at least two hours of training prior to using the maturity equipment.

Rename the Table in Subsection 804.03.16.1 on page 874 from "Table 6" to "Table 8".

907-804.03.19--Finishing Concrete Surfaces.

907-804.03.19.7--Finishing Bridge Floors.

907-804.03.19.7.4--Acceptance Procedure for Bridge Deck Smoothness. After the first sentence of the second paragraph of Subsection 804.03.19.7.4 on page 886, add the following:

Auxiliary lanes, tapers, shoulders and other areas that are not checked with the profilograph, shall meet a 1/8 inch in 10-foot straightedge check made transversely and longitudinally across the deck or slab.

907-804.05--Basis of Payment. Add the "907" prefix to the pay items listed on page 898.

SPECIAL PROVISION NO. 906-3

Training Special Provisions

This Training Special Provision supersedes subparagraph 7b of the Special Provision entitled "Specific Equal Employment Opportunity Responsibilities," (Attachment 1), and is in implementation of 23 U.S.C. 140(a).

As part of the Contractor's equal employment opportunity affirmative action program training shall be provided as follows:

> The Contractor shall provide on-the-job training aimed at developing full journeymen in the type of trade or job classification involved.

The number of trainees to be trained under this special provision will be as indicated in the bid schedule of the contract.

In the event that a Contractor subcontracts a portion of the contract work, he shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided, however, that the Contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The Contractor shall also insure that this training special provision is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

The number of trainees shall be distributed among the work classifications on the basis of the Contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment. Prior to commencing construction, the Contractor shall submit to the State highway agency for approval the number of trainees to be trained in each selected classification and training program to be used. Furthermore, the Contractor shall specify the starting time for training in each of the classifications. The Contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees as provided hereinafter.

Training and upgrading of minorities and women toward journeymen status is a primary objective of this Training Special Provision. Accordingly, the Contractor shall make every effort to enroll minority trainees and women (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees) to the extent that such persons are available within a reasonable area of recruitment. The Contractor will be responsible for demonstrating the steps that he has taken in pursuance thereof, prior to a determination as to whether the Contractor is in compliance with this Training Special Provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employee shall be employed as a trainee in any classification in which he has successfully completed a training course leading to journeyman status or in which he has been employed as a

journeyman. The Contractor should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used the Contractor's records should document the findings in each case.

The minimum length and type of training for each classification will be as established in the training program selected by the Contractor and approved by the State highway agency and the Federal Highway Administration. The State highway agency and the Federal Highway Administration shall approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the Contractor and to qualify the average trainee for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau and training programs approved but not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work on the classification covered by the program. It is the intention of these provisions that training is to be provided in the construction crafts rather than clerk-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the division office. Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Except as otherwise noted below, the Contractor will be reimbursed 80 cents per hour of training given an employee on this contract in accordance with an approved training program. As approved by the engineer, reimbursement will be made for training persons in excess of the number specified herein. This reimbursement will be made even though the Contractor receives additional training program funds from other sources, provided such other does not specifically prohibit the Contractor from receiving other reimbursement. Reimbursement for offsite training indicated above may only be made to the Contractor where he does one or more of the following and the trainees are concurrently employed on a Federal-aid project; contributes to the cost of the training, provides the instruction to the trainee or pays the trainee's wages during the offsite training period.

No payment shall be made to the Contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyman, is caused by the Contractor and evidences a lack of good faith on the part of the Contractor in meeting the requirements of this Training Special Provision. It is normally expected that a trainee will begin his training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project as long as training opportunities exist in his work classification or until he has completed his training program. It is not required that all trainees be on board for the entire length of the contract. A

Contractor will have fulfilled his responsibilities under this Training Special Provision if he has provided acceptable training to the number of trainees specified. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

Trainees will be paid at least 60 percent of the appropriate minimum journeyman's rate specified in the contract for the first half of the training period, 75 percent for the third quarter of the training period, and 90 percent for the last quarter of the training period, unless apprentices or trainees in an approved existing program are enrolled as trainees on this project. In that case, the appropriate rates approved by the Departments of Labor or Transportation in connection with the existing program shall apply to all trainees being trained for the same classification who are covered by this Training Special Provision.

The Contractor shall furnish the trainee a copy of the program he will follow in providing the training. The Contractor shall provide each trainee with a certification showing the type and length of training satisfactorily completed.

The Contractor will provide for the maintenance of records and furnish periodic reports documenting his performance under this Training Special Provision.

SPECIAL PROVISION NO. 906-6

MISSISSIPPI DEPARTMENT OF TRANSPORTATION
ON-THE-JOB TRAINING PROGRAM

ALTERNATE TRAINING SPECIAL PROVISION

PURPOSE

The purpose of the On-The-Job Training (OJT) Program is to provide training for minority, female and economically disadvantaged individuals in order that they may develop marketable skills and gain journey status in the skilled craft classifications in which they are being trained.

INTRODUCTION

This voluntary OJT Program has been developed through the partnering efforts of the Road Builders of Mississippi, the Federal Highway Administration (FHWA) and the Mississippi Department of Transportation (MDOT).

The OJT Program has been designed for use by participating contractors and subcontractors in meeting their training needs. The objective of the OJT Program is to develop skilled workers in the skilled craft trade areas of highway construction who are sufficiently trained to be productive employees in the highway construction industry work force.

The success of the OJT Program will require that contractors and subcontractors take part in the program and follow uniform procedures in training and in tracking trainee's progress.

FUNDING

MDOT will establish an annual OJT Fund from which, contractors and subcontractors may bill the Department directly for hours worked by trainees. The funding source of this money will be state and federal funds for MDOT's OJT Program.

DISBURSEMENT OF FUNDS

MDOT will pay $3.00 per hour toward the trainee's salary for each hour of training performed by each trainee in an approved training program. Program reimbursements will be made directly to the prime or sub contractor. Requests for payment will be submitted to the Office of Civil Rights for approval.

Contractors must provide a signed invoice providing the following information to be reimbursed.

- Contractor's Name
- Mailing Address
- Trainee Name
- Social Security Number

- Race
- Sex
- Project Number
- Job Classification
- Total Number of Hours Completed

TRAINING PROGRAM APPROVAL

A. To use the OJT Program on highway construction projects, the contractor will notify the Department Office of Civil Rights using the On-the-Job Trainee Schedule Form. The notification must include the following information:

   - Trainee Starting Date
   - Project number (s) trainee starting on
   - Training program (classification) to be used; and
   - Number of Training Hours Required

B. If a contractor chooses to use a training program different from those listed in the OJT Program Manual, or desires to train in a different classification, the training program must be submitted in its entirety for approval by the Department and FHWA. The training proposal must include the following:

   1. The primary objective of the program: To provide training for minority, female and economically disadvantaged individuals for development to full journey status in the work classifications in which they are being trained.

   2. The minimum number of hours and type of training the trainee will receive as it relates to each specific task required to achieve journey status.

   3. No less than minimum wage.

   4. Trainee certification of completion.

   5. Records and reports submitted to the Office of Civil Rights on a monthly basis.

DEPARTMENT RESPONSIBILITY

1. Department project staff will monitor trainees on the project. They will monitor payrolls for payment of correct wage rates and fringe benefits. The Office of Civil Rights will maintain a master list by contractor name, project number, trainee name and trainee social security number to aid project staff in monitoring trainees who work on multiple projects.

2. The Office of Civil Rights may elect to interview trainees periodically during the training period to assess their performance and training program.

CONTRACTOR RESPONSIBILITY

1. Trainees must be identified on payrolls (i.e. dragline trainee).

2. When any trainee completes a program, or is terminated for a reason or reasons other than successful completion, the contractor must include the date of completion or an explanation for the termination and date of termination on the OJT Termination Report.

3. The contractor will assign each trainee to a particular person--either a supervisor or a journeyman/woman who is proficient in the craft the trainee is being trained in, to ensure that timely instructional experience is received by the trainee. This person, cooperating with the appropriate company personnel, will see that proper records and the total intended training hours are completed during the allocated number of hours set up in the classification criteria.

4. The contractor has the prerogative of terminating the training period of the trainee and advancing the trainee to journey status. Approval requests must be submitted to the Office of Civil Rights with an explanation (***refer to 2 above***).

5. Upon notification from the contractor, the Department will issue a skill verification card and certificate of training to the trainee.

6. Trainees may be transferred to state-aid highway construction projects in order to complete the training program. If transfers are made the Office of Civil Rights must be notified on the Monthly Trainee Form. All of the training hours completed by trainees will count toward overall program completion.

7. Program reimbursements will be made directly to the prime or sub contractor.

WAGE RATE

The wage rate for all trainees is the current Minimum Federal Wage Rate, during their OJT training program. Trainees shall be paid full fringe benefit amounts, where applicable. At the completion of the training program, the trainee shall receive the wages of a skilled journey.

RECRUITMENT AND SELECTION PROCEDURES

A. Prerequisites for Trainees

To be qualified for enrollment in the OJT Program, trainees must possess basic physical fitness for the work to be performed, dependability, willingness to learn and ability to follow instructions.

B. Licenses

Truck driver trainees must possess appropriate driver permits or licenses for the operation of Class A, B and C trucks. However, when an instructional permit is used in lieu of a license, the trainee must be accompanied by an operator who:

1. Holds a license corresponding to the vehicle being operated;

2. Has had at least one year of driving experience; and

3. Is occupying the seat next to the driver.

C. Recruitment

1. Notices and posters setting forth the contractor's Equal Employment Opportunity Policy and availability of training programs will be placed in areas readily accessible to employees, applicants for employment and potential employees.

2. The contractor must target minority, female or economically disadvantaged trainees.

3. The contractor will conduct systematic and direct recruitment through public and private employee referral sources. Contractors must submit the trainee's name and completed application form to the Office of Civil Rights for review and approval. Approval must be obtained before the trainee can begin work under the training program.

4. Present employees will be screened for upgrading.

D. Selection

1. The selection and employment of a person by participating contractor shall qualify the person for the OJT Program.

2. Selection will be made without regard to race, color, religion, sex, age or national origin and shall be completely nondiscriminatory.

3. Employment of trainees will be in accordance with the work force requirements of the contractor. Each contractor will hire and train the trainees for uses in their own organization.

4. Written certification of individuals under the category of economically disadvantaged can be provided to the contractor at the time of the interview. This certification must then be provided to the Office of Civil Rights with the other required information as part of the approval process for trainees.

- ***NOTE:*** The OJT Program is to provide training for minority, female and economically disadvantaged individuals in order that they may develop marketable skills and gain journey status in the skilled craft classifications in which they are being trained. However, this program does not exclude trainees that are not members of the above groups.

S E C T I O N 9 0 5 - P R O P O S A L

Date _____

Mississippi Transportation Commission
Jackson, Mississippi

Sirs: The following proposal is made on behalf of _____
_____ of _____
_____
for constructing the following designated project(s) within the time(s) hereinafter specified.

The plans are composed of drawings and blue prints on file in the offices of the Mississippi Department of Transportation, Jackson, Mississippi.

The Specifications are the current Standard Specifications of the Mississippi Department of Transportation approved by the Federal Highway Administration, except where superseded or amended by the plans, Special Provisions and Notice(s) to Bidders attached hereto and made a part thereof.

I (We) certify that I (we) possess a copy of said Standard and Supplemental Specifications.

Evidence of my (our) authority to submit the Proposal is hereby furnished. The proposal is made without collusion on the part of any person, firm or corporation. I (We) certify that I (we) have carefully examined the Plans, the Specifications, including the Special Provisions and Notice(s) to Bidders, herein, and have personally examined the site of the work. On the basis of the Specifications, Special Provisions, Notice(s) to Bidders, and Plans, I (we) propose to furnish all necessary machinery, tools, apparatus and other means of construction and do all the work and furnish all the materials in the manner specified. I (We) understand that the quantities mentioned herein are approximate only and are subject to either increase or decrease, and hereby propose to perform any increased or decreased quantities of work at the unit prices bid, in accordance with the above.

Attached hereto is a certified check, cashier's check or Proposal Guaranty Bond in the amount as required in the Advertisement (or, by law).

INSTRUCTION TO BIDDERS: Alternate and Optional Items on Bid Schedule.

1. Two or more items entered opposite a single unit quantity WITHOUT DEFINITE DESIGNATION AS "ALTERNATE ITEMS" are considered as "OPTIONAL ITEMS". Bidders may or may not indicate on bids the Optional Item proposed to be furnished or performed WITHOUT PREJUDICE IN REGARD TO IRREGULARITY OF BIDS.

2. Items classified on the bid schedule as "ALTERNATE ITEMS" and/or "ALTERNATE TYPES OF CONSTRUCTION" must be preselected and indicated on bids. However, "Alternate Types of Construction" may include Optional Items to be treated as set out in Paragraph 1, above.

3. Optional items not preselected and indicated on the bid schedule MUST be designated in accordance with Subsection 102.06 prior to or at the time of execution of the contract.

4. Optional and Alternate items designated must be used throughout the project.

I (We) further propose to perform all "force account or extra work" that may be required of me (us) on the basis provided in the Specifications and to give such work my (our) personal attention in order to see that it is economically performed.

S E C T I O N 9 0 5 -- P R O P O S A L (CONTINUED)

I (We) further propose to execute the attached contract agreement (Section 902) as soon as the work is awarded to me (us), and to begin and complete the work within the time limit(s) provided for in the Specifications and Advertisement. I (We) also propose to execute the attached contract bond (Section 903) in an amount not less than one hundred (100) percent of the total of my (our) part, but also to guarantee the excellence of both workmanship and materials until the work is finally accepted.

I (We) enclose a certified check, cashier's check or bid bond for **five percent (5%) of total bid** and hereby agree that in case of my (our) failure to execute the contract and furnish bond within Ten (10) days after notice of award, the amount of this check (bid bond) will be forfeited to the State of Mississippi as liquidated damages arising out of my (our) failure to execute the contract as proposed. It is understood that in case I am (we are) not awarded the work, the check will be returned as provided in the Specifications.

Respectfully Submitted,

DATE _____

_____
Contractor

BY _____
Signature

TITLE _____

ADDRESS _____

CITY, STATE, ZIP _____

PHONE _____

FAX _____

E-MAIL _____

(To be filled in if a corporation)

Our corporation is chartered under the Laws of the State of _____ and the names, titles and business addresses of the executives are as follows:

_____
President Address

_____
Secretary Address

_____
Treasurer Address

The following is my (our) itemized proposal.

Installation of a Traffic Management System, known as State Project No. SP-0017-00(001) / 104589301, in the County of Desoto, State of Mississippi and County of Shelby, State of Tennessee.

I (We) agree to complete the entire project within the specified contract time.

***** SPECIAL NOTICE TO BIDDERS *****
BIDS WILL NOT BE CONSIDERED UNLESS BOTH UNIT PRICES AND ITEM TOTALS ARE ENTERED.
BIDS WILL NOT BE CONSIDERED UNLESS THE BID CERTIFICATION LOCATED AT THE END OF THE BID SHEETS IS SIGNED

*****BID SCHEDULE*****

Line No.	Item Code	Adj Code	Quantity	Units	Description	Unit Price		Item Amount	
						Dollar	Ct	Dollar	Ct
					Roadway Items				
0010	618-A001		1	Lump Sum	Maintenance of Traffic	XXXXXXXX	XXX		
0020	618-B001		1	Square Feet	Additional Construction Signs	10.	00	10.	00
0030	619-E1001		2	Each	Flashing Arrow Panel, Type C				
0040	620-A001		1	Lump Sum	Mobilization	XXXXXXXX	XXX		
0050	647-A003		8	Each	Pullbox, Type 4				
0060	647-A004		10	Each	Pullbox, Type 5				
0070	647-A005		7	Each	Pullbox, Type 2				
0080	666-B037		1,000	Linear Feet	Electric Cable, Underground in Conduit, THHN, AWG 1/0, 4 Conductor				

Line No.	Item Code	Adj Code	Quantity	Units	Description	Unit Price		Bid Amount	
0090	668-A029		12,235	Linear Feet	Traffic Signal Conduit, Underground, Rolled Pipe, 2"				
0100	668-B024		1,360	Linear Feet	Traffic Signal Conduit, Underground Drilled or Jacked, Rolled Pipe, 2"				
0110	907-619-E3001		2	Each	Changeable Message Sign				
0120	907-630-I001		1	Lump Sum	Metal Overhead Sign Supports, Assembly No. 1, Contractor Designed	XXXXXXXX	XXX		
0130	907-637-A001		2	Each	Equipment Cabinet, Type B				
0140	907-639-E001		2	Each	Camera Pole with Foundation, 50' Pole				
0150	907-639-F001		1	Each	Detector Pole with Foundation, 35' Pole				
0160	907-641-A001		2	Each	Radar Detection System				
0170	907-642-B001		3	Each	Solid State Traffic Actuated Controller Modification				
0180	907-650-A001		2	Each	On Street Video Equipment				
0190	907-656-A001		1	Each	Dynamic Message Sign, Type 1				
0200	907-656-B001		1	Lump Sum	Dynamic Message Sign Training	XXXXXXXX	XXX		

Line No.	Item Code	Adj Code	Quantity	Units	Description	Unit Price		Bid Amount	
0210	907-657-A001		12,110	Linear Feet	Fiber Optic Cable, 72 SM				
0220	907-657-B001		1,220	Linear Feet	Fiber Optic Drop Cable, 12 SM				
0230	907-658-A001		2	Each	Hardened Network Switch, Type A				
0240	907-658-B001		1	Each	Terminal Server				
0250	907-659-A001		1	Lump Sum	Traffic Management Center Modifications	XXXXXXXX	XXX		
0260	907-659-C001		1	Lump Sum	Traffic Management Center Modifications - Training	XXXXXXXX	XXX		
0270	907-662-A001		2	Each	Video Encoder, Type A				

*** BID CERTIFICATION ***

TOTAL BID.....$_____

*** SIGNATURE STATEMENT ***

BIDDER ACKNOWLEDGES THAT HE/SHE HAS CHECKED ALL ITEMS IN THIS PROPOSAL FOR ACCURACY AND CERTIFIED THAT THE FIGURES SHOWN THEREIN CONSTITUTE THEIR OFFICIAL BID.

_____

BIDDER'S SIGNATURE

_____

BIDDER'S COMPANY

_____

BIDDER'S FEDERAL TAX ID NUMBER

CONDITIONS FOR COMBINATION BID

If a bidder elects to submit a combined bid for two or more of the contracts listed for this month's letting, the bidder must complete and execute these sheets of the proposal in each of the individual proposals to constitute a combination bid. In addition to this requirement, each individual contract shall be completed, executed and submitted in the usual specified manner.

Failure to execute this Combination Bid Proposal in each of the contracts combined will be just cause for each proposal to be received and evaluated as a separate bid.

* * * *

SECTION 905 - COMBINATION BID PROPOSAL (Continued)

Project Number	Pay Item Number	Unit	Unit Price Reduction	Total Item Reduction	Total Contract Reduction
1. _____	_____ _____	_____ _____	_____ _____	_____ _____	
2. _____	_____ _____	_____ _____	_____ _____	_____ _____	
3. _____	_____ _____	_____ _____	_____ _____	_____ _____	
4. _____	_____ _____	_____ _____	_____ _____	_____ _____	
5. _____	_____ _____	_____ _____	_____ _____	_____ _____	
6. _____	_____ _____	_____ _____	_____ _____	_____ _____	
7. _____	_____ _____	_____ _____	_____ _____	_____ _____	
8. _____	_____ _____	_____ _____	_____ _____	_____ _____	

Project Number	Pay Item Number	Unit	Unit Price Reduction	Total Item Reduction	Total Contract Reduction
9. _____	_____ _____	_____ _____	_____ _____	_____ _____	
10. _____	_____ _____	_____ _____	_____ _____	_____ _____	

C. If option (c) has been selected, then initial and complete one of the following, go to II. and sign Combination Bid Proposal.

_____ I (We) desire to be awarded work not to exceed a total monetary value of $ _____.

_____ I (We) desire to be awarded work not to exceed _____ number of contracts.

II. It is understood that the Mississippi Transportation Commission not only reserves the right to reject any and all proposals, but also the right to award contracts upon the basis of lowest separate bids or combination bids most advantageous to the State.

It is further understood and agreed that the Combination Bid Proposal is for comparison of bids only and that each contract shall operate in every respect as a separate contract in accordance with its proposal and contract documents.

I (We), the undersigned, agree to complete each contract on or before its specified completion date.

SIGNED _____

_____

_____

TO: EXECUTIVE DIRECTOR, MISSISSIPPI DEPARTMENT OF TRANSPORTATION
JACKSON, MISSISSIPPI

CERTIFICATE

If awarded this contract, I (we) contemplate that portions of the contract will be sublet. I (we) certify that those subcontracts which are equal to or in excess of fifty thousand dollars ($50,000.00) will be in accordance with regulations promulgated and adopted by the Mississippi State Board of Contractors on January 13, 1999.

I (we) agree that this notification of intent DOES NOT constitute APPROVAL of the subcontracts.

NOTE: Insert name and address of subcontractors. (Subcontracts equal to or in excess of fifty thousand dollars ($50,000.00) ONLY.)

_____	_____
(Individual or Firm)	(Address)
_____	_____
(Individual or Firm)	(Address)
_____	_____
(Individual or Firm)	(Address)
_____	_____
(Individual or Firm)	(Address)

NOTE: Failure to complete the above DOES NOT preclude subsequent subcontracts. Subsequent subcontracts, if any, equal to or in excess of fifty thousand dollars ($50,000.00) will be in accordance with regulations promulgated and adopted by the Mississippi State Board of Contractors on January 13, 1999.

Contractor _____

By _____

Title _____

CERTIFICATE MUST BE EXECUTED

REV. 2/99

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

CERTIFICATION
(Execute in duplicate)

State of Mississippi

County of _____

I,_____,
(Name of person signing certification)

individually, and in my capacity as _____ of
(Title)

_____ do hereby certify under
(Name of Firm, Partnership, or Corporation)

penalty of perjury under the laws of the United States and the State of Mississippi that

_____, Bidder
(Name of Firm, Partnership, or Corporation)

on Project No. **SP-0017-00(001) / 104589301**_____,

in _____**Desoto**_____ County(ies), Mississippi, has not either directly or indirectly entered into any agreement, participated in any collusion; or otherwise taken any action in restraint of free competitive bidding in connection with this contract; nor have any of its corporate officers or principal owners.

Except as noted hereafter, it is further certified that said legal entity and its corporate officers, principal owners, managers, auditors and others in a position of administering federal funds are not currently under suspension, debarment, voluntary exclusion or determination of ineligibility; nor have a debarment pending; nor been suspended, debarred, voluntarily excluded or determined ineligible within the past three years by the Mississippi Transportation Commission, the State of Mississippi, any other State or a federal agency; nor been indicted, convicted or had a civil judgment rendered by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past three years.

Initial here "_____" if exceptions are attached and made a part thereof. Any exceptions shall address to whom it applies, initiating agency and dates of such action.

Note: Exceptions will not necessarily result in denial of award but will be considered in determining bidder responsibility. Providing false information may result in criminal prosecution or administrative sanctions.

All of the foregoing and attachments (when indicated) is true and correct.

Executed on _____ _____
Signature

(11/23/92S)

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

CERTIFICATION
(Execute in duplicate)

State of Mississippi

County of _____

I,_____,
(Name of person signing certification)

individually, and in my capacity as _____ of
(Title)

_____ do hereby certify under
(Name of Firm, Partnership, or Corporation)

penalty of perjury under the laws of the United States and the State of Mississippi that

_____, Bidder
(Name of Firm, Partnership, or Corporation)

on Project No. **SP-0017-00(001) / 104589301**_____,

in _____**Desoto**_____ County(ies), Mississippi, has not either directly or indirectly entered into any agreement, participated in any collusion; or otherwise taken any action in restraint of free competitive bidding in connection with this contract; nor have any of its corporate officers or principal owners.

Except as noted hereafter, it is further certified that said legal entity and its corporate officers, principal owners, managers, auditors and others in a position of administering federal funds are not currently under suspension, debarment, voluntary exclusion or determination of ineligibility; nor have a debarment pending; nor been suspended, debarred, voluntarily excluded or determined ineligible within the past three years by the Mississippi Transportation Commission, the State of Mississippi, any other State or a federal agency; nor been indicted, convicted or had a civil judgment rendered by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past three years.

Initial here "_____" if exceptions are attached and made a part thereof. Any exceptions shall address to whom it applies, initiating agency and dates of such action.

Note: Exceptions will not necessarily result in denial of award but will be considered in determining bidder responsibility. Providing false information may result in criminal prosecution or administrative sanctions.

All of the foregoing and attachments (when indicated) is true and correct.

Executed on _____ _____
Signature

(11/23/92S)

S E C T I O N 9 0 2

CONTRACT FOR **SP-0017-00(001) / 104589301**

LOCATED IN THE COUNTY(IES) OF **Desoto**

STATE OF MISSISSIPPI,

COUNTY OF HINDS

This contract entered into by and between the Mississippi Transportation Commission on one hand, and the undersigned contractor, on the other witnesseth;

That, in consideration of the payment by the Mississippi Transportation Commission of the prices set out in the proposal hereto attached, to the undersigned contractor, such payment to be made in the manner and at the time of times specified in the specifications and the special provisions, if any, the undersigned contractor hereby agrees to accept the prices stated in the proposal in full compensation for the furnishing of all materials and equipment and the executing of all the work contemplated in this contract.

It is understood and agreed that the advertising according to law, the Advertisement, the instructions to bidders, the proposal for the contract, the specifications, the revisions of the specifications, the special provisions, and also the plans for the work herein contemplated, said plans showing more particularly the details of the work to be done, shall be held to be, and are hereby made a part of this contract by specific reference thereto and with like effect as if each and all of said instruments had been set out fully herein in words and figures.

It is further agreed that for the same consideration the undersigned contractor shall be responsible for all loss or damage arising out of the nature of the work aforesaid; or from the action of the elements and unforeseen obstructions or difficulties which may be encountered in the prosecution of the same and for all risks of every description connected with the work, exceptions being those specifically set out in the contract; and for faithfully completing the whole work in good and workmanlike manner according to the approved Plans, Specifications, Special Provisions, Notice(s) to Bidders and requirements of the Mississippi Department of Transportation.

It is further agreed that the work shall be done under the direct supervision and to the complete satisfaction of the Executive Director of the Mississippi Department of Transportation, or his authorized representatives, and when Federal Funds are involved subject to inspection at all times and approval by the Federal Highway Administration, or its agents as the case may be, or the agents of any other Agency whose funds are involved in accordance with those Acts of the Legislature of the State of Mississippi approved by the Governor and such rules and regulations issued pursuant thereto by the Mississippi Transportation Commission and the authorized Federal Agencies.

The Contractor agrees that all labor as outlined in the Special Provisions may be secured from list furnished by

It is agreed and understood that each and every provision of law and clause required by law to be inserted in this contract shall be deemed to be inserted herein and this contract shall be read and enforced as though it were included herein, and, if through mere mistake or otherwise any such provision is not inserted, then upon the application of either party hereto, the contract shall forthwith be physically amended to make such insertion.

The Contractor agrees that he has read each and every clause of this Contract, and fully understands the meaning of same and that he will comply with all the terms, covenants and agreements therein set forth.

Witness our signatures this the _____ day of _____, _____.

_____

Contractor (s)

By _____

MISSISSIPPI TRANSPORTATION COMMISSION

Title _____

By _____

Executive Director

Signed and sealed in the presence of:
(names and addresses of witnesses)

_____

_____

Secretary to the Commission

Award authorized by the Mississippi Transportation Commission in session on the ____ day of _____, _____, Minute Book No. _____, Page No. _____.

Revised 8/06/2003

S E C T I O N 9 0 3

CONTRACT BOND FOR: **SP-0017-00(001) / 104589301**

LOCATED IN THE COUNTY(IES) OF: **Desoto**

STATE OF MISSISSIPPI,

COUNTY OF HINDS

Know all men by these presents: that we, _____

_____ Principal, a _____

residing at _____ in the State of _____

and _____

residing at _____ in the State of _____,

authorized to do business in the State of Mississippi, under the laws thereof, as surety, are held and firmly bound unto the State of Mississippi in the sum of _____

_____

($_____) Dollars, lawful money of the United States of America, to be paid to it for which payment well and truly to be made, we bind ourselves, our heirs, administrators, successors, or assigns jointly and severally by these presents.

Signed and sealed this the _____ day of _____ A.D. _____.

The conditions of this bond are such, that whereas the said _____

_____

principal, has (have) entered into a contract with the Mississippi Transportation Commission, bearing the date of _____ day of _____ A.D. _____ hereto annexed, for the construction of certain projects(s) in the State of Mississippi as mentioned in said contract in accordance with the Contract Documents therefor, on file in the offices of the Mississippi Department of Transportation, Jackson, Mississippi.

Now therefore, if the above bounden _____

_____ in all things shall stand to and abide by and well and truly observe, do keep and perform all and singular the terms, covenants, conditions, guarantees and agreements in said contract, contained on his (their) part to be observed, done, kept and performed and each of them, at the time and in the manner and form and furnish all of the material and equipment specified in said contract in strict accordance with the terms of said contract which said plans, specifications and special provisions are included in and form a part of said contract and shall maintain the said work contemplated until its final completion and acceptance as specified in Subsection 109.11 of the approved specifications, and save harmless said Mississippi Transportation Commission from any loss or damage arising out of or occasioned by the negligence, wrongful or criminal act, overcharge, fraud, or any other loss or damage whatsoever, on the part of said principal (s), his (their) agents, servants, or employees in the performance of said work or in any manner connected therewith, and shall be liable and responsible in a civil action instituted by the State at the instance of the Mississippi Transportation Commission or any officer of the State authorized in such cases, for double any amount in money or property, the State may lose or be overcharged or otherwise defrauded of, by reason of wrongful or criminal act, if any, of the Contractor(s), his (their) agents or

employees, and shall promptly pay the said agents, servants and employees and all persons furnishing labor, material, equipment or supplies therefor, including premiums incurred, for Surety Bonds, Liability Insurance, and Workmen's Compensation Insurance; with the additional obligation that such Contractor shall promptly make payment of all taxes, licenses, assessments, contributions, damages, any liquidated damages which may arise prior to any termination of said principal's contract, any liquidated damages which may arise after termination of the said principal's contract due to default on the part of said principal, penalties and interest thereon, when and as the same may be due this state, or any county, municipality, board, department, commission or political subdivision: in the course of the performance of said work and in accordance with Sections 31-5-51 et seq. Mississippi Code of 1972, and other State statutes applicable thereto, and shall carry out to the letter and to the satisfaction of the Executive Director of the Mississippi Department of Transportation, all, each and every one of the stipulations, obligations, conditions, covenants and agreements and terms of said contract in accordance with the terms thereof and all of the expense and cost and attorney's fee that may be incurred in the enforcement of the performance of said contract, or in the enforcement of the conditions and obligations of this bond, then this obligation shall be null and void, otherwise to be and remain in full force and virtue.

Witness our signatures and seals this the _____ day of _____ A.D. _____.

_____
(Contractors) Principal

By _____

Title _____
(Contractor's Seal)

_____
Surety

By _____
(Signature) Attorney in Fact

Address _____

_____

_____
Local Mississippi Representative

_____
(Signature) Local Mississippi Representative

Address _____

_____

_____
(Surety Seal)

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we _____
Contractor

_____
Address

_____
City, State ZIP

as Principal, hereinafter called the Principal, and _____

a corporation duly organized under the laws of the state of _____

as Surety, hereinafter called the Surety, are held and firmly bound unto **State of Mississippi, Jackson, Mississippi**

As Obligee, hereinafter called Obligee, in the sum of **Five Per Cent (5%) of Amount Bid**

Dollars ($ _____)

for the payment of which sum will and truly to be made, the said Principal and said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for **Installation of a Traffic Management System, known as State Project No. SP-0017-00(001) / 104589301, in the County of Desoto, State of Mississippi and County of Shelby, State of Tennessee.**

NOW THEREFORE, the condition of this obligation is such that if the aforesaid Principal shall be awarded the contract, the said Principal will, within the time required, enter into a formal contract and give a good and sufficient bond to secure the performance of the terms and conditions of the contract, then this obligation to be void; otherwise the Principal and Surety will pay unto the Obligee the difference in money between the amount of the bid of the said Principal and the amount for which the Obligee legally contracts with another party to perform the work if the latter amount be in excess of the former, but in no event shall liability hereunder exceed the penal sum hereof.

Signed and sealed this _____ day of _____ , 2008

_____
(Principal) (Seal)

_____ By: _____
(Witness) (Title)

_____
(Surety) (Seal)

_____ By: _____
(Witness) (Attorney-in-Fact)

_____
Resident MS Agent

Bid bond must be signed or countersigned by a qualified Mississippi resident agent and the bidder as per Section 102.08 of the Mississippi Standard Specifications for Road and Bridge Construction, 2004 edition.

MISSISSIPPI DEPARTMENT OF TRANSPORTATION

HAUL PERMIT FOR BRIDGES

WITH

POSTED WEIGHT LIMITS

DATE: _____

PROJECT: SP-0017-00(001) / 104589301

COUNTIES: Desoto

LOCATION: Installation of a Traffic Management System

A permit is issued to _____ for transporting loads exceeding the posted limit for any such bridge located on State designated routes within the project termini provided that such transport vehicles comply with all other governing statutory weight limits.

This permit is valid on all State designated routes from the point of origin to the point of delivery for materials and equipment utilized in construction of said project and also valid for sub-contractors and vendors upon written permission of the Contractor. The permit is non-transferable and no other haul permit for posted bridges will be issued to other individuals, vendors, or companies for construction of this project.

A copy of this signed permit shall be carried in all vehicles operating under the authority of this permit and also a copy of the Contractor's written permission when the vehicle is other than Contractor owned.

In accordance with State law, the above named Contractor will be liable for damages directly attributable to vehicles operating under this permit.

_____

EXECUTIVE DIRECTOR