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SM No. CBRNH0008011541

# PROPOSAL AND CONTRACT DOCUMENTS

## FOR THE CONSTRUCTION OF

01

Add 2 Lanes on US 49 from O'Neal Road to north of School Road, known as  
Federal Aid Project No. BRNH-0008-01(154) / 102111301 in Harrison County.

Project Completion: Contractor Determined

**(STATE DELEGATED)**

### NOTICE

**BIDDERS MUST COMPLETE AN ONLINE REQUEST  
FOR PERMISSION TO BID THIS PROJECT.**

Electronic addendum updates will be posted on [www.gomdot.com](http://www.gomdot.com)

**SECTION 900**  
**OF THE CURRENT**  
**2017 STANDARD SPECIFICATIONS**  
**FOR ROAD AND BRIDGE CONSTRUCTION**  
**JACKSON, MISSISSIPPI**

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION  
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**PROJECT: BRNH-0008-01(154)/102111301 - Harrison**

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Form -- OCR-485

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

09/27/2023 03:21 PM

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

## SECTION 901 - ADVERTISEMENT

Electronic bids will be received by the Mississippi Transportation Commission at 10:00 o'clock A.M., Tuesday, November 28, 2023, from the Bid Express Service and shortly thereafter publicly read on the Sixth Floor for:

Add 2 Lanes on US 49 from O'Neal Road to north of School Road, known as Federal Aid Project No. BRNH-0008-01(154) / 102111301 in Harrison County.

The attention of bidders is directed to the Contract Provisions governing selection and employment of labor. Minimum wage rates have been predetermined by the Secretary of Labor and are subject to Public Law 87-581, Work Hours Act of 1962, as set forth in the Contract Provisions.

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.

**The award of this contract will be contingent upon the Contractor satisfying the DBE requirements.**

Contractors may request permission to bid online at <http://shop.mdot.ms.gov> at no cost. Upon approval, Contractors shall be eligible to submit a bid using Bid Express at <http://bidx.com>. Specimen proposals may be viewed and downloaded online at no cost at <http://mdot.ms.gov> or purchased online at <http://shop.mdot.ms.gov> at a cost of Ten Dollars (\$10.00) per proposal plus a small convenience fee. Cash or checks will not be accepted as payment.

Plans must be purchased online at <<https://shop.mdot.ms.gov>>. Costs of plans will be on a per sheet basis plus a small convenience fee. If you have any questions, you can contact the MDOT Plans Print Shop at (601) 359-7460, or e-mail at [plans@mdot.state.ms.us](mailto:plans@mdot.state.ms.us). Plans will be shipped upon receipt of payment. Cash or checks will not be accepted as payment.

Bid bond, signed or countersigned by a Mississippi Agent or Qualified Nonresident Agent, with Power of Attorney attached, 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.

BRAD WHITE  
EXECUTIVE DIRECTOR

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SUPPLEMENT TO NOTICE TO BIDDERS NO. 1**

**DATE: 06/08/2021**

**SUBJECT: Governing Specifications**

Change the web address at the end of the first paragraph to the following.

<https://shop.mdot.ms.gov/default.aspx?StoreIndex=1>

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

**SECTION 904 - NOTICE TO BIDDERS NO. 1**

**CODE: (IS)**

**DATE: 03/01/2017**

**SUBJECT: Governing Specifications**

The current (2017) 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 within this proposal. Copies of the specification book may be purchased from the MDOT Construction Division, or online at [shopmdot/default.aspx?StoreIndex=1](http://shopmdot/default.aspx?StoreIndex=1).

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 2004 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 2017 Edition of the Standard Specifications.

## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

**SECTION 904 - NOTICE TO BIDDERS NO. 2**

**CODE: (IS)**

**DATE: 03/01/2017**

**SUBJECT: Status of Right-of-Way**

Although it is desirable to have acquired all rights-of-way and completed all railroad agreements, 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, relocations, railroad agreements and utilities adjustments which have not been completed.

The status of right-of-way acquisition, utility adjustments, encroachments, potentially contaminated sites, railroad facilities, improvements, and asbestos contamination are set forth in the following attachments.

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**

BRNH-0008-01(154)

102111/301000

Harrison County

All rights of way and legal rights of entry have been acquired, except:

Please refer to the attached Improvements Status Report for station numbers and pictures of improvements to be removed in the construction contract, inclusive of the encroachment noted on the District Status Report under Right of Way Clearance. Also, coordination with the Railroad will be required. Please see Notice to Bidders

STATUS OF POTENTIALLY CONTAMINATED SITES  
BRNH-0008-01(154)  
102111-301000  
Harrison County

September 7, 2023

This project has been inspected and there was no visible indication of potentially contaminated sites within the proposed right of way.

ASBESTOS CONTAMINATION STATUS OF BUILDINGS  
TO BE REMOVED BY THE CONTRACTOR

BRNH-0008-01(154)  
102111-301000  
Harrison County

September 7, 2023

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.


The improvements as shown in Exhibit B are to be removed by the contractor. See the plans and Notice to Bidders for further details. The improvements have been inspected and no ACMs were identified.

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

## *Inter-Departmental Memorandum*

TO: Trudi Loflin  
Right of Way Division

DATE: September 7, 2023

FROM: Martha Brewer   
District Preconstruction Engineer

SUBJECT OR PROJECT NO: 102111/301000  
BRNH-0008-01(154)

INFORMATION COPY TO:  
File

COUNTY: Harrison

### District Status Report

1. **STATUS OF RIGHT OF WAY:** All ROW necessary for construction has been acquired.
2. **RIGHT OF WAY CLEARANCE:** At approx. Sta. 252+00 Left of LtLn (SW of 49 & 53 intersection), there is a 'Welcome to Gulfport' sign that is an encroachment on the Right of Way. The Contractor will be required to remove sign as part of this contract.
3. **STATUS OF AFFECTED RAILROAD OPERATING FACILITIES:** No Right of Way is required from the railroad. See Notice to Bidders.
4. **STATUS OF REQUIRED UTILITY RELOCATIONS:** All utility conflicts have been relocated and are complete.
5. **STATUS OF CONSTRUCTION AGREEMENT:** None

UTILITY STATUS REPORT						
Project Number		BRNH-0008-01(154); 102111-301000				
County		Harrison				
Project Description		US 49 from O'Neal Road to Little Biloxi River				
Utilities that were Relocated						
Utility Name & Contact Info	Relocation Site of Utility	Status of the conflict with Project Construction	Restriction information & other remarks, if applicable (i.e. location, date in effect, etc...)	Estimated date for Utility relocation completion	Restriction information & other remarks, if applicable (i.e. location, date in effect, etc...)	
Gulfport Water	US 49	Completed	N/A			
Gulfport Sewer	US 49	Completed	N/A			
CenterPoint Energy	US 49	Completed	N/A			
AT&T Mississippi	US 49	Completed	N/A			
MS Power	US 49	Completed	N/A			
C-Spire	US 49	Completed	N/A			
Uniti Fiber	US 49	Completed	N/A			
Sparklight	US 49	Completed	N/A			
Utilities to be relocated						
Utility Name & Contact Info	Current Utility Location	Status of plans, agreements, or permits	Proposed Relocation Site	Estimated date for Utility relocation completion	Restriction information & other remarks, if applicable (i.e. location, date in effect, etc...)	
Utilities to remain						
Utility Name & Contact Info	Utility Location to Remain	Status of the conflict with Project Construction	Restriction information & other remarks, if applicable (i.e. location, date in effect, etc...)	Estimated date for Utility relocation completion	Restriction information & other remarks, if applicable (i.e. location, date in effect, etc...)	
OTHER REMARKS:						

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 - NOTICE TO BIDDERS NO. 9**

**CODE: (IS)**

**DATE: 03/01/2017**

**SUBJECT: Federal Bridge Formula**

Bidders are hereby advised that the latest revision of Federal Highway Administration Publication No. FHWA-HOP-06-105, **BRIDGE FORMULA WEIGHTS**, dated August 2006, 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 7<sup>th</sup> Street, SW  
Washington, DC 20590  
(202) 366-2212

or

[http://www.ops.fhwa.dot.gov/Freight/publications/brdg\\_frm\\_wgths/bridge\\_formula\\_all\\_rev.pdf](http://www.ops.fhwa.dot.gov/Freight/publications/brdg_frm_wgths/bridge_formula_all_rev.pdf)

An on line **BRIDGE FORMULA WEIGHTS CALCULATOR** is available at

[http://ops.fhwa.dot.gov/freight/sw/brdgcalc/calc\\_page.htm](http://ops.fhwa.dot.gov/freight/sw/brdgcalc/calc_page.htm)

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SUPPLEMENT TO NOTICE TO BIDDERS NO. 14**

**DATE: 09/26/2023**

**PROJECT: BRNH-0008-01(154) / 102111301 – Harrison County**

After the second paragraph on page 1, add the following:

Name Insured: Kansas City Southern Railway Company

Description and Designation: US Highway 49 in Gulfport, MS

Mile Post: SR 53 Crossing

After the fourth paragraph on page 1, add the following:

Kansas City Southern Railway

Denise Case

Transaction Manager

Jones Lang Lasalle (JLL)

Rail Practice Group

4200 Buckingham, Suite 110

Fort Worth, Texas 76155

tel 1+8172302600 direct 1+8172302614

[denise.case@am.jll.com](mailto:denise.case@am.jll.com)

[www.joneslanglasalle.com](http://www.joneslanglasalle.com)

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 14

CODE: (SP)

DATE: 01/17/2017

SUBJECT: Railway-Highway Provisions

Prior to bidding, the Contractor shall contact the Railroad concerning insurance coverage required for this project. In case the railroad requires coverage over and above that required by the Standard Specifications, the railroad requirements shall be met.

The name insured, description of the work and designation of the job site to be shown on the Policy are as follows:

Notice of starting to work, completion of any required forms, and correspondence pertaining to railroad liability insurance shall be directed to the person below.

The Contractor shall not commence, or carry on, any work for installation, maintenance, repair, changing or renewal of any FACILITY, under, over or on RAILROAD property at any location without giving at least ten (10) working days prior notice to the RAILROAD authorized representative at the RAILROAD's office(s) below.

If in the opinion of the RAILROAD, the presence of an authorized representative of the RAILROAD is required to supervise the same, the RAILROAD shall render bills to the Contractor for all expenses incurred by it for such supervision. This includes all labor costs for flagmen or cable locate supplied by the RAILROAD to protect RAILROAD operation, and for the full cost of furnishing, installation and later removal of any temporary supports for said tracks, as the RAILROAD's Chief Engineer's Office may deem necessary.

**It will be the Contractor's responsibility to pay all bills associated with railroad flagging and cable locating.** Generally, the flagging rate is \$700.00 per day (1 to 8 hours) plus overtime at \$125.00 per hour, however, the Contractor shall contact the RAILROAD to verify all rates.

A flagman is required anytime a Contractor does any work on or near RAILROAD property within twenty-five (25) feet horizontally of the centerline or any work over any railroad track. The RAILROAD, however, also reserves the right to require a flagman for work on RAILROAD property, which is more than twenty-five (25) feet from the centerline of a railroad track when there are other conditions or considerations that would dictate the need for a flagman to safeguard the RAILROAD's operations, property and safety of working personnel.

A cable locate of RAILROAD owned facilities may be required to identify and protect Signal & Communication cables that have been installed to provide power, signal control, wayside communications. These cables are vital to a safe and reliable railway operation. The cable locate will be performed by a qualified RAILROAD employee.

Outside Contractors are prohibited from driving on, along, or across any track that does not have a RAILROAD installed crossing. They may utilize an existing public crossing. The practice of allowing rubber tired equipment to operate over track with no crossing has been banned.

Exceptions to this rule will require the express approval from the RAILROAD Engineers.



## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

**SECTION 904 - NOTICE TO BIDDERS NO. 113**

**CODE: (SP)**

**DATE: 04/18/2017**

**SUBJECT: Tack Coat**

Bidders are advised that in addition to the products listed on the Department's APL as referenced in Subsection 401.03.1.2 on page 256, the Contractor may use one of the following as a tack coat.

- CSS-1
- CSS-1h
- SS-1
- SS-1h

## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

**SECTION 904 - NOTICE TO BIDDERS NO. 246**

**CODE: (SP)**

**DATE: 06/27/2017**

**SUBJECT: Kansas City Southern Construction Requirements**

Bidders are hereby advised that provisions which are required as per the Notice to Bidders entitled “Railway-Highway Provisions” shall also include the following.

The Contractor shall submit to the Project Engineer and the Railroad detailed plans and design data for temporary construction clearances, stages of construction, erection plans, demolition plans, false-work plans, excavation plans, and temporary shoring plans and calculations, as required, and shall be sealed by a Mississippi Registered Professional Engineer. All submittals must be approved by the Railroad before excavation or construction can begin within Railroad Right-of-Way. All construction submittals for work performed within the Kansas City Southern Railway Company (KCS) right-of-way shall be made per the KCS “Guidelines for the Design and Construction of Railroad Overpasses and Underpasses” as updated in May 2008.

Prior to beginning any work on the KCS right-of-way, the Contractor shall obtain a Right of Entry Permit. To request a permit application, the Contractor should contact Sylvia Schmidt. Mrs. Schmidt’s contact information is as follows.

Sylvia Schmidt  
Permit Manager  
Jones Lang LaSalle Americas, Inc.  
3017 Lou Menk Drive, Suite 100  
Fort Worth, Texas 76131-2800  
817-230-2688

The Contractor shall be responsible for payment of all application fees.

This project will require construction activities on the right-of-way of active railroad tracks which are currently owned and/or operated by KCS. When work requires that equipment or personnel be within the KCS right-of-way or the “foul zone” adjacent to the right-of-way, a qualified “Employee-in-Charge” (EIC) must be present for the purpose of providing on-track safety and flagging protection for the work crews. The EIC shall also be responsible for the coordination of the Contractor’s activities within the KCS right-of-way with the operation of the Railroad. The EIC must be certified under the KCS General Code of Operation Rules (GCOR) and must be approved by the local KCS Roadmaster prior to beginning work on the KCS right-of-way. The Contractor will be required to provide radios for the EIC, all equipment operators, supervisors, and foremen in charge of employees working within the KCS right-of-way. All personnel who must enter upon the KCS right-of-way must check in and out with the EIC and be logged in and out of the site.

All personnel who must work within the KCS right-of-way at any time shall be trained and certified as a KCS "Roadway Worker" and must at all times have their certification card with them and available for random inspection. The Contractor will be responsible for providing this training for Contractor employees or any subcontractor(s) employees. The Contractor shall contact Mr. Larry Slater of Track Sense Inc. at 330-847-8661 or 330-219-4721 ([lslater@neo.rr.com](mailto:lslater@neo.rr.com)) for approximate fees and scheduling the necessary training sessions. The Contractor shall also contact the MDOT Project Engineer to see if any MDOT employees need this training. If so, the Contractor shall include the MDOT employees in the list of participants for training. The Contractor shall bear the cost of training the MDOT employees. Costs for training the MDOT employees will be reimbursed to the Contractor by supplemental agreement.

Prior to commencing work, the Contractor shall provide to the Railroad Engineer or the Railroad Engineer's designated representative, [with copies to the Project Engineer](#), a detailed construction schedule for its work on Railroad's right-of-way, including the proposed temporary horizontal and vertical clearances and construction sequence for all work to be performed on Railroad right-of-way. This schedule shall also include the anticipated dates when the milestone events listed below will occur. The Contractor shall update the schedule for these milestone events as necessary, but at least monthly, and shall provide a copy of all updates to the Railroad so that site visits may be scheduled.

- Preconstruction meetings.
- Excavations, shoring placement/removal, pile driving, drilling of caissons or drilled shafts adjacent to tracks.
- Reinforcement and concrete placement for near track piers.
- Erection of precast concrete or steel overpass bridge superstructure.
- Reinforcement and concrete placement of overpass bridge decks.
- Completion of the bridge structure.

The Contractor shall so arrange and conduct construction operations in such a manner that there will be no interference with Railroad operations, including train, signal, telephone and telegraphic services, or damage to the property of the Railroad or to poles, cables or wires (whether overhead or underground) and other facilities or tenants on the rights-of-way of the Railroad. Before undertaking any work within Railroad right-of-way and before placing any obstruction over any track, the Contractor shall:

- Notify the Railroad's representative at least 72 hours in advance of the work.
- Provide assurance to the Railroad's representative that arrangements have been made for any required flagging service.
- Receive permission from the Railroad Engineer to proceed with the work.
- Ascertain that the Project Engineer has received copies of notice to the Railroad and the Railroad's response.

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 - NOTICE TO BIDDERS NO. 296**

**CODE: (SP)**

**DATE: 07/25/2017**

**SUBJECT: Reduced Speed Limit Signs**

Bidders are advised that when the plans or contract documents require the speed limit on a project to be reduced, the Contractor shall begin work within 48 hours of installing the reduced speed limit signs. Should the Contractor not start work or have no plans to start work within 48 hours of installing the signs, the reduced speed limit signs shall be covered and existing speed limit signs uncovered.

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 - NOTICE TO BIDDERS NO. 445**

**CODE: (SP)**

**DATE: 10/10/2017**

**SUBJECT: Mississippi Agent or Qualified Nonresident Agent**

Bidders are hereby advised of the requirements of Subsections 102.08, 103.05.2, and 107.14.2.1 of the *2017 Standard Specifications for Road and Bridge Construction* as it refers to bonding agents. Proposal guaranties, bonds, and liability insurance policies must be signed by a **Mississippi Agent or Qualified Nonresident Agent.**

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 - NOTICE TO BIDDERS NO. 446**

**CODE: (SP)**

**DATE: 10/18/2017**

**SUBJECT: Traffic on Milled Surface in Urban Areas**

Bidders are hereby advised that when the main lanes of a roadway are fine milled, traffic will be allowed to run on a milled surfaces for up to five (5) calendar days. The Contractor will be assessed a penalty of **\$5,000 per calendar day** afterwards until the milled surfaces are covered with the next lift of asphalt. It shall be the Contractor's responsibility to ensure that the milling operations do not commence until such time as forecasted weather conditions are suitable enough to allow the placement of the asphalt pavement after the milling operations.

## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 516

CODE: (IS)

DATE: 11/28/2017

SUBJECT: Errata and Modifications to the 2017 Standard Specifications

<u>Page</u>	<u>Subsection</u>	<u>Change</u>
16	102.06	In the seventh full paragraph, change “Engineer” to “Director.”
33	105.05.1	In the sixth sentence, change “Contract Administration Engineer” to “Contract Administration Director.”
34	105.05.2.1	In subparagraph 2, change “SWPPP, ECP” to “SWPPP and the ECP”
35	105.05.2.2	In subparagraphs 2, add “ and” to the end of the sentence. In subparagraph 3, remove “, and” and add “.”.
90	109.04.2	In the last paragraph of subparagraph (a), place a period “.” at the end of the sentence.
93	109.04.2	In the last paragraph of subparagraph (g), place a period “.” at the end of the sentence. Also, in the first paragraph of subparagraph (h), place a period “.” at the end of the sentence.
97	109.07	Under ADJUSTMENT CODE, subparagraph (A1), change “HMA mixture” to “Asphalt mixtures.”
98	109.11	In the third sentence, change “Engineer” to “Director.”
219	308.04	In the last sentence of the last paragraph, change “Contractor’s decision” to “Engineer’s decision.”
300	405.02.5.9	In the first sentence of the second paragraph, change “Hot Mix Asphalt” to “Asphalt Mixtures.”
502	630.01.1	In the first paragraph, change “ <u>AASHTO</u> ” to “ <u>AASHTO’s LRFD</u> ”.
636	646.05	Change “each” to “per each” for the pay item units of payment.
640	656.02.6.2	In item 7), change “down stream” to “downstream”.
688	630.03.2	Change the subsection number from “630.03.2” to “680.03.2.”

- |     |               |   |
|-----|---------------|---|
| 725 | 702.08.3      | In the second sentence of the first paragraph, change “hot-mix” to “asphalt.”                     |
| 954 | 804.02.13.1.6 | In the definition for “M” in the % Reduction formulas, change “paragraph 7.3” to “paragraph 5.3.” |



## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 757

CODE: (IS)

DATE: 03/20/2018

SUBJECT: Additional Erosion Control Requirements

Bidders are hereby advised of the following requirements that relate to erosion control activities on the project.

**THE MAXIMUM TOTAL ACREAGE THAT CAN BE DISTURBED, AT ONE TIME, ON THE PROJECT IS NINETEEN (19) ACRES. THE CONTRACTOR SHALL BE REQUIRED TO STABILIZE DISTURBED AREAS PRIOR TO OPENING UP ADDITIONAL SECTIONS OF THE PROJECT. STABILIZED SHALL BE WHEN THE DISTURBED AREA MEETS ONE OF THE FOLLOWING CRITERIA:**

- **THE AREA HAS BEEN SEEDED, EITHER TEMPORARY OR PERMANENT, AND MULCHED ACCORDING TO THE SPECIFICATIONS, OR**
- **A CRUSHED STONE COURSE OR A LIFT OF ASPHALT PAVEMENT HAS BEEN PLACED, OR**
- **THE AREA HAS BEEN CHEMICALLY TREATED USING PORTLAND CEMENT OR LIME-FLY ASH, AND SEALED.**

**DISTURBED AREAS INCLUDE THE ROADBED, SLOPES AND REMAINING AREA OUT TO THE ROW LINE.**

**Clearing and Grubbing:** Prior to beginning any clearing and grubbing operations on the project, controls shall be in place to address areas such as drainage structures, wetlands, streams, steep slopes and any other sensitive areas in accordance with the approved Erosion Control Plan or as directed by the Engineer. Clearing and grubbing should be limited to the minimum area necessary to construct the project. Grubbing operations should be minimized in areas outside the construction limits and stumps should be cut off flush with the existing ground elevations. A buffer area of at least fifteen (15) feet or as shown in the Plans shall be in place adjacent to the right-of-way line. The buffer area can either be the existing vegetation that is left undisturbed or re-established by planting new vegetation if clearing and grubbing was required. *As applicable, see the Riparian Buffer Erosion Control sheet(s) in the Plans for clearing and grubbing limits adjacent to stream banks.*

**Unclassified Excavation:** Cut sections shall be graded in accordance with the typical sections and plan grades. Permanent erosion control BMP's should be placed as soon as possible after the cut material has been moved. Fill sections that are completed shall have permanent erosion control BMP's placed. Fill sections that are not completed shall be either permanently or temporarily seeded until additional material is made available to complete these sections. All unclassified excavation on the project is be required to be moved prior to incorporating any borrow excavation. The Contractor may have to stockpile unclassified excavation in order to comply with the nineteen (19) acre requirement. No additional compensation will be made for stockpiling operations.

Disturbed areas that remain inactive for a period of more than fourteen (14) days shall be temporary grassed and mulched. Temporary grassing and mulching shall only be paid one time for a given area.

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 - NOTICE TO BIDDERS NO. 1225**

**CODE: (SP)**

**DATE: 11/13/2018**

**SUBJECT: Early Notice to Proceed**

Bidders are advised that if an early notice to proceed is allowed by the Department and the Contractor experiences problems or delays between the early notice to proceed date and the original notice to proceed date, this shall not be justification for any monetary compensation or an extension of contract time.

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 - NOTICE TO BIDDERS NO. 1226**

**CODE: (IS)**

**DATE: 11/16/2018**

**SUBJECT: Material Storage Under Bridges**

Bidders are advised that Subsection 106.08 of the Standard Specifications allows the Contractor to store materials and equipment on portions of the right-of-way. However, the Contractor will not be allowed to store or stockpile materials under bridges without written permission from the Project Engineer. The Contractor shall submit a detailed request of all proposed materials to be stored under bridges to the Engineer a minimum of 14 calendar days prior to anticipated storage. This detail shall include, but not limited to, bridge location, material type, material quantity, and duration of storage. The Project Engineer and any other needed Division will review this information and determine whether to grant approval. The Contractor shall not store any material under any bridge without written approval from the Project Engineer.

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 - NOTICE TO BIDDERS NO. 1241**

**CODE: (IS)**

**DATE: 11/27/2018**

**SUBJECT: Fuel and Material Adjustments**

Bidder's attention is brought to the last paragraph of Subsection 109.07 of the Standard Specifications which states that no fuel or material adjustment will be made after the completion of contract time. Any fuels consumed or materials incorporated into the work during the monthly estimate period falling wholly after the expiration of contract time will not be subject a fuel or material adjustment.

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 - NOTICE TO BIDDERS NO. 1434**

**CODE: (IS)**

**DATE: 03/06/2019**

**SUBJECT: Erosion Control Plan**

Bidders are advised that the Best Management Practices (BMPs) shown at sensitive areas on the Erosion Control Sheets in the Plans shall be shown on the Contractor's Erosion Control Plan and shall be used in the field as indicated on the original plans sheets. Should the installation of these BMPs produce an unsatisfactory result, the Contractor shall submit to the Engineer alternate BMPs for approval. Once approved, the Contractor shall revise the Contractor's Erosion Control Plan to include these changes.

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 - NOTICE TO BIDDERS NO. 1963**

**CODE: (SP)**

**DATE: 9/23/2019**

**SUBJECT: Guardrail Pads**

Bidders are hereby advised that prior to construction of the guardrail pads, the Contractor shall coordinate with the guardrail Subcontractor to determine the guardrail pad dimensions necessary to meet MASH compliance.

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 - NOTICE TO BIDDERS NO. 2172**

**CODE: (SP)**

**DATE: 01/06/2020**

**SUBJECT: App for Storm Water Reports**

Bidders are advised that the Department has created a smart phone App for completing and submitting storm water reports required on this project. The Contractor who monitors storm water activities and completes storm water reports will be required to download and use this App when completing and submitting storm water reports. The reports will then be readily available to all persons who need access to the forms. The App is free and is available for downloading at the following location.

<https://extacctmgmt.mdot.state.ms.us/>

## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

**SECTION 904 - NOTICE TO BIDDERS NO. 2206**

**CODE: (IS)**

**DATE: 01/14/2020**

**SUBJECT: MASH Compliant Devices**

Bidders are hereby advised that compliance associated with the requirements of meeting either the National Cooperative Highway Research Program (NCHRP) Report 350 or the Manual for Assessing Safety Hardware (MASH) for installations of certain traffic control devices and permanent safety hardware devices (guardrails, guardrail terminals, permanent portable barriers, cast-in-place barriers, all other permanent longitudinal barriers, crash cushions, cable barriers, cable barrier terminals, bridge rails, bridge rail transitions, all other terminals, sign supports, and all other breakaway hardware) as listed throughout the Standard Specifications and/or the Standard Drawings, or both, is now replaced with the requirements of meeting the 2016 version of MASH after December 31, 2019. This change applies to new permanent installations and to full replacements of existing installations.

At the preconstruction conference or prior to starting any work on the project, the Contractor shall submit a letter stating that the traffic control devices and permanent safety hardware devices as outlined within the paragraph above that are to be used on the project are certified to meet MASH 2016.

When a MASH 2016-compliant device does not exist for the new permanent installations and/or full replacement installations of permanent safety hardware devices, as listed above, a MASH 2009-compliant or a NCHRP 350-compliant device may be proposed by the Contractor for the project. A written request for such instances must be submitted by the Contractor either at the preconstruction conference or prior to starting any work on the project. The Contractor shall submit the following items to the Project Engineer: (1) a detailed list of the proposed devices and locations thereof; and (2) certification letters indicating that the proposed devices are compliant with either MASH 2009 or NCHRP 350.

When a MASH 2016-compliant device does not exist for the temporary work zone traffic control devices (Category 1, Category 2, and Category 3 devices), a MASH 2009-compliant or a NCHRP 350-compliant device may be proposed by the Contractor for the project. Temporary work zone traffic control devices (Category 1, Category 2, and Category 3 devices) that are MASH 2009-compliant or NCHRP 350-compliant that have been in use prior to December 31, 2019, and that have a remaining service life may be proposed for use throughout their normal service life on the project by the Contractor. For either of these scenarios for temporary work zone traffic control devices, a written request must be submitted by the Contractor either at the preconstruction conference or prior to starting any work on the project. The Contractor shall submit the following items to the Project Engineer: (1) a detailed list of the proposed devices and locations thereof; and (2) certification letters indicating that the proposed devices are compliant with either MASH 2009 or NCHRP 350.

Work will only be allowed to proceed after the Department has granted written concurrence(s) with the proposed request(s) as listed above.



**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 - NOTICE TO BIDDERS NO. 2273**

**CODE: (SP)**

**DATE: 02/12/2020**

**SUBJECT: Mississippi Special Fuel Tax Law**

Bidder's attention is brought to the second paragraph of Subsection 107.02 of the Standard Specifications which states that all Contractors and Subcontractors must comply with all requirements contained in the Mississippi Special Fuel Tax Law, Section 27-55-501, *et seq.* Attached are two Fact Sheets provided by the Mississippi Department of Revenue (MDOR) with additional information.

## Gasoline and Dyed Diesel Used for Non-Highway Purposes

*Mississippi provides a reduced rate for gasoline and dyed diesel used for non-highway purposes. The reduced rates are 6.44 cents per gallon and 5.75 cents per gallon of gasoline or dyed diesel. These fuels are generally taxed at 18 cents per gallon if for on road use.*

### Gasoline Used for Non-Highway Purposes

You may be entitled to a refund of 11.56 cents per gallon (making this an equivalent to a tax rate of 6.44 cents per gallon) if you desire to purchase gasoline to be used off road. The gasoline must be used for agricultural, maritime, industrial, manufacturing, domestic or non-highway purposes only.

Examples of non-highway include gasoline used in boats, golf carts, machinery used for manufacturing or farm equipment used exclusively in plowing, planting or harvesting farm products.

### Refund Gasoline User

The refund is based on the amount of gallons used. Before a refund is issued, you are required to...

1. Obtain a refund gasoline user's permit and a certificate for refund booklet from the Department of Revenue;
2. Have a storage tank marked "REFUND GASOLINE"; and,
3. Purchase the gasoline from someone who holds a refund gasoline dealer's permit.

No refund will be allowed for gasoline used in motor vehicles owned or operated by a government entity or used in Mississippi government contracts.

### Refund Gasoline Dealer

You must obtain a refund gasoline dealer's permit from the Department of Revenue before selling refund gasoline. At no time should the gasoline be delivered to a tank that is not properly marked. The gasoline must be dyed a distinctive mahogany color at the time of delivery.

The Department of Revenue may waive the dye requirement if the dye may cause damage to the equipment. The refund gasoline user is required to obtain the waiver from the Department of Revenue.

### Dyed Diesel Used for Non-Highway Purposes

Unlike gasoline, you are not required to apply for a refund if you desire to purchase dyed diesel to be used off road. Mississippi provides a reduced rate of 5.75 cents per gallon on dyed diesel used off road. Diesel used on road is subjected to 18 cents per gallon. Dyed diesel used in motor vehicles owned or operated by a government entity or used in Mississippi government contracts will be subjected to 18 cents per gallon.

### Dyed Diesel Used on the Highway

Any person who purchases, receives, acquires or uses dyed diesel for highway use will be liable to pay 18 cents per gallon and subject to a penalty in the amount of \$1000.

### Identifying Dyed Diesel

Storage facilities for dyed diesel must be plainly marked "NONHIGHWAY DIESEL FUEL" or "NONHIGHWAY KEROSENE". Retailers are also required to mark all pumps or dispensing equipment.



## Special Fuel Used on Government Contracts

### State and Local Government Contracts

Special fuel purchased, acquired or used in performing contracts with the State of Mississippi, counties, municipalities or any political subdivision is taxed at a rate of 18 cents per gallon. Special fuel includes but is not limited to the following:

- Dyed diesel fuel;
- Kerosene;
- Undyed diesel fuel; and,
- Fuel oil.

State and local government contracts include construction, reconstruction and maintenance or repairs of projects such as roads, bridges, water systems, sewer systems, buildings, drainage canals and recreational facilities. The Department of Revenue may require contractors to remit the excise tax directly to the state in lieu of paying the tax to a distributor.

### Special Fuel Direct Pay Permit

Contractors that remit the excise tax to the state will be issued a Special Fuel Direct Pay Permit. This permit relieves the distributor from collecting the tax and requires the contractor to file a monthly special fuel return. The distributor should include the contractor’s permit number on all invoices that are related to tax-free sales.

The contractor is required to furnish a surety or cash bond guaranteeing the payment of the excise tax prior to receiving the Special Fuel Direct Pay Permit. The Department of Revenue may accept a contractors tax bond if the bond covers the excise tax levied on special fuel.

### Special Fuel Distributors

If the contractor does not have a Special Fuel Direct Pay Permit, distributors are required to collect the 18 cents excise tax and remit the tax to the Department of Revenue. The additional 12.25 cents levied on special fuel (excluding undyed diesel) should be reported on schedules 5F and 5G of the special fuel return.

### Environmental Protection Fee

Special fuel distributors are required to collect the environmental protection fee even if the contractor has a Special Fuel Direct Pay Permit. The fee is levied at 4/10<sup>ths</sup> of a cent per gallon. The fee is suspended or reinstated when the trust fund has exceeded or fallen below the obligatory balance.

### Penalties

Any person who knowingly and willfully purchases untaxed fuel for use in equipment utilized on a road or highway construction site in this state is guilty of a misdemeanor and, upon conviction, shall be fined not less than \$1,000 or more than \$100,000, or imprisoned in the county jail for not more than one year, or both.



## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

### SUPPLEMENT TO NOTICE TO BIDDERS NO. 2611

**DATE:**       **05/02/2020**

The goal is 7 percent for the Disadvantaged Business Enterprise. All Bidders are required to submit Form OCR-481 for all DBEs. Bidders are advised to check the bid tabulation link for this project on the MDOT website at:

[https://mdot.ms.gov/portal/current\\_letting](https://mdot.ms.gov/portal/current_letting)

Bid tabulations are usually posted by 3:00 pm on Letting Day.

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 2611

CODE: (IS)

DATE: 05/21/2020

SUBJECT: Disadvantaged Business Enterprises In Federal-Aid Highway Construction

This contract is subject to the "Moving Ahead for Progress in the 21<sup>st</sup> Century Act (MAP-21)" and applicable requirements of "Title 49, Code of Federal Regulations, Part 26." Portions of the Act are set forth in this Notice as applicable to compliance by the Contractor and all of the Act, and the MDOT DBE Program, is incorporated by reference herein.

The Department has developed a Disadvantaged Business Enterprise Program that is applicable to this contract and is made a part thereof by reference.

Copies of the program may be obtained from:

Office of Civil Rights  
Mississippi Department of Transportation  
P. O. Box 1850  
Jackson, Mississippi 39215-1850

## POLICY

It is the policy of the Mississippi Department of Transportation to provide a level playing field, to foster equal opportunity in all federally assisted contracts, to improve the flexibility of the DBE Program, to reduce the burdens on small businesses, and to achieve that amount of participation that would be obtained in a non-discriminatory market place. In doing so, it is the policy of MDOT that there will be no discrimination in the award and performance of federally assisted contracts on the basis of race, color, sex, or national origin.

## ASSURANCES THAT CONTRACTORS MUST TAKE

MDOT will require that each contract which MDOT signs with a sub-recipient or a Contractor, and each subcontract the Prime Contractor signs with a Subcontractor, includes the following assurances:

“The Contractor, sub-recipient or Subcontractor shall not discriminate on the basis of race, color, sex, or national origin in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR 26 in the award and administration of federally assisted contracts. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as MDOT deems appropriate.”

**DEFINITIONS**

For purposes of this provision the following definitions will apply:

"Disadvantaged Business" means a small business concern: (a) which is at least 51 percent owned by one or more socially and economically disadvantaged individual(s) or in the case of any publicly owned business, at least 51 percent of the stock of which is owned by one or more socially and economically disadvantaged individual(s); and (b) whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individual(s) who own it. It is important to note that the business owners themselves must control the operations of the business. Absentee ownership or title ownership by an individual who does not take an active role in controlling the business is not consistent with eligibility as a DBE under 49 CFR Part 26.71.

**CONTRACTOR'S OBLIGATION**

The Contractor and all Subcontractors shall take all necessary and reasonable steps to ensure that DBE firms can compete for and participate in the performance of a portion of the work in this contract and shall not discriminate on the basis of race, color, sex, or national origin. Failure on the part of the Contractor to carry out the DBE requirements of this contract constitutes a breach of contract and after proper notification the Department may terminate the contract or take other appropriate action as determined by the Department.

When a contract has a zero percent (0%) DBE goal, the Contractor still has the responsibility to take all necessary and reasonable steps to ensure that DBE firms can compete for and participate in the performance of the work in the contract. In this case, all work performed by a certified DBE firm is considered to be a "race neutral" measure and the Department will receive DBE credit towards the overall State goals when the DBE firm is paid for their work. If the Prime Contractor is a certified DBE firm, the Department can receive DBE credit only for the work performed by the Prime Contractor's work force or any work subcontracted to another DBE firm. Work performance by a non-DBE Subcontractor is not eligible for DBE credit.

**CONTRACT GOAL**

The goal for participation by DBEs is established for this contract in the attached Supplement. The Contractor shall exercise all necessary and reasonable steps to ensure that participation is equal to or exceeds the contract goal.

If the percentage of the contract that is proposed for DBEs is 1% or greater, the Contractor shall agree to meet or exceed the contract goal on the last bid sheet of the proposal.

All Bidders shall submit to the Office of Civil Rights Form OCR-481, signed by the Prime Contractor and the DBE Subcontractors, no later than the 3<sup>rd</sup> business day after opening of the bids.

Form OCR-481 is available on the MDOT website at [www.mdot.ms.gov](http://www.mdot.ms.gov) under the Civil Rights tab, or by calling 601-359-7466.

The OCR-481 Form must contain the following information:

The name and address of each certified DBE Contractor / Supplier;

The Reference Number, percent of work to be completed by the DBE subcontractor and the dollar amount of each item. If a portion of an item is subcontracted, a breakdown of that item including quantities and unit price must be attached, detailing what part of the item the DBE firm is to perform and who will perform the remainder of the item.

If the DBE Commitment shown on the last bid sheet of the proposal, does not equal or exceed the contract goal, the bidder must submit, to MDOT Contract Administration Division prior to bid opening, information to satisfy the Department that adequate good faith efforts have been made to meet the contract goal.

Failure of the lowest bidder to furnish acceptable proof of good faith efforts, submitted to MDOT Contract Administration Division prior to bid opening, shall be just cause for rejection of the proposal. Award may then be made to the next lowest responsive bidder or the project may be re-advertised.

### **GOOD FAITH EFFORTS**

The following factors are illustrative of matters the Department will consider in judging whether or not the bidder has made adequate good faith effort to satisfy the contract goal.

- (1) Whether the bidder attended the pre-bid meeting that was scheduled by the Department to inform DBEs of subcontracting opportunities;
- (2) Whether the bidder advertised in general circulation, trade association, and minority-focus media concerning the subcontracting opportunities;
- (3) Whether the bidder provided written notice to a reasonable number of specific DBEs that their interest in the contract is being solicited;
- (4) Whether the bidder followed up initial solicitations of interest by contacting DBEs to determine with certainty whether they were interested;
- (5) Whether the bidder selected portions of the work to be performed by DBEs in order to increase the likelihood of meeting the contract goal;
- (6) Whether the bidder provided interested DBEs with adequate information about the plans, specifications and requirements of the contract;

- (7) Whether the bidder negotiated in good faith with interested DBEs and did not reject them as unqualified without sound reasons based on a thorough investigation of their capabilities; and
- (8) Whether the bidder made efforts to assist interested DBEs in obtaining any required bonding or insurance.
- (9) Whether the bidder has written notification to certified DBE Contractors soliciting subcontracting for items of work in the contract.
- (10) Whether the bidder has a statement of why an agreement was not reached.
- (11) Proof of written notification to certified DBE Contractors by certified mail that their interest is solicited in subcontracting the work defaulted by the previous DBE or in subcontracting other items of work in the contract.

The bidder’s execution of the signature portion of the proposal shall constitute execution of the following assurance:

The bidder hereby gives assurance pursuant to the applicable requirements of "Moving Ahead for Progress in the 21<sup>st</sup> Century Act (MAP-21)" and applicable requirements of "Title 49, Code of Federal Regulations, Part 26" that the bidder has made a good faith effort to meet the contract goal for DBE participation for which this proposal is submitted.

### **DIRECTORY**

A list of “Certified DBE Contractors” which have been certified as such by the Mississippi Department of Transportation and other Unified Certification Partners (UPC) can be found on the Mississippi Department of Transportation website at [www.mdot.ms.gov](http://www.mdot.ms.gov). The list is in the top left corner of the current Letting Calendar under Contracts & Letting. The DBE firm must be certified at the time the project is let and approved by MDOT to count towards meeting the DBE goal.

### **REPLACEMENT**

If a DBE Subcontractor cannot perform satisfactorily, and this causes the OCR-481 commitment to fall below the contract goal, the Contractor shall take all necessary reasonable steps to replace the DBE with another certified DBE Subcontractor or submit information to satisfy the Mississippi Department of Transportation that adequate good faith efforts have been made to replace the DBE. The good faith efforts outlined previously in this document still apply. The replacement DBE must be a DBE who was on the Department's list of "Certified DBE Contractors" when the job was let, and who is still active. All DBE replacements must be approved by the Department.



Under no circumstances shall the Prime or any Subcontractor perform the DBE's work (as shown on the OCR-481) without prior written approval from the Department. See "Sanctions" at the end of this document for penalties for performing DBE's work.

When a Contractor proposes to substitute/replace/terminate a DBE that was originally named on the OCR-481, the Contractor must obtain a release, in writing, from the named DBE explaining why the DBE Subcontractor cannot perform the work. A copy of the original DBE's release must be attached to the Contractor's written request to substitute/replace/terminate along with appropriate Subcontract Forms for the substitute/replacement/terminated Subcontractor, all of which must be submitted to the DBE Coordinator and approved, in advance, by MDOT.

### **PRE-BID MEETING**

A pre-bid meeting will be held in the [Commission Room on the 1<sup>st</sup> Floor](#) of the [MDOT Administration Building](#) in Jackson, at 2:00 P.M. on the day preceding the date of the bid opening.

This meeting is to inform DBE firms of subcontracting and material supply opportunities. Attendance at this meeting is considered of prime importance in demonstrating good faith effort to meet the contract goal.

### **PARTICIPATION / DBE CREDIT**

Participation shall be counted toward meeting the goal in this contract as follows:

- (1) If the Prime Contractor is a certified DBE firm, only the value of the work actually performed by the DBE Prime can be counted towards the project goal, along with any work subcontracted to a certified DBE firm.
- (2) If the Contractor is not a DBE, the work subcontracted to a certified DBE Contractor will be counted toward the goal.
- (3) The Contractor may count toward the goal a portion of the total dollar value of a contract with a joint venture eligible under the standards of this provision equal to the percentage of the DBE partner in the joint venture.
- (4) Expenditures to DBEs that perform a commercially useful function may be counted toward the goal. A business is considered to perform a commercially useful function when it is responsible for the execution of a distinct element of the work and carries out its responsibilities by actually performing, managing, and supervising the work involved.
- (5) The Contractor may count 100% of the expenditures for materials and supplies obtained from certified DBE suppliers and manufacturers that produce goods from raw materials or substantially alters them for resale provided the suppliers and manufacturers assume the actual and contractual responsibility for the provision of the materials and supplies. The Contractor may count sixty percent (60%) of the expenditures to suppliers that are not

manufacturers, provided the supplier performs a commercially useful function in the supply process. Within 30 days after receipt of the materials, the Contractor shall furnish to the DBE Coordinator invoices from the certified supplier to verify the DBE goal.

- (6) Any work that a certified DBE firm subcontracts or sub-subcontracts to a non-DBE firm will not count towards the DBE goal.
- (7) Only the dollars actually paid to the DBE firm may be counted towards the DBE goal. The participation of a DBE Firm cannot be counted towards the Prime Contractor's DBE goal until the amount being counted towards the goal has been paid to the DBE.

### **AWARD**

Award of this contract to the low bidder will be contingent upon the following conditions:

- (1) Concurrence from Federal Highway Administration, when applicable.
- (2) **All Bidders** must submit to the Office of Civil Rights for approval, Form OCR-481 (DBE Commitment) no later than the 3<sup>rd</sup> business day after opening of the bids to satisfy the Department and that adequate good faith efforts have been made to meet the contract goal. For answers to questions regarding Form OCR-481, contact the MDOT Office of Civil Rights at (601) 359-7466.
- (3) Bidder must include OCR-485 information with their bid proposal listing all firms that submitted quotes for material supplies or items to be subcontracted. OCR-485 information must be **signed and** included with the bid proposal. If the OCR-485 information is not included as part of bid proposal, your bid will be deemed irregular.

Prior to the start of any work, the bidder must notify the Project Engineer, in writing, of the name of the designated "DBE Liaison Officer" for this project. This notification must be posted on the bulletin board at the project site.

### **DEFAULT**

If the contract goal established by MDOT in this proposal is 1% or greater, it must be met to fulfill the terms of the contract. The Contractor may list DBE Subcontractors and items that exceed MDOT's contract goal, but should unforeseen problems arise that would prevent a DBE from completing its total commitment percentage, the Contractor will meet the terms of the contract as long as it meets or exceeds MDOT's Contract Goal. For additional information, refer to "Replacement" section of this Notice.

### **DBE REPORTS**

- (1) OCR-481: Refer to "CONTRACT GOAL" section of this Notice to Bidders for information regarding this form.

- (2) OCR-482: At the conclusion of the project, before the final estimate is paid and the project is closed out, the Prime Contractor will submit to the Project Engineer for verification of quantities and further handling Form OCR-482 whereby the Contractor certifies to the amounts of payments made to all Contractors / Suppliers over the life of the contract. The Project Engineer shall submit the completed Form OCR-482 to the DBE Coordinator (Office of Civil Rights). Final acceptance of the project is dependent upon Contract Administration Division's receipt of completed Form OCR-482 which they will receive from the Office of Civil Rights.
- (3) OCR-483: The Project Engineer/Inspector will complete Form OCR-483, the Commercially Useful Function (CUF) Performance Report, in accordance with MDOT S.O.P. No. OCR-03-05-02-483. Evaluations reported on this form are used to determine whether or not the DBE firm is performing a CUF. The Prime Contractor should take corrective action when the report contains any negative evaluations. DBE credit may be disallowed and/or other sanctions imposed if it is determined the DBE firm is not performing a CUF. This form should also be completed and returned to the DBE Coordinator (Office of Civil Rights).
- (4) OCR-484: Each month, the Prime Contractor will submit to the Project Engineer OCR-484 that certifies payments to all Subcontractors and shows all firms even if the Prime Contractor has paid no monies to the firm during that estimate period (negative report). The Project Engineer will attach the form to the monthly estimate before forwarding to the Contract Administration Division for further processing. Failure of the Contractor to submit the OCR-484 will result in the estimate not being processed and paid.
- (5) OCR-485: ALL BIDDERS must submit signed form with bid proposal of all firms that submitted quotes for material supplies or items to be subcontracted. If the OCR-485 information is not included as part of bid proposal, the bid will be deemed irregular.
- (6) OCR-487: Only used by Prime Contractors that are certified DBE firms. This form is used in determining the exact percentage of DBE credit for the specified project. The low Bidder should return this form to MDOT with the OCR-481 form, or can also be returned with the Permission to Subcontract Forms (CAD-720, CAD-725 and CAD-521).

DBE Forms, can be obtained from the Office of Civil Rights Division, MDOT Administration Building, 401 North West Street, Jackson, MS, or at [www.mdot.ms.gov](http://www.mdot.ms.gov) under the Civil Rights tab.

### SANCTIONS

The Department has the option to enforce any of the following penalties for failure of the Prime Contractor to fulfill the DBE goal as stated on the OCR-481 form or any violations of the DBE program guidelines:

- (1) Disallow credit towards the DBE goal

(2) Withhold progress estimate payments

(3) Deduct from the final estimate or recover an amount equal to the unmet portion of the DBE goal which may include additional monetary penalties as outlined below based on the number of offenses and the severity of the violation as determined by MDOT.

1 <sup>st</sup> Offense	10% of unmet portion of goal	or	\$5,000 lump sum payment	or	Both
2 <sup>nd</sup> Offense	20% of unmet portion of goal	or	\$10,000 lump sum payment	or	Both
3 <sup>rd</sup> Offense	40% of unmet portion of goal	or	\$20,000 lump sum payment	or	\$20,000 lump sum payment and debarment

(4) Debar the Contractor involved from bidding on MDOT federally funded projects for a period of up to 12 months after notification by certified email.

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 - NOTICE TO BIDDERS NO. 2782**

**CODE: (SP)**

**DATE: 8/13/2020**

**SUBJECT: DBE Pre-Bid Meeting**

Due to the COVID-19 pandemic and the Department not allowing visitors in the Administration Building at this time, the DBE Pre-Bid Meeting referenced on Page 5 of Notice to Bidders No. 2611 will be held by **video conference only**. The meeting will be held at 2:00 P.M. on the day preceding the date of the bid opening using Zoom video conferencing software. Anyone interested in participating can download Zoom and connect to the meeting at the below link.

<https://zoom.us/j/5548736403?pwd=SDh5S2hQSE5pNG5FOEkzR3NsUnBYQT09>

Password (if prompted): 272147

For those unable to participate via Zoom, the below teleconference number may be used instead.

1-888-227-7517

Conference Code: 404496

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 - NOTICE TO BIDDERS NO. 2812**

**CODE; (SP)**

**DATE: 09/01/2020**

**SUBJECT: Traffic Signal and ITS Components**

Bidders are hereby advised that all products selected for use on this project shall be in compliance with 2 CFR 200.216. No telecommunication and video surveillance equipment or services shall be manufactured by the following companies: Huawei Technologies Company, ZTE Corporation, Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, Dahua Technology Company, and any subsidiary or affiliate of these entities.

The Contractor shall provide a Certification Statement that the referenced product(s) is not manufactured by any of the following: Huawei Technologies Company, ZTE Corporation, Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, Dahua Technology Company, and any subsidiary or affiliate of these entities. (as per 2 CFR 200.216)

## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 2954

CODE: (IS)

DATE: 12/01/2020

SUBJECT: Reflective Sheeting for Signs

Bidders are hereby advised that the retroreflective sign sheeting used for signs on this project shall be as listed below and shall meet the requirements of Subsection 721.06.

### Temporary Construction Signs

Temporary traffic control (orange) sign sheeting shall be a minimum Type IX Fluorescent Orange sheeting as shown in Special Provision 907-721.

### Permanent Signs

Permanent signs, except signs on traffic signal poles/mast arms, shall be as follows:

- Brown background sheeting on guide signs shall be a minimum Type VIII sheeting,
- Green and blue background sheeting on guide signs shall be a minimum Type IX sheeting, and
- All white, yellow, red, fluorescent yellow, and fluorescent yellow/green sheeting shall be Type XI sheeting.

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 - NOTICE TO BIDDERS NO. 3676**

**CODE: (SP)**

**DATE: 09/21/2021**

**SUBJECT: Asphalt Gyrotory Compactor Internal Angle Calibration**

Bidders are advised that by March 1, 2022, all asphalt gyrotory compactors shall be calibrated to an internal angle of  $1.16^{\circ} \pm 0.02^{\circ}$ . This requirement will be reflected in updates made to MT-78, MT-80, and MT-83. This calibration requirement also extends to all QC/QA testing.



## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 3875

CODE: (IS)

DATE: 12/15/2021

SUBJECT: ITS General Requirements

For this Notice to Bidders, the “Engineer” shall mean the Project Engineer and/or their designee(s) throughout the rest of this NTB, unless stated otherwise.

### Submittals

All submittals covered under this section shall be made electronically to the Project Engineer and to the ITS Engineer, shall clearly state the project name and project number, and should be in as few separate submittals as possible.

All products selected for use on this project shall be in compliance with 2 CFR 200.216, in addition to all other contract requirements as outlined throughout the specifications, special provisions and plans. No telecommunication and video surveillance equipment or services shall be manufactured by the following companies: Huawei Technologies Company, ZTE Corporation, Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, Dahua Technology Company, and any subsidiary or affiliate of these entities.

Product Data. Manufacturers’ product data including specifications/cut-sheets, design guides, installation manuals, operating manuals, and maintenance/service manuals shall be submitted by the Contractor for each component of the ITS system, including but not limited to cabinets, controllers, sensors, conduit, pull boxes, hardware, and all other parts of the system selected for installation.

The complete information for the original product data submittal shall be contained in as few submittals as possible and be in an organized fashion.

The product data submittal shall be accompanied by a specification checklist. At a minimum, this checklist shall clearly state the following:

- 1) The project name and project number
- 2) The date of the submittal
- 3) The pay item number and description
- 4) The part and/or model number, matching the cut-sheet
- 5) The manufacturer
- 6) A Certification Statement that the referenced product is not manufactured by any of the following: Huawei Technologies Company, ZTE Corporation, Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, Dahua Technology Company, and any subsidiary or affiliate of these entities. (as per 2 CFR 200.216)
- 7) Every material requirement as stated in in this Notice to Bidders and as outlined elsewhere within this contract.

- 8) A statement of whether the product complies with the requirements set forth in the specifications, special provisions, plans and NTB. If product is not compliant, an explanation of non-compliance shall be provided.

All subsections of a particular section may be omitted if the section heading is included, is indicated to be not applicable, and that it is evident that all subsections being omitted are also not applicable.

It shall be the responsibility of the Contractor to guarantee the accuracy of the checklist.

Other Submittals. The following submittals shall be required:

- 1) Shop Drawings
- 2) Cabinet wiring diagrams with system labeling schedule.
- 3) Site wiring/connection drawings.
- 4) Rack diagrams showing rack mounted equipment.
- 5) All documentation as described in the Project Testing Plan Requirements section below.
- 6) Project Record Drawings:
  - a. The purpose of Project Record Drawings is to provide factual information regarding all aspects of the Work, to enable future service, modifications, and additions to the Work.
  - b. Project Record Drawings are an important element of this Work. Contractor shall accurately maintain Project Record Drawings throughout the course of this project.
  - c. Project Record Drawings shall include documentation of all Work, including the conduit locations, pull box locations, equipment locations, foundation details, setup parameters and wiring and block diagrams.
  - d. Project Record Drawings shall accurately show the physical placement of the following:
    - i. Cabinets, sensors, pull boxes, and other materials installed at each site.
    - ii. Conduit runs and splicing information.
  - e. Project Record Drawings shall show the physical placement of each system component installed during the project at each site. Where the plan details do not depict actual field conditions, the Contractor shall amend the construction plan as required.
- 7) Upon completion of Work, and prior to Final Acceptance, the Contractor shall prepare and submit the final record set of Project Record Drawings. This set shall reflect the installed Work.
- 8) Closeout Submittals - A set of Project Record Drawings shall be provided to the Project Engineer and ITS Engineer for any items that changed or were not previously submitted, including:
  - a. Project Record Drawings
  - b. Product Data
  - c. Installation Manuals
  - d. Operating Manuals
  - e. Maintenance/Service Manuals

As-Built Plans. The Contractor shall provide GPS locations of all pull boxes, splices,

termination equipment cabinets, ITS field locations and all pole locations. The Contractor shall record and submit 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 provide a site location inventory of ITS devices to include manufacturer model, serial numbers, MAC addresses, and IP addresses (as applicable) for all installed devices. All documentation will be due to the Department a minimum of thirty (30) calendar days after the installation.

**Additional Quality Assurance Measures**

The project shall be constructed in such a manner as to comply with environmental regulations and erosion control as specified in the plans and elsewhere in MDOT standard specifications.

At the completion of the Work, the site shall be cleaned, restored, grassed and otherwise stabilized to a condition consistent with conditions before work began. This work shall be paid for under other items of work.

All disturbed signs, guardrail, markers, fencing, and other roadway appurtenances shall be restored. Disturbed roadway appurtenances that require complete removal and replacement will be identified within the contract and will have separate pay items and quantities set forth for such work.

The Contractor shall clean-up debris caused by Contractor's activities on a daily basis as the work progresses. This work shall be paid for under other items of work.

All work-related accidents shall be reported immediately to the Project Engineer or his/her representative.

Maintenance and Technical Support. The supplier must provide and have a parts support system capable of providing parts for the length of the warranty period.

**Project Testing Plan Requirements**

The Contractor shall conduct a Project Testing Plan as required below in addition to all other project testing and acceptance procedures required elsewhere in the specifications and Plans. Some specifications contain details regarding the testing for individual device types or attributes, but this section outlines the overall testing plans for the entire project as a whole. The Project Testing Plan shall include a series of tests on all project materials occurring at various stages in the project. All costs associated with the Project Testing Plan shall be absorbed in contract pay items; no separate payment will be made for any testing.

General Requirements. The Contractor is responsible for planning, coordinating, conducting and documenting all aspects of the Project Testing Plan as detailed below and providing all required equipment for the tests. The Engineer reserves the right to attend and observe all tests.

Each test shall be an individual and separate event for each type of test and for each type of equipment as defined elsewhere within this NTB. The Contractor shall follow the testing sequence as described in this NTB and shall perform the required tests on all applicable

devices and infrastructure.

Test procedures shall be submitted and approved for each test as part of the project submittals programs. Test procedures shall include every action necessary to fully demonstrate that the material under test is clearly and definitively in full compliance with all project requirements. Test procedure actions shall cross-reference to the specifications or Plans requirement that is the subject of the test action. Test procedure actions shall cross-reference the applicable sections of the final approved Project Submittal Compliance Form and the submittal materials for the subject of the test action. Test procedures shall contain test setup and block/wiring diagrams showing all materials being tested and all test and measurement equipment, with calibration documentation, and shall contain documentation regarding the equipment configurations and programming. Test procedures shall include checkoff blanks for each project requirement included in that test and shall include forms for the documentation of all measured test results.

No testing shall be scheduled until approval of all project submittals for all materials covered under a given test and approval of the test procedures for the given test has been granted.

Unless otherwise required herein, the Contractor shall request in writing the 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 material to be tested. The Engineer reserves the right to reschedule tests if needed.

For any series of tests on different installations of a given material (e.g., different sections of cable), the Contractor shall request in writing the Engineer's approval for the first test occurrence of the series a minimum of 14 days prior to the requested test date, regardless of the notification requirements for subsequent test occurrences.

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

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

The Contractor shall provide test results documentation in electronic format and printed format (3 copies). Electronic formats shall be provided in both PDF and Microsoft Excel or other approved application. Printed copies shall be bound and organized by test, equipment type, and individual unit.

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

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

All test results deemed by the Engineer to be unsatisfactorily completed shall be repeated by the Contractor, following all test requirements as defined elsewhere in this NTB and contract specifications. This shall include a request in writing for the Engineer's approval for the repeated test a minimum of 14 days prior to the requested test date, unless this requirement is waived by the Engineer. 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. Any revisions to the test procedures for a repeated test occurrence shall meet all requirements for the original test procedures, including review and approval by the Engineer.

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

It is possible for the Contractor to schedule multiple test dates and revise the actual test being performed on a particular day if; 1) the Engineer approves of the change, 2) all test scheduling requirements above have still been met for the actual test to be performed on the date, and 3) there is not an unreasonable change of location, time, duration, or requirement of the Engineer.

Factory Acceptance Test (FAT). FATs shall be conducted at the Manufacturer or Contractor's facility or at a facility acceptable to all parties prior to shipping from the factory. The goal of the FAT is to verify that the equipment meets the requirements of the specifications. All equipment to be utilized for this project shall be subject to tests that demonstrate the suitability of the design and manufacturing procedures and compliance with the contract requirements, unless an exception for a specific equipment item is granted by the Engineer. The tests shall be performed on production units identified to be delivered under this Contract. As a minimum, a FAT is required for each of the following project materials:

- Dynamic Message Signs

The FAT testing procedures and results for specifically identified materials shall demonstrate that all testing requirements as outlined within the contract (standard specifications, plans, special provisions, and notice to bidders) 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 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 the Engineer's discretion, the Engineer may be in attendance at the FAT for any units tested. The FAT for the first three (3) units shall be conducted during the same time period and shall be completed before additional units are produced.

The Engineer shall be notified a minimum of 45 calendar days in advance of such tests. Salary and travel expenses of the Engineer and his/her representatives will be the responsibility of the Department. In case of equipment or other failures that make a retest necessary, travel expenses associated with retests for the Engineer and his/her representatives shall be the responsibility of

the Contractor. The travel expenses shall include all costs associated with having a two-person Engineer review team on site, 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 the payments 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 Engineer that the FATs were completed. The 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 Engineer and the Engineer's approval to ship.

Bench Test Components (BTC). The Contractor shall perform a complete BTC on the lesser of the full contract quantity of units of equipment and materials or the number of units required as specified in this subsection below. The quantity listed in the subsection below is a "minimum" quantity and the Engineer reserves the right to require testing of additional quantities if the initial testing is not deemed adequate. The Contractor shall provide the testing location and facility, which shall be in Mississippi and within a 25-mile radius of the project limits. The test location must be approved by the Engineer as part of the BTC test procedure submittal.

The BTC shall demonstrate that all equipment and materials are in full compliance with all project requirements and works "out of the box" by visual inspection, setup and operation "on the bench", functional testing of the component including manufacturer's recommended startup diagnostics, and testing prior to any field installation of that equipment or material. Test results documentation shall be provided for each equipment item and material in the full contract quantity; test results documentation shall include the manufacturer's serial number and the project location ID for each item.

As a minimum, a BTC is required for each of the following project materials for quantities as shown.

- Closed Circuit Television Equipment, 4 PTZ units & 6 fixed units
- Dynamic Message Sign, 2 complete units of each type
- Travel Time Signs, 2 complete units
- Network Switches Type A, 4 units
- Network Switches Type B & F, 2 units each
- Network Switches, Type C, D, & E, 1 unit each
- ITS Radar Vehicle Detection Sensors, 6 units
- Highway Advisory Radios, 2 units
- Radio Interconnect System, 4 units of each type
- Bluetooth Detection System, 6 units
- DSRC devices, 6 units
- Roadway Weather Information System, 2 complete units
- Traveler Information Video Kiosk, 2 complete units

- Smart Work Zone System
  - Portable CCTV station, 2 complete units
  - Non-Intrusive Vehicle Detection Devices / Portable Traffic Sensors, 4 complete units
  - Highway Advisory Radio, 2 complete units
  - Portable Changeable Message Signs, 2 complete units
  - Portable Traffic Signal, 2 complete units
- Off-the-shelf and Vendor Software, all necessary
- Equipment Cabinet (Type A), 2 cabinets
- Equipment Cabinet (Type B), 4 cabinets
- Equipment Cabinet (Type C), 2 cabinets

Pre-Installation Tests (PIT). The Contractor shall perform Pre-Installation Tests (PIT) on all device quantities that are not included in the BTC. The Contractor shall provide the testing location and facility, which shall be within a 25-mile radius of the project limits or as approved by the Engineer. The test location must be approved by the Engineer as part of the PIT test procedure submittal. The PIT shall be a shortened version of the BTC to ensure the equipment will power up, operate, and was not damaged during shipment. The Engineer reserves the right to attend any PIT as desired; however, the contractor shall submit documentation of the PITs whether the Engineer is present or not. In addition to these requirements, see the DMS, TTS, and Fiber Optic Cable Special Provisions for more details.

Stand Alone Site Tests (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 infrastructure (fiber, leased copper, wireless), cable, poles, camera lowering devices, device communication cables, cabinet apparatus, etc. The goal of the SAT is to verify that the equipment has been properly installed and commissioned according to the manufacturer requirements. A SAT shall be conducted at every field device site including communications hubs. A SAT shall be conducted for a fully installed and completed control center in the TMC as described in the TMC modification NTB. A SAT shall be conducted for all fiber optic infrastructure.

The SAT shall demonstrate that all equipment and materials are in full compliance with all project requirements, are fully functional as installed, and are in their final configuration. As part of this demonstration, SATs shall include but are not limited to the following:

- A visual inspection of the cabinet and all construction elements at the site to ensure they are compliant with the Specifications and have no physical damage or deformities.
- The inspection of the cabinet at each site shall include the functional test of all cabinet equipment, including circuit breaker, receptacles, fan and thermostat, lights, and door switches.
- Verify that manufacturer documentation for each device is present.
- A measurement of the DC power supply shall be made at the cabinet when it is operating under full load.
- Verify that all equipment has proper power, surge protector, and grounding connections.
- Inspect the integrity of all cable connections and terminations and verify that the cables are



connected and terminated as specified in the Plans.

The SATs for each site type shall include but are not limited to the following:

- *CCTV Stand Alone Site Test:* Shall be conducted at the CCTV Cabinet and shall demonstrate the complete operation of the CCTV, Network Switch, and the link(s) to any devices that are connected to the Power Supply in the CCTV Cabinet. The SAT shall include a 5-minute recording of each PTZ and Fixed camera showing the field of view and video quality. Two copies of the recording shall be provided to the Engineer on USB flash drives. The recording will start at the preset default position(s) and will demonstrate the full zoom capabilities of the cameras, as well as the full range of the pan and tilt functions of PTZ cameras. This recording shall be in a format playable with Windows Media Player or pre-approved by the Engineer.
- *ITS Communications HUT Stand Alone Site Test:* Shall be conducted at the HUT and shall demonstrate the complete operation of all equipment inside the HUT including Network Switches. This also includes visual inspection of the Site elements associated with the HUT.
- *ITS Termination Cabinet Stand Alone Site Test:* Shall be conducted at the termination cabinet and shall demonstrate the complete operation of all equipment inside the cabinet including Network Switches. This also includes visual inspection of the Site elements associated with the termination cabinet.
- *Radio Interconnect System Stand Alone Site Test:* Shall be conducted from the cabinets at both ends of the communications link (even if one end consists of existing equipment) and shall demonstrate that the radios, the antennas, the entire link, the Network Switch, and the transmission of video and/or data are fully operational. See Radio Interconnect Special Provision for more details.
- *Highway Advisory Radio Site Test:* Shall be conducted at the HAR cabinet, antenna, and advisory signs and shall demonstrate complete operation of recordings, transmissions, and remote flashing beacon unit(s). See HAR Special Provision for more details.
- *Fiber Optic Cable Stand Alone Site Test:* Shall be conducted at each Cabinet and at each HUB and shall include both power meter tests and OTDR tests. See Fiber Optic Special Provision for more details.
- *Conduit Detection Wire Stand Alone Site Test:* Shall be conducted at each pull box and shall demonstrate that a continuous run of conduit detection wire was installed between pull boxes, vaults, cabinets, and structures as required.
- *ITS Radar Vehicle Detection Stand Alone Site Test:* Shall be conducted at the IRVD Cabinet and shall demonstrate the complete operation, proper configuration, and verification of detection for each lane of traffic or zone of the IRVD unit(s).
- *BDS Stand Alone Site Test:* Shall be conducted at the Device Cabinet and shall demonstrate the complete operation and proper configuration of the unit(s), verify network connection to the BDS through ping and telnet sessions from a remote PC, and confirm that the system is fully functional by detecting Bluetooth devices at a sample rate approved by the Engineer.
- *RWIS Stand Alone Site Test:* Shall be conducted at the RWIS Cabinet and shall demonstrate the complete operation and proper configuration of the RWIS and shall verify that the remote flashing beacon unit(s) on the warning signs are activated properly as



specified and will de-activate automatically without renewal at preset intervals.

- *SWZ Stand Alone Site Test:* Shall be conducted at each device at its initial location and shall demonstrate the complete operation and proper configuration of the device as described in the Smart Work Zone Special Provision and NTB. At any subsequent locations, at a minimum, a document verifying that the device is configured for the new location shall be submitted to the Engineer.
- *Kiosk Stand Alone Site Test:* Shall be conducted at the device, verify all required video layouts and displays, demonstrate all required software features, and demonstrate the complete operation of the device and Network Switch. Refer to the Traveler Information Video Kiosk specification for more details.

*DMS & TTS Stand Alone Site Test:* Shall be conducted at the Device Cabinet, verify that all pixels are operational, verify that the sign can be controlled locally through both the serial and Ethernet ports, and demonstrate the complete operation of the device and Network Switch. The signs shall be delivered with and tested using default fonts and sizes that are provided by the MDOT ATMS drivers.

The Contractor shall request in writing the Engineer's approval for each test occurrence a minimum of 14 days prior to the requested test date. The Contractor shall arrange, at no additional expense to the State, the attendance of a qualified technical representative of the equipment manufacturer to attend each test until a minimum of two (2) sites of that type are approved.

Sub-System Test (SST). The Contractor shall perform an SST on each DMS and TTS to verify and document that all remote TTS and DMS functions and alarms are operational from the TMC.

An SST is required for at least ten percent (10%) of each of the following devices being placed for the project, taken by a random sampling: BDS, Network Switch, IRVD, HAR, Radio, CCTV, Video Vehicle Detection, and RWIS including beacons. The SST will require the Contractor to demonstrate and document that all functions and alarms are operational from the TMC.

An SST is required for each Traveler Information Kiosk in the project and will require the Contractor to demonstrate and document the features demonstrated in the Kiosk SAT using remote access from the TMC.

An SST is required for each Smart Work Zone device in the project and will require the Contractor to demonstrate and document the connection between the device and the central data/video collection site. Once a Smart Work Zone device has been verified to be properly configured, working, and communicating at its current location, the device can be utilized without further testing. The Conditional System Acceptance Test, Burn-in period, Final Inspection, or Final System Acceptance is not required for a device being solely utilized as part of the temporary Smart Work Zone System. Devices moved to a new location do require verification that they are still working as intended in the new location.

The Contractor shall coordinate the SST to be performed with the Project Engineer or designee present. The Contractor shall provide an SST plan to the Project Engineer for review and approval a minimum of two weeks in advance of tests being performed.

Conditional System Acceptance Test. 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 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 documenting that the Contractor has performed a dry-run of the conditional system acceptance test. The Engineer reserves the right to attend a dry-run test session.

The Contractor shall coordinate the CSAT with the Engineer. The Contractor shall provide a CSAT plan to the Engineer and be approved a minimum of fourteen (14) calendar days in advance of tests being performed. The CSAT plan shall be inclusive of steps and procedures to be performed and scheduled times to perform test procedures.

The Contractor shall test all project systems simultaneously from the State TMC in a manner equivalent to the normal day-to-day operation 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 State TMC. If pre-processing systems (e.g., edge computing) or post-processing systems (e.g., video image processing and analytics, detection in one device triggering an alarm or event in another device, etc.) are present, these shall be tested, verified, and documented as working as intended during the CSAT. Edge computing is where data-handling activities, such as analysis and event-triggering, takes place near the physical location that the data is collected.

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 any given Conditional System Acceptance Test.

Upon completion and full approval of the Conditional System Acceptance Test for all equipment in all phases, Conditional System Acceptance will be given and the Burn-in Period will begin.

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 **thirty (30) day** burn-in period. The Contractor shall be responsible for the full maintenance of the newly installed equipment during the burn-in period. This maintenance includes all troubleshooting and repairs as well as providing preventive maintenance that meets the equipment manufacturer's recommendations. However, no separate payment will be made during the burn-in period. Successful completion of the burn-in period will occur at the end of **thirty (30) complete days** of operation without a system failure attributable to hardware, software or communications components. Each system failure during the burn-in period will require an additional **thirty (30) days** of successful operation prior to being eligible for Final Acceptance (i.e., if the initial burn-in period is **thirty (30) days** and there are two (2) system failures during this time, the burn-in period would be increased to **ninety (90) days**).

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 three (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 two (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 of receiving the repair documentation.
  - 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 ensure 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 respond 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.

Contract time will not cease during the burn-in period(s). Contract time for the burn-in period was considered when determining the original contract time.

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

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

Prior to conducting the Final Inspection, the burn-in period shall demonstrate that all requirements defined in the specifications have been 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 system.

The Contractor shall request in writing the Engineer's approval to start the 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 Final Inspection cannot be prior to the successful completion of the overall burn-in period.

An unsuccessful or incomplete Final Inspection shall require a new Final Inspection after the Contractor has made the necessary corrections. Up to 14 days shall be allowed for the Engineer to conduct a Final Inspection. The presence of the MDOT ITS Engineer or his/her designee is required during the 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 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.

Final System Acceptance. Upon successful completion of the Final Inspection and all other items of work on the project, the Engineer will grant Final System Acceptance in accordance with Subsection 105.20 of the Standard Specifications.

Beneficial Use of Dynamic Message Signs During Construction. Each DMS shall be roadside controllable (by sign vendor software) within 30 days of attachment to structures (visible to motorists). The Contractor's construction schedule shall clearly identify when installation of the signs over the roadway shall occur, and when roadside control shall be established for each sign. The Contractor shall not install a DMS over the roadway until all ancillary and infrastructure elements, including cabinets, controllers, conduits, cabling, etc. necessary to operate the sign are in place and functional. Once roadside controllable, the Contractor shall display emergency, special event, construction, safety or traveler information messages approved by MDOT, only when requested by MDOT, at no additional cost to MDOT. Normal diagnostic messaging for the purpose of installation and testing shall be determined by the Contractor but shall not be allowed to the extent that excessive power consumption or distraction to motorists occurs as determined by the Engineer. Any beneficial use of the signs to MDOT and the public prior to Final Acceptance does not constitute MDOT acceptance or waive any Contractor testing requirements. The cost that may be incurred by the Contractor to display messages as described above during this construction contract shall be considered incidental and included in the cost of other items.

**Warranties**

The following components of the Project shall be warranted against manufacturing defects and workmanship for a period of at least one (1) year:

- Radio interconnect system components as listed under SP 907-662-2
- Layer 2, Type A; Layer 3, Type C, Type C4, Type E1, and Type E2 Network Switches; and Network Terminal Server & Network Cellular Modem as listed under SP 907-663-5
- Communication Node Hut & Hut Modifications under SP 907-664-4
- Video Communication Equipment components under SP 907-665-1
- Bluetooth Detection System components under SP 907-666-3
- Roadway Weather Information System & Warning Signs with Flashing Beacon under SP 907-670-3
- Kiosk Monitoring Camera under SP 907-671-1
- Travel Time Sign under SP 907-674-1
- ITS Radar Vehicle Detector under SP 907-641-2
- On Street Video Equipment under SP 907-650-4;
- Highway Advisory System components under SP 907-655-2;
- Dynamic Message Signs under SP 907-656-1.

The following components of the Project shall be warranted against manufacturing defects and workmanship for a period as listed below for each respective item from the date of Final Maintenance Release.

- *Fiber Optic Cable*: Ten (10) year warranty on materials and workmanship
- *Traveler Information Video Kiosk*: Two (2) year extended warranty on materials/hardware
- *TMC Modification*: Two (2) year warranty on hardware and one (1) year warranty on software
- *Type C1, C2, & C3 Network Switches*: Five (5) year warranty on hardware
- *Type D, E, & F Network Switches*: Five (5) year warranty on hardware

The Contractor shall supply the warranties in writing with the Final Maintenance Release date documented on them. These warranties shall cover complete replacement at no charge for the equipment. The Contractor will be responsible for all labor, shipping, insurance and other charges until Final System Acceptance. Equipment covered by the manufacturers' warranties shall have the registration of that component placed in the Department's name prior to Final Inspection. The Contractor is responsible for ensuring that the vendors 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 material of equal or greater kind and quality and meeting all of the applicable specifications herein, 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 Contractor via telephone within four (4) hours of the time a call is made by the Department. If it is deemed necessary by the Engineer, technical support shall be available from factory certified personnel of the supplier via telephone within eight (8) hours of the time of the initial call made by the Department. During the warranty period, updates, patches, performance improvements, and corrections to all software and firmware used during the project shall be made available to the Department by the supplier at no additional cost.

**Training**

After the Stand Alone Site Tests have been conducted but prior to Conditional System Acceptance, the Contractor shall provide separate training sessions for each subsystem training pay item included in the project. The training sessions may require multiple classes as noted below) and shall accommodate from six (6) to twelve (12) personnel per class. Additional sessions for additional personnel may be required if the make and model of the subject component is not currently in the MDOT system.

The training must include formal classroom and "hands-on" operations training with a complete demonstration of the configuration, operation, and capabilities of each component in the system. The training should also consist of a hands-on demonstration of all software configuration and functionality where applicable. Each training day shall include a mixture of classroom style



training in equipment operations, hands-on operator training using the same models of equipment furnished for the project, and question and answer sessions.

During the burn-in period, the Contractor shall also provide two (2) identical non-consecutive training sessions on the maintenance of the overall system. The training shall be provided for at least ten (10) personnel with individual copies of all training materials provided to each participant. 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. Additional sessions for additional personnel may be required if the make and model of certain components are not currently in the MDOT system.

Prior to scheduling the training, the Contractor shall submit resume and references of the training instructor(s) to the Engineer for approval. The qualifications of the trainers must meet, at a minimum, the recommended qualifications of the equipment manufacturer with a minimum of four years of experience in training personnel. If qualified personnel are not on the Contractor's staff, a representative of the manufacturer shall provide the training.

The training shall be provided at an agreed upon location. If training requires travel on the part of training instructors, then the cost of travel shall be included.

The Contractor shall provide individual copies of documentation, training, and maintenance materials for each participant. These materials shall include detailed specifications and information pertaining to each device in the system. The documentation shall include details of the technical and operational aspects of the completed system. This shall include operational and maintenance manuals, system diagrams, cabling diagrams and mounting/positioning details. The Contractor shall supply emergency contact information and necessary procedures for obtaining vital replacement parts within a designated, agreed upon time frame.

The Contractor shall submit a detailed Training Plan including course agendas, detailed description of functions to be demonstrated, and a general schedule to the Engineer for approval within 90 days of Contract Notice-to-Proceed. The exact date of the training shall be submitted to the Engineer for approval at least four (4) weeks ahead of the date.

### **Grounding**

The Contractor shall provide a grounding and lightning protection system to protect from electrical power surges caused by lightning or disruptions in the power supply system. Ground rods, ground conductor, lightning collectors and appurtenances shall be as detailed on the plans and as required by these specifications.

General. All non-current carrying metal parts of the site shall be grounded according to NEC specifications. In addition, all non-current carrying metal parts shall have a voltage potential of zero relative to reference ground. This reference ground shall be achieved via the equipment-grounding conductor.

Support cable, metallic cable sheaths, conduit, metal poles, pedestals, and communication building shall be made mechanically and electrically secure and grounded. Bonding and grounding jumpers

shall be properly sized according to the NEC and in no case shall they be smaller than a #6 AWG copper wire. Ground pole-mounted accessories to the pole. Equipment on wood poles shall be grounded.

Permanently ground the poles by bonding the No. 6 AWG solid copper wire to a separate ground rod.

Metal raceways, metal enclosures of electrical devices, lighting fixtures, panelboards, and other non-current carrying metallic parts of equipment shall be securely grounded.

Ground rods shall be installed according to plan details. A length of copper conductor shall be attached to the ground rod, utilizing the specified grounding methods, and connected to the grounding system. Do not ground to a permanent water system instead of the driven ground rod. Ensure that grounding devices conform to the requirements of the NEC and NEMA.

Cabinet Grounding. A single-point grounding system shall be constructed.

All grounds for the cabinet shall be installed on the side of the building that utilities, communication cables, and fiber enter. All earth grounds shall be connected to this point, including the grounding system for Surge Protection Devices (SPD). All connections to SPDs shall be made according to the manufacturer's recommendations.

A single ground bus bar shall be mounted on the side of the cabinet wall adjacent to the power panel for the connection of AC neutral wires and chassis ground wires.

The Contractor shall ensure that communication cables, AC power, emergency generator, and equipment frames are connected by the shortest practical route to the grounding system. The lead lengths from each device to the SPD shall be protected. Electrical continuity of all connections shall be verified. All non-conducting surface coatings shall be removed before each connection is made. Ground conductors shall be downward coursing, vertical, and as short and straight as possible. Sharp bends and multiple bends shall be avoided in grounding conductors.

**Surge Suppressor**

Surge protection device (SPD) shall be provided to protect electronics from lightning, transient voltage surges, and induced current. All SPDs shall be installed at the top and bottom of each pole to provide reliable lightning protection. SPDs shall be installed on all power, data, video and any other conductive circuit.

SPD for 120 Volt or 120/240 Volt Power. A SPD shall be installed at the utility disconnect to the cabinet. The SPD at the utility disconnect shall include L-N, L-G, and N-G protection. The SPD shall meet the requirements of UL 1449, Third Edition and be listed by a NRTL.

A SPD shall be provided where the supply circuit enters the cabinet. The SPD shall be located on the load side of the main disconnect and ahead of any and all electronic devices and connected in parallel with the AC supply. The SPD in the cabinet shall include L-N, L-G, and N-G protection. The SPD shall meet the requirements of UL 1449, Third Edition and be listed by a NRTL.



The SPD shall have a visual indication system that monitors the weakest link in each mode and shows normal operation or failure status and also provides one set of normally open (NO)/normally closed (NC) Form C contacts for remote alarm monitoring. The enclosure for a SPD shall have a NEMA 4 rating

SPDs for Low-Voltage Power, Control, Data and Signal Systems. A specialized SPD shall be installed on all conductive circuits including, but not limited to, data communication cables, coaxial video cables, and low-voltage power cables. These devices shall comply with recommendations from the device manufacturer.

SPD at Point of Use. A SPD shall be installed at the point the ITS devices receive 120 volt power and connected in series with the circuits. SPDs shall be selected and installed according to recommendation from the device manufacturer. The units shall be rated at 15 or 20 amps load and configured with receptacles. These units shall have internal fuse protection and provide common mode (L+N-G) protection.

SPDs shall meet the requirements of UL 497B or UL 497C, as applicable, and are listed by a NRTL.

### **Solar Power Systems**

The Contractor shall provide a solar power system meeting the following requirements:

1. The supplier shall provide documentation specifying approximate daily power generation, power consumption, storage capacity, and charge rates representing an optimal power source to the satisfaction and approval of the Project Engineer.
2. Shall include a solar controller with automatic battery temperature compensation and automatic charging circuitry to prevent overcharging.
3. The battery back-up system chargers shall meet all specified requirements while operating between -40 °C to +74 °C (-40 °F to +165 °F), and 95% relative humidity.
4. Shall include metering for voltage and charging current.
5. Solar panels shall be Jet Propulsion Laboratory Block-5 tested and approved.
6. Solar panels shall be compliant with IEC 61215 and IEEE 1262.
7. Solar panels shall be break-resistant and sealed.
8. Battery shall be maintenance-free, sealed, gel-cell.
9. The Contractor shall test the battery for faulty irregularities and provide documentation to the Project Engineer stating the battery's voltage, and resistance. The battery voltage and resistance shall meet the manufacturer's specifications.

The Solar Power Systems for each site type shall include but are not limited to the following:

- *HAR Flashing Beacons:*
  1. A performance design study shall be conducted and submitted for approval for the proposed solar power system. The solar power system shall be designed on the performance design study.
  2. The solar system shall, at a minimum, operate the flashing beacons continuously at

- full power for at least three (3) days with no sunlight. This must be accomplished without an auxiliary generator or AC power connection.
3. Solar panels shall have a power rating of 80-watts.
  4. The Solar power system shall include a separate aluminum NEMA 3R enclosure to house the battery. This enclosure shall be designed to provide protection from rain, sleet, snow and corrosion.
    - a. The enclosure shall be constructed from 0.125" thick aluminum alloy type 5052- H32.
    - b. The enclosure shall be lockable.
    - c. The enclosure door shall include a EDPM rubber or equivalent closed-cell gasket
- *Type A BDS:*
    1. All solar panels shall be in accordance with UL1703, or equivalent.
    2. The solar cell shall have a minimum power capacity of 30 watts.
    3. The battery shall provide sufficient power for all BDS component operation for a minimum of 168 hours (7 days).
    4. Should solar power be specified with the Type A BDS, the NEMA 4 enclosure shall be sized appropriately for the solar power components.

Performance Design Study. A performance design study shall be conducted where required before the installation of a Solar Power System. The performance design study shall include, but is not limited to:

1. The daily Solar Insulation data averaged on a monthly basis.
2. The correct Tilt Angle for the solar array.
3. The daily Array Output, in Amp-Hours, averaged on a monthly basis.
4. The total Daily Load requirement, in Amp Hours, averaged on a monthly basis.
5. A monthly Loss of Load Probability (LOLP) of the designed power supply.
6. The number of Battery Reserve Days, averaged on a monthly basis.
7. The monthly Average Battery State of Charge.
8. The statistical Interval to Loss of Load, in years.

## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

**SECTION 904 - NOTICE TO BIDDERS NO. 4638**

**CODE: (SP)**

**DATE: 10/05/2022**

**SUBJECT: Storm Water Discharge Associated with Construction Activity  
(≥ 5 Acres)**

**PROJECT: BRNH-0008-01(154) / 102111301 – Harrison County**

A Construction Storm Water General NPDES Permit to discharge storm water associated with construction activity is required.

The Department has acquired Certificate of Permit Coverage MSR-109066 under the Mississippi Department of Environmental Quality's (MDEQ) Storm Water Large Construction General Permit. Projects issued a certificate of permit coverage are granted permission to discharge treated storm water associated with construction activity into State waters. Copies of said permit, completed Large Construction Notice of Intent (LCNOI), and Storm Water Pollution Prevention Plan (SWPPP) are on file with the Department.

Prior to the execution of the contract, the successful bidder shall execute and deliver to the Executive Director an original signed copy of the completed Prime Contractor Certification Forms.

Failure of the bidder to execute and file the completed Prime Contractor Certification Forms shall be just cause for the cancellation of the award.

The executed Prime Contractor Certification Forms shall be prima facie evidence that the bidder has examined the permit, is satisfied as to the terms and conditions contained therein, and that the bidder has the primary responsibility for meeting all permit terms including, but not limited to, the inspection and reporting requirements. For this project, the Contractor shall furnish, set up and read, as needed, an on-site rain gauge.

The Contractor shall make inspections in accordance with condition No. S-5, page 26, and shall furnish the Project Engineer with the results of each weekly inspection as soon as possible following the date of inspection. A copy of the inspection form is provided with the packet. The weekly inspections must be documented monthly on the Inspection and Certification Form. The Contractor's representative and the Project Engineer shall jointly review and discuss the results of the inspections so that corrective action can be taken. The Project Engineer shall retain copies of the inspection reports.

The Engineer will have the authority to suspend all work and/or withhold payments for failure of the Contractor to carry out provisions of MDEQ's Storm Water Construction General Permit, the erosion control plan, updates to the erosion control plan, and /or proper maintenance of the BMPs.

By a full maintenance release or confirmation by the Permit Closeout Committee that the permit is ready for termination, the Construction Division shall submit a completed Request for Termination (RFT) of Coverage to the Office of Pollution Control.

Securing a permit (s) for storm water discharge associated with the Contractor's activity on any other regulated area the Contractor occupies, shall be the responsibility of the Contractor.

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 - NOTICE TO BIDDERS NO. 4699**

**CODE: (SP)**

**DATE:** 11/22/2022

**SUBJECT: Right-of-Way Plat**

Bidders are advised that pay item 617-A: Right-of-Way Marker or 617-B: Permanent Easement Markers not only addresses the requirements for furnishing and placing right-of-way markers or permanent easement markers but also includes the preparation and submittal of a Final Right-of-Way Plat by a Licensed Professional Surveyor. Since the submittal of the plat is considered a part of the pay item and the pay item is not complete until the plat is received, contract time will not be suspended while waiting on the Contractor to submit the plat.

## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

**SECTION 904 - NOTICE TO BIDDERS NO. 4702**

**CODE: (SP)**

**DATE: 11/22/2022**

**SUBJECT: App for Traffic Control Reports**

Bidders are advised that the Department has created a smart phone App for completing and submitting traffic control reports (Form CSD-762) required on this project. The Contractor who monitors traffic control activities and completes traffic control reports will be required to download and use this App when completing and submitting traffic control reports. The reports will then be readily available to all persons who need access to the forms. The App is free and is available for downloading at the following location.

<https://extacctmgmt.mdot.state.ms.us/>

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 - NOTICE TO BIDDERS NO. 5086**

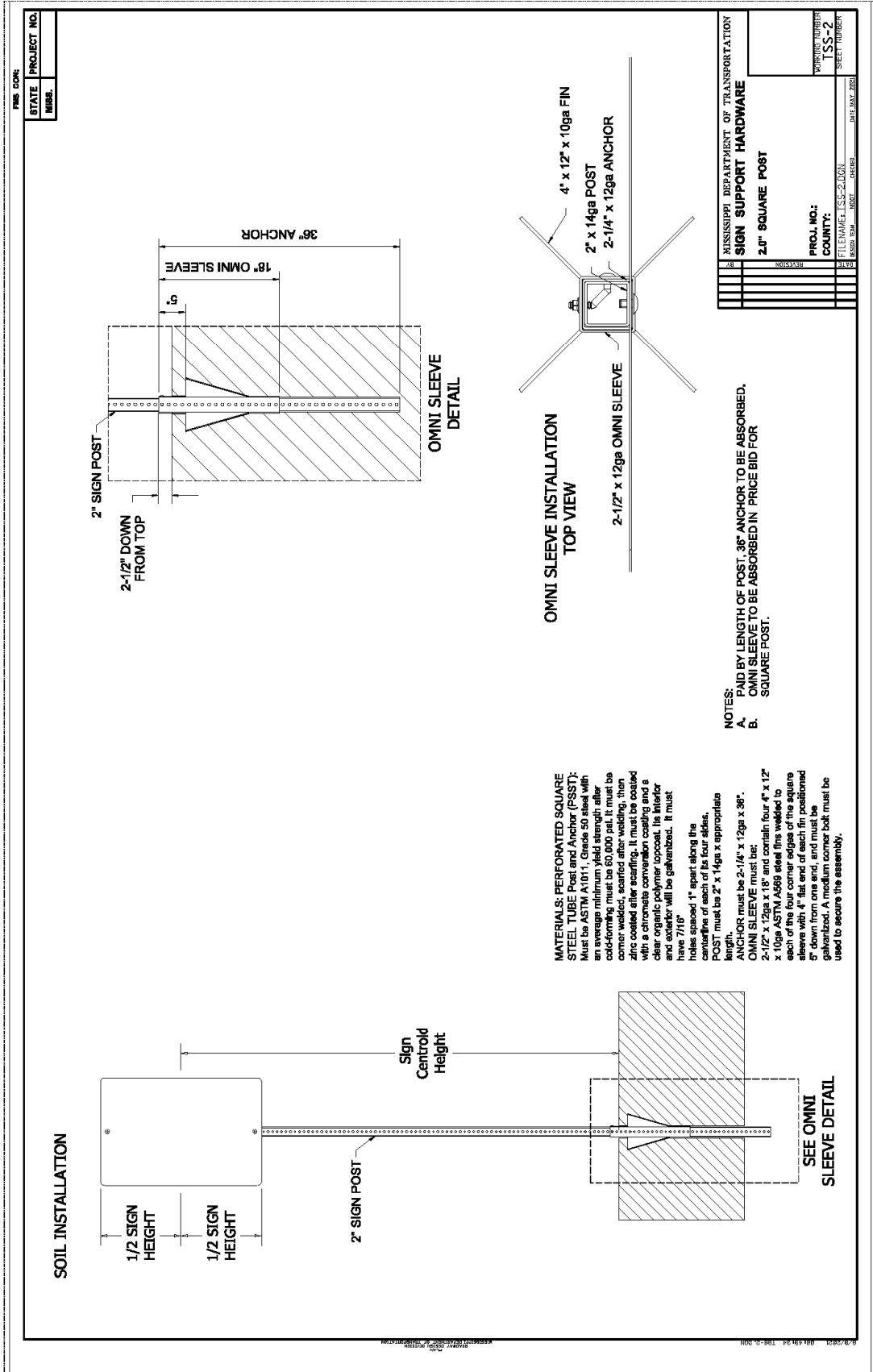
**CODE: (SP)**

**DATE: 05/02/2023**

**SUBJECT: Detail of Square Tube Sign Posts**

Bidders are advised that the following drawings shall be used in the manufacture and installation of square tube sign posts, unless otherwise directed by the Engineer.





MISSISSIPPI DEPARTMENT OF TRANSPORTATION	<b>SIGN SUPPORT HARDWARE</b>				
2-1/2" SQUARE POST					
PROJ. NO.:	COUNTY:	WORKS NUMBER:	TSS-2	SHEET NUMBER:	DATE: MAY 2020
FILE NAME: ISS-2.DWG	XREF: 104	NOT: 0000	0000	0000	0000





PMS CON. STATE PROJECT NO. MISS.	<b>HINGE ASSEMBLY</b>	
	<p><b>HINGE ASSEMBLY</b>                  (1) 2" DIA. STAINLESS STEEL HEX BOLTS                  (2) 2" DIA. STAINLESS STEEL HEX NUTS                  (3) 2" DIA. STAINLESS STEEL WASHERS                  (4) 2" DIA. STAINLESS STEEL FLANGE NUTS                  (5) 2" DIA. STAINLESS STEEL TUBES                  (6) 2" DIA. STAINLESS STEEL TUBES                  (7) 2" DIA. STAINLESS STEEL TUBES                  (8) 2" DIA. STAINLESS STEEL TUBES                  (9) 2" DIA. STAINLESS STEEL TUBES                  (10) 2" DIA. STAINLESS STEEL TUBES                  (11) 2" DIA. STAINLESS STEEL TUBES                  TORQUE TO 100 Ft-Lbs.</p>	
	<p><b>SIGN POSTS</b>                  STEEL CONFORMS TO ASTM A500, GRADE C. MUST BE WELDED, BEARDED OUTSIDE AFTER WELDING. GALVANIZED INTERIOR AND EXTERIOR AFTER SCRAPING. MUST BE COATED WITH A CHROMATE CONVERSION POLYMER TOPCOAT. POST WEIGHT IS 5.6 LBS/LF.</p>	
	<p><b>SIGN CLAMP KIT</b>                  MATERIALS: 2" WIDE x 3/16" THICK 304, 18-8, FINISHED STAINLESS STEEL BRACKET, 2" DIA. STAINLESS STEEL BOLTS AND NUTS, ONE CLAMP BRACE TO POST JUNCTION.</p>	
	<p><b>UNIBASE ANCHOR STUB</b>                  1-1/2" x 4" x 7/8" UNIBASE ANCHOR WELDED TO 1" THICK A572 SLIP PLATE, GALVANIZED PER ASTM A153.</p>	
	<p><b>4\" SQUARE POST RECEIVER</b>                  1\" ONE-DIRECTIONAL SLIP BASE RECEIVER FOR 4\" SQUARE POSTS. ADD 3\" DIA. STEEL TUBE WELDED TO 1\" THICK A572 SLIP PLATE, GALVANIZED PER ASTM A153.</p>	
	<p><b>SLIP PLATE DIMENSION</b>                  13\" DIA. STEEL TUBE WELDED TO 1\" THICK A572 SLIP PLATE, GALVANIZED PER ASTM A153.</p>	
	<p><b>4\" SQUARE POST RECEIVER</b>                  1\" ONE-DIRECTIONAL SLIP BASE RECEIVER FOR 4\" SQUARE POSTS. ADD 3\" DIA. STEEL TUBE WELDED TO 1\" THICK A572 SLIP PLATE, GALVANIZED PER ASTM A153.</p>	
	<p><b>NOTES:</b>                  A. CONCRETE FOOTING MUST BE A MINIMUM OF 18\" DIAMETER x 54\" DEEP.                  B. BRASS SHIMS MAY BE USED BETWEEN SLIP PLATES TO LEVEL THE UPPER SLIP PLANE.                  C. MAXIMUM SIGN AREA PER SIGN BRACKET TO POST JUNCTION IS 10FT<sup>2</sup>.</p>	
	<p><b>POST ATTACHMENT HARDWARE KIT WILL CONSIST OF:</b>                  (1) 5/8\" x 1-1/2\" HEX BOLTS - A325                  (2) 5/8\" x 1-1/2\" ARMO WASHERS                  (3) 5/8\" x 1-1/2\" ARMO WASHERS - F488                  (4) 5/8\" HEX NUTS - A563DCH                  ALL HOT DIP GALVANIZED PER ASTM A153/F2323.</p>	
	<p><b>NOTE: 1 POST ATTACHMENT HARDWARE KIT IS USED FOR EACH POST. 2 POST ATTACHMENT HARDWARE KITS ARE USED FOR HINGE ATTACHMENT TO MAIN POST AND TO SIGN POST. TORQUE TO 100 Ft-Lbs.</b></p>	
	<p><b>4\" SQUARE POST (DUAL POST)</b>                  MISSISSIPPI DEPARTMENT OF TRANSPORTATION                  WORKING NUMBER: TSS-4                  COUNTY:                  PROJECT NO.:                  FILE NAME: TSS-4.DGN                  DATE: MAY, 2003</p>	

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 - NOTICE TO BIDDERS NO. 5318**

**CODE: (SP)**

**DATE: 09/01/2023**

**SUBJECT: Contract Time**

**PROJECT: BRNH-0008-01(154) / 102111301 – Harrison County**

The completion of work to be performed by the Contractor for this project will not be a specified date but shall be when all allowable working days are assessed, or any extension thereto as provided in Subsection 108.06. It is anticipated that the Notice of Award will be issued no later than **December 12, 2023** and the date for Notice to Proceed / Beginning of Contract Time will be **March 14, 2024**.

Should the Contractor request a Notice to Proceed earlier than **March 14, 2024** and it is agreeable with the Department for an early Notice to Proceed, the requested date will become the new Notice to Proceed / Beginning of Contract Time date.

All requests for an early Notice to Proceed shall be sent to the Project Engineer who will forward it to the Contract Administration Division.

Prior to beginning work, the Contractor shall submit a Progress Schedule to the Project Engineer for review and approval.

## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 5319

DATE: 08/31/2023

SUBJECT: Specialty Items

PROJECT: BRNH-0008-01(154)/102111301 - HARRISON

Pursuant to the provisions of Section 108, the following work items are hereby designated as "Specialty Items" for this contract. Bidders are reminded that these items must be subcontracted in order to be considered as specialty items.

### CATEGORY: CURBING, SIDEWALKS, GUTTERS

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Line No	Pay Item	Description
0950	609-B002	Concrete Curb, Header
0960	609-D003	Combination Concrete Curb and Gutter Type 2
0970	609-D004	Combination Concrete Curb and Gutter Type 2 Modified
0980	609-D012	Combination Concrete Curb and Gutter Type 3A Modified

### CATEGORY: DISPOSAL OF BUILDINGS, RIGHT OF WAY CLEARING & GRUBBING

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Line No	Pay Item	Description
0170	202-B240	Removal of Traffic Stripe

### CATEGORY: EROSION CONTROL

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Line No	Pay Item	Description
0250	213-C001	Superphosphate
0260	216-A001	Solid Sodding
0270	217-A001	Ditch Liner
0280	219-A001	Watering
0290	220-A001	Insect Pest Control
0300	223-A001	Mowing
0310	225-A001	Grassing
0320	225-B001	Agricultural Limestone
0330	225-C001	Mulch, Vegetative Mulch
0340	226-A001	Temporary Grassing
0350	235-A001	Temporary Erosion Checks
0360	236-A008	Silt Basin, Type D
0370	236-B004	Maintenance and Removal of Existing Silt Basins, Type D
0380	237-A002	Wattles, 20"
0390	246-B001	Rockbags
1650	907-234-A001	Temporary Silt Fence
1660	907-234-D001	Inlet Siltation Guard
1670	907-240-A001	Interlocking Flexible Block Erosion Control System

CATEGORY: GUARDRAIL, GUIDERAIL

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Line No	Pay Item	Description
0890	606-B002	Guard Rail, Class A, Type 1, 'W' Beam
0900	606-B009	Guard Rail, Class A, Type 1, Metal Post
0910	606-C001	Guard Rail, Cable Anchor Type 1, Metal Post
0920	606-C003	Guard Rail, Cable Anchor, Type 1
0930	606-E001	Guard Rail, Terminal End Section
0940	606-E007	Guard Rail, Terminal End Section, Non-Flared

CATEGORY: INTELLIGENT TRANSPORTATION SYSTEMS

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Line No	Pay Item	Description
2180	907-659-A001	Traffic Management Center Modifications

CATEGORY: MISCELLANEOUS/ SPECIALTY WORK ITEMS

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Line No	Pay Item	Description
0480	423-A001	Rumble Strips, Ground In

CATEGORY: PAVEMENT STRIPING AND MARKING

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Line No	Pay Item	Description
1210	626-A001	6" Thermoplastic Double Drop Traffic Stripe, Skip White
1220	626-C002	6" Thermoplastic Double Drop Edge Stripe, Continuous White
1230	626-D002	6" Thermoplastic Double Drop Traffic Stripe, Skip Yellow
1240	626-E002	6" Thermoplastic Double Drop Traffic Stripe, Continuous Yellow
1250	626-F001	6" Thermoplastic Double Drop Edge Stripe, Continuous Yellow
1260	626-G004	Thermoplastic Double Drop Detail Stripe, White
1270	626-G005	Thermoplastic Double Drop Detail Stripe, Yellow
1280	626-H001	Thermoplastic Double Drop Legend, White
1290	626-H002	Thermoplastic Double Drop Legend, White
1300	627-J001	Two-Way Clear Reflective High Performance Raised Markers
1310	627-K001	Red-Clear Reflective High Performance Raised Markers
1320	627-L001	Two-Way Yellow Reflective High Performance Raised Markers

CATEGORY: SURVEY AND STAKING

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Line No	Pay Item	Description
1600	699-A001	Roadway Construction Stakes

CATEGORY: TRAFFIC CONTROL - PERMANENT

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Line No	Pay Item	Description
1330	630-A001	Standard Roadside Signs, Sheet Aluminum, 0.080" Thickness
1340	630-A003	Standard Roadside Signs, Sheet Aluminum, 0.125" Thickness
1350	630-B002	Interstate Directional Signs, Bolted Extruded Aluminum Panels, Ground Mounted

CATEGORY: TRAFFIC CONTROL - PERMANENT

Line No	Pay Item	Description
1360	630-B003	Interstate Directional Signs, Bolted Extruded Aluminum Panels, Overhead Mounted
1370	630-C001	Square Tube Posts, 4.0 lb/ft
1380	630-C003	Steel U-Section Posts, 3.0 lb/ft
1390	630-D006	Structural Steel Beams, W6 x 12
1400	630-D007	Structural Steel Beams, W6 x 15
1410	630-D008	Structural Steel Beams, W6 x 9
1420	630-E001	Structural Steel Angles & Bars, 3 1/2" x 3 1/2" x 1/4" Angles
1430	630-E004	Structural Steel Angles & Bars, 7/16" x 2 1/2" Flat Bar
1440	630-F003	Delineators, Flexible Post Mounted, Crossover, Type II
1450	630-F006	Delineators, Guard Rail, White
1460	630-F011	Delineators, Post Mounted, Double Yellow
1470	630-I003	Metal Overhead Sign Supports, Assembly No. 1, Contractor Designed
1480	630-I015	Metal Overhead Sign Supports, Assembly No. 2, Contractor Designed
1490	630-K001	Welded & Seamless Steel Pipe Posts, 3 1/2"
1500	630-K003	Welded & Seamless Steel Pipe Posts, 4"
1510	635-A059	Traffic Signal Head, Type 1
1520	635-A061	Traffic Signal Head, Type 2
1530	635-A065	Traffic Signal Head, Type 2 FYA
1540	635-A070	Traffic Signal Head, Type 3
1550	635-A073	Traffic Signal Head, Type 4
1560	638-A006	Flasher Assembly, Prepare To Stop
1570	647-A001	Removal of Existing Traffic Signal Equipment
1580	660-A003	Equipment Cabinet, Type B
1590	660-A004	Equipment Cabinet, Type C
1710	907-630-L001	Pedestal Sign Support, Assembly No 1, Contractor Designed
1720	907-630-L002	Pedestal Sign Support, Assembly No 2, Contractor Designed
1730	907-632-A010	Solid State Traffic Cabinet Assembly, Type IV Cabinet, Type 1 Controller
1740	907-632-C001	Modify Existing Traffic Signal Cabinet Assembly
1750	907-632-J001	Power Service Pedestal
1760	907-633-A001	Uninterruptable Power Supply
1770	907-634-A042	Traffic Signal Equipment Pole, Type II(L), 30' Shaft, 30' Arm
1780	907-634-A047	Traffic Signal Equipment Pole, Type II(L), 30' Shaft, 55' Arm
1790	907-634-A048	Traffic Signal Equipment Pole, Type II(L), 30' Shaft, 60' Arm
1800	907-634-A083	Traffic Signal Equipment Pole, Type II, 17' Shaft, 45' Arm
1810	907-634-A140	Traffic Signal Equipment Pole, Type II, 40' Shaft, 35' Arm
1820	907-634-A274	Traffic Signal Equipment Pole, Type III(L), 30' Shaft, 50' & 75' Arm
1830	907-634-A344	Traffic Signal Equipment Pole, Type III(L), 40' Shaft, 55' & 65' Arm
1840	907-634-C002	Pole Foundations, Class "DS" Concrete
1850	907-634-D003	Slip Casing, 36" Diameter
1860	907-634-E001	Camera Pole with Foundation, 50' Pole
1870	907-634-PP005	Traffic Signal Equipment Pole Air Ground
1880	907-636-B002	Electric Cable, Underground in Conduit, IMSA 20-1, AWG 1/0, 4 Conductor

CATEGORY: TRAFFIC CONTROL - PERMANENT

Line No	Pay Item	Description
1890	907-636-B012	Electric Cable, Underground in Conduit, IMSA 20-1, AWG 14, 3 Conductor
1900	907-636-B014	Electric Cable, Underground in Conduit, IMSA 20-1, AWG 14, 5 Conductor
1910	907-636-B016	Electric Cable, Underground in Conduit, IMSA 20-1, AWG 14, 8 Conductor
1920	907-636-B038	Electric Cable, Underground in Conduit, THHN, AWG #10, 3 Conductor
1930	907-636-B053	Electric Cable, Underground in Conduit, THHN, AWG #6, 3 Conductor
1940	907-636-D006	Electric Cable, Aerial Supported in Conduit, IMSA 20-1, AWG 14, 5 Conductor
1950	907-636-D008	Electric Cable, Aerial Supported in Conduit, IMSA 20-1, AWG 14, 8 Conductor
1960	907-636-D020	Electric Cable, Aerial Supported in Conduit, THHN, AWG #6, 3 Conductor
1970	907-637-A002	Pullbox Enclosure, Type 2
1980	907-637-A003	Pullbox Enclosure, Type 3
1990	907-637-A004	Pullbox Enclosure, Type 4
2000	907-637-A005	Pullbox Enclosure, Type 5
2010	907-637-C028	Traffic Signal Conduit, Underground, Type 4, 2"
2020	907-637-C030	Traffic Signal Conduit, Underground, Type 4, 3"
2030	907-637-D002	Traffic Signal Conduit, Underground Drilled or Jacked, Rolled Pipe, 2"
2040	907-637-D003	Traffic Signal Conduit, Underground Drilled or Jacked, Rolled Pipe, 3"
2050	907-637-I001	Traffic Signal Conduit Bank, Underground, Drilled or Jacked, Rolled Pipe, 2 @ 2"
2060	907-637-K001	Traffic Signal Conduit Bank, Aerial Supported, Type 1, 2 @ 2"
2070	907-639-J001	Type 3 Intersection Device
2080	907-643-A004	Video Vehicle Detection Sensor, Type 1A
2090	907-643-B001	Video Vehicle Detection Cable
2100	907-643-E001	Multi-Sensor Vehicle Detection Sensor
2110	907-643-F001	Multi-Sensor Vehicle Detection Cable
2120	907-650-A002	On Street Video Equipment, Fixed Type
2130	907-650-A003	On Street Video Equipment, PTZ Type
2140	907-650-A004	On Street Video Equipment, PTZ Type, Signal Monitoring
2150	907-653-A001	Traffic Sign
2160	907-653-B001	Street Name Sign
2170	907-656-A002	Dynamic Message Sign, Type 2
2190	907-661-A004	Fiber Optic Cable, 72 SM
2200	907-661-B002	Fiber Optic Drop Cable, 12 SM
2210	907-663-A001	Network Switch, Type A
2220	907-663-A005	Network Switch, Type E
2230	907-663-D001	Category 6 Cable, Installed in Conduit

CATEGORY: TRAFFIC CONTROL - TEMPORARY

Line No	Pay Item	Description
1060	619-A1001	Temporary Traffic Stripe, Continuous White
1070	619-A2001	Temporary Traffic Stripe, Continuous Yellow
1080	619-A3001	Temporary Traffic Stripe, Skip White
1090	619-A4001	Temporary Traffic Stripe, Skip Yellow
1100	619-A5001	Temporary Traffic Stripe, Detail

CATEGORY: TRAFFIC CONTROL - TEMPORARY

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Line No	Pay Item	Description
1110	619-A6001	Temporary Traffic Stripe, Legend
1120	619-A6002	Temporary Traffic Stripe, Legend
1130	619-D1001	Standard Roadside Construction Signs, Less than 10 Square Feet
1140	619-D2001	Standard Roadside Construction Signs, 10 Square Feet or More
1150	619-F1002	Portable Median Barrier
1160	619-F2002	Remove and Reset Portable Median Barrier
1170	619-G4005	Barricades, Type III, Single Faced
1180	619-G5001	Free Standing Plastic Drums
1190	619-G7001	Warning Lights, Type "B"
1700	907-619-E3001	Changeable Message Sign



## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SECTION 904 - NOTICE TO BIDDERS NO. 5320

CODE (SP)

**DATE:** 08/08/2019

**SUBJECT:** Placement of Fill Material in Federally Regulated Areas

**PROJECT:** BRNH-0008-01(154) / 102111301 – Harrison County

A Permit (404, General, Nationwide, etc.) for placing fill material in federally regulated sites is required on this project.

The Department has acquired the following permits for permanently filling at regulated sites that are identified during project development:

**General Permit No. 46 (Wetlands & Waters of the U.S.) -- All sites.  
(ID No. SAM-2008-01674-JBM)**

**Nationwide Permit No. 3 (Waters of the U.S.) -- All sites with area less than 0.10 acre.**

Copies of said permit(s) are available at the below referenced link for the appropriate letting date under the column titled "Permit Doc."

<http://mdot.ms.gov/Applications/BidSystem/Home.aspx>

The permit may have plan sheets attached as reference but these sheets are not to be used for construction. Official plans sheets are those included in the Project Plans.

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

**SECTION 904 - NOTICE TO BIDDERS NO. 5321**

**CODE: (SP)**

**DATE: 09/08/2023**

**SUBJECT: Removal of Obstructions**

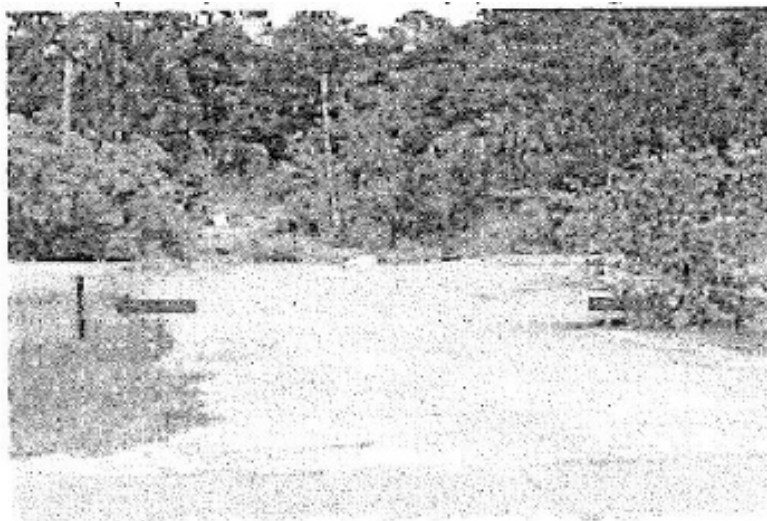
**PROJECT: BRNH-0008-01(154) / 102111301 – Harrison County**

Bidders are hereby advised of the following obstructions that will be removed from the right-of-way by the Contractor.

If buildings are listed below, there may be a potential for the buildings to contain materials contaminated with asbestos, a hazardous air pollutant. The bidder's attention is called to the Notices to Bidders entitled "Status of Right-of-Way" for pertinent information concerning asbestos, if any, contained in the buildings listed below to be removed by the Contractor.

The Contractor shall remove the following obstructions in accordance with Section 202, Removal of Structures and Obstructions, and, if necessary, Subsection 107.25, Hazardous and/or Toxic Waste Procedures, of the Mississippi Standard Specifications for Road and Bridge Construction. Payment for removal and disposal of the obstruction(s) listed herein, including demolition, handling, loading, transporting, and disposal of any asbestos containing materials, shall be made under the applicable subsection of the Basis of Payment portion of Section 202 - Removal of Structures and Obstructions:

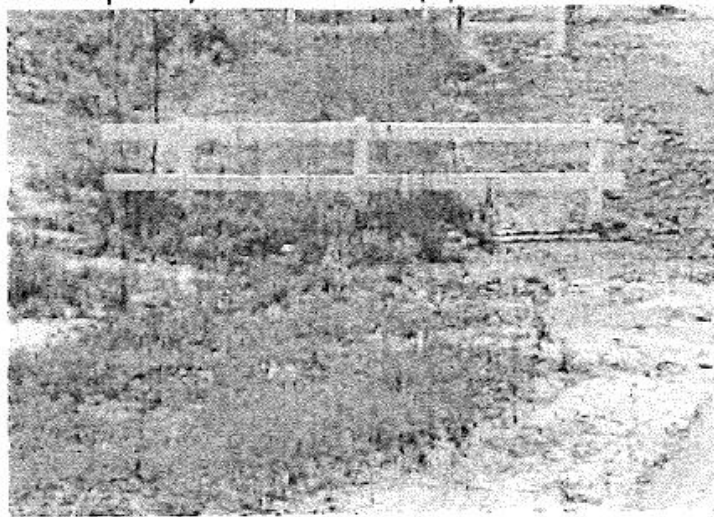
1. Two (2) metal gate posts located approximately 110 feet right of centerline of project at Station 250+15. The improvement has been inspected and no ACM'S were identified.



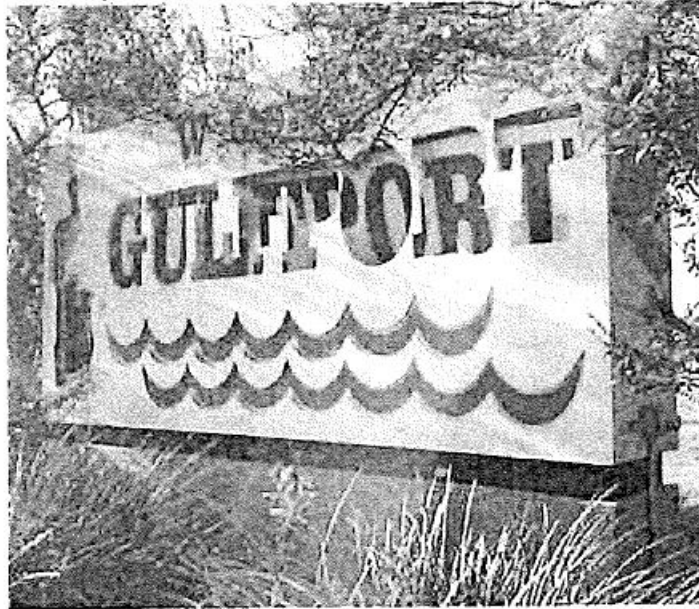
2. One (1) planter located approximately 80 feet left of centerline of project at Station 317+65. The improvement has been inspected and no ACM'S were identified.



3. One (12) portion of fence located approximately 70 feet left of centerline of project at Station 315+25. The improvement has been inspected and no ACM'S were identified.



4. One (1) Welcome to Gulfport sign located approximately 75 feet left of centerline of project at Station 252+0065. The improvement has been inspected and no ACM'S were identified.



**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 – NOTICE TO BIDDERS NO. 5322**

**CODE: (SP)**

**DATE: 09/01/2023**

**SUBJECT: Lane Closure Restrictions**

**PROJECT: BRNH-0008-01(154) / 102111301 - Harrison County**

Bidders are advised of note (38) on working number GN-2 sheet 9 of the plans:

- Lane closures shall be restricted to 7:00 P.M. to 5:00 A.M. Sunday thru Thursday.
- Changes or variances from the listed restrictions shall be submitted to the Project Engineer in writing for review and written approval.

A lane rental fee of **\$1,500.00** per full or partial 5 minutes shall be assessed for closures or obstructions that extend beyond the times mentioned above. No exposed signs shall be viewable to the traveling public prior to or after the above mentioned times. No part of a closures, drums or cones, shall be in the roadway prior to or after the above mentioned times.

Failure to begin work within this one (1) hour will result in the contractor being assessed a lane rental fee of **\$1,500.00** per full or partial 5 minutes until work begins.

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 - NOTICE TO BIDDERS NO. 5323**

**CODE: (SP)**

**DATE: 09/01/2023**

**SUBJECT: A + C Bidding**

**PROJECT: BRNH-0008-01(154) / 102111301 – Harrison County**

Bidders are hereby advised this project contains requirements for A + C bidding.

The bidder shall determine the total number of working days required to complete the work in the contract. The product of the total number of working days required for construction of the project in accordance with the plans and specifications (contract time), as determined by the Bidder, times the disincentive cost of **\$10,000.00 per working day** shall be added to the total bid determined from the bid items. The sum of these two amounts will be the amount used for comparison of bids. This information will be shown on the Expedite Bid Sheets.

The proposal guaranty for this project should not include the amount determined for contract time as specified above. The proposal guaranty should be for the amount of the bid items.

After the proposals are opened and read, they will be compared on the basis of the following formula:

$$X = A + C$$

Where:

X = The total amount used only for determining the lowest bid for award of Contract.

A = Total Bid - Direct and Dependent Items - This being the summation of the products of the quantities shown in the bid schedule multiplied by their respective unit prices.

C = Value of the Contract Time – This being the total working days required to complete construction of the project in accordance with the plans and specifications (contract time), as determined by the Bidder, multiplied by the disincentive cost of **\$10,000.00** per day. The value C is included for comparison of bids only and will NOT be included in any payment to the Contractor. **The total number of days entered for contract time CAN NOT EXCEED 355 Working Days.** If the Contractor enters a Contract Time of more than **355 working days**, the proposal will be considered **irregular, rejected, and returned to the bidder.**

**.MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SECTION 904 - NOTICE TO BIDDERS NO. 5325**

**CODE: (SP)**

**DATE: 09/26/2023**

**SUBJECT: Pay Item Corrections**

**PROJECT: BRNH-0008-01(154) / 102111301 – Harrison County**

Bidders are hereby advised that the following pay items have been revised from what is shown on plan Summary of Quantities. Bid Items are correct.

- 403-D001 12.5mm, HT, Asphalt Pavement, Polymer Modified---20,053 Tons  
**Changed to**  
**907-405-A002 Stone Matrix Asphalt, 12.5 Mixture---20,053 Tons**
- 403-D007 9.5mm, HT, Asphalt Pavement, Polymer Modified---14,922 Tons  
**Changed to**  
**907-405-A002 Stone Matrix Asphalt, 9.5 Mixture---14,922 Tons**
- **907-618-M2001 Work Zone Law Enforcement---1,500 Hours**  
**Added**
- **413-E001 Sawing and Sealing Transverse Joints in Asphalt Pavement---13,450 LF**  
**Changed to**  
**907-413-E001 Sawing and Sealing Transverse Joints in Asphalt Pavement---13,450 LF**
- **907-618-M2001 Work Zone Law Enforcement---1,500 Hours**  
**Added**

**Bidders are also advised that any references in the Contract Plans to Polymer Asphalt is understood to be Stone Matrix.**

"General Decision Number: MS20230133 01/06/2023

Superseded General Decision Number: MS20220133

State: Mississippi

Construction Type: Highway

County: Harrison County in Mississippi.

HIGHWAY CONSTRUCTION PROJECTS

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60).

<p>If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:</p>	<ul style="list-style-type: none"> <li>. Executive Order 14026 generally applies to the contract.</li> <li>. The contractor must pay all covered workers at least \$16.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2023.</li> </ul>
<p>If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:</p>	<ul style="list-style-type: none"> <li>. Executive Order 13658 generally applies to the contract.</li> <li>. The contractor must pay all covered workers at least \$12.15 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2023.</li> </ul>

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at <http://www.dol.gov/whd/govcontracts>.

Modification Number      Publication Date  
 0                              01/06/2023

SUMS2010-056 08/04/2014



	Rates	Fringes
CARPENTER (Form Work Only).....	\$ 14.43 **	0.00
CEMENT MASON/CONCRETE FINISHER...	\$ 15.25 **	0.00
ELECTRICIAN.....	\$ 25.57	6.79
HIGHWAY/PARKING LOT STRIPING: Truck Driver (Line Striping Truck).....	\$ 14.75 **	0.00
INSTALLER - SIGN.....	\$ 13.41 **	0.00
INSTALLER: Guardrail.....	\$ 11.78 **	0.00
IRONWORKER, REINFORCING.....	\$ 17.33	0.00
LABORER: Asphalt, Includes Raker, Shoveler, Spreader and Distributor.....	\$ 12.27 **	0.00
LABORER: Common or General.....	\$ 11.00 **	0.00
LABORER: Flagger.....	\$ 11.16 **	0.00
LABORER: Grade Checker.....	\$ 15.63 **	0.00
LABORER: Landscape.....	\$ 12.00 **	0.00
LABORER: Luteman.....	\$ 12.88 **	0.00
LABORER: Mason Tender - Cement/Concrete.....	\$ 13.14 **	0.00
LABORER: Pipelayer.....	\$ 15.00 **	0.00
LABORER: Laborer-Cones/ Barricades/Barrels - Setter/Mover/Sweeper.....	\$ 13.19 **	0.00
OPERATOR: Asphalt Spreader.....	\$ 14.83 **	0.00
OPERATOR: Backhoe/Excavator/Trackhoe.....	\$ 15.62 **	0.00
OPERATOR: Bobcat/Skid Steer/Skid Loader.....	\$ 11.86 **	0.00
OPERATOR: Broom/Sweeper.....	\$ 14.25 **	0.00
OPERATOR: Bulldozer.....	\$ 15.47 **	0.00
OPERATOR: Concrete Saw.....	\$ 14.96 **	3.27
OPERATOR: Crane.....	\$ 15.89 **	0.00
OPERATOR: Distributor.....	\$ 13.87 **	0.00
OPERATOR: Grader/Blade.....	\$ 16.44	0.00
OPERATOR: Loader.....	\$ 14.38 **	0.00
OPERATOR: Mechanic.....	\$ 19.33	88 0.00

OPERATOR: Milling Machine.....	\$ 15.44 **	0.00
OPERATOR: Oiler.....	\$ 12.22 **	0.00
OPERATOR: Paver (Asphalt, Aggregate, and Concrete).....	\$ 15.81 **	0.00
OPERATOR: Roller (All Types)....	\$ 14.23 **	0.00
OPERATOR: Scraper.....	\$ 14.00 **	0.00
OPERATOR: Tractor.....	\$ 12.29 **	0.00
TRUCK DRIVER: Flatbed Truck.....	\$ 14.72 **	0.00
TRUCK DRIVER: Lowboy Truck.....	\$ 11.00 **	0.00
TRUCK DRIVER: Mechanic.....	\$ 12.31 **	0.00
TRUCK DRIVER: Water Truck.....	\$ 17.08	0.00
TRUCK DRIVER: Dump Truck (All Types).....	\$ 14.32 **	0.00
TRUCK DRIVER: Semi/Trailer Truck.....	\$ 14.36 **	0.00

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WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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\*\* Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 (\$16.20) or 13658 (\$12.15). Please see the Note at the top of the wage determination for more information.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at <https://www.dol.gov/agencies/whd/government-contracts>.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

#### Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

#### Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

#### Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current

negotiated/CBA rate of the union locals from which the rate is based.

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WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- \* an existing published wage determination
- \* a survey underlying a wage determination
- \* a Wage and Hour Division letter setting forth a position on a wage determination matter
- \* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations  
Wage and Hour Division  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board  
U.S. Department of Labor  
200 Constitution Avenue, N.W.  
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISIO"



**SUPPLEMENT TO FORM FHWA-1273**

**DATE:** 07/26/2022

**SUBJECT:** Federal Contract Provisions for Subcontracts

**Federal Contract Provisions for Subcontracts**

All subcontracts shall be in writing and contain all pertinent provisions and requirements of the prime contract.

Each “Request for Permission to Subcontract” (Mississippi Department of Transportation Form CAD-720) shall include a copy of the subcontract. The federal contract provisions (FHWA-1273, SUPPLEMENT TO FORM FHWA-1273, NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246), DAVIS-BACON AND RELATED ACT PROVISIONS (WAGE RATES)) must be physically incorporated as part of the subcontract. A completed Mississippi Department of Transportation Form CAD-521 and Form CAD-725 must be attached to the CAD-720.

**REQUIRED CONTRACT PROVISIONS  
FEDERAL-AID CONSTRUCTION CONTRACTS**

- I. General
- II. Nondiscrimination
- III. Non-segregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion
- XI. Certification Regarding Use of Contract Funds for Lobbying
- XII. Use of United States-Flag Vessels:

**ATTACHMENTS**

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

**I. GENERAL**

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under title 23, United States Code, as required in 23 CFR 633.102(b) (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services). 23 CFR 633.102(e).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider. 23 CFR 633.102(e).

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services) in accordance with 23 CFR 633.102. The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in solicitation-for-bids or request-for-proposals documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract). 23 CFR 633.102(b).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work

performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract. 23 CFR 633.102(d).

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. 23 U.S.C. 114(b). The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors. 23 U.S.C. 101(a).

**II. NONDISCRIMINATION** (23 CFR 230.107(a); 23 CFR Part 230, Subpart A, Appendix A; EO 11246)

The provisions of this section related to 23 CFR Part 230, Subpart A, Appendix A are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR Part 60, 29 CFR Parts 1625-1627, 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR Part 60, and 29 CFR Parts 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR Part 230, Subpart A, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

**1. Equal Employment Opportunity:** Equal Employment Opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (see 28 CFR Part 35, 29 CFR Part 1630, 29 CFR Parts 1625-1627, 41 CFR Part 60 and 49 CFR Part 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140, shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR Part 35 and 29 CFR Part 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract. 23 CFR 230.409 (g)(4) & (5).

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, sexual orientation, gender identity, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

**2. EEO Officer:** The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

**3. Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action or are substantially involved in such action, will be made fully cognizant of and will implement the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

**4. Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

**5. Personnel Actions:** Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to ensure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action



within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

#### **6. Training and Promotion:**

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs (i.e., apprenticeship and on-the-job training programs for the geographical area of contract performance). In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

**7. Unions:** If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. 23 CFR 230.409. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide

sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

**8. Reasonable Accommodation for Applicants / Employees with Disabilities:** The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established thereunder. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

**9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors, suppliers, and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

#### **10. Assurances Required:**

a. The requirements of 49 CFR Part 26 and the State DOT's FHWA-approved Disadvantaged Business Enterprise (DBE) program are incorporated by reference.

b. The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the recipient deems appropriate, which may include, but is not limited to:

- (1) Withholding monthly progress payments;
- (2) Assessing sanctions;
- (3) Liquidated damages; and/or
- (4) Disqualifying the contractor from future bidding as non-responsible.

c. The Title VI and nondiscrimination provisions of U.S. DOT Order 1050.2A at Appendixes A and E are incorporated by reference. 49 CFR Part 21.

**11. Records and Reports:** The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women.

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

### III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of more than \$10,000. 41 CFR 60-1.5.

As prescribed by 41 CFR 60-1.8, the contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location under the contractor's control where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

### IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size), in accordance with 29 CFR 5.5. The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. 23 U.S.C. 113. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. 23 U.S.C. 101. Where applicable law requires that projects be treated as a project on a Federal-aid highway, the provisions of this subpart will apply regardless of the location of the project. Examples include: Surface Transportation Block Grant Program projects funded under 23 U.S.C. 133 [excluding recreational trails projects], the Nationally Significant Freight and Highway

Projects funded under 23 U.S.C. 117, and National Highway Freight Program projects funded under 23 U.S.C. 167.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

#### 1. Minimum wages (29 CFR 5.5)

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b.(1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

## 2. Withholding (29 CFR 5.5)

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics,

including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

## 3. Payrolls and basic records (29 CFR 5.5)

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b.(1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency.

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or

subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5(a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 231.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

#### 4. Apprentices and trainees (29 CFR 5.5)

##### a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State

Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

##### b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the

corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. 23 CFR 230.111(e)(2). The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

**5. Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract as provided in 29 CFR 5.5.

**6. Subcontracts.** The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

**7. Contract termination: debarment.** A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

**8. Compliance with Davis-Bacon and Related Act requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract as provided in 29 CFR 5.5.

**9. Disputes concerning labor standards.** As provided in 29 CFR 5.5, disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor

set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

#### **10. Certification of eligibility (29 CFR 5.5)**

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

#### **V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT**

Pursuant to 29 CFR 5.5(b), the following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

**1. Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek. 29 CFR 5.5.

**2. Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in paragraph 1 of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph 1 of this section, in the sum currently provided in 29 CFR 5.5(b)(2)\* for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph 1 of this section. 29 CFR 5.5.

\* \$27 as of January 23, 2019 (See 84 FR 213-01, 218) as may be adjusted annually by the Department of Labor; pursuant to the Federal Civil Penalties Inflation Adjustment Act of 1990).

### **3. Withholding for unpaid wages and liquidated damages.**

The FHWA or the contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 2 of this section. 29 CFR 5.5.

**4. Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs 1 through 4 of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs 1 through 4 of this section. 29 CFR 5.5.

## **VI. SUBLETTING OR ASSIGNING THE CONTRACT**

This provision is applicable to all Federal-aid construction contracts on the National Highway System pursuant to 23 CFR 635.116.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" in paragraph 1 of Section VI refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions: (based on longstanding interpretation)

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;
- (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
- (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or

equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract. 23 CFR 635.102.

2. Pursuant to 23 CFR 635.116(a), the contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. Pursuant to 23 CFR 635.116(c), the contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract. (based on longstanding interpretation of 23 CFR 635.116).

5. The 30-percent self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements. 23 CFR 635.116(d).

## **VII. SAFETY: ACCIDENT PREVENTION**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR Part 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract. 23 CFR 635.108.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR Part 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704). 29 CFR 1926.10.

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance

with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

### **VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR Part 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 11, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

### **IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT (42 U.S.C. 7606; 2 CFR 200.88; EO 11738)**

This provision is applicable to all Federal-aid construction contracts in excess of \$150,000 and to all related subcontracts. 48 CFR 2.101; 2 CFR 200.326.

By submission of this bid/proposal or the execution of this contract or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, subcontractor, supplier, or vendor agrees to comply with all applicable standards, orders

or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal Highway Administration and the Regional Office of the Environmental Protection Agency. 2 CFR Part 200, Appendix II.

The contractor agrees to include or cause to be included the requirements of this Section in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements. 2 CFR 200.326.

### **X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION**

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200. 2 CFR 180.220 and 1200.220.

#### **1. Instructions for Certification – First Tier Participants:**

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction. 2 CFR 180.320.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default. 2 CFR 180.325.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances. 2 CFR 180.345 and 180.350.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900-180.1020, and 1200. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant

who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction. 2 CFR 180.330.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 180.300.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. 2 CFR 180.300; 180.320, and 180.325. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. 2 CFR 180.335. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov/>). 2 CFR 180.300, 180.320, and 180.325.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default. 2 CFR 180.325.

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## **2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:**

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.335;.

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property, 2 CFR 180.800;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification, 2 CFR 180.700 and 180.800; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default. 2 CFR 180.335(d).

(5) Are not a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(6) Are not a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability (USDOT Order 4200.6 implementing appropriations act requirements).

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal. 2 CFR 180.335 and 180.340.

## **3. Instructions for Certification - Lower Tier Participants:**

(Applicable to all subcontracts, purchase orders, and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200). 2 CFR 180.220 and 1200.220.

a. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances. 2 CFR 180.365.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900 – 180.1020, and 1200. You may contact the person to which this proposal is



submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contractor). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated. 2 CFR 1200.220 and 1200.332.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 1200.220.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov/>), which is compiled by the General Services Administration. 2 CFR 180.300, 180.320, 180.330, and 180.335.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment. 2 CFR 180.325.

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**Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:**

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals:

(a) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.355;

(b) is a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(c) is a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability. (USDOT Order 4200.6 implementing appropriations act requirements)

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal.

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**XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000. 49 CFR Part 20, App. A.

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier

subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

## **XII. USE OF UNITED STATES-FLAG VESSELS:**

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, or any other covered transaction. 46 CFR Part 381.

This requirement applies to material or equipment that is acquired for a specific Federal-aid highway project. 46 CFR 381.7. It is not applicable to goods or materials that come into inventories independent of an FHWA funded-contract.

When oceanic shipments (or shipments across the Great Lakes) are necessary for materials or equipment acquired for a specific Federal-aid construction project, the bidder, proposer, contractor, subcontractor, or vendor agrees:

1. To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels. 46 CFR 381.7.
2. To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b)(1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Office of Cargo and Commercial Sealift (MAR-620), Maritime Administration, Washington, DC 20590. (MARAD requires copies of the ocean carrier's (master) bills of lading, certified onboard, dated, with rates and charges. These bills of lading may contain business sensitive information and therefore may be submitted directly to MARAD by the Ocean Transportation Intermediary on behalf of the contractor). 46 CFR 381.7.

**ATTACHMENT A - EMPLOYMENT AND MATERIALS  
PREFERENCE FOR APPALACHIAN DEVELOPMENT  
HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS  
ROAD CONTRACTS (23 CFR 633, Subpart B, Appendix B)**

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

**NOTICE OF REQUIREMENTS FOR AFFIRMATIVE  
ACTION TO ENSURE EQUAL EMPLOYMENT  
OPPORTUNITY (EXECUTIVE ORDER 11246)**

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

2. The goal for female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work, is 6.9%.

Until further notice	Goals for minority participation for each trade (percent)
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**SHSA Cities:**

Pascagoula - Moss Point -----	16.9
Biloxi - Gulfport -----	19.2
Jackson -----	30.3

**SMSA Counties:**

Desoto -----	32.3
Hancock, Harrison, Stone-----	19.2
Hinds, Rankin-----	30.3
Jackson -----	16.9

**Non-SMSA Counties:**

George, Greene-----	26.4
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Alcorn, Benton, Bolivar, Calhoun, Carroll, Chickasaw, Clay, Coahoma, Grenada, Itawamba, Lafayette, Lee, Leflore, Marshall, Monroe, Montgomery, Panola, Pontotoc, Prentiss, Quitman, Sunflower, Tallahatchie, Tate, Tippah, Tishomingo, Tunica, Union, Washington, Webster, Yalobusha -----	26.5
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Attala, Choctaw, Claiborne, Clarke, Copiah, Covington, Franklin, Holmes, Humphreys, Issaquena, Jasper, Jefferson, Jefferson Davis, Jones Kemper, Lauderdale, Lawrence, Leake, Lincoln, Lowndes, Madison, Neshoba, Newton, Noxubee, Oktibbeha, Scott, Sharkey, Simpson, Smith, Warren, Wayne, Winston, Yazoo-----	32.0
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Forrest, Lamar, Marion, Pearl River, Perry, Pike, Walthall-----	27.7
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Adams, Amite, Wilkinson -----	30.4
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These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4.2(d). Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor, employer identification number of the subcontractor, estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.

4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is to the county and city (if any), stated in the advertisement.

5. The notification required in Paragraph 3 shall be addressed to the following:

Contract Compliance Officer  
Mississippi Department of Transportation  
P.O. Box 1850  
Jackson, Mississippi 39215-1850

(12/04/2018)

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-101-1

CODE: (IS)

DATE: 07/20/2023

SUBJECT: Definitions and Terms

Section 101, Definitions and Terms, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

**907-101.01--Abbreviations.** After the abbreviation API on page 1, add the following.

APL Approved Products List

Replace the abbreviation for AWPA on page 1 with the following.

AWPA American Wood Protection Association

**907-101.02--Definitions.** Delete the sentence after the list of holidays in Subsection 101.02 on page 6 under **holidays, legal**, and substitute the following.

When a legal holiday falls on a Saturday or Sunday, the succeeding Monday, or as proclaimed by the Governor, will be observed as a legal holiday.

Delete the definition for Notice to Proceed in Subsection 101.02 on page 8, and substitute the following.

**Notice to Proceed** - Written notice to the Contractor to proceed with the contract work.

Delete the definition for “Plans” in Subsection 101.02 on page 8, and substitute the following.

**plans** - The approved plans, profiles, typical cross-sections, working drawings and supplemental drawings, or exact reproduction thereof, that show the location, character, dimensions, and details of the work to be done. The plans may also include electronic files, referred to on the plans as Electronic Files Identified as Plans, which may include engineering models, spreadsheets, CADD files or other electronic files used to convey design intent. When the contract does not have an official set of plans, reference to the plans shall mean the contract documents.

## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-102-2

CODE: (IS)

DATE: 11/22/2017

SUBJECT: **Bidding Requirements and Conditions**

Section 102, Bidding Requirements and Conditions, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

**907-102.01--Prequalification of Bidders.** Delete the last sentence of the third paragraph of Subsection 102.01 on page 13, and substitute the following.

The Bidder's Certificate of Responsibility number must be on file with the Department's Contract Administration Division prior to request for permission to bid.

**907-102.02--Contents of Proposal Forms.** Delete the fourth paragraph in Subsection 102.02 on page 13, and substitute the following.

Prospective bidders must complete an online request for permission to be eligible to bid a project. Upon approval, the bidder will be authorized to submit a bid electronically using Bid Express at <http://bidx.com>.

## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-105-2

CODE: (IS)

DATE: 07/20/2023

SUBJECT: Control of Work

Section 105, Control of Work, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

**907-105.01--Authority of the Engineer.** Delete the first sentence of the second paragraph of Subsection 105.01 on page 31, and substitute the following.

The Engineer has the right to suspend the work wholly or in part and to withhold payments because of the Contractor's failure to correct conditions unsafe for workmen or the general public, for failure to carry out provisions of the Contract, or for failure to carry out orders.

**907-105.02--Plans and Working Drawings.** Delete the first paragraph of Subsection 105.02 on page 31, and substitute the following.

After the contract is executed by the Executive Director, the Contractor will receive, free of charge, two bound copies of the proposal and contract documents (one executed and one blank) two full scale copies of the plans, five half-scale copies of the Plans, and Electronic Files Identified as Plans. The Contractor shall have one copy of the proposal and contract documents and one half-scale copy of the plans available at all times during work activity on the project.

## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-106-1

CODE: (IS)

DATE: 10/25/2022

SUBJECT: Control of Materials

Section 106, Control of Materials, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

After Subsection 106.13 on page 47, add the following.

**907-106.14--Buy America Materials Sourcing Requirements for Federal-Aid Projects.** The “Infrastructure Investment and Jobs Act” (the “Act”), or Bipartisan Infrastructure Law (BIL), was enacted on November 15, 2021 (See Public Law No. 117-58, Sections 70901-70953). The Buy America provisions of the Act expand the previous Buy America requirements beyond what is currently required for steel and iron products.

Any steel and iron materials per Subsection 700.01 or construction materials per Subsection 907-700.01.1, that are used for a Federal-Aid highway construction project, shall be domestically manufactured (as further described in Subsection 700.01) and compliant with current requirements of the Act, as implemented by the Office of Management and Budget (OMB) in the “Preliminary Guidance for Construction Materials” in OMB Memorandum M-22-11.

As determined by the Department within the contract prior to award, all products and/or materials will only be classified under one of the following categories: Steel and Iron, Manufactured Products, and Construction Materials. It is the Prime Contractor’s responsibility to ensure all submittals required for Buy America are submitted to the Project Engineer prior to the products and/or materials being incorporated into the work.

The following items require Buy America Certification on Federal-Aid projects:

- (a) Steel and Iron
- (b) Construction Materials

A list of items that require Buy America Certification may be viewed at [www.goMDOT.com](http://www.goMDOT.com) under Business Center → Engineering Standards/Guides/Manuals → Construction Materials.

Items classified as a Manufactured Product that do not include steel and iron components do not require a Buy America Certification on a Federal-Aid project. Manufactured Products are currently exempted under the 1983 waiver from FHWA. Manufactured Products are determined by the Department’s Materials Division.

To be considered a Manufactured Product, an item shall meet one of the following requirements:



- (a) The item consists of two or more of the listed construction materials that have been combined through a manufacturing process.
- (b) The item consists of at least one of the listed construction materials that has been combined through a manufacturing process with a material that is not listed as a construction material.

Buy America provisions do not apply to temporarily used items that (1) are specified to be removed at the end of the project per the contract provisions or (2) are specified to remain in place per the contract provisions and are also documented by the Department in the contract provisions to be removed in a subsequent imminent, near-term phased project.

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SPECIAL PROVISION NO. 907-107-2**

**CODE: (SP)**

**DATE: 01/31/2018**

**SUBJECT: Contractor's Erosion Control Plan**

Section 107, Legal Relations and Responsibility to Public, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

**907-107.22--Environmental Protection.**

**907-107.22.1--Contractor's Erosion Control Plan (ECP).** After the first sentence of the first paragraph of Subsection 107.22.1 on page 63, add the following.

The ECP shall be submitted electronically to the Project Engineer who will forward it to the appropriate MDOT Divisions.

Delete the example Narrative in Subsection 107.22.1 on page 65, and substitute the following.

**EXAMPLE**  
**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**  
**Storm Water Pollution Prevention Plan (SWPPP)**  
**Narrative**

General Permit Coverage No: MSR \_\_\_\_\_  
Project Number: \_\_\_\_\_  
County: \_\_\_\_\_  
Route: \_\_\_\_\_

**SITE INFORMATION**

This project consists of grading and installing drainage structures necessary to construct approximately 6 miles of parallel lanes on SR 31 between the Hinds County Line and the Rankin County Line.

**SEDIMENT AND EROSION CONTROLS**

- a) **Vegetative Controls:** Clearing and grubbing areas will be minimized to comply with the buffer zones (minimum of 15 feet along the ROW lines and 5 feet along creeks) as per the contract documents. A combination of temporary and permanent grassing will be used to protect slopes as construction progresses. **Should a disturbed area be left undisturbed for 14 days or more, placement of temporary BMPs (seeding & mulching, silt fences, basins, ditch checks, slope drains, etc.) or permanent erosion control measures (seeding & mulching, riprap, paved ditch, flumes, etc.) will be initiated by the next working day after the land disturbing activities have stopped.**
- b) **Structural Controls:** Gravel construction entrance/exit will be installed near Stations 145+50, 159+50, 164+50 & 172+50. Riprap ditch checks will be constructed at Stations 144+50, 151+75, 162+00 & 166+25. The Concrete washout area will be at Stations 140+25, 152+00 & 168+50.
- c) **Housekeeping Practices:** Structural BMPs will be cleaned out when sediment reaches 1/3 to 1/2 of the height of the BMP. Maintenance and repair of equipment will be performed off-site, material wash out will occur either off-site or within designated wash out areas.
- d) **Post-Construction Control Measures:** As construction is completed, permanent vegetative growth will be established on disturbed soils to improve soil stability and provide a buffer zone for loose material. Paved ditches and flumes will be placed as specified in the ECP to reduce erosion in concentrated flow areas and rip rap will be placed as specified to dissipate flow energy and reduce flow velocity.

**IMPLEMENTATION SEQUENCE**

Perimeter controls will be installed first. Clearing and grubbing will be performed in 19-acre sections beginning at the BOP and temporary grassing will be installed as needed. Temporary erosion control BMPs will be installed at the drainage structures prior/during construction of the drainage structures. Grading activities will commence at the BOP and proceed towards the EOP, fill slopes will be permanently grassed in stages for fill heights that exceed 5 feet. Base materials will be installed on completed grading sections with the paving to follow.

**MAINTENANCE PLAN**

All erosion and sediment control practices will be checked for stability and operation following every rainfall but in no case less than once every week. Any needed repairs will be made immediately to maintain all practices as designed. Sediment basins will be cleaned out when the level of sediment reaches 2.0 feet below the top of the riser. Sediment will be removed from the front/upstream end of the BMPs when it becomes about 1/3 to 1/2 height of BMP.

\_\_\_\_\_  
Prime Contractor's Signature

\_\_\_\_\_  
Date

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Title

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SPECIAL PROVISION NO. 907-108-4**

**CODE: (SP)**

**DATE: 10/07/2020**

**SUBJECT: Subletting of Contract**

Section 108, Prosecution and Progress, of the 2017 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.** Delete the third sentence of the tenth paragraph of Subsection 108.01.1 on the bottom of page 72.

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-109-4

CODE: (IS)

DATE: 04/19/2021

SUBJECT: Measurement and Payment

Section 109, Measurement and Payment, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

**907-109.01--Measurement of Quantities.** Delete the sixth full paragraph of Subsection 109.01 on page 88, and substitute the following.

If appropriate based on the specific circumstances of the project, the Contractor may request that material specified to be measured by the cubic yard or ton be converted to the other measure. The Contractor must submit this request to the Engineer. The Engineer will provide an approval or denial in writing. The decision is in the sole discretion of the Engineer. If approved, factors for this conversion will be determined by the District Materials Engineer and agreed to by the Contractor. The conversion of the materials along with the conversion factor will be incorporated into the Contract by supplemental agreement. The supplemental agreement must be executed before such method of measurement is used.

**907-109.04--Extra Work.**

**907-109.04.1--Supplemental Agreement.** Delete the second paragraph of Subsection 109.04.1 on page 90.

**907-109.06--Partial Payment.**

**907-109.06.2--Advancement on Materials.**

Delete the next to last paragraph of Subsection 109.06.2 on page 95, and substitute the following.

Materials for which an advanced payment has been allowed must be paid for by the Contractor within 30 days of the estimate on which the advanced payment was first allowed and proof of said payment must be verified by the supplier. If proof of payment is not furnished within the allowable 30 days, the advanced payment will be deducted on subsequent current estimates until such time that proof of payment is furnished.

**907-109.07--Changes in Material Costs.** After the fifth paragraph of Subsection 109.07 on page 96, change the web address to the following.

[https://mdot.ms.gov/portal/current\\_letting](https://mdot.ms.gov/portal/current_letting)

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SPECIAL PROVISION NO. 907-234-1**

**CODE: (SP)**

**DATE: 10/13/2021**

**SUBJECT: Silt Fence**

Section 234, Silt Fence, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

**907-234.02--Materials.** Delete the first paragraph of Subsection 234.02 on page 181, and substitute the following.

Materials used in silt fence and super silt fence may be accepted by certification per Subsection 700.05.1. Geotextile fabric, posts, staples and woven wire backing, when required, shall meet the requirements of Subsection 714.13.

**907-234.05--Basis of Payment.** Add the “907” prefix to the pay items listed on page 183.

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-240-1

CODE: (SP)

DATE: 01/17/2017

SUBJECT: Interlocking Flexible Block Erosion Control System

Section 907-240, Interlocking Flexible Block Erosion Control System, is hereby added to and made a part of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction as follows.

## SECTION 907-240 -- INTERLOCKING FLEXIBLE BLOCK EROSION CONTROL SYSTEM

**907-240.01--Description.** This work consists of installing a cellular concrete interlocking erosion control grid system in accordance with the requirements of this specification and to the line, grade and dimensions shown on the plans, or as directed by the Engineer.

**907-240.02--Materials.** The erosion control system shall be a multi-directional, positive-interlocking type mat and, when installed, shall exhibit the ability to expand and contract with the underlying terrain.

The erosion control system shall be one of the following, or an approved equal.

**Conlock II**  
by: Hydropave L.P.  
[www.hydropave.com](http://www.hydropave.com)

**Armorflex**  
by: Armortec  
[www.armortec.com](http://www.armortec.com)

**UltraLok**  
by: Submar  
[www.submar.com](http://www.submar.com)

Any product submitted for approval as an equal to one of the above products shall be submitted at least forty five (45) days prior to use.

The geotextile shall be Type V meeting the requirements of Subsection 714.13.

**907-240.03--Construction Requirements.** Areas on which geotextile and the erosion control system are to be placed shall be constructed to the lines and grades shown on the plans. Where such areas are below the allowable grade, it shall be brought to grade by placing layers not to exceed eight inches (8") of selected material and compacted as directed by the Engineer. All obstructions such as, but not limited to, roots, lumps and projecting objects shall be removed and any resulting voids filled to the satisfaction of the Engineer

**907-240.03.1--Geotextile.** The geotextile shall be placed loosely without wrinkles or creases with the long dimension perpendicular to the channel. The strips shall be placed to provide a minimum overlap of two feet (2'). Securing pins shall be inserted through both strips of overlapped geotextile at mid-point and not greater than 2-foot intervals. Additional pins shall be installed throughout the geotextile as necessary to prevent any slippage. The geotextile shall be

placed so that the upstream strip overlaps the downstream strip and the higher slope strip overlaps the lower strip. Each securing pin shall be pushed through the geotextile until the washer bears against the geotextile and secures it firmly.

The geotextile shall be protected from contamination and damage during installation and placement of the erosion control system. Contaminated geotextile shall be replaced, and damaged geotextile shall be repaired or replaced as directed at no cost to the Department.

The geotextile shall be covered with a layer of the specified material within 14 calendar days after placement. Geotextile not covered within this time period shall be removed and replaced at the Contractor's expense if damage or deterioration is evident, as determined by the Engineer.

**907-240.03.2--Erosion Control System.** The erosion control system shall be placed within the limits shown on the plans. The erosion control system shall be placed individually on the geotextile in such a manner as to produce a continually interlocking surface free from field seams and non-interlocked connections, except as approved by Project Engineer and/or as shown on the plans.

Anchoring trenches, if required, shall be as shown on the plans or recommended by the manufacturer.

Open cell blocks that are below the normal waterline and exhibit an average open area greater than 5%, shall be backfilled with crushed stone as approved by Project Engineer. Open cell blocks that are above the normal waterline shall be backfilled with material approved by Engineer to a minimum depth of 35% of the specified block vertical thickness above the top surfaces.

**907-240.04-Method of Measurement.** Interlocking flexible block erosion control system will be measured by the square yard of surface area covered.

No separate measurement will be made for geotextile or backfilling the erosion control system.

**907-240.05--Basis of Payment.** Interlocking flexible block erosion control system, measured as prescribed above, will be paid for at the contract unit price per square yard, which price shall be full compensation for all labor, equipment, furnishing and placing the erosion control system, backfilling geotextile, pins, lapping, sewing, maintaining the geotextile until covered, and incidentals required to satisfactorily completing the work.

Payment will be made under:

907-240-A: Interlocking Flexible Block Erosion Control System - per square yard



# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-405-1

CODE: (SP)

DATE: 09/21/2021

SUBJECT: Stone Matrix Asphalt

Section 907-405, Stone Matrix Asphalt, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

## 907-405.02--Materials.

### 907-405.02.5--Contractor's Quality Management Program.

Delete Subsection 405.02.5.9 on page 300, and substitute the following.

**907-405.02.5.9--Trial Section.** At the beginning of placement for each lift, the Contractor shall construct a trial section of a maximum of 400 tons of mixture, for the purpose of establishing and evaluating consistent mixture properties and the compactability of the mixture. At the discretion of the Engineer, the requirement of a trial section may be waived if the Contractor has successfully produced and placed the asphalt mixture within the previous 365 calendar days. The Contractor shall determine the production point at which the mixture shall be sampled during trial section construction. This sample does not have to be selected by the formal random selection procedures used during actual production, but should be representative of the mixture produced.

Density tests shall be performed according to the procedures in Chapter 7 of MDOT's Field Manual for Asphalt Mixtures (First Production Day) with the exception that two (2) lots shall be tested and the core densities be averaged. The Contractor (QC) and the Department (QA) will conduct tests for mixture quality. A trial section is considered to be successful if the QC test results are within the Warning Limits (the testing indicates a pay factor of 1.0) and the QC tests compare to the QA tests within the allowable differences set forth in Subsection 401.02.6.2. If the criteria for a successful trial section are not achieved, additional trial sections of at least 200 tons but not more than 400 tons shall be constructed until the criteria are achieved, at which time full production can begin. In the event a successful trial section is not accomplished by the completion of the second trial section, the Contractor shall construct additional trial sections at an offsite location. The Engineer reserves the right to have any trial section removed and replaced at no additional cost to the State, if the pay factor for any characteristic for a trial section is less than 0.75.

For actual payment purposes, a pay factor of 1.00 will be used for all first and second trial sections allowed to remain in place. Any required offsite trial sections will be constructed at no additional cost to the State.

**907-405.05--Basis of Payment.** Add the "907" prefix to the pay item listed on page 305.

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SPECIAL PROVISION NO. 907-413-2**

**CODE: (SP)**

**DATE: 05/09/2023**

**SUBJECT: Cleaning and Sealing Joints and Cracks**

Section 413, Cleaning and Sealing Joints and Cracks, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

**907-413.03--Construction Requirements.**

**907-413.03.3--Sawing and Sealing Transverse Joints in Asphalt Pavement.**

**907-413.03.3.4--Sealing.** Delete the last sentence of the last paragraph of Subsection 413.03.3.4 on page 333, and substitute the following.

Poured joint sealing material shall only be placed when the air temperature is within the limits specified by the manufacturer.

**907-413.05--Basis of Payment.** Delete the last pay item listed on page 336, and substitute the following.

907-413-E: Sawing and Sealing Transverse Joints in Asphalt Pavement - per linear foot

## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-618-8

CODE: (SP)

DATE: 07/31/2019

SUBJECT: Work Zone Law Enforcement

Pursuant to House Bill No. 580, Section 618, Maintenance of Traffic and Traffic Control Plan, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

**907-618.01--Description.** After Subsection 618.01.4 on page 443, add the following.

**907-618.01.6--Work Zone Law Enforcement.** On projects that the Commission determines are on high-volume roadways or are otherwise high risk projects, the Commission may include a pay item to provide for reimbursement to the Contractor for enhanced law enforcement safety operations in the work zone.

When the Work Zone Law Enforcement pay item is included, the Contractor may enter into an agreement with a law enforcement agency having jurisdiction in the work zone, to provide work zone safety operations. If the Contractor is unable to reach a mutually acceptable agreement with a local law enforcement agency after good faith negotiations, then officers from the Mississippi Department of Transportation Office of Law Enforcement (MDOT Law Enforcement) may be utilized.

According to House Bill No. 580, the work zone safety operations, when required by the Commission, shall consist of utilizing a uniformed law enforcement officer equipped with a patrol vehicle with blue flashing lights to enforce traffic laws and provide for an enhanced law enforcement presence in order to facilitate the safe movement of traffic through the work zone and to protect workers within the work zone.

**907-618.03--Construction Requirements.** After Subsection 618.03.5 on page 447, add the following.

**907-618.03.7--Work Zone Law Enforcement.** When the Work Zone Law Enforcement pay item is included, the utilization of work zone law enforcement shall be done at such locations and time periods deemed necessary and appropriate by the Engineer, after discussion with the Contractor. The work zone law enforcement will be required until the given/selected phase of work is completed, whether it is before or after the expiration of contract time. After the expiration of contract time, all costs for work zone law enforcement shall be the responsibility of the Contractor.

The Contractor shall be responsible for any and all coordination with the law enforcement agency. The Department will not be a party to any agreement between the Contractor and any local law enforcement agency.

At the end of each estimate pay period, the Contractor shall provide a daily work record of the actual hours of work performed by the law enforcement agency and shall be accompanied by signed invoices from the law enforcement agency, which must be verified by the Engineer. If MDOT Law Enforcement is used, no records will be required by the Contractor.

**907-618.04--Method of Measurement.** After the last paragraph of Subsection 618.04 on page 449, add the following.

Work zone law enforcement, other than MDOT Law Enforcement, will be measured per hour for every hour verified by the Engineer using an invoice or other acceptable record. Measurement for payment will not be made for work zone law enforcement after expiration of contract time.

Payment for MDOT Law Enforcement will be made under pay item 907-618-M2. MDOT Law Enforcement will send an invoice or other acceptable record to the Project Engineer who will verify the hours for payment. Payment will be made to the Contractor under pay item 907-618-M2 and then deducted from the Contractor's monthly estimate as a line item deduction. After the completion of contract time, no payment will be made under pay item 907-618-M2 but deductions from the monthly estimate will continue until law enforcement is no longer needed.

**907-618.05--Basis of Payment.** After the third paragraph of Subsection 618.05 on page 449, add the following.

Work zone law enforcement, measured as prescribed above, will be paid for at the fixed contract unit price per hour, which price shall be full compensation for furnishing and reimbursing work zone law enforcement.

Regardless of the terms of any agreement reached between the Contractor and the law enforcement agency, the Commission will not reimburse the Contractor for any amount over the fixed contract price shown in the pay item for work zone law enforcement.

If MDOT Law Enforcement is used, the hours charged by MDOT Law Enforcement will be verified by the Contractor and deducted from the Contractor's estimate.

After the last pay item listed on page 450, add the following.

907-618-M2: Work Zone Law Enforcement - per hour

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-619-5

CODE: (IS)

DATE: 01/17/2018

SUBJECT: Traffic Control for Construction Zones

Section 619, Traffic Control for Construction Zones, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

## 907-619.02--Materials.

907-619.02.8--Traffic Signals and Flashers. Delete Subsection 619.02.8.1 on pages 452 thru 455, and substitute the following.

907-619.02.8.1-Portable Traffic Signals. Portable traffic signals shall be trailer or pedestal mounted units that provide for easy, legal transportation and quick setup and deployment. Each unit shall be self-contained. The types of portable traffic signals are as follows.

- Type 1 portable traffic signal shall include two signal heads per trailer with one signal head mounted on an overhead mast arm that can be extended over the travel lane, and the other signal head shall be mounted on the vertical upright of the trailer.
- Type 2 portable traffic signal shall include one signal head that is mounted on the vertical upright of the pedestal/cart or trailer. Pedestal/Cart mounted shall be designated as Type 2A and Trailer mounted shall be designated as Type 2B. Type 2 portable traffic signals shall be tested to MASH Standards or NCHRP Test Level 3 crash testing requirements by an accredited independent test facility, with supporting documentation available upon request.
- Type 3 portable traffic signal shall be the same as Type 1 mentioned above but with enhanced capabilities as mentioned in each applicable section below.

The portable traffic signals shall be MUTCD Compliant and utilize standard ITE signal heads, and adhere to the ITE Specifications and Standards for Vehicle Traffic Control Signal Heads, Light Emitting Diode (LED) Circular Signal Supplement. The units shall be battery powered with a solar charging system, and be equipped with an onboard battery charger capable of being used with a 120V AC power source. Portable traffic signals shall be able to communicate with other portable signals via 900 MHz or other accepted wireless communications. If wireless connectivity is not feasible, hardwired connectivity shall be an acceptable alternative, as approved by the Engineer. Portable Traffic Signals shall include all the major components listed below or be able to perform the functions of these components. The major components of the unit shall include, but are not limited to, the trailer or pedestal/cart, telescoping mast arm (on Type 1 and 3), signal head(s) and back plates, traffic signal controller with operating software, solar charging system with batteries, input and output devices, vehicle detection, flasher units, conflict monitor, relays,

communications system and other equipment required for the safe operation and installation of the unit.

**907-619.02.8.1.1--Signal Heads.** The signal heads and all applicable components of the portable traffic signal shall meet the physical display and operational requirements of conventional traffic signals as specific in the Manual on Uniform Traffic Control Devices (MUTCD). The signal heads shall be cast aluminum or polycarbonate and shall meet the requirements laid out in the Mississippi Standard Specification for traffic signal heads and associated MDOT material specifications for traffic signal heads. The signal heads shall accommodate standard 12-inch LED indications meeting the ITE Specification “Vehicle Traffic Control Signal Heads” and ITE Specifications and Standards for Vehicle Traffic Control Signal Heads, Light Emitting Diode (LED) Circular Signal Supplement.

For Type 1, Type 2 and Type 3 portable traffic signals, the signal heads shall have the ability to be rotated 180 degrees to face in the opposite direction and shall have the ability to rotate and lock in approximately 10 degree increments to position the signal head for the optimum visibility to motorists.

For Type 1 portable traffic signals, each unit shall contain two signal heads with one signal head mounted on an overhead mast arm that can be extended over the travel lane with a minimum clearance of 17 feet measured from the bottom of the signal head unit to the road surface. The lower signal head shall be mounted to the vertical upright of the trailer at a minimum height of eight feet (8') from the bottom of the signal head unit to the road surface.

For Type 2 portable traffic signals, the signal head shall be mounted to the vertical upright of the trailer at a minimum height of eight feet (8') from the bottom of the signal head unit to the road surface.

For Type 3 portable traffic signals, each unit shall be the same as Type 1 mentioned above but with enhanced capabilities as mentioned below.

**907-619.02.8.1.2--Controller and Operating Requirements.** The portable traffic signal (Types 1, 2, and 3) shall include a solid state Controller Unit (CU) that is in compliance with NEMA TS 5 Performance Standard. The CU shall have an easy to read front panel backlit display for viewing and programming the configuration settings and CU status. The CU shall be capable of operating the portable traffic signal system in a fixed time, traffic actuated or manual control mode. Multiple portable traffic signals shall have the capability to be interconnected to form a portable traffic signal system. Each portable traffic signal within a connected system shall have the capability to serve as either the master or remote signal. Each portable traffic signal shall include a Conflict Monitor Unit (CMU), or Malfunction Management Unit (MMU) to ensure phase conflicts do not exist during operation.

For Type 1 and Type 2 portable traffic signals, a minimum of five (5) automatic time-of-day timing plans within a 24-hour period should be available in fixed time mode. The CU should have the ability to control a minimum of four (4) traffic phases with programmable cycle time adjustments and user adjustable red, amber, minimum green and maximum green times. The CU shall have

the capability of programming green and red times from 1 to 999 seconds and yellow times up to 15 seconds in one-second increments. The CU shall also have the capability of facilitating standby modes of red, red flash and yellow flash.

For Type 3 portable traffic signals, a minimum of ten (10) automatic time-of-day timing plans within a 24-hour period should be available in fixed time mode. The CU should have the ability to control a minimum of 16 traffic phases with programmable cycle time adjustments and user adjustable red, amber, minimum green and maximum green times. The CU shall have the capability of programming green and red times from 1 to 999 seconds and yellow times up to 15 seconds in one-second increments. The CU shall also have the capability of facilitating standby modes of red, red flash and yellow flash.

The system shall also have the ability to operate in vehicle actuation mode when vehicle detection components are used. The operating system shall have the capability to allow the Portable Traffic Signal to be connected to and controlled by a standard NEMA controller.

The system shall have the capability to be controlled remotely using a hardwired or wireless remote. The wireless radio remote shall be capable of communicating at a clear line of site distance up to ¼ mile from the master.

The CU shall have the capability of interfacing with a Remote Monitoring System (RMS) capable of reporting signal location, battery voltage, and system faults. The RMS shall include a password-protected web site, viewable via an internet connection. In the event of a system fault, the RMS shall provide specific information concerning the cause of the system fault (example: "red lamp on signal number 1 out"). The RMS shall immediately contact previously designated individuals via SMS text messaging or email, upon a fault event.

The active timing program operating the PTS system shall be available and viewable through the RMS website at all times. The RMS shall maintain a history of the operating system in each signal including total operating hours, alerts, and the location of the PTS trailer.

**907-619.02.8.1.3--Wireless Communications.** The portable traffic signals shall communicate with other portable traffic signals within the signal system via license-free wireless 900 MHZ radio link communications as specified in Subsection 662.02.2 of the radio Interconnect System specification. The radio units shall maintain communications at a minimum distance of one (1) mile. The radio system shall conform to the applicable Federal Communications Commission requirements and all applicable state and local requirements.

The portable traffic signals shall be in direct communication at all times either by wireless or hardware connection to provide for the required conflict monitoring / malfunction management system.

**907-619.02.8.1.4--Power Requirements.** Each Portable Traffic Signal shall be equipped with a power source consisting of a solar collection array, solar controller and/or charging unit and batteries sufficient to operate the signal system. The number and size of batteries shall be sufficient to operate the Type 1 and Type 3 signals for a minimum of 30 days and Type 2A signals for

minimum of five (5) days, and Type 2B signals for minimum of 15 days without additional charging or assist from the solar array. An on-board battery charger shall be compatible with both the solar array and with a 120V AC power source.

For Type 1 signals, the solar panel array shall provide for a minimum of 440 watts of solar collection capability.

For Type 2A signals, the solar panel array shall provide for a minimum of 90 watts of solar collection capability.

For Type 2B signals, the solar panel array shall provide for a minimum of 110 watts of solar collection capability.

For Type 3 signals, the solar panel array shall provide for a minimum of 480 watts of solar collection capability and shall include a tilt and rotate system to optimally position the panels.

All instrumentation for the electrical system and battery compartment shall be contained in a lockable weatherproof enclosure. Solar panels shall be secured to the mounting brackets for theft prevention.

**907-619.02.8.1.5--Trailer and Lift System.** The trailer or pedestal/cart and all mounted components shall conform to the wind loading requirements as follows: 100 mph minimum for Type 1 portable traffic signals, 55 mph minimum for Type 2A portable traffic signals, 75 mph minimum for Type 2B portable traffic signals, and 90 mph minimum for Type 3 portable traffic signals as described in the AASHTO *Standard Specifications for Highway Signs, Luminaries and Traffic Signals*, as specified in the plans including all interims and updates. At the request of the Engineer, proof of conformance to these wind load ratings shall be verified by a third-party. No additional loose ballast shall be used to meet these wind load requirements. The trailer shall be made of structural steel and shall include four (4) leveling/stabilizer jacks capable of lifting the trailer a minimum of six inches (6”).

The trailer or pedestal shall be equipped with a mechanical, hydraulic or electric lift system sufficient for one person to be able to raise and lower the vertical upright and/or horizontal mast arm to and from the operating position.

For Type 1, 2B, and Type 3 signals, the trailer shall be equipped to provide legal and safe transport on the public highway system at speeds up to 55 mph.

All exterior metal surfaces, except signal heads and back plates, shall be powder-coat painted highway safety orange.

**907-619.02.9--Impact Attenuators.** Delete the sentence in the first paragraph of Subsection 619.02.9 on page 455, and substitute the following.

Impact attenuators must be listed on the Department's APL.



**907-619.02.11--Snap-Back Delineators.** Delete the sentence in the paragraph of Subsection 619.02.11 on page 456, and substitute the following.

Snap-back delineators shall be selected from the list of surface mounted flexible delineator posts as shown on the Department's APL.

**907-619.02.14--Changeable Message Sign.**

**907-619.02.14.5--PCMS Controller and Storage Cabinets.** Delete the fifth sentence in the first paragraph of Subsection 619.02.14.5 on pages 462 and 463, and substitute the following.

The controller cabinet shall be illuminated.

**907-619.05--Basis of Payment.** Add the following to the list of pay items ending on page 480.

907-619-E3: Changeable Message Sign \*\*\*\*\* - per each

907-619-H2: Traffic Signal, Portable, Type \_\_\_\_ - per each

## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-630-1

CODE: (SP)

DATE: 01/17/2017

SUBJECT: Remove and Reset Signs

Section 630, Traffic Signs and Delineators of the Mississippi Standard Specifications for Road and Bridge Construction, 2017 Edition, is hereby amended as follows.

**907-630.01--Description.** After the last paragraph of Subsection 630.01 on page 503, add the following.

Selected existing, temporarily installed, and/or permanently installed signs other than construction traffic control signs shall be removed and reset as shown on the plans, in the contract documents, or as directed by the Engineer. Removing and resetting of signs may include provisions of continuous sign visibility by the traveling public before, during, and after the operation. The Contractor shall provide all materials necessary to remove and reset the sign, including any footings, supports, brackets, hardware, breakaway features and other incidentals. All installations within 30 feet of the pavement edge of temporary or permanent thru lanes shall include breakaway support features certified to meet NCHRP Report 350 prior to the removal and resetting of the sign.

Selected existing overhead sign shall be removed and reset as shown on the plans, in the contract documents, or as directed by the Engineer. The Contractor shall provide all materials necessary to remove and reset the sign, including any supports, brackets, hardware, and other incidentals. The Contractor shall take all precautions necessary when removing, transporting, storing, and re-installing to protect the sign from any damage to the sign panel or reflective sign surface.

**907-630.04--Method of Measurement.** After the last paragraph of Subsection 630.04 on page 510, add the following.

Remove and reset signs will be measured per each or square foot.

If a sign assembly is removed and temporarily placed in storage, then later reset as directed by the Engineer, measurement for payment will be made one time only, after the stored sign is reset.

No separate measurement will be made for removal only of a sign assembly, as said removal shall be included in the appropriate pay item for removal of signs.

**907-630.05--Basis of Payment.** After the first paragraph of Subsection 630.05 on page 510, add the following.

Remove and reset sign, measured as prescribed above, will be paid for at the contract unit price per each or square foot, which price shall be full compensation for furnishing and placing all

materials necessary to effect the removal and resetting, including footings, supports, brackets, hardware, breakaway features, transporting, storage, and for all labor, equipment, tools and incidentals necessary to complete the work.

Add the following to the list of pay items on pages 510 & 511.

907-630-O: Remove and Reset Sign, Description - per each or square foot

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-631-1

CODE: (IS)

DATE: 11/15/2017

SUBJECT: Traffic Signal Systems - General

Section 631, Traffic Signal Systems - General, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

## **907-631.02--Materials.**

**907-631.02.4--Operations.** Delete the second paragraph in Subsection 631.02.4 on page 513 and substitute the following.

The Contractor shall conduct the work at all times in such a manner as to ensure the least possible inconvenience to the traveling public, and to property owners on the streets, alleys, and other public places where the construction will take place.

**907-631.02.5--Electrical Service.** Delete the first paragraph in Subsection 631.02.5 on page 515 and substitute the following.

It shall be the Contractor's responsibility to make the necessary arrangements with the local power company to provide the electrical service for any new installation. The Contractor shall pay for, at no cost to the Department, all deposits, hook-up charges, or other service fees required by the power company for the establishment of new service. The cost of all such fees shall be considered incidental and absorbed within existing pay items. The Department or the local agency will be responsible for payment of the monthly service bill for the new power service installation. It shall be the responsibility of the Contractor to swap the electrical service account over to the Department or local agency.

## **907-631.03--Construction Requirements.**

**907-631.03.2--Electrical Service Equipment.** Delete the paragraphs of Subsection 631.03.2 on pages 515 and 516, and substitute the following.

The power supply assembly shall consist of all equipment mounted in a Power Service Pedestal as described in Subsection 722.13 or as otherwise shown in the plans. The configuration and installation of the equipment mounted on the assembly shall meet the safety requirements and approval of the utility company or municipality furnishing power for operation.

When required, service poles shall be provided by the Contractor and consist of wood poles with required pole line hardware, conduit, ground rods, guy wires and anchors and all other accessories and appurtenances mounted on the pole, except those items furnished by the utility company or

municipality, or as specified separately in the contract or plans. Costs of service poles shall be included in other items bids.

Main disconnect switches shall be separately housed on the power supply assembly. Circuit breaker cabinets and meters shall not be installed on the street or walk side of the pole or pedestal.

**907-631.03.3--Performance Tests.** Delete the second sentence of Subsection 631.03.3 on page 516.

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-632-1

CODE: (IS)

DATE: 11/15/2017

SUBJECT: Traffic Signal Cabinet Assemblies

Section 632, Traffic Signal Cabinet Assemblies, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

Delete Section 632 on pages 517 thru 538, and substitute the following.

## **SECTION 907-632 - TRAFFIC SIGNAL CABINET ASSEMBLIES**

**907-632.01--Description.** This work consists of furnishing, assembling, configuring and installing all component materials and software required to form completed traffic signal controller assemblies, closed loop master controller assemblies and signal system installation of the types specified, in conformity with these specifications, to ensure fully operational traffic signal installations as shown on the plans.

### **907-632.02--Materials.**

**907-632.02.1--Cabinet Assembly.** Cabinet Assemblies shall meet the NEMA 3R requirements and be constructed principally of 0.125-inch thick, 5052-H32 aluminum. The aluminum shall have a mill finish per NEMA TS 2 7.7.3. Intermittent welds may be used for construction and any unwelded cabinet seams shall be sealed with clear RTV silicone. All external fasteners shall be stainless steel and no holes will be allowed in top of cabinet.

The door handles shall be stainless steel or cast aluminum. Door hinges shall be of the continuous type with a stainless steel hinge pin. Rivets are not be used to attach the hinge. The main door stop rod shall be constructed using stainless steel. The door stop mechanism shall be adjustable and capable of being securely latched in multiple opened positions including 90 degrees and a maximum of 120 degrees. The brackets attaching the stop rod to the door and cabinet shall be aluminum and welded in place. The main door cylinder lock shall be a #2 key type lock. Two (2) traffic industry standard No. 2 keys shall be provided with each cabinet and shall be made using heavy duty key blanks.

Extruded aluminum channels permanently attached to the right and left cabinet sides shall be provided for attaching adjustable shelving and mounting of other component panels. The cabinet shall have two (2) shelves installed. Both shelves shall be provided with the front edge pre-drilled with 0.25-inch holes located twelve (12) inches apart.

### **907-632.02.2--Physical Features.**

**907-632.02.2.1--Pull Out Drawer.** A pull out drawer shall be installed and centered under the

bottom shelf. The drawer shall be made of 0.080-inch thick, 5052-H32 aluminum and come out on full extension drawer slides. The pull out drawer shall provide an approximate 16-inch x 14-inch working area and have the ability to bear a constant 25 pound burden. There shall be a compartment for document storage. The lid shall be hinged at the rear, to gain access to the storage area. The drawer will be used to store documents as well as support a notebook computer. The drawer slides shall be of the full extension ball bearing type. Dimensions of the drawer shall be large enough to support a notebook computer and a drawer of sufficient size to hold at least two (2) copies of the cabinet drawings and other related cabinet documentation. The surface of the lid shall have a non-slip surface.

**907-632.02.2.2--Cabinet Lighting.** Cabinets shall be provided with a minimum of two (2) white light LED modules. One (1) lighting module shall be installed along the front top section of the cabinet and the second lighting module shall be installed underneath the bottom cabinet shelf in such a location as to provide direct lighting of the load bay area of the cabinet but must not interfere with the cabinet drawer operation.

Both LED lighting modules shall be controlled by a NEMA rated, commercial quality, pushbutton door switch. The cabinet lighting shall turn on when the cabinet main door is opened and shall turn off when the main door is closed or an ON/OFF NEMA rated, commercial quality, toggle switch mounted on the inside cabinet door service panel shall be provided to turn both LED lighting modules on or off.

**907-632.02.2.3--Police Panel Switches.** Police panel switches shall be provided with all controller cabinets. All switches shall be hard wired and labeled as to their function.

**NORMAL-FLASH:** When this switch is in the FLASH position, all signal indications shall transfer to the flashing mode. AC power shall be removed from the load switches when the signal indications transfer to the flashing mode.

The controller unit shall operate in accordance with appropriate specifications during the flashing mode. When the switch is placed in the NORMAL position, transfer from the flash mode to normal operation shall be made in accordance with uniform code flash requirements.

**SIGNAL ON-OFF:** AC power shall be removed from the signal heads and the intersection will become dark when this switch is in the OFF position.

**MANUAL CONTROL ON-OFF:** When this switch is in the ON position, a logic ground shall be applied to the manual control enable input of the controller unit.

**INTERVAL ADVANCE INPUT JACK:** A manual jack shall be installed on the police panel. The jack shall inter-mate with a 3-circuit, ¼-inch diameter phone plug. The tip and ring (middle) circuits of the jack shall be connected to the logic ground and the interval advance inputs of the controller unit. When the manual hand cord is plugged into the jack and the pushbutton is pressed, logic ground shall be connected to the interval advance input of the controller unit.

When specified in the contract documents, an interval advance cord shall be provided. The cord

shall have a minimum length of three (3) feet. It shall have a 1/4-inch diameter, three circuit plug connected to one end and a manual pushbutton enclosed in a hand-held enclosure at the other end. A complete cycle (push-release) of the manual pushbutton shall terminate the controller unit interval which is active except the vehicular yellow and red clearance intervals. Cycling the pushbutton during the vehicular yellow or all red clearance intervals shall not terminate the timing of those intervals.

**907-632.02.2.4--Service Panel Switches.** Service panel switches shall be hard wired and clearly labeled to identify as to their functions. Service panel switches shall be mounted on the service panel located on the inside of the main cabinet door. Alternate switch locations may be described in the plans or contract documents but final switch design and location shall be approved by the Engineer prior to cabinet fabrication.

**NORMAL-FLASH:** When this switch is in the FLASH position, all signal indications shall transfer to the flashing mode. AC power shall be removed from the load switches when the signal indications transfer to the flashing mode.

The controller unit shall operate in accordance with appropriate specifications during the flashing mode. When the switch is placed in the NORMAL position transfer from the flash mode to normal operation shall be made in accordance with uniform code flash requirements.

**CONTROLLER ON-OFF:** When this switch is in the OFF position, AC power shall be removed from the controller. When this switch is returned to the ON position, the controller unit shall perform normal start up functions and resume normal operation in accordance with the applicable specification.

**STOP TIME-RUN-NORMAL:** A 3-position manual switch shall be provided which places the controller into Stop Time mode manually or through remote input.

**VEHICLE DETECTORS:** A 3-position switch shall be provided for each vehicle and pedestrian detector circuit. All switches shall be located on a panel mounted on the inside of the main cabinet door. The switch panel shall be labeled CALL SWITCH. Labeling of phase number and intended function (vehicles or pedestrian calls) shall be provided for each switch.

The vehicle detector switch functions are defined as follows:

- Locked Call            Call is continually placed into the controller unit.
- Off (center)            Vehicle detector is connected to the controller unit vehicle detector input, i.e. normal detector operation.
- Momentary Call        Call is continuous as long as the switch is manually held in this position.

**907-632.02.2.5--Police and Service Panel Locations.** The police and service panels shall be constructed of 5052-H32 0.125-inch thick aluminum.

The police panel shall be located behind the police door which is enclosed within the main door.



The police door shall be hinged and provided with a neoprene gasket seal. Access to any portion or equipment contained behind the main cabinet door shall not be accessible through any part of the police panel. The police panel shall be of appropriate dimensions to accommodate all switch or devices described within this specification, the plans or contract document. The police door shall be provided with a treasury #2 key type lock and two (2) keys for the police door lock shall be provided with each cabinet.

The service panel shall be mounted on the inside portion of the main cabinet door, adjacent to the back side of the police panel or on the left hand side of the cabinet.

**907-632.02.2.6--Cabinet Ventilation.** Cabinets shall be vented to allow dissipation of the heat generated by the equipment contained within. All cabinets shall have a thermostatically controlled exhaust fan located at the top of the cabinet that is capable of 100 cubic feet per minute air displacement. The thermostat shall be mounted on the inside top of the cabinet and shall have a nominal temperature range from 80°F to 170°F.

The intake vent shall be louvered or equivalent design to prevent rain infiltration. The vent area will be located along the bottom portion of the cabinet door. A 16-inch x 12-inch x 1-inch disposable pleated air filter shall be provided on the inside portion of the cabinet and shall fully cover the vent area.

**907-632.02.2.7--Air Filter Assembly.** Air filters shall be one piece and shall be held firmly in place against the cabinet door in order to prevent dust from bypassing the perimeter of the filter and shall fully cover the vent area. Wing nuts or thumbscrews are preferred. Air filter shall be a 16-inch x 12-inch x 1-inch disposable pleated filter.

**907-632.02.2.8--Cabinet Sizes.**

**907-632.02.2.8.1--Type I Cabinet.** A Type I cabinet, 51”H x 30”W x 18”D, may be used for both pole and base mounted cabinets that require a maximum eight (8) position load bay. Pole mounted cabinets do not require rear access.

**907-632.02.2.8.2--Type II Cabinet.** A Type II cabinet, 51”H x 36”W x 18”D, may be used for both pole and base mounted cabinets that require a maximum twelve (12) position load bay. Pole mounted cabinets do not require rear access.

**907-632.02.2.8.3--Type III Cabinet.** A Type III cabinet, 56”H x 44”W x 27”D, shall be used for base mount installations and shall require a sixteen (16) position load bay and rear access door.

**907-632.02.2.8.4--Type IV Cabinet.** A Type IV dual chamber cabinet, 56”H x 57”W x 29”D, shall be used for base mount installations and shall require a sixteen (16) position load bay, rear access door, and external generator plug. When called for in the plans, a UPS shall be housed inside this cabinet.

**907-632.02.2.8.5--Type V Cabinet.** A Type V cabinet, 77”H x 44”W x 27”D, shall be used for base mount installations and shall require a sixteen (16) position load bay and rear access door.

**907-632.02.3--Power Distribution Panel.** The power panel shall be wired to provide the necessary power to all equipment. It shall be manufactured from 0.125-inch thick, 5052- H32 aluminum. The power panel shall house the following components: Main Breaker, Auxiliary Breakers, and Terminal Block. The panel shall be of such design so as to allow a technician to easily access the main and auxiliary breakers.

A 3-position terminal block with a removable insulated cover accepting up to AWG #4 stranded wire shall be supplied for accepting only the incoming power lines. This terminal block shall be in advance of and supply only the 30-amp main breaker, 10-amp and 5-amp Auxiliary breakers, AC neutral buss and earth ground buss.

**907-632.02.3.1--Ground and Neutral Busbars.** Cabinet grounding shall meet the requirements set forth in Subsection 722.09 for grounding and ground rods. A solid copper ground busbar shall be mounted on the side of the cabinet wall adjacent to the power panel for the connection of chassis ground wires. If more than one (1) ground busbar is used in a cabinet, a minimum of an AWG #6 copper wire shall be used to bond them.

The copper ground busbar shall have a minimum of thirteen (13) connector points, each capable of securing at least one (1) AWG #6 conductor.

A solid copper neutral busbar shall be mounted on the side of the cabinet wall adjacent to the power panel for the connection of AC neutral wires.

The copper neutral busbar shall have a minimum of thirteen (13) connector points, each capable of securing at least one (1) AWG #6 conductor.

**907-632.02.3.2--Terminal Strips.** Conductors shall be terminated on terminal strips with insulated terminal lugs. When two (2) or more conductors are terminated on field wiring terminal strip screws, a terminal ring lug shall be used for termination of those conductors. The voltage and current rating of terminal strips shall be greater than the voltage and current rating of the wire which is terminated on the terminal strip.

**907-632.02.3.3--Cabinet Receptacles.** A 3-wire 115 Volt AC (15A) Ground Fault Circuit Interrupt (GFCI) duplex receptacle shall be provided in the cabinet for maintenance use. It shall be securely mounted near the bottom right side of the cabinet and easily accessible.

Two (2) 3-wire 115 Volt AC (15A) non-GFCI protected outlets shall be installed, one on each side of the cabinet. These two (2) outlets are used for communication or other auxiliary equipment.

**907-632.02.3.4--Operating Line Voltage.** All equipment shall be designed to operate from a 120 volt, 60 cycle AC supply. Operation shall be satisfactory at voltages from 105 volts to 130 volts. All operating voltages into and out of the controller shall be NEMA level DC voltages except for the controller AC power source (Connector A, Pin p – AC-Control and Pin U – AC Common).

**907-632.02.3.5--Circuit Breakers.** Circuit breakers shall meet the requirements set forth in

Subsection 722.07. A 30-amp main breaker, with a minimum of 10,000 amp interrupting capacity, shall be provided for all cabinets to supply power to the controller, MMU, signals, and rack power supply.

Two (2) auxiliary breakers shall be provided. The first breaker, 10-amp, shall supply power to the fan, light, GFCI utility receptacle and two (2) auxiliary standard receptacles. The second breaker, 5-amp, shall be installed to supply power for the Controller Unit and MMU2. The above circuit breakers line side shall be jumpered together and will be fed from an external main circuit. A third 5-amp breaker shall be required if an ITS camera panel is called for in the plans.

**907-632.02.3.6--Main Line Arrestors.** Surge protection shall be provided that meets the requirements set forth in Subsection 722.12. A main line arrestor shall be provided to reduce the effects of voltage transients on the AC power line. It shall be installed after the circuit breaker. The main line arrestor shall be sufficient to protect all equipment and devices as per the plans and the following minimum specifications.

- Multi-stage Hybrid Design
- Series induction filtering
- Thermally protected Metal Oxide Varistors (TMOV's)
- Operating Voltage: 120 VAC
- Clamping Voltage: 395 VAC
- Operating Current: 15 A
- Peak Surge Current: 50 kA/Mode, 100 kA/Phase
- Operating Frequency: 47-63Hz
- EMI Attenuation: 40 dB Typ
- SPD Technology: TMOV's w/ W-C Filter
- Modes of Protection: L-N, L-G, N-G
- Status Indication: Power On & TMOV's Functional
- Connection Type: ¼-20 Stainless Steel Stud
- Operating Temperature: -40°F to +185°F

**907-632.02.3.7--Solid State Main Line Relay (SSR).** A normally-open, 75-amp, hybrid SSR shall be provided on the power distribution panel. The relay shall include a LED indicator to verify circuit power.

**907-632.02.4--Terminal Facilities Board.** The Terminal Facility shall be a hardwired load bay for NEMA TS 2 Type 1 actuated controllers. The load bay shall include either eight (8), twelve (12) or sixteen (16) load switch positions, as specified by the plans, and shall be centered along the back of the cabinet below the bottom shelf.

All wires terminated behind the backboard, as well as any additional panels, shall be soldered. No pressure or solderless connectors shall be used, unless they are soldered to the wire and tab after connection.

**907-632.02.4.1--Load Switches and Flashers.** Solid State Load Switches, compatible with low

wattage LED signals, shall be provided for the sequence called for on the plans. The load switch sockets shall be wired for triple-signal load switches conforming to NEMA TS 1-1994 and NEMA TS 2-2003 requirements.

The flasher socket shall be wired for and provided with a Type 3, two (2) circuit Solid State Flasher conforming to NEMA TS 1-1994 and NEMA TS 2-2003 requirements. It shall be possible to flash either the amber or red indication on any load switch outputs. It shall be possible to easily change the flash indication from the front side of the panel using readily available tools such as a screwdriver. A nominal flash rate of 50 to 60 FPM shall be provided. Flash rate shall be stable when used with generators or inverters.

Support(s) shall be provided to support the Flasher and Load Switches at some point approximately half of the total length from the panel surface. Sufficient area beneath the Load Switch or Flasher shall be clear in order to allow for free flow of air across the Load Switches or Flasher. Load Switches and Flashers must be provided with LED indicator lights on the side facing the cabinet door.

**907-632.02.4.2--Flash Transfer Relay.** All flash transfer relays, as a minimum, shall meet NEMA TS 1 requirements. The number of relays that shall be supplied with each cabinet shall accommodate the number of signal phases as indicated in the project plans. The coil of the flash transfer relay must be de-energized for flash operation.

**907-632.02.5--Cabinet Wiring.** Controller cabinets shall be wired in accordance with the signal phasing plans. If phases are indicated as omitted for future use, or if phases are not shown to be used in the plans, the cabinet shall be wired for use of the phases shown as future or unused. Load Switches shall not be provided for future or unused phases.

Wiring in the cabinets shall conform to the requirements of the National Electrical Code (NEC) and all of these specifications. All conductors in the cabinet shall be stranded copper. All wiring shall be laced. All wiring shall be in accordance as specified by Section 636 and Subsection 722.03 for Electric Cable and IMSA Specification 19 and/or 20 for Signal Wiring.

Connector harnesses for controller, conflict monitor, vehicle detectors, and accessory equipment (including NEMA defined Card Rack with power supply and pre-wired optical detection slots) shall be provided and wired into the cabinet circuitry. Connecting cables for controller and conflict monitor harnesses shall be sleeved in a braided mesh. All wires shall be securely terminated on terminal strips. The lay of the interconnect cable between the components must be such that when the door is closed, it does not press against the cables or force the cables against the various components inside the cabinets.

All communication wiring shall be bundled and routed independently of all other wiring. All live conductors shall be covered with suitable insulating material. All equipment grounds shall run directly and independently to the grounding bus.

All wires shall be cut and terminated as close as possible to the proper length before assembly. Consideration of equipment location adjustments must be made when determining appropriate

wire lengths. Excessive lengths of wire or cable shall not be allowed. All line voltage conductors used in controller cabinet shall conform to the following color code:

- AC Neutral: White
- AC Hot: Black
- Safety Ground: Green

**907-632.02.5.1--Signal Terminal Arrestor Grounding Bar.** A field terminal arrestor grounding bar shall be provided along the back portion of the cabinet for the installation of signal arrestors. This bar shall be attached using an AWG #10 stranded copper to the earth ground circuitry.

**907-632.02.5.2--Signal Terminal Arrestors.** The field terminal arrestor shall be a three (3) circuit protective device intended for use on traffic control load relay outputs. The arrestor shall be furnished with three (3) leads and a grounding stud which will be used to attach the arrestor to the grounding bar. The field terminal arrestor shall meet the following minimum specifications:

- Operating Voltage: 120 VAC
- Clamping Voltage: 475 VAC
- Peak Surge Current: 10 kA
- Operating Frequency: 47 – 63 Hz
- SPD Technology: MOV's
- Connection Type: Wire Leads
- Lead Wire: 14 AWG 12" Length
- Ground Stud: 10 x 32 5/8" Length
- Operating Temperature: -40°F to +185°F

**907-632.02.6--Accessory Components.**

**907-632.02.6.1--Traffic Actuated Controller Unit.** The fully actuated controller unit shall, at a minimum, meet the requirements of both NEMA TS 1-1989 and NEMA TS 2-2003 requirements for actuated controller units. The controller shall be of the TS 2 Type 2 configuration. The controller shall be provided with the multiple communication interface devices or properties as defined below.

- 10 Base-T Ethernet with front panel RJ-45 connector
- IEEE defined MAC address
- EIA-232 port
- External Serial Fiber options for both single and multi-mode (optional as per plans)
- External FSK 1200 bps modem (optional as per plans)
- D connector with 37 pin configuration for TS 1 compatibility
- USB port for signal controller database upload/download to the controller flash
- Controller
- ECOMM Compatible

The controller unit must have an alphanumeric backlit LCD display with a minimum of sixteen

(16) lines at 40 characters per line. The controller must be air-cooled with sufficient ventilation openings and capable of operating between -30°F and 165°F. The controller unit must be provided with a time-of-day clock, automatic daylight savings time adjustment and a power supply for maintaining SRAM during a power outage. The controller unit shall be capable of being used in a Closed-Loop System and must be capable of operating in the role of master controller in a Closed Loop System. The controller unit firmware shall be fully compatible with the Department's existing Traffic Signal Management Software. The Contractor shall ensure all controller firmware versions are compatible with the existing Traffic Signal Management Software that the Regional Department staff currently utilizes prior to submitting the controller for approval. The Contractor shall notify the Department if any special controller configuration or firmware is needed prior to submitting the controller for approval based on project requirements.

Where Flashing Yellow Arrow (FYA) operations are being used, all traffic signal controller firmware shall be capable of delaying the onset of the flashing yellow arrow.

All operator entered data shall be stored and backed up on to a flash memory device provided with the controller unit at no cost. This flash memory device shall require no battery to support value storage. No internal components of circuitry shall require battery support. The database shall be able to be backed up to a USB drive via the USB drive on the controller.

Traffic Actuated Controllers shall be of the Type shown on the plans. Type 1 Controllers shall have a Linux based processor and a minimum of one (1) USB port. Type 2 Controllers shall have the same features as Type 1 Controllers with the addition of an ATC backplane.

Type 3 Controllers shall have all features of the Type 2 Controller with the addition of the ATC module. All three (3) types of actuated controllers shall have Master controller capability, and if required shall be designated with 'M' in the plans.

**907-632.02.6.2--Closed Loop Master Controller Unit.** When called for in the plans, this work also consists of furnishing, installing and configuring the equipment, software and accessories necessary to connect one (1) traffic Closed-Loop Master Controller to its corresponding central or portable PC-based Traffic Computer Facility Control System via a communications connection. The communications or network connection device will be either existing or provided by the Contractor.

**907-632.02.6.2.1--General.** The Master shall monitor intersections in the system, display status and operational state and provide traffic flow data from intersection vehicle detectors. The Master shall include all communications equipment and software necessary to provide reporting to a remote terminal as well as upload/download of all local intersection data and provide timing synchronization. Communications to local controllers from the Master and from the Master to the central-office computer facility shall be by FSK, 900 MHz Radio, Broadband Radio, Serial Fiber, Ethernet, Fiber, Cell Modem or Leased Line, as indicated in the plans. The Master shall be able to run on the same controller simultaneously operating the intersection, with the local signal control software, on any given controller unit.

**907-632.02.6.2.2--System Configuration.** The system architecture shall be designed to minimize

the effect of equipment failures on system operation and performance. The system consists of four (4) principal elements:

- Local System Intersection Controllers
- Communication (Telemetry Links)
- On-Street Master(s)
- Central-Office Computer Software

**907-632.02.6.2.3--Local System Intersection Controller.** The local system intersection controllers connected to the Master controller unit shall be capable of controlling a fully actuated two (2) to sixteen (16) phase intersection and shall meet or exceed NEMA TS 1-1989 and TS 2-2003 standards for fully actuated traffic control units. The local controller shall have internal communication capability with direct access to the data memory. The local system controller shall be capable of processing controller and detector data and provide all necessary intersection control functions. The local system intersection controller shall meet the requirements of the Traffic Actuated Controller Unit.

**907-632.02.6.2.4--Communications (Telemetry) Links.** The communications links for the "Closed-Loop" System shall perform the following functions:

- Provide the medium (radio/fiber/hardwire/etc.) for two-way communications between the On-Street Master and the local intersection controllers.
- Provide the medium for two-way communication between the On-Street Master and the central-office computer facility.
- Error checking shall be included in both mediums to assure transmission and reception of valid data.

**907-632.02.6.2.5--On-Street Master.** The On-Street Master may be located at an intersection and connected via the communication network to at least 32 local intersection controllers. The Master shall be capable of implementing Traffic Responsive Control, Time Base Control, Manual Control or Remote Control modes of operation.

Analysis of sampling sensor data from at least 64 system detectors and corresponding selection of the best Traffic Responsive timing pattern shall be provided by the On-Street Master during the Traffic Responsive mode of operation.

Automatic and continuous monitoring of system activity shall be provided by the On-Street Master to include both Master and intersection alarm conditions.

System parameter entry shall be provided via the On-Street Master including all Master and local intersection assignment and group parameters. Master parameters shall include:

- System coordination setup and pattern data entry by group
- System time base event scheduler
- System traffic responsive computational and pattern selection setup by group
- Intersection system group and detector assignments

The On-Street Master shall provide comprehensive system report generation including, as a minimum: system, intersection, detector and failure status and history reports in addition to system performance reporting.

A RS-232C interface shall be provided on the On-Street Master to allow for printing of reports or for interconnecting to a remote central site.

To enhance overall system operation and increase system management flexibility, the On- Street Master shall also support two-way dial-up communications to a central office computer for control, monitoring, data collection and for timing pattern updating purposes, all from a remote central office location. Continuous, seven (7) days/week - 24 hours/day, system monitoring shall be enhanced by the On-Street Master's capability to automatically dial-up the central office computer upon detection of user defined critical alarm conditions.

**907-632.02.6.2.6--System Functional Requirements.**

**907-632.02.6.2.6.1--Operator Interface.** In order to provide ease in programming and operation, the system shall provide a simplified user-friendly menu format at each local, master and central office facility. No special programming skills shall be required for the user to fully access and operate this control and monitoring system at any level.

All programming, both of the local intersection controllers and the On-Street Master(s) shall be via a front panel keyboard and display, driven by English Language menus. All data change entries will be automatically verified against established ranges prior to acceptance to prevent programming data errors. Data access shall be controlled by user- definable access controls.

**907-632.02.6.2.6.2--System Traffic Control.** The system shall have the capability of controlling a minimum of sixteen (16) vehicle phases and eight (8) pedestrian phases. The system shall have the capability of implementing a minimum of four (4) timing rings, fifteen (15) alternate sequences, and sixteen (16) offsets.

The system shall provide the capability of selecting any of the following operational modes on a group basis:

- Traffic Responsive
- Time Base (Time-of-Day/Day-of-Week)
- Remote (External Command)
- Manual (Operator Entry)

The system shall be capable of implementing system FLASH and system FREE operation. The system shall have the capability to command, on/off based on time, up to eight (8) independent special functions.

**907-632.02.6.2.6.3--Detectors.** The system shall have the capability of accepting and processing data from at least 632 system detectors for Traffic Responsive program selection.



**907-632.02.6.2.6.4--Pattern Selection.** In addition to providing Manual and Remote program selection capability, the Master shall provide for Traffic Responsive and Time Base modes of operation for timing pattern selection.

**907-632.02.6.2.6.4.1--Traffic Responsive Mode.** Traffic plan selection in the Traffic Responsive mode shall be user-enabled and supplied with the controller, per the plans and specifications. The pattern selection shall be based on sampling detector volume and occupancy analysis by the On-Street Master.

**907-632.02.6.2.6.4.2--Time Base Mode.** The system shall provide the capability of implementing time-of-day, day-of-week and week-of-year control for each of the two (2) groups using an internal time clock referenced to the 60-Hz AC power line frequency for its time base. The Time Base mode shall contain automatic adjustment for leap year and daylight savings time changes.

The system Time Base mode shall provide, as a minimum, 100 events each capable of requesting any of the 48 traffic control patterns along with Traffic Responsive override enable or auxiliary events consisting of enable/disable any of up to four (4) system-wide special functions and setting sample and log interval time periods.

**907-632.02.6.2.6.5--System Control Priority.** The system coordination control (program-in-effect) for each group shall be selected on a priority basis. The priority from highest to lowest shall be as follows:

- Manual Control Entry
- External Control (Remote Command)
- Time Base Control (Time-of-Day/Day-of-Week) (Traffic Responsive control will prevail whenever Traffic Responsive Override Enable is active and the selected cycle length is greater than that being commanded by Time Base)
- Traffic Responsive Control

**907-632.02.6.2.6.6--Measures of Effectiveness.** The system shall have the capability to report selected Measures of Effectiveness (MOE's) on an intersection basis. MOE calculations shall be made on all phases by the local system intersection controller and as a minimum shall include measures such as: volume, number of stops, delays and green utilization. These measures shall be calculated on the basis of the active timing plan. Alternate ways of reporting MOE'S may be approved on a case-by-case review.

**907-632.02.6.2.6.7--Uploading and Downloading.** The system shall provide, for any selected local system intersection controller, the capability of uploading and downloading any or all, new or modified local intersection parameters from the central-office computer and the Department Central Traffic Signal Management Software, and shall include, as a minimum, all: Phase Timing and Unit Data; Coordination Data, Time Base Data; Preemption Data, System Communication Parameters, System Traffic Responsive Data, and any other System Data residing at the intersection such as Detector Diagnostic Values, Report Parameters and Speed Parameters.

During either uploading or downloading operations, normal traffic control operations shall not be suspended. All data shall be continually accessible and may be displayed at the On- Street Master or the central office computer.

**907-632.02.6.2.6.8--System Monitoring and Diagnostics.** The system shall automatically and continually monitor system activity and log/report occurrences of Master and intersection alarm conditions. All alarm condition events shall include at the intersection, (Master and central-office computer) an alpha-numeric description of the event as well as the time and date of occurrence.

As a minimum, monitored master alarms conditions shall include:

- Insufficient or Improper Data
- Failed Computational Channels
- Failed System Detectors
- Intersection Communication Failure
- Failed Controllers
- Minimum of six (6) special user defined alarms for user application flexibility
- Monitored intersection alarms conditions shall include as a minimum:
  - Cycle Faults and Failures
  - Coordination Failures
  - Voltage Monitor
  - Conflict, Local and Remote Flash Conditions
  - Preempt
  - Local Free
- Minimum of six (6) special user defined alarms for additional user flexibility.

When the Master detects a critical alarm condition, as defined by the user, it shall automatically dial-up the central office computer and report the condition. On a BUSY or NO ANSWER, the system may be programmed, at user option, to alert a secondary computer.

The system shall also automatically and continually monitor, verify and attempt to correct Sync Pulse, Time Base Clock and Pattern-In-Effect. The system shall provide capabilities to perform diagnostics on system and local detectors, communications and intersection operations. When a fault has been detected, an indication shall be provided. It shall be possible to isolate the fault to the failed unit from controls and indicators available on the Master unit. Auxiliary equipment such as a data terminal or CRT shall not be required to identify the failure.

**907-632.02.6.2.6.9--Real Time Display.** The Master shall provide for any selected local system intersection controller, real-time status information on its front panel. Real-time intersection status information shall include simultaneous display of: vehicle and pedestrian signal and detector status by phase, overlap signal status and cars waiting count by phase. Real-time controller status information shall include simultaneous display of: two (2) Ring Active timers, On/Next, Call/Recall and Hold/Omit Status by phase, Coordination, Preempt and Stop Time Status.

**907-632.02.6.2.6.10--System Management.** The system, without hardware changes but with its

ability to directly modify Master and intersection parameters, shall provide the user system configuration and operational controls of the following functions: add/delete controllers and system detectors, enable Traffic Responsive mode, assign intersections to groups, assign system detectors to computational channels and channels to pattern select routines, and assign special and/or standard detectors as system detectors for use with computational channels or to track activity.

**907-632.02.6.2.6.11--System Logging and Reports.** The system shall automatically and continually process system data and log/report on occurrence of changes in intersection status, system detector status, communications status, controller status and local detector status in addition to system program changes, Traffic Responsive computations, measures of effectiveness and performance.

**907-632.02.6.2.6.12--Security.** The On-Street Master shall provide for a user-specified security code entry before any data may be altered. In order to view any parameter, security code entry shall not be required. Security access shall be automatically rescinded approximately ten (10) minutes after either access was gained or the last parameter change was entered. The Master and local controller shall have the ability via keyboard to disable security code requirements, allowing for perpetual access without requiring hardware changes.

**907-632.02.6.2.7--Design Characteristics.** The On-Street Master shall be designed to operate in either an office or field environment and shall be suitably housed in a separate enclosure or in a local intersection cabinet. The Master shall be designed to meet the following electrical and mechanical requirements:

**907-632.02.6.2.7.1--Programming and Security.** Operator programmable data entry shall be accomplished through panel keyboard(s). The Master shall prevent the alteration of keyboard set variables prior to the user having entered a specific access code through the keyboard. The Master shall maintain user-programmable variables in non-volatile memory with a battery-backed RAM to assure continued efficient system operation.

**907-632.02.6.2.7.2--Test and Repair.** To enhance maintenance and trouble-shooting activities, On-Street Masters shall include resident diagnostics as a standard. No extender- cards, special tools or PROMs shall be necessary to fully maintain these components. The Master unit design shall ensure that all printed circuit boards be readily accessible for maintenance testing purposes. All fuses, connectors and controls shall be accessible from the front of the Master unit.

**907-632.02.6.2.8--Traffic Signal System Software.** All Traffic Signal System Software shall be compatible with the latest version of the Department's existing Master and local controllers and existing Traffic Signal Management Software for the Department region.

**907-632.02.6.2.8.1--Traffic Signal Closed Loop Software.** The Traffic Signal Closed-Loop Software shall provide the ability to manage Master and local controller databases including the uploading and downloading of data parameters. The software shall provide status information and provide reporting capabilities for Master and local controller data, alarms and logs.

**907-632.02.6.2.8.2--Traffic Signal System Workstation Software.** The Traffic Signal System Workstation shall provide the ability to manage Master and local controller databases including the uploading and downloading of data parameters. The software shall provide status information and provide reporting capabilities for Master and local controller data, alarms and logs.

The Traffic Signal System Workstation Software shall also be capable of operating as a network-connected user workstation to existing centralized signal systems and their associated databases.

When disconnected from the centralized signal system, the software shall be capable of running as a standalone system similar to the Closed-Loop Software. Under this mode, the software shall provide management, report and status functions for Master and local controllers. Under Standalone Mode of operation the software shall allow for its own database(s) for data management without the need for connecting to a centralized signal system database.

**907-632.02.6.2.9--Services.** Technical services shall be provided, as required, to assist in installation and initial setup of the Closed-Loop Master System and its sub-components. Technical assistance with database migration and/or setup, as well as the development of graphics (such as master maps and local intersection depictions) and the assignment of associated attributes such as detectors, phasing, signals, etc., shall be provided as required. Additionally, training shall be provided on a basic or advanced target user level, as required.

**907-632.02.6.3--Malfunction Management Unit (MMU2).** The Malfunction Management Unit (MMU2) shall be a shelf-mountable, sixteen (16) channel, solid-state, IP addressable MMU. The MMU2 shall accomplish the detection of, and response to, improper and conflicting signals and improper operating voltages in a traffic signal controller assembly, including support for four (4) section Flashing Yellow Arrow (FYA) left turn displays. The MMU2 shall be capable of running a minimum of twelve (12) different modes of FYA operation.

The MMU2 shall meet or exceed Section 4 requirements of the NEMA Standards Publication No. TS 2-2003 including NEMA TS 2 Amendment #4-2012 and provide downward compatibility to NEMA Standards Publication No. TS 1-1989: Type 12 Operation, in addition to those specifications set forth in this document.

The MMU2 shall include a graphics based Liquid Crystal Display (LCD) to view the current monitor status and navigate the unit's menus. An RJ-45 Ethernet Port shall be provided for communications.

A built-in Diagnostic Wizard shall be provided that displays detailed diagnostic information regarding the fault being analyzed. This mode shall provide a concise view of the signal states involved in the fault, pinpoint faulty signal inputs and provide guidance on how the technician should isolate the cause of the malfunction. The Diagnostic Wizard shall be automatically invoked when the MMU2 is in the fault mode and the HELP button is pressed. It shall also be automatically invoked when the MMU2 is in the Previous Fail (PF) event log display and the HELP button is pressed.

A built-in Setup Mode shall be provided that automatically configures the Dual Indication Enable, Field Check Enable, Red Fail Enable and Minimum Yellow Plus Red Clearance Enable parameters from user input consisting only of channel assignment and class (vehicle, ped, pp-turn, FYA, etc.) responses.

The MMU2 shall be capable of operating in the Type 12 mode with SDLC communications enabled on Port 1. The Channel Status display shall operate in the Type 12 configuration and provide the Field Check function for up to four (4) Pedestrian Walk inputs.

In the interest of reliability and repair ability, printed circuit board mounted MS connectors shall not be acceptable. Internal MS harness wire shall be a minimum of nineteen (19) strand AWG 22 wire.

**907-632.02.6.4--NEMA defined Card Rack and Power Supply.** A minimum of one (1) NEMA compliant detector card rack with five (5) slot positions (first slot for power supply and four (4) available slots) shall be provided in each cabinet. The detector rack shall be installed on the bottom shelf of the cabinet. The power supply for the NEMA defined card slots shall be provided as a 175W minimum with four (4) independent regulated channels of 24 VDC each rated at 0.75 amps over the full NEMA operating temperature range of -30°F to +165°F. The output should be regulated to 24 VDC +/- 15%. Each of the four (4) outputs shall be independently fused, each with a separate LED for displaying output and fuse status for each of the four (4) outputs. Each of the four (4) outputs shall be protected against voltage transients by a minimum 1500 watt suppressor. All card racks shall be wired for the type detection shown in the plan sheets.

Card Guides shall be provided on the top and bottom of the card rack for each connector position.

**907-632.02.6.5--In-Cabinet Network.**

**907-632.02.6.5.1--Communications Arrestor.** The Controller Cabinet network shall consist of an SDLC connection between the Controller Unit and MMU2. Surge suppression for this network shall meet the requirements set forth in Subsection 722.12 and the following minimum requirements below:

- Operating Voltage: 5 VDC
- Clamping Voltage: 8 VDC
- Operating Current: 1.5 A
- Peak Surge Current: 47 A (10x1000  $\mu$ s)
- Frequency Range: 0 to 20 MHz
- Insertion Loss: < 0.1 dB at 20 MHz
- SPD Technology: SAD
- Connection Type: DB-15
- Operating Temperature: -40°F to +185°F

**907-632.02.6.6--System Communications.**

**907-632.02.6.6.1--Traffic Signal Ethernet Switch.** When specified in the plans or contract

documents, a traffic signal Ethernet switch shall be installed in the cabinet assembly. It shall meet the requirements for the type specified in Section 907-663. Ethernet patch cables of sufficient length shall be provided for all supplied Ethernet ready cabinet components. The switch and all components shall be connected and configured.

**907-632.02.6.6.2--Fiber Optic Patch Panel.** When specified in the plans or contract documents, fiber optic attenuator patch cords shall be installed in the cabinet assembly as specified in Section 907-661.

**907-632.02.6.6.3--Wireless Communications.** When specified in the plans or contract documents, wireless communication components shall be installed in the cabinet assembly and shall be as specified in Section 907-662.

**907-632.02.6.6.4--Serial Port Server or Terminal Server.** When specified in the plans or contract documents, serial port servers shall be installed in the cabinet assembly and shall be as specified in Subsection 907-663.02.2.

**907-632.02.6.6.5--GPS Clock.** This work includes furnishing a Global Positioning System (GPS) Synchronization clock that can be used to sync the internal clocks in traffic signal controllers when coordination is desired, but communication is not necessary. The GPS Clock System shall provide GPS based time and date synchronization to provide coordination of traffic controllers to a common time base. The system shall process GPS Time data using a tamper/vandal resistant GPS antenna and correct for Time Zone, Daylight Savings Time, Leap Years, and GPS Leap Seconds. The processed time information shall be sent to the traffic controller in the native format for the respective controller. A contact closure synchronization pulse with variable pulse width shall be available for a once per day update. If the GPS antenna is blocked for up to one (1) hour prior to scheduled time of synchronization, the system shall synchronize the traffic controllers with less than 0.4 seconds variance from the accuracy provided under normal operation with GPS satellites in view.

- The GPS Clock shall also meet the following minimum specifications:
- Input Voltage: 9-24 VDC
- Current Draw: 150 mA (max) at 12 VDC: 125 mA (max) at 24 VDC
- Contact Closure: 750 mA at 30 VDC
- Temperature Rating: -29.4°F to +167°F

GPS unit shall be mounted to the traffic signal controller cabinet as per the manufacturer's recommendation. Any and all holes created in the cabinet for the purpose of mounting the GPS unit shall be sealed to the satisfaction of the Engineer at no direct pay.

**907-632.02.6.6.6--Power-Over-Ethernet Arrestor.** Surge suppression that meets the requirements set forth in Subsection 722.12 shall be provided. In addition, the following minimum specifications shall be supplied for loads that require Power-Over-Ethernet with isolated shielded or non-shielded cable:

- Operating Voltage: 48 VDC
- Clamping Voltage: 68 VDC
- Operating Current: 0.75 A per Pin Continuous
- Peak Surge Current: 10 kA
- Insertion Loss: < 0.1 dB
- SPD Technology: GDT, SAD, with series PTC
- Modes of Protection: All Lines (1-8) Protected (L-L) and (L-G): Signal High- Low; High-Ground; Low-Ground
- Transmission Speeds: 10BaseT; 100BaseT; 1000BaseT
- Connection Type: RJ-45
- Operating Temperature: -40°F to +185°F

**907-632.02.7--Detector Panel.** A vehicle detector harness shall be provided to connect the detector panel to the card rack. The detector panel shall accept the connection of sixteen (16) field loop inputs and four (4) pedestrian detector inputs.

**907-632.02.7.1--Detector Input Arrestors.** Field Loop and Pedestrian input arrestors shall meet the requirements set forth in Subsection 722.12. Field loop arrestors shall have differential and common mode protection and be provided with the following minimum specifications:

- Operating Voltage: 75 VDC
- Clamping Voltage: 130 VDC
- Peak Surge Current: 250 A
- SPD Technology: Silicon Break-Over
- Operating Temperature: -40°F to +185°F

Pedestrian input arrestors shall be a four (4) circuit device provided with the following minimum specifications:

- Operating Voltage: 30 VDC
- Clamping Voltage: 36 VDC
- Operating Current: 0.15 A
- Peak Surge Current: 10 kA (8 x 20  $\mu$ s)
- Frequency Range: 0 to 20 MHz
- Insertion Loss: < 0.1 dB at 20 MHz
- SPD Technology: GDT, SAD, with Series PTC
- Connection Type: Terminal Block with compression lugs; Terminals accept up to 10 AWG
- Operating Temperature: -40°F to +185°F

**907-632.02.8--System Detectors.** The controller shall have the ability to receive input data from up to eight (8) special system detectors in addition to the normal actuated controller unit phase detectors. The user shall have the option to assign any of the phase detectors as “system detectors”.

**907-632.02.9--Preemption.** The cabinet shall be completely wired to accept and service calls from preemption phase selector modules, associated optical detector units and GPS units. Optical detector units and GPS unit cabinet components shall be as specified in Section 639. Provision for two (2) standard card modules shall be accommodated in a separate card rack for preemption. The preemption card rack shall provide a minimum of eight (8) channels.

Provisions shall also be made in the cabinet to accommodate Railroad Preemption when specified in the plans or contract documents. Railroad Preemption shall meet the requirements set forth in Section 639. While it is not necessary that a Railroad Preemption interface board be provided with the cabinet, the cabinet and back panel shall be designed so that a Railroad Preemption interface panel that uses a relay to isolate the track switch from the controller cabinet circuitry can be installed. Preempt 1 and 2, in the case of gate down preemption, shall be reserved for Railroad Preemptions; all subsequent preemptions shall be reserved for Emergency Vehicle, Fire Station, or Police Preemption.

**907-632.02.10--Uninterruptable Power Supply.** When specified in the plans or contract documents an Uninterruptable Power Supply (UPS) System shall be installed in the cabinet assembly. The UPS shall be installed in the cabinet and meet the requirements set forth in Section 633.

**907-632.02.11--Power Service Pedestal.** A Power Service Pedestal shall be provided as described in Section 631.03.2.

**907-632.03--Construction Requirements.**

**907-632.03.1--Mounting.** Traffic Signal Cabinet Assemblies shall be wall or pole mounted, base mounted on a concrete cabinet pad, or base mounted using a composite enclosure as specified below and as shown in the plans.

Power Service Pedestal shall be base mounted on a concrete cabinet pad or on a composite enclosure as specified below and as shown in the plans.

**907-632.03.1.1--Wall or Pole Mounted.** Wall or pole mount hardware shall be provided for mounting cabinets in specific installations as indicated in the design plans. Wall or pole mounted cabinets shall be manufactured with rigid tabs, rigid brackets or other acceptable configuration for attachment of the cabinet to the wall or pole support. Rigid attachment devices must allow for field alignment of cabinet to the wall or pole support.

**907-632.03.1.2--Concrete Cabinet Pad.** Concrete foundations shall be constructed of Class B concrete in specific installations as indicated in the design plans.

Cabinets for installation on a concrete base shall be manufactured with rigid tabs, rigid brackets or other acceptable configuration for attachment of the cabinet bottom to its flat support structure. Rigid attachment devices must allow for field alignment of cabinet with the support base. Concrete base construction details shall be provided in the design plan drawings.



**907-632.03.1.3--Composite Enclosure.** Cabinets for installation on a composite enclosure base shall be manufactured with rigid tabs, rigid brackets or other acceptable configuration for attachment of the cabinet bottom to its' flat support structure. Rigid attachment devices must allow for field alignment of cabinet with the composite enclosure. Composite enclosure attachment details shall be provided as shown in the plans.

**907-632.03.2--Documentation.** Documentation packages shall be delivered for each unit at the same time as the equipment to which it pertains.

A minimum of two (2) sets of complete schematic drawings and equipment documentation shall be supplied with each cabinet. The first copy shall be placed in a clear re-sealable print pouch of sufficient size to accommodate one (1) complete set of folded cabinet prints and placed in the pull-out drawer of the cabinet and the second copy shall be provided to the Department. Comprehensive controller data shall be included as part of the cabinet documentation package and shall be placed in the cabinet drawer pouch. Digital copies of all cabinet documentation shall be provided to the Department before final acceptance.

The documentation packages shall contain a schematic wiring diagram of the controller cabinet assembly and all auxiliary equipment. The schematic wiring diagram, including a symbols legend, shall show in detail all integrated circuits, transistors, resistors, capacitors, inductors as well as switches and indicators. All parts shown shall be easily identified on both in the cabinet and on the schematic diagram. Model numbers shall be used on schematic diagram when available.

A complete physical description of the signal cabinet assembly shall be provided to include at least the physical dimensions of the unit, weight, temperature ratings, voltage requirements, power requirements, material of construction, and complete performance specifications.

A complete set of operation guides, user manuals, and performance specifications shall be provided.

Detailed programming instructions, preventative maintenance requirements, and troubleshooting procedures shall also be provided for the controllers. These documents shall fully cover all programming procedures and programmable options capable of being made to the controllers and associated traffic control equipment. Instructions for modifications within the range of the capabilities of the unit such as changes in phases or sequences and programming matrix boards shall be included.

An intersection diagram shall be provided on the cabinet door showing geometric configuration, lane use assignments, controller cabinet and signal pole locations, vehicle and pedestrian signal head locations, vehicle and pedestrian detector zone locations, ring-barrier phasing diagram, and detector channel assignments. The intersection diagram shall be labeled with, at a minimum, a North Arrow, main street name(s), side street name(s), signal pole numbers, vehicle and pedestrian head type(s), detector zone designations, volume density and phase recall requirements, flash sequence. All field wires within the cabinet shall be labeled to coincide with those shown on the intersection diagram.

**907-632.04--Method of Measurement.** Traffic Signal Cabinet Assembly will be measured as a unit per each.

Remove and Replace Existing Traffic Signal Cabinet Assembly will be measured as unit per each.

Modify Existing Traffic Signal Cabinet will be measured as a unit per each.

Solid State Traffic Actuated Controller, of the type specified in the project plans, will be measured as a unit per each.

Signal Software License, of the type specified in the project plans, will be measured as a unit per each.

Malfunction Management Unit, of the type specified in the project plans, will be measured as a unit per each.

Card Rack, of the type specified in the project plans, will be measured as a unit per each.

GPS Clock, as specified in the project plans, will be measured as a unit per each.

Power Service Pedestal, as specified in the project plans, will be measured as a unit per each.

All pay items shall be inclusive of all materials, work, system integration, testing and incidentals necessary for a complete and operable unit in place and accepted. All removal, turn on, and acceptance of equipment, devices, traffic signals, and traffic signal assemblies shall follow Section 631 - Traffic Signal Systems-General prior to payment.

**907-632.05--Basis of Payment.** Traffic Signal Cabinet Assembly, measured as prescribed above, will be paid for at the contract unit price per each for each type(s) specified in the contract, which price shall be full compensation for furnishing, installing, configuring, wiring, testing, and mounting foundation construction, cabinets, relays, terminals, circuit breakers, modules, coordination and time base control programs, connectors wiring, overlap equipment, load switches, power cables, power supplies, controller mechanism and housing, MMU2, mounting material, all other materials, and all equipment, labor, tools, and incidentals necessary to complete the work.

Remove and Replace Existing Traffic Signal Cabinet Assembly, measured as prescribed above, will be paid for at the contract unit price per each for each type(s) specified in the contract, which price shall be full compensation for furnishing, installing, configuring, wiring, testing, cabinets, relays, terminals, circuit breakers, modules, coordination and time base control programs, connectors wiring, overlap equipment, load switches, power cables, power supplies, controller mechanism and housing, MMU2, mounting material, all other materials, removal, disposal, transfer, storage, and/or resetting of components that are existing, all other components included in the traffic signal cabinet, and all equipment, labor, tools, and incidentals necessary to complete the work.

Modify Existing Traffic Signal Cabinet, measured as prescribed above, will be paid for at the

contract unit price per each, which price shall be full compensation for furnishing, installing, configuring, and mounting all components, wiring, and devices; rewiring, reconfiguring, removal, disposal, transfer, storage, and/or resetting of existing components and devices, installing or changing coordination and time base control programs in the traffic signal cabinet assemblies, testing, final cleanup, all equipment, labor, tools, and incidentals necessary to complete the work.

Solid State Traffic Actuated Controller, measured as prescribed above, will be paid for at the contract unit price per each for each type(s) specified in the contract, which price shall be full compensation for all labor, equipment, tools, materials inclusive of the controller mechanism(s) and housing(s), all power cables, power supplies, wiring, factory and manufacturing inspection, attachment hardware, testing, storage, packaging, shipping, warranty, and all work, equipment, and appurtenances, and all incidentals necessary to provide a fully functional traffic controller ready for use. It shall also include all documentation including operations and maintenance manuals and other material necessary to document the operation of the traffic controller.

Signal Software Licenses, measured as prescribed above, will be paid for at the contract unit price per each for each type(s) specified in the contract, which price shall be full compensation for all labor, equipment, tools, materials inclusive of furnishing, installing and configuring the Signal Software, all power cables, power supplies, wiring, factory and manufacturing inspection, testing, storage, packaging, shipping, warranty, appurtenances, and all incidentals necessary to provide fully functional Signal Software ready for use. It shall also include all documentation including operations and maintenance manuals and other material necessary to document the operation of the Signal Software.

Malfunction Management Unit, measured as prescribed above, will be paid for at the contract unit price per each for each type(s) specified in the contract, which price shall be full compensation for all labor, equipment, tools, materials inclusive of furnishing, installing and configuring the Malfunction Management Unit (MMU2), all power cables, power supplies, wiring, attachment hardware, factory and manufacturing inspection, testing, storage, packaging, shipping, warranty, and all work, equipment, and appurtenances, and all incidentals necessary to provide a fully functional Malfunction Management Unit (MMU2) ready for use. It shall also include all documentation including operations and maintenance manuals and other material necessary to document the operation of the Malfunction Management Unit (MMU2).

Card Rack, measured as prescribed above, will be paid for at the contract unit price per each for each type(s) specified in the contract, which price shall be full compensation for all labor, equipment, tools, materials inclusive of furnishing, installing and configuring the Card Rack, all power cables, power supplies, wiring, attachment hardware, factory and manufacturing inspection, testing, storage, packaging, shipping, warranty, and all work, equipment, and appurtenances, and all incidentals necessary to provide a fully functional Card Rack ready for use. It shall also include all documentation including operations and maintenance manuals and other material necessary to document the operation of the Card Rack.

GPS Clock, measured as prescribed above, will be paid for at the contract unit price per each for each type(s) specified in the contract, which price shall be full compensation for all labor, equipment, tools, materials inclusive of furnishing, installing and configuring the Global

Positioning System (GPS) Clock(s), all power cables, power supplies, wiring, attachment hardware, factory and manufacturing inspection, testing, storage, packaging, shipping, warranty, and all incidentals necessary to provide a fully functional GPS Clock ready for use. It shall also include all documentation including operations and maintenance manuals and other material necessary to document the operation of the GPS Clock.

Power Service Pedestal, measured as prescribed above, will be paid for at the contract unit price per each for each type(s) specified in the contract, which price shall be full compensation for furnishing, installing, configuring, wiring, testing, and mounting foundation construction, cabinets, circuit breakers, connectors wiring, mounting material, all other materials, and all equipment, labor, tools, and incidentals necessary to complete the work.

Payment will be made under:

- 907-632-A: Solid State Traffic Signal Cabinet Assembly,  
Type \_\_ Cabinet, Type \_\_ Controller - per each
- 907-632-B: Remove and Replace Existing Traffic Signal Cabinet Assembly,  
Type \_\_ Cabinet, Type \_\_ Controller - per each
- 907-632-C: Modify Existing Traffic Signal Cabinet Assembly - per each
- 907-632-D: Solid State Traffic Actuated Controller, Type \_\_\_\_\_ - per each
- 907-632-E: Single-user Workstation Signal Software License - per each
- 907-632-F: Single-user Server Signal Software License - per each
- 907-632-G: Malfunction Management Unit - per each
- 907-632-H: Card Rack, \_\_\_\_ Position - per each
- 907-632-I: GPS Clock - per each
- 907-632-J: Power Service Pedestal - per each

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-633-1

CODE: (IS)

DATE: 11/15/2017

SUBJECT: Uninterruptable Power Supply

Section 633, Uninterruptable Power Supply, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

## 907-633.02--Materials.

907-633.02.1--Electronics Module. Delete the fourth bullet in Subsection 633.02.1 on page 538, and substitute the following.

- Local and remote communication capabilities.

907-633.02.4--UPS Operation. Delete the fourth subparagraph of Subsection 633.02.4.1 on page 539, and substitute the following.

- 4) The UPS system shall be capable of providing continuous, fully conditioned and regulated sinusoidal (AC) power to selected devices such as signal controllers, modems, communication hubs, National Transportation Communications for ITS Protocol (NTCIP) adapters and video equipment, for a minimum of 8 continuous hours.

## 907-633.02.4.3--Electric Specifications.

907-633.02.4.3.1--Input Specifications. Change the value of the Input Voltage Range in the Table in Subsection 633.02.4.3.1 on page 540, from “75 VAC to 155 VAC (without drawing energy from batteries)” to “75 VAC to 150 VAC (without drawing energy from batteries).”

Delete Subsection 633.02.4.4 on page 540, and substitute the following.

## 907-633.02.4.4--Blank.

907-633.03--Construction Requirement. Delete the first sentence of the second paragraph of Subsection 633.03 on page 541, and substitute the following.

Field tests shall be performed with various devices as noted in design plans to verify that each device operates optimally.

907-633.05--Basis of Payment. Delete the pay item listed on page 541, and substitute the following.

907-633-A: Uninterruptable Power Supply

- per each

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-634-4

CODE: (IS)

DATE: 05/25/2021

SUBJECT: Traffic Signal and ITS Equipment Poles

Section 634, Traffic Signal and ITS Equipment Poles, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

## 907-634.02--Materials.

907-634.02.1--Poles. Delete the bullet for Type X poles in Subsection 634.02.1 on page 542 and substitute the following.

- Type X -- Aluminum Pole for Detectors

After Type XI poles in Subsection 634.02.1 on page 542, add the following.

- Type XII -- ITS Extension Poles

907-634.02.1.1--Traffic Signal Poles. Delete the first, third, fourth, and fifth bullets in Subsection 634.02.1.1 on pages 542 and 543, and substitute the following.

- Self-supporting straight or upswept mast arm(s), in accordance with Plan details. Where possible, the mast arms shall match the adjacent signal poles in the area unless otherwise stated;
- Tag installed on shaft side opposite the mainline highway and located approximately 48 inches above the top of the Baseplate;
- Minimum nominal size of four (4) inches wide by 26 inches tall reinforced hand-hole with included terminal block(s);
- A ½-inch coarse thread grounding stud shall be located on the interior side of the pole hand-hole opening;

907-634.02.1.2--Galvanized Steel Poles for Cameras. Delete the second paragraph of Subsection 634.02.1.2 on page 543, and substitute the following.

Unless specified otherwise in the plans, poles shall be designed in accordance with the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals*, as specified in the plans, including all interims and updates. Design life shall be 50 years for all poles. The design wind speed for all parts of the structure shall meet the wind requirements set forth in the latest edition of the AASHTO Wind Map, as stated in Subsection 722.02.3. The pole shall meet the design wind loading with all equipment installed.

In the fifth sentence of the fifth paragraph of Subsection 634.02.1.2 on page 544, change “butt welded” to butt-welded” and change “radio graphically” to radio-graphically.”

Delete the second bullet in Subsection 634.02.1.2 on page 544, and substitute the following.

- Consideration shall be given for all possible loading combinations including ice and wind loads.

After the fourth bullet in Subsection 634.02.1.2 on page 544, add the following.

- Top of pole deflection shall not exceed one (1) inch deflection from center due to 30 mph (non-gust) winds or the maximum deflection allowed by Subsection 722.02.3, whichever is more restrictive, for 80-foot poles.

In the first bullet in Subsection 634.02.1.2 at the bottom of page 544, change “cross sectional” to “cross-sectional.”

In the second paragraph of Subsection 634.02.1.2.4 on page 545, change “butt weld” to “butt-weld.”

**907-634.02.1.3--Galvanized Steel Poles for Detectors.** In the first paragraph of Subsection 634.02.1.3 on page 546, change “ground mounted” to “ground-mounted.”

Delete the second paragraph of Subsection 634.02.1.3 on page 546, and substitute the following.

Unless specified otherwise in the plans, poles shall be designed in accordance with the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals*, as specified in the plans, including all interims and updates. Design life shall be 50 years for all poles. The design wind speed for all parts of the structure shall meet the wind requirements set forth in the latest edition of the AASHTO Wind Map, as stated in Subsection 722.02.3.

Delete the last two sentences of the fifth paragraph of Subsection 634.02.1.3 on page 546, and substitute the following.

Design wind loading shall be as indicated in Subsection 722.02.3 unless otherwise noted in the plans. The pole shall meet design wind loading with all equipment installed.

**907-634.02.1.4--Aluminum Poles for Detectors.** Delete the second paragraph of Subsection 634.02.1.4 on page 547, and substitute the following.

Unless specified otherwise in the plans, poles shall be designed in accordance with the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals*, as specified in the plans, including all interims and updates. Design life shall be 50 years for all poles. The design wind speed for all parts of the structure shall meet the wind requirements set forth in the latest edition of the AASHTO Wind Map, as stated in Subsection 722.02.3. The pole shall meet design wind loading with detector(s) installed.

**907-634.02.1.5--Structure-Mounted ITS Equipment Poles.** Delete the second paragraph of Subsection 634.02.1.5 on page 548, and substitute the following.

Unless specified otherwise in the plans, poles shall be designed in accordance with the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals*, as specified in the plans, including all interims and updates. Design life shall be 50 years for all poles. The design wind speed for all parts of the structure shall meet the wind requirements set forth in the latest edition of the AASHTO Wind Map, as stated in Subsection 722.02.3. For projects that are in areas with higher wind standards, the higher standard is required. The pole shall meet design wind loading with all equipment installed.

In the fifth sentence of the fifth paragraph of Subsection 634.02.1.5 on page 548, change “butt welded” to butt-welded” and change “radio graphically” to radio-graphically.”

Delete the second bullet in Subsection 634.02.1.5 on page 548, and substitute the following.

- Consideration shall be given for all possible loading combinations including ice and wind loads, as stated in Subsection 722.02.

In the first bullet in Subsection 634.02.1.5 at the top of page 549, change “cross sectional” to “cross-sectional.”

After Subsection 634.02.1.8 on page 549, add the following.

**907-634.02.1.9--ITS Extension Poles.** ITS extension poles are used to provide ITS devices a mounting location with a vertical or horizontal clearance away from an existing pole or structure to which they are to be attached. As such, extension poles and the mounting and attachment hardware shall be of a material that will not cause galvanic corrosion with existing or proposed equipment. If possible, the extension poles shall be similar in color to the base pole or structure, unless otherwise directed. They shall meet the requirements of the base pole, the plans, and Subsection 722.02. Design considerations shall be given to the additional loading being subjected to the base pole or structure.

**907-634.02.2--Camera Lowering Device.** The lowering device system shall be designed to support, raise, and lower a standard CCTV camera, lens, housing, PTZ mechanism, cabling, connectors, and other supporting field components. The camera connector box shall be cast ZA-12 (12% Al and 88% Zn) and have a minimum weight that ensures stability of the camera during raising and lowering operation. The camera connector box shall have fully gasketed doors to prevent water intrusion. The bottom of the camera connector box shall be equipped with a condensation/moisture exit system. The camera connector block shall be molded in thermoset, weather-resistant, synthetic rubber designed to handle harsh environments.

Electrical contacts must also be designed to handle harsh environments. There shall be a locking mechanism between the fixed and movable components. For the movable components, a latching mechanism shall be provided to hold the device in place (when latched all weight shall be removed



from the lowering cable) and to raise or lower the assembly using the lowering tool and lowering cable. The suspension contact unit housing shall be weatherproof with a gasket to isolate the interior from dust and moisture.

All pulleys shall have sealed, self-lubricated bearings, oil tight bronze bearings, or sintered bronze bushings. The lowering cable shall be a minimum 1/8-inch diameter stainless steel aircraft cable. Internal wireways shall prevent the stainless steel lifting cable from contacting power or video cabling. The only cable permitted to move is the lifting cable, all other cables must remain stable and secure during lowering and raising operations.

The lowering tool shall consist of a lightweight metal frame and winch assembly, a quick release cable connector, an adjustable safety clutch, and a variable speed industrial duty electric drill motor. This tool shall be able to access the lifting cable through a pole hand hole, shall support itself and the load during lowering, and shall provide a means to prevent freewheeling when loaded. This tool shall have a reduction gear to reduce the manual effort required during lifting operations. In addition, this tool shall be provided with an adapter for operating the lowering device with a portable drill using a clutch mechanism. The portable lowering tool shall be included as part of the installed system. The lowering device shall include customized adapter brackets to install cylindrical type PTZ CCTV cameras that have a mounting base below the camera assembly and is require to be installed in an upright position.

**907-634.03--Construction Requirements.**

**907-634.03.1--Foundations.** Delete the last sentence of the fourth paragraph of Subsection 632.03.1 on page 550, and substitute the following.

Where foundations are constructed in areas where the pavement edge elevation and shoulder edge elevation differ more than twelve (12) inches, taller foundations may be used but must be approved by the Engineer.

After Subsection 634.03.3 on page 552, add the following.

**907-634.03.4--Submittals.** The submittal requirements defined in the Notice to Bidders entitled “ITS General Requirements”, along with the requirements in this specification, shall be met for all ITS components. All costs associated with submittals shall be included in the overall contract price; no separate payment will be made for any documenting and submitting.

**907-634.03.5--Quality Assurance.** The quality assurance requirements defined in the Notice to Bidders entitled “ITS General Requirements” shall be met for all ITS components. All costs associated with the quality assurance requirements shall be included in the overall contract price.

**907-634.04--Method of Measurement.** After the last sentence of the fourth paragraph of Subsection 634.04 on page 552, add the following.

Field conditions may require taller foundations than specified in the plans. In which case, the addition concrete will be paid for at the contract bid price per cubic yard for pole foundations.

After the sixth paragraph of Subsection 634.04 on page 553, add the following.

ITS extension poles of the type specified will be measured as a unit quantity per each.

Delete the last paragraph in Subsection 634.04 on page 553 and substitute the following.

Wooden poles will be measured as a unit quantity per each.

Camera lowering device will be measured as a unit quantity per each.

**907-634.05--Basis of Payment.** Delete the fourth paragraph of Subsection 634.05 on page 553, and substitute the following.

Camera pole with foundation and detector pole with foundation, measured as prescribed above, will be paid for at the contract unit price per each, which price shall be full compensation for furnishing all materials, all documentation and submittals, for excavating, backfilling, replacing sod, and for all constructing, placing, curing, erecting, installing, connecting and testing; for foundations, poles, pole bases, conduit inside foundation as indicated on the plans, connections to support structures, caps, covers, ground wire, ground rods, hardware and for all equipment, tools, labor and incidentals necessary to complete the work and quality assurance, including remote and local control of the camera site complete in place and ready for use.

Camera lowering device and camera lowering tool, as described above, shall be paid for at the contract unit price per each. This price shall be full compensation for all materials, design, installation, equipment, tools, labor and incidentals associated with providing and installing the camera lowering device and the camera lowering tool.

Delete the sixth paragraph of Subsection 634.05 on page 553, and substitute the following.

Structure-mounted equipment pole, measured as prescribed above, will be paid for at the contract unit price per each, which price shall be full compensation for furnishing all materials, all documentation and submittals, for all constructing, placing, erecting, installing, connecting and testing, for poles, conduit between structure attachment location as indicated in the plans; wiring between pole-mounted devices and field cabinet; all structure-mounting hardware indicated in the plans, caps, covers, ground wire, ground rods, hardware and for all equipment, tools, labor and incidentals necessary to complete the work and quality assurance, including remote and local control of the camera site complete in place and ready for use.

ITS extension poles, measured as prescribed above, will be paid for at the contract unit price per each, which price shall be full compensation for furnishing all materials, all documentation and submittals, for installing the extension pole, mounting attachments as necessary, adjusting the pole to meet specific project needs, and for all equipment, tools, labor, and incidentals necessary to complete the work and quality assurance.

After the last paragraph of Subsection 634.05 on page 554, add the following.

Sizing poles and their appurtenances to field conditions is the Contractor’s responsibility. No separate payment will be made for designing to meet project specifications and field conditions.

Delete the pay items listed on page 554, and substitute the following.

- 907-634-A: Traffic Signal Equipment Pole, Type \_\_, \_\_’ Shaft, \_\_’ Arm \* - per each
- 907-634-B: Traffic Signal Equipment Pole Shaft Extension, \_\_\_’ \*\* - per each
- 907-634-C: Pole Foundations, Class \_\_\_ Concrete - per cubic yard
- 907-634-D: Slip Casing, \_\_\_” Diameter - per linear foot
- 907-634-E: Camera Pole with Foundation, \_\_\_’ Pole - per each
- 907-634-F: Detector Pole with Foundation, \_\_\_’ Pole - per each
- 907-634-G: Traffic Signal Equipment Pole Mast Arm Extension, \_\_\_’ \*\* - per each
- 907-634-H: ITS Equipment Pole, Structure Mounted, \_\_\_’ Pole - per each
- 907-634-I: Wood Pole, Class \_\_\_ Height \_\_\_’ - per each
- 907-634-J ITS Extension Pole, \_\_\_\_\_’ \*\* - per each
- 907-634-K: Camera Lowering Device - per each

\* Multiple Arms may be indicated  
\*\* Additional information may be indicated

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-636-3

CODE: (IS)

DATE: 05/25/2021

SUBJECT: Electrical Cable

Section 636, Electrical Cable, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

**907-636.01--Description.** Delete the last sentence of the last paragraph in Subsection 636.01 on page 555 and substitute the following.

It shall include excavating, laying, placing tracer cable or tape, backfilling, replacing sod, aerial supports and/or pull-through conduits, as applicable; and transformer enclosures and/or terminal boxes when not placed under other items of the contract.

**907-636.02--Materials.** After the paragraph of Subsection 636.02 on page 555, add the following.

**907-636.02.1--ITS Ground Mounted Meter Enclosure.**

**907-636.02.1.1--Meter Base.** Meter bases shall be NEMA Type 3R with a minimum rating of 100 amps and shall meet the requirements of the local utility. The meter base shall be provided with ampere rating of meter sockets based on sockets being wired with insulated wire rated at least 167°F. The meter base shall be designed for underground service.

Meter bases shall be 4-terminal, 600 volt, single phase, 3-wire furnished with the following:

- (a) Line, load and neutral terminals accepting #8 to 2/0 AWG copper/aluminum wire,
- (b) Ringed or ringless type, with or without bypass,
- (c) Made of galvanized steel,
- (d) Listed as meeting UL Standard UL-414, and
- (e) Underground service entrance as specified.

The meter bases shall have electrostatically applied dry powder paint finish, light gray in color, with a minimum thickness of 2.4 mils.

A 1-inch watertight hub for threaded rigid conduit shall be furnished with meter base.

**907-636.02.1.2--Disconnect.** External electrical service disconnects shall be furnished with a single pole 50-amp inverse time circuit breaker with at least 10,000 RMS symmetrical amperes short circuit current rating in a lockable in open or closed position in accordance with National Electric Code (NEC) and be a NEMA 3R Type enclosure. The disconnect shall be listed as meeting UL Standard UL-489 and marked as being suitable for use as service equipment.

The disconnect enclosure shall be fabricated from galvanized steel and electrostatically apply dry powder paint finish, light gray in color, to yield a minimum thickness of 2.4 mils. Ground bus and neutral bus shall be provided with at least four terminals with minimum wire capacity range of number 14 through number 4.

For 480V service, a local utility approved, lockable, non-fused disconnect switch on the supply side of the meter base shall be furnished, installed, and labeled as "Utility Disconnect". A separate load side disconnect with overcurrent protection shall be provided within two feet (2') of the meter.

**907-636.02.1.3--Ground Mounted – Pedestal – Service Panel.** The pedestal shall be of NEMA Type 3R rainproof construction and shall be UL Listed as "Enclosed Industrial Control Equipment" (UL 508A). External construction shall comply with UL50 requirements and shall be of G90 galvanized steel with light green #14672 Federal Specification 595 polyurethane industrial grade powder paint.

Hinges shall be stainless steel and of the continuous piano hinge type.

The pedestal mounting bolts shall not be externally accessible. The pedestal shall be able to be embedded in concrete or use anchor bolts for mounting on concrete base. Either pedestal mounting base or anchor bolt kit shall be used for installation.

The service pedestal should have three separate isolated sections for metering equipment, utility termination and customer equipment.

The metering section shall be pad-lockable and sealable and have a hinged swing hood with an integral hinged polycarbonate sealable window for access to demand meters. Meter socket type shall meet the requirements of the serving utility.

The utility termination section shall be pad-lockable and sealable and shall have a stainless steel handle provided on a lift-off cover. Sufficient clearance shall be provided for a 4-inch diameter conduit for utility cables entrance. Utility landing lugs shall be UL listed and shall accommodate conductor sizes between AWG #6 – 350 kcmil.

The customer compartment door shall be hinged on the left hand side. A stainless pad-lockable hasp shall be provided to secure customer compartment. A door keeper shall be provided to keep the door in an open position. A print pocket shall be provided on the inside of the door in a weatherproof sleeve. Required UL labeling shall be located on the inside of the customer door. Distribution and control equipment shall be behind an internal dead-front door with a quarter-turn securing latch and be hinged to open more than 90 degrees. The dead-front door shall be hinged on the same side as the customer section door. All distribution and control equipment shall be factory wired using 600-volt wire sized to NEC and UL requirements.

The service pedestal shall be rated for operation at 10K minimum amps interrupting capacity (AIC). The provided documentation shall list circuit breaker combinations and those to be used for de-rated operation for series ratings. Circuit breakers shall be permanently labeled with engraved name plates.

The serving utility shall be contacted for necessary requirements before ordering or installing equipment.

**907-636.02.2--ITS Ground Mounted Transformer Enclosure.**

**907-636.02.2.1--Disconnect.** The disconnect shall meet the requirements of Subsection 907-636.02.1.2.

**907-636.02.2.2--Ground Mounted - Pedestal – Service Panel.** The ground mounted - pedestal – service panel shall meet the requirements of Subsection 907-636.02.1.3. In addition, the transformer shall be rated to match the requirement of the primary service and the types of load served as specified in the plans. The transformer unit shall be installed inside the enclosure and meet all applicable codes. Each transformer shall be furnished as one complete unit and wiring of multiple transformers to meet the required ratings at each enclosure location is not allowed. Step-up and Step-down transformers shall be designed specifically for each application. Reverse feeding of step-up and step-down transformers is not allowed. All transformers shall be designed for outdoor installation and rated 600 VAC and below.

**907-636.03--Construction Requirements.**

**907-636.03.1--Direct Buried Cable.** After the fourth sentence of Subsection 636.03.1 on page 555, add the following.

Direct buried electric cable shall not be placed in the same trench as fiber optic cables.

**907-636.04--Method of Measurement.** Delete the first paragraph of Subsection 636.04 on page 557, and substitute the following.

Electric cable of the type specified, constructed as specified on the plans, will be measured by the linear foot. Measurement will be computed horizontally along the conduit, messenger cable or mast arm and vertically along the pole. Measurement in underground conduit is only in the horizontal plane and no additional quantity shall be added for conduit depth or change in elevation of the conduit. No extra length will be allowed for cable inside signal heads, drip loops, or sag in aerial supported cable. Tracer tape, when required in the plans, used with tracer cable will not be measured for separate payment but shall be included in the contract price for Tracer Cable. The terminals for the measurements of lengths will be considered specifically as the center of the pull boxes, poles, signal heads or controller cabinets.

After the first paragraph of Subsection 636.04 on page 557, add the following.

ITS Ground Mounted Enclosures, complete in place and accepted, will be measured as a unit quantity per each for a complete and operable unit in accordance with the contract provisions.

**907-636.05--Basis of Payment.** After the first paragraph of Subsection 636.05 on page 557, add the following.

ITS Ground mounted enclosures, measured as prescribed above, will be required wherever ground mounted meter enclosures or step-up or step-down transformers are noted as required in the plans. The enclosures shall be paid for at the contract unit price bid per each; which price shall be full compensation for any transformers (as described in the plans), foundation construction, cabinets, pedestals, meter bases, disconnects, relays, terminals, circuit breakers, sockets, hubs, buses, connectors, 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.

In the first sentence of the second paragraph of Subsection 636.05 on page 557, change “relaid” to “re-laid”.

Delete the list of pay items on pages 557 and 558, and substitute the following.

- 907-636-A: Electric Cable, Direct Burial, Type, AWG \_\_\_\_, \_\_\_\_ Conductor - per linear foot
- 907-636-B: Electric Cable, Underground in Conduit, Type, AWG \_\_\_\_,  
\_\_\_\_ Conductor - per linear foot
- 907-636-C: Electric Cable, Aerial Supported, Type, AWG \_\_\_\_,  
\_\_\_\_ Conductor - per linear foot
- 907-636-D: Electric Cable, Aerial Supported in Conduit, Type, AWG \_\_\_\_,  
\_\_\_\_ Conductor - per linear foot
- 907-636-E: Electric Cable, Underground in Conduit, Tracer Cable - per linear foot
- 907-636-F: Electric Cable, Repair - per linear foot
- 907-636-G: Underground Cable and Conduit, Removed - per linear foot
- 907-636-H: Underground Cable and Conduit, Removed and Re-laid - per linear foot
- 907-636-I: ITS Ground Mounted \* Enclosure - per each

\* Indicate Meter or Transformer

## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-637-3

CODE: (IS)

DATE: 05/25/2021

SUBJECT: Traffic Signal Conduit and Pull Boxes

Section 637, Traffic Signal Conduit and Pull Boxes, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

### 907-637.02--Materials.

907-637.02.1--Pull Box / Enclosures. Delete the first sentence of the second paragraph of Subsection 637.02.1 on page 558, and substitute the following.

For grade level pull boxes and enclosures only, Tier 22 (22,500-pound design load, 33,750-pound test load) enclosures with minimum size dimensions as shown in the detail drawings on the plans shall be installed for use in traffic signal construction. Enclosure boxes shall be open bottom.

Delete the fourth sentence of the second paragraph of Subsection 637.02.1 on page 558.

### 907-637.03--Construction Requirements.

907-637.03.1--Pull box/Enclosures. Delete the sixth sentence of the first paragraph of Subsection 637.03.1 on page 559, and substitute the following.

Enclosures located in soil or sodded areas shall be installed with a supporting poured concrete collar or approved composite collar assembly, as shown by details on the plans.

907-637.03.2.1--Conduit Duct Bank. Delete the first sentence of subparagraph a) under Bored or drilled conduit in Subsection 637.03.2.1 on page 560, and substitute the following.

All conduits under railroad tracks shall be horizontal directional bored or drilled at a minimum of ten (10) feet below the railroad bed, or as required by the Railroad Company.

Delete Subsections 637.03.2.4 and 637.03.2.5 on pages 561 & 562, and substitute the following.

### 907-637.03.2.4--Blank.

### 907-637.03.2.5--Blank.

After Subsection 637.03.2.7 on page 563, add the following.

907-637.03.3--Submittals. The submittal requirements defined in the Notice to Bidders entitled "ITS General Requirements" shall be met if the NTB is included as part of the Project Proposal



and Contract Documents. In all cases, submittals shall be thorough and timely. All costs associated with submittals shall be included in the overall contract price; no separate payment will be made for any documenting and submitting.

**907-637.03.4--Quality Assurance.** The quality assurance requirements defined in the Notice to Bidders entitled “ITS General Requirements” shall be met if the NTB is included as part of the Project Proposal and Contract Documents. In all cases, the Contractor shall conduct, maintain, and leave the worksite in a professional and organized manner. All costs associated with the quality assurance requirements shall be included in the overall contract price.

**907-637.04--Method of Measurement.** Delete subparagraphs a) and b) in Subsection 637.04 on page 563, and substitute the following.

- a) From center to center of pull box and/or foundation.
- b) Any above ground vertical conduit runs, as indicated in the plans. Measurement in underground conduit is only in the horizontal plane and no additional quantity shall be added for conduit depth or change in elevation of the conduit.

**907-637.05--Basis of Payment.** Delete the first, second, third, fourth and fifth paragraphs of Subsection 637.05 on page 564, and substitute the following.

Pull Box Enclosures, measured as prescribed above, will be paid for at the contract unit price per each, which price shall be full compensation for furnishing all materials including the cover, installing, crushed gravel underlayment, poured concrete collars, replacement of sod or existing grassing, final clean-up and for all equipment, all documentation and submittals, tools, labor and incidentals necessary to complete the work and quality assurance.

Conduit / Duct Bank, measured as prescribed above, will be paid for per linear feet, which price shall be full compensation for all materials, equipment, labor, trenching, installing, backfilling trench, plowing, directional boring, restoration, marking tape, pull tape, duct plugs, fittings, testing, bore logs, all documentation and submittals, and all other incidentals necessary for the installation and quality assurance of the conduit system.

Rigid Galvanized Steel, measured as prescribed above, will be paid for per linear feet, which price shall be full compensation for all materials, equipment, labor, all documentation and submittals, all related materials including but not limited to couplings, mounting straps, bonding to ground, etc., that is installed on sign structures, poles or between the pull boxes, and all other incidentals necessary for the installation and quality assurance of the conduit system.

Duct Plugs and Sealant will be included in the cost of the conduit and will not be measured separately.

Delete the pay items listed on page 564 and substitute the following.

907-637-A: Pull Box Enclosure, Type - per each

907-637-B:	Pull Box Enclosure, Structure Mounted, <u>Type</u>	- per each
907-637-C:	Traffic Signal Conduit, Underground, <u>Type, Size</u>	- per linear foot
907-637-D:	Traffic Signal Conduit, Underground Drilled or Jacked, <u>Type, Size</u>	- per linear foot
907-637-E:	Traffic Signal Conduit, Structural Conduit, <u>Type, Size</u>	- per linear foot
907-637-F:	Traffic Signal Conduit, Aerial Supported, <u>Type, No, Size</u>	- per linear foot
907-637-G:	Traffic Signal Conduit, Underground Encased in Concrete, <u>Type, Size</u>	- per linear foot
907-637-H:	Traffic Signal Conduit Bank, Underground, <u>Type, No., Size</u>	- per linear foot
907-637-I:	Traffic Signal Conduit Bank, Underground Drilled or Jacked, <u>Type, No., Size</u>	- per linear foot
907-637-J:	Traffic Signal Conduit Bank, Structural Conduit, <u>Type, No., Size</u>	- per linear foot
907-637-K:	Traffic Signal Conduit Bank, Aerial Supported, <u>Type, Size and Number</u>	- per linear foot

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

**SPECIAL PROVISION NO. 907-639-2**

**CODE: (IS)**

**DATE: 11/15/2017**

**SUBJECT: Traffic Signal Preemption Systems**

Section 639, Traffic Signal Preemption System, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

Delete Section 639 on pages 566 thru 578, and substitute the following.

## SECTION 907-639 - TRAFFIC SIGNAL PREEMPTION SYSTEMS

**907-639.01--Description.** This item consists of providing Railroad Signal Preemption, Type 1 and Type 2 Emergency Vehicle Preemption for the traffic signal controller in accordance with Plan details, the Standard Specifications, these specifications, and as directed by the Engineer.

The Type 1 Emergency Vehicle Preemption for the traffic signal controller shall use optical communication to identify the presence of designated priority vehicles and cause the traffic signal controller to advance to and/or hold a desired traffic signal display selected from phases normally available.

The Type 2 Emergency Vehicle Preemption for the traffic signal controller shall utilize Radio/GPS to identify the presence of designated priority vehicles and cause the traffic signal controller to advance to and/or hold a desired traffic signal display selected from phases normally available.

A confirmation lights and rotating beacons shall be utilized to indicate the activation of preemption call. The system shall initiate beacons indicating a priority call has been received. The system shall initiate a confirming steady white light to the approach direction from which the vehicle is approaching once the desired priority display has been received. The beacon and confirming white light shall remain energized until the preemption call is dropped.

**907-639.02--Materials.** All connections and equipment shall be new and constructed using the highest quality, commercially available components and techniques to assure high reliability and minimum maintenance of the emergency vehicle and railroad signal preemption systems.

The requirements for the emergency preemption vehicle equipment in Subsection 907-639.02.2.1 are to be furnished and installed by the local maintaining agencies and not the responsibility of the Contractor. However, it is the responsibility of the Contractor to provide the intersection preemption equipment required in Subsections 907-639.02.2.2 and 907-639.03 that is compatible with the equipment listed in Subsection 907-639.02.2.1.

**907-639.02.1--Railroad Preemption.** The Railroad Signal Preemption shall consist of the minimum following components:

- Coordination
- Flagger (as required)
- Application Submittals (as required)
- Connections to hardware (as required)

**907-639.02.2--Type 1 Emergency Vehicle Preemption.** Emergency Vehicle Preemption Systems shall consist of the following principal Intersection Equipment components: Detectors/Receivers, Multimode Phase Selectors, and Auxiliary Interface Panel. The function intended for use with this system includes Emergency Vehicle Preemption to the traffic signal.

**907-639.02.2.1--Vehicle Equipment.**

**907-639.02.2.1.1--Emitter.** The emitter shall include a multi-purpose communication port compliant with the SAE J1708 communication standard. This port shall enable unit configuration to be set into the emitter and read from the emitter. It also shall allow real-time communication between the vehicle and the emitter.

An ON/OFF switch (available for each emitter) shall be equipped with an indicator light providing internal diagnostics to assist in troubleshooting.

While operating, the emitter shall conduct self-diagnostics designed to monitor data transmission integrity by checking for missing pulses. Any failures of the self-diagnostic tests shall be displayed by flashing of the ON/OFF switch indicator light.

The emitter shall be equipped with a disabling input that, when activated, will cause the emitter to stop flashing. This input shall eliminate the possibility of inadvertent signal transmission after the priority vehicle has arrived at its destination. The disable input shall be programmable to operate in either a latching or non-latching mode. Operation of the disable input shall be programmable using software.

The emitter shall provide operating modes that allow it to be powered on with the strobe/LEDs for activation of the preempt.

The emitter shall be powered by the DC voltage supplied from the battery of the vehicle, 10 to 32 volts DC.

The unit shall be equipped with a weatherproof in-line fuse holder and a weatherproof quick-disconnect plug.

The emitter shall contain visible light LEDs which may be user configured as follows:

- Flash at emitter flash rate during normal operation.
- Flash at diagnostic rate when unit has failed or is in disable mode.
- Off during normal operation, flash at diagnostic rate when unit has failed or is in
- Disable mode. The visible LEDs will be Off during normal operation.
- Flash once per second for ten (10) seconds at power up.
- Always Off: The visible LEDs will remain Off at all times.

The Emitter shall be supplied complete with a two (2) foot installation cable.

The flash sequence generated by the emitter shall carry three (3) types of information:

- The first type shall be one (1) of three (3) distinctly different base frequencies of:
  - 10Hz for a low priority emitter;
  - 14Hz for a high priority emitter; or
  - 12Hz for Probe frequency.
- The second type of information generated by the emitter shall be a vehicle classification and identification code that is interwoven into the base frequency flashes. Setting the vehicle classification and identification code shall be accomplished through Emitter Programming Software.
- The third type of information generated by the emitter shall be reserved for setting the intersection detection range. A specially equipped emitter control module with a range setting command switch will enable the Engineer to activate the range code from the vehicle.

The emitters shall use infrared LEDs with an angle of half intensity of  $\pm 10$  degrees to provide precise directionality control. The emitter shall operate over a temperature range of  $-30^{\circ}\text{F}$  to  $+165^{\circ}\text{F}$ . The emitter shall operate over a relative humidity range of 5% to 95%. Windows™ based software shall be available at no charge for programming the emitter through its SAE J1708 compatible multi-purpose port.

#### **907-639.02.2.2--Intersection Equipment.**

**907-639.02.2.2.1--Multimode Phase Selector.** The multimode phase selector recognizes inputs from both infrared and Radio/GPS activation methods at the intersection and supplies coordinated inputs to the controller.

The multimode phase selector shall be designed to be installed in the traffic controller cabinet and is intended for use directly with numerous controllers. These include Type 170/2070 controllers with compatible software, NEMA controllers, or other controllers along with the system card rack and suitable interface equipment and controller software.

The multimode phase selector shall include the ability to directly sense the green traffic controller signal indications through the use of dedicated sensing circuits and wires connected directly to field wire termination points in the traffic controller cabinet. This connection shall be made using the Auxiliary Interface Panel.

The multimode phase selector will be a plug-in, 4-channel, multiple-priority, multi-modal device intended to be installed directly into a card rack located within the controller cabinet. The multimode phase selector shall be capable of using existing infrared or Radio/GPS system card racks. The multimode phase selector shall be powered from either +24 VDC or 120 VAC.

The multimode phase selector shall support front-panel RS-232, USB and Ethernet interfaces to allow management by on-site interface software and central software. An RS-232 port shall be provided on the unit. Additional RS-232 communication ports shall be available using the

### Auxiliary Interface Panel.

The multimode phase selector shall have the capability of storing a minimum of 10,000 priority control calls. When the log is full, the phase selector shall drop the oldest entry to accommodate the new entry. The multimode phase selector shall store each call record in non-volatile memory and shall retain the record if power terminates.

The multimode phase selector shall support a minimum of 5,000 code pairs (agency ID, vehicle ID) for each of the priority levels, high and low, providing unique vehicle identification and system security implementation at the vehicle level.

The multimode phase selector shall include several programmable control timers that will limit or modify the duration of a priority control condition, by channel. The control timers will be as follows:

- Max call time
- Off approach call hold time
- Lost signal call hold time
- Call delay time

The multimode phase selector shall have the ability to enable or disable all calls of all priority levels. This shall be independently settable by channel.

A unique intersection name, which shall be broadcast, shall be settable for each Multimode Phase Selector.

Up to 25 different radio channels shall be available to be assigned to the multimode phase selector.

The multimode phase selector shall operate in a mode that shall vary the output based on the status of the approaching vehicle's turn signal. Additional outputs available on an auxiliary interface panel may be needed. Settings shall be available for this mode as follows:

- Output mappings for each channel.
- Separate setting for high and low priority levels.
- Separate settings for each left turn, right turn or straight signal status for each of the four (4) channels and priority levels.

The multimode phase selector's default values shall be programmable by the operator on-site or at a remote location.

The multimode phase selector shall be capable of three (3) levels of signal discrimination, as follows:

- Verification of the presence of the signal of either high priority or low priority.
- Verification that the vehicle is approaching the intersection within a prescribed
- Estimated Time of Arrival (ETA).
- Determination of when the vehicle is within the prescribed range, either by intensity level or

distance from the intersection.

The multimode phase selector shall include one (1) opto-isolated NPN, or sinking, output per channel that provides the following electrical signal to the appropriate pin on the card edge connector:

- 6.25Hz  $\pm$ 0.1Hz 50% on/duty square wave in response to a low priority call.
- A steady ON in response to a high priority call.
- The multimode phase selector will also have the option of providing separate outputs for High and Low priority calls for controllers that do not recognize a 6.25 Hz pulsed
- low priority request.
- Additional outputs or output modes shall also be available on the Auxiliary Interface
- Panel in case of need for additional modes of operation.

The multimode phase selector shall accommodate the following three (3) methods for setting range thresholds for High and Low priority signals.

- Based on the approaching vehicle's Estimated Time of Arrival (ETA). This shall be settable between zero (0) and 255 seconds in one (1) second increments.
- Based on the approaching vehicle's distance from the intersection. This shall be settable in one (1) foot increments.
- Based on emitter intensity the system shall accommodate setting a separate range from 200 feet to 2,500 feet with range set points for both High and Low priority signals.

The multimode phase selector will have the following indicators:

- A status indicator that illuminates steadily to indicate proper operation.
- A link indicator on the multimode phase selector illuminates if other radios are within range.
- A radio indicator that indicates the status of the communication between the vehicle control unit and the Radio/GPS unit. The indicator illuminates to indicate that there is communication between the vehicle control unit and the Radio/GPS unit. The indicator illuminates to indicate that a GPS signal has been acquired and the 2.4 GHz radio is on the air.
- LED indicators (one (1) for high priority, one (1) for low priority) for each channel display active calls as steady ON and pulse to indicate pending preemption requests.

The multimode phase selector shall have a test switch for each channel to test proper operation of High or Low Priority.

The multimode phase selector shall utilize the time obtained from the GPS satellites to time stamp the activity logs. The user will set the local time zone (offset from GPS time) via the interface software.

The interface software shall have the capability to set the multimode phase selector to automatically adjust the GPS time offset for changes in daylight savings time.

An auxiliary interface panel shall be available to facilitate interconnections between the multimode phase selector and traffic cabinet wiring as well as provide additional outputs.

A multimode phase selector port may be configured to output GPS data at a user selectable baud rate in the NMEA 0183format. It will output the following messages depending on the baud rate:

- GGA - Global Positioning System Fix Data (2400 baud and higher)
- GSA - GPS DOP and active satellites (2400 baud and higher)
- GSV - Satellites in view (4800 baud and higher)
- RMC - Recommended Minimum Navigation Information (1200 baud and higher)

The following diagnostic tests are incorporated in the multimode phase selector:

- Power up built in test
- Communications port tests
- Preemption output test call
- Detector response test

The multimode phase selector shall be capable of call bridging.

When used with a GPS radio unit, the multimode phase selector shall relay a priority request to the next adjacent intersection based on the direction indicated by the vehicle's turn signals.

The multimode phase selector shall support evacuation mode for Low priority calls. The multimode phase selector shall allow relative priority.

**907-639.02.2.1.1--Card Rack.** The required card rack shall provide simplified installation of a multimode phase selector into controller cabinets that do not already have a suitable card rack.

The card rack shall be factory wired with one (1) connector, located behind the card slot, and one (1) connector on the front of the card rack.

The card rack connector on the front shall provide for connections to the traffic controller.

The Contractor shall verify card rack requirements with the Engineer prior to submitting this equipment.

One (1) version of the card rack shall contain a 24 VDC power supply to power the phase selector. The power supply shall be capable of being powered by 100-240 VAC 50-60 Hz.

Another version of the card rack shall pass 120 VAC through to the rear card rack connector. This version shall provide labeled terminal blocks for connecting the primary infrared detectors to a phase selector.

Additionally, there shall be an optional card rack with a built-in Electromechanical Relay for use in switching high current loads such as flashers and gate operators. The relay shall be capable of switching the following loads.



Resistive: 10 A, 240 VAC  
10 A, 30 VDC

General Use: 7.5 A, 120 VAC  
7.5 A, 240 VAC  
7 A, 30 VDC  
1/6 hp, 120 VAC  
1/3 hp, 240 VAC

**907-639.02.2.2.2--Optical Detector.**

**907-639.02.2.2.2.1--General.** The optical detector shall be a light-weight, weather proof device capable of sensing and transforming pulsed optical energy into electrical signals for use by the traffic signal phase selection equipment.

**907-639.02.2.2.2.2--Functional Requirements.** The optical detector unit shall perform the following functions and meet the requirements listed below.

- a) The unit shall be high-impact polycarbonate construction with stainless steel and/or brass hardware. The unit shall be designed for easy mounting at or near an intersection on mast arm, pedestal, pole, or intersection span wire.
- b) The unit shall accept optical signals from one (1) or two (2) directions and provide a single electrical output signal, as specified in the plans. The unit shall include a design feature to allow aiming of the two optical sensing inputs for hills, skewed approaches or slight curves.
- c) The unit shall have built-in terminal strip to simplify wiring connections. The unit shall receive power from the traffic signal phase selector equipment and have internal voltage regulation to be operational from 16 to 40 volts AC.
- d) The unit shall be responsive to the optical emitter at a distance of 1,800 feet. The unit shall deliver the necessary electrical signal to the traffic signal phase selector equipment via up to 1,000 feet of optical detector cable.
- e) The unit shall employ replacement circuit board assembly and photocells to facilitate repair.

**907-639.02.2.2.3--Optical Detector Cable.** The optical detector cable shall meet the requirements listed below.

- a) The cable shall guarantee delivery of the necessary quality signal from the optical detector to the traffic signal phase selector equipment over non-spliced distance of 1,000 feet. The cable shall guarantee sufficient power to the optical detector over a non-spliced distance of 1,000 feet.
- b) The cable shall be of durable construction for installation by direct burial, in conduit or mast arm, or exposed overhead supported by messenger wire. The weight of the cable shall have a minimum insulation rating of 600 volts and a temperature rating of 80°C.
- c) The cable shall have three (3) conductors of AWG 20 stranded, individually tinned copper color coded as follows.
  - 1. Orange for delivery of optical detector power (+)
  - 2. Blue for optical detector power return (-)
  - 3. Yellow for optical detector signal

The conductors will be shielded with aluminized polyester and have an AWG #20 stranded and individually tinned drain wire to provide signal integrity and transient protection. The shield

wrapping shall have 20% overlap to ensure integrity following conduit and mast arm pulls.

**907-639.02.2.2.4--Electrical and Environmental Requirements.** All equipment supplied as part of the priority control system intended for use in the controller cabinet shall meet the following electrical and environmental specifications spelled out in the NEMA Standards Publication TS 2-2003, Part 2: v02.06:

- Line voltage variations per NEMA TS 2-2003, Paragraph 2.1.2.
- Power source frequency per NEMA TS 2-2003, Paragraph 2.1.3.
- Power source noise transients per NEMA TS 2-2003, Paragraph 2.1.6
- Temperature range per NEMA TS 2-2003, Paragraph 2.1.5
- Humidity per NEMA TS 2-2003, Paragraph 2.1.5
- Shock test per NEMA TS 2-2003, Paragraph 2.2.9.
- Vibration per NEMA TS 2-2003, Paragraph 2.2.8
- Non-Destructive Transient immunity NEMA TS 2-2003, Paragraph 2.1.8.
- Input-output terminals NEMA TS 2-2003, Paragraph 2.1.7.
- FCC Part 15 Subpart B Class A EMC Standard
- Canada ICES-003, Issue 4:2004 Class A EMC Standard
- EN50293: 2000 Electromagnetic Compatibility--Road Traffic Signal Systems -- Product Standard.
- EN 61326-1:2006 EMC Standard.
- EN 55011:2007 +A2:2007 EMC Standard.

**907-639.02.3--Type 2 Emergency Vehicle Preemption.** Emergency Vehicle Preemption Systems shall consist of the following principal Intersection Equipment components: Detectors/Receivers, Multimode Phase Selectors, and Auxiliary Interface Panel. The function intended for use with this system includes Emergency Vehicle Preemption to the traffic signal.

**907-639.02.3.1--Vehicle Equipment.**

**907-639.02.3.1.1--Vehicle Control Unit.** The vehicle control unit shall provide the interface between the vehicle and the priority control system. The vehicle control unit shall also interface with the Radio/GPS module. The vehicle control unit shall monitor the status of the vehicle turn signal via an interface cable that will connect between the vehicle control unit and the left and right turn signal lines in the vehicle. The vehicle control unit shall also monitor the disable input line as well as the remote activation input. Power to the vehicle equipment shall be provided through the vehicle control unit.

The vehicle shall transmit the following information when within range of an equipped intersection:

- The priority level of the vehicle equipment. This shall be either high priority or low priority. The priority level shall be factory set. Each vehicle control unit shall be capable of setting 254 different agency IDs and 15 different vehicle type classifications with 9,999 different identification numbers per class.
- The location, speed and heading of the vehicle.

- The status of the vehicle's turn signal.
- The radio channel as assigned by the intersection and the serial number of the Vehicle Control Unit.

The vehicle shall be capable of being wired so that the GPS data is available either while the equipment is requesting priority or when not requesting priority. The vehicle control unit shall be equipped with an ON/OFF switch to activate the system and request priority. The switch shall be depressed to activate the system. In addition, a remote activation line shall be provided to interface with other vehicle equipment. This line shall have +12 VDC applied to request priority. The equipment shall be configured to activate with the light bar/remote activation line or via the ON/OFF switch.

The vehicle equipment shall be supplied complete with a 20-foot minimum installation cable as well as a 15-foot minimum vehicle interface cable.

The vehicle control unit shall include multi-purpose communication ports compliant with the RS-232 communication standard. These ports shall enable unit configuration to be set into the vehicle control unit and read from vehicle control unit. It also shall allow real-time communication between the vehicle control unit and the interface computer as well as interfacing with other devices. One of the ports shall be configured to output GPS data at a user selectable baud rate in the NMEA format while the vehicle control unit is turned On. It shall output the following messages (depending on the baud rate):

- GGA Global Positioning System Fix Data (2400 baud and higher)
- GSA GPS DOP and active satellites (2400 baud and higher)
- GSV Satellites in view (4800 baud and higher)
- RMC Recommended Minimum Navigation Information (1200 baud and higher)

The vehicle control unit shall also have a series of indicator lights that will operate as follows:

- A power indicator as well as an indicator light in the switch will indicate that the equipment is powered On.
- A GPS indicator will indicate the status of GPS reception.
- An indicator will indicate the status of the communication between the vehicle control unit and the Radio/GPS unit.
- A disable indicator will indicate if the vehicle equipment is in a Disable mode. The disable indicator and the indicator in the power switch will flash green or any other color as approved by the Engineer.
- The indicators shall be capable of being programmed to provide feedback for the following:
  - Phase selector has received preemption request.
  - Another vehicle approaching the intersection has received the preemption request.
  - Phase selector has received preemption request and another equipped vehicle is approaching the intersection from another direction.

The vehicle control unit shall be equipped with a disable input that, when activated, will cause the radio to transmit that the vehicle is in Disable mode, thereby eliminating the possibility of the priority request continuing after the priority vehicle has arrived at its destination. The disable

input shall be programmable to operate in either a latching or non- latching mode. The disable input shall be programmed so that the input may be activated by applying ground or by applying +12 VDC. Operation of the disable input shall be programmable using software. Additional inputs shall be included to temporarily switch the vehicle control unit to low priority and to Probe Mode. The vehicle equipment shall operate over a temperature range of -30°F to 165°F and a relative humidity range of 5% to 95%. Windows™ based software shall be available for programming the vehicle control unit through its RS-232 compatible multi-purpose port.

**907-639.02.3.1.1.1--Antenna.** A GPS receiver and antenna shall obtain the vehicle position, speed and heading from the GPS satellite system operated by the Department of Defense (DOD). The time information from the GPS satellites shall also be used to synchronize the frequency hopping of the 2.4 GHz radio.

The Radio/GPS antenna cables shall consist of a pair of 25-foot coax cables with factory terminated SMA connectors. One of these connectors shall have a pin and the other shall have a socket.

**907-639.02.3.1.1.2--Radio.** The Radio shall operate in the reserved Industrial, Scientific and Medical (ISM) communications band, requiring no license. A 2.4 GHz spread spectrum/frequency hopping radio shall provide the communications from the vehicle to the intersection when within range of a Radio/GPS equipped intersection. The radio shall have a transmit power of not more than one (1) watt. The radio shall have an unobstructed range of at least 2,500 feet. The radio shall meet FCC Part 15 rules. Radio link association and coordination among intersections and vehicles shall be automatic.

**907-639.02.3.2--Intersection Equipment.**

**907-639.02.3.2.1--Multimode Phase Selector.** The multimode phase selector recognizes inputs from both infrared and Radio/GPS activation methods at the intersection and supplies coordinated inputs to the controller.

The multimode phase selector shall be designed to be installed in the traffic controller cabinet and is intended for use directly with numerous controllers. These include Type 170/2070 controllers with compatible software, NEMA controllers, or other controllers along with the system card rack and suitable interface equipment and controller software.

The multimode phase selector shall include the ability to directly sense the green traffic controller signal indications through the use of dedicated sensing circuits and wires connected directly to field wire termination points in the traffic controller cabinet. This connection shall be made using the Auxiliary Interface Panel.

The multimode phase selector will be a plug-in, 4-channel, multiple-priority, multi-modal device intended to be installed directly into a card rack located within the controller cabinet. The multimode phase selector shall be capable of using existing infrared or Radio/GPS system card racks. The multimode phase selector shall be powered from either +24 VDC or 120 VAC.

The multimode phase selector shall support front-panel RS-232, USB and Ethernet interfaces to allow management by on-site interface software and central software. An RS-232 port shall be

provided on the unit. Additional RS-232 communication ports shall be available using the Auxiliary Interface Panel.

The multimode phase selector shall have the capability of storing a minimum of 10,000 priority control calls. When the log is full, the phase selector shall drop the oldest entry to accommodate the new entry. The multimode phase selector shall store each call record in non-volatile memory and shall retain the record if power terminates.

The multimode phase selector shall support a minimum of 5,000 code pairs (agency ID, vehicle ID) for each of the priority levels, high and low, providing unique vehicle identification and system security implementation at the vehicle level.

The multimode phase selector shall include several programmable control timers that will limit or modify the duration of a priority control condition, by channel. The control timers will be as follows:

- Max call time
- Off approach call hold time
- Lost signal call hold time
- Call delay time

The multimode phase selector shall have the ability to enable or disable all calls of all priority levels. This shall be independently settable by channel.

A unique intersection name, which shall be broadcast, shall be settable for each Multimode Phase Selector.

Up to 25 different radio channels shall be available to be assigned to the multimode phase selector.

The multimode phase selector shall operate in a mode that shall vary the output based on the status of the approaching vehicle's turn signal. Additional outputs available on an auxiliary interface panel may be needed. Settings shall be available for this mode as follows:

- Output mappings for each channel.
- Separate setting for high and low priority levels.
- Separate settings for each left turn, right turn or straight signal status for each of the four (4) channels and priority levels.

The multimode phase selector's default values shall be programmable by the operator on-site or at a remote location.

The multimode phase selector shall be capable of three (3) levels of signal discrimination, as follows:

- Verification of the presence of the signal of either high priority or low priority.
- Verification that the vehicle is approaching the intersection within a prescribed Estimated Time of Arrival (ETA).

- Determination of when the vehicle is within the prescribed range, either by intensity level or distance from the intersection.

The multimode phase selector shall include one (1) opto-isolated NPN, or sinking, output per channel that provides the following electrical signal to the appropriate pin on the card edge connector:

- 6.25Hz  $\pm$ 0.1Hz 50% on/duty square wave in response to a low priority call.
- A steady ON in response to a high priority call.
- The multimode phase selector will also have the option of providing separate outputs for High and Low priority calls for controllers that do not recognize a 6.25 Hz pulsed low priority request.
- Additional outputs or output modes shall also be available on the Auxiliary Interface Panel in case of need for additional modes of operation.

The multimode phase selector shall accommodate the following three (3) methods for setting range thresholds for High and Low priority signals.

- Based on the approaching vehicle's Estimated Time of Arrival (ETA). This shall be settable between zero (0) and 255 seconds in one (1) second increments.
- Based on the approaching vehicle's distance from the intersection. This shall be settable in one (1) foot increments.
- Based on emitter intensity the system shall accommodate setting a separate range from 200 feet to 2,500 feet with range set points for both High and Low priority signals.

The multimode phase selector will have the following indicators:

- A status indicator that illuminates steadily to indicate proper operation.
- A link indicator on the multimode phase selector illuminates if other radios are within range.
- A radio indicator that indicates the status of the communication between the vehicle control unit and the Radio/GPS unit. The indicator illuminates to indicate that there is communication between the vehicle control unit and the Radio/GPS unit. The indicator illuminates to indicate that a GPS signal has been acquired and the 2.4 GHz radio is on the air.
- LED indicators (one (1) for high priority, one (1) for low priority) for each channel display active calls as steady ON and pulse to indicate pending preemption requests.

The multimode phase selector shall have a test switch for each channel to test proper operation of High or Low Priority.

The multimode phase selector shall utilize the time obtained from the GPS satellites to time stamp the activity logs. The user will set the local time zone (offset from GPS time) via the interface software.

The interface software shall have the capability to set the multimode phase selector to automatically adjust the GPS time offset for changes in daylight savings time.

An auxiliary interface panel shall be available to facilitate interconnections between the multimode phase selector and traffic cabinet wiring as well as provide additional outputs.

A multimode phase selector port may be configured to output GPS data at a user selectable baud rate in the NMEA 0183format. It will output the following messages depending on the baud rate:

- GGA - Global Positioning System Fix Data (2400 baud and higher)
- GSA - GPS DOP and active satellites (2400 baud and higher)
- GSV - Satellites in view (4800 baud and higher)
- RMC - Recommended Minimum Navigation Information (1200 baud and higher)

The following diagnostic tests are incorporated in the multimode phase selector:

- Power up built in test
- Communications port tests
- Preemption output test call
- Detector response test

The multimode phase selector shall be capable of call bridging.

When used with a GPS radio unit, the multimode phase selector shall relay a priority request to the next adjacent intersection based on the direction indicated by the vehicle's turn signals.

The multimode phase selector shall support evacuation mode for Low priority calls. The multimode phase selector shall allow relative priority.

**907-639.02.3.2.1.1--Card Rack.** The required card rack shall provide simplified installation of a multimode phase selector into controller cabinets that do not already have a suitable card rack.

The card rack shall be factory wired with one (1) connector, located behind the card slot, and one (1) connector on the front of the card rack.

The card rack connector on the front shall provide for connections to the traffic controller. The Contractor shall verify card rack requirements with the Engineer prior to submitting this equipment.

One (1) version of the card rack shall contain a 24 VDC power supply to power the phase selector. The power supply shall be capable of being powered by 100-240 VAC 50-60 Hz.

Another version of the card rack shall pass 120 VAC through to the rear card rack connector. This version shall provide labeled terminal blocks for connecting the primary infrared detectors to a phase selector.

Additionally, there shall be an optional card rack with a built-in Electromechanical Relay for use in switching high current loads such as flashers and gate operators. The relay shall be capable of switching the following loads.



Resistive: 10 A, 240 VAC  
10 A, 30 VDC

General Use: 7.5 A, 120 VAC  
7.5 A, 240 VAC  
7 A, 30 VDC  
1/6 hp, 120 VAC  
1/3 hp, 240 VAC

**907-639.02.3.2.2--Blank.**

**907-639.02.3.2.3--Intersection Radio/GPS Module.** A GPS receiver and antenna shall obtain the intersection position from the GPS satellite system operated by the DOD. The time information from the GPS satellites shall be used to synchronize the frequency hopping of the 2.4 GHz radio and to time stamp the activity log. The GPS receiver and the GPS antenna shall reside inside of the Radio/GPS module.

A 2.4 GHz spread spectrum/frequency hopping radio shall provide the communications from the intersection to the vehicle as well as from intersection to intersection, or as shown in the plans.

As an alternate, the following Radio/GPS unit and Radio GPS antenna may be used in the intersection.

The Radio/GPS antenna shall be a hemispherical dome with a pair of 15-foot coax cables with factory terminated SMA connectors. One (1) of these connectors shall have a pin and the other will have a socket. This antenna shall include one (1) element for receiving the GPS signal and one (1) element for transmitting and receiving the radio signal. This antenna, along with the radio/GPS module, may also be used in the intersection.

The radio shall have a maximum transmit power of not more than one (1) watt. The radio shall have an unobstructed range of at least 2,500 feet. The radio will meet FCC Part 15 rules. The radio and the radio antenna shall reside inside of the Radio/GPS module.

The Radio/GPS module shall be housed in an impact resistant polycarbonate housing that will include a water resistant wire entry point. It shall contain a water resistant access cover to facilitate cable termination.

The Radio/GPS module shall be designed for mounting at or near an intersection on mast arms and span wire poles. Additional hardware may be needed.

The Radio/GPS module shall communicate to the multimode phase selector via a Radio/GPS cable up to 250 feet in length.

**907-639.02.3.2.4--Radio/GPS Cable.** The Radio/GPS cable shall deliver sufficient power from the multimode phase selector to the Radio/GPS module and will deliver the necessary quality signal from the Radio/GPS module to the multimode phase selector over a non-spliced distance of 250 feet.

Coaxial cable will not be permitted for this cable.



The Radio/GPS cable shall deliver sufficient power from the vehicle control unit to the Radio/GPS module and will deliver the necessary quality signal from the Radio/GPS module to the vehicle control unit over a non-spliced distance of 50 feet.

The cable shall be of durable construction to satisfy the following installations:

- Direct burial.
- Conduit and mast arm.
- Exposed overhead (supported by messenger wire)

The outside diameter of the cable shall not exceed 0.4 inches. The insulation rating of the cable shall be 300 volts minimum.

The temperature rating of the detector cable will be -40°F to +194°F.

The conductors shall be AWG #20 (7x28) stranded and individually tinned. The cable shall be shielded and have a drain wire to provide signal integrity and transient protection.

When the aluminum enclosure version of the Radio/GPS module is used, the Radio/GPS cable assembly shall use a 15-pin connector that will mate with the connector on the Radio/GPS module.

**907-639.02.3.2.5--Electrical and Environmental Requirements.** All equipment supplied as part of the priority control system intended for use in the controller cabinet shall meet the following electrical and environmental specifications spelled out in the NEMA Standards Publication TS 2-2003, Part 2: v02.06:

- Line voltage variations per NEMA TS 2-2003, Paragraph 2.1.2.
- Power source frequency per NEMA TS 2-2003, Paragraph 2.1.3.
- Power source noise transients per NEMA TS 2-2003, Paragraph 2.1.6
- Temperature range per NEMA TS 2-2003, Paragraph 2.1.5
- Humidity per NEMA TS 2-2003, Paragraph 2.1.5
- Shock test per NEMA TS 2-2003, Paragraph 2.2.9.
- Vibration per NEMA TS 2-2003, Paragraph 2.2.8
- Non-Destructive Transient immunity NEMA TS 2-2003, Paragraph 2.1.8.
- Input-output terminals NEMA TS 2-2003, Paragraph 2.1.7.
- FCC Part 15 Subpart B Class A EMC Standard
- Canada ICES-003, Issue 4:2004 Class A EMC Standard
- EN50293: 2000 Electromagnetic Compatibility--Road Traffic Signal Systems – Product Standard.
- EN 61326-1:2006 EMC Standard.
- EN 55011:2007 +A2:2007 EMC Standard.

**907-639.02.4--Confirmation Light.** This indication is intended for use at traffic signal installations that employ Emergency Vehicle Preemption (EVP) systems which utilize confirmation lights to notify the emergency vehicle operators that the designated preemption display is active and from which approach direction the call activating the display was received.

The indication shall be an incandescent, tungsten-halogen or light emitting diode (LED) lamp. The confirmation light lamp shall be rated for outdoor use and shall have the illumination equivalent of a 95W incandescent lamp.

**907-639.02.4.1--Confirmation Light Lamp Holder.** The confirmation light lamp holder shall meet the following.

- (a) Be precision die-cast aluminum with heat sinks and ribbing to maximize heat dissipation.
- (b) Be a medium base lamp holder that accepts PAR38 lamps up to 250W incandescent or Tungsten-Halogen, and will also accept LED style lamps.
- (c) Have a premium porcelain socket with double reinforced screw shell and spring loaded center contact.
- (d) Be suitable for wet locations.
- (e) Have a gasket that consists of a thick silicone rubber seal backed up by a durable heat barrier and anchored in place with a metal lock ring to ensure unit stays weather tight in any position, above or below horizontal.
- (f) Have a nominal ½-inch NPT threaded adjustable arm, locknut preinstalled, and pre-lubed to facilitate mounting.
- (g) Have cast-in quadrants with serrated teeth to lock unit in place once aimed.
- (h) Have extra-long wire pigtailed for easy splicing.
- (i) Shall be UL Listed.

**907-639.02.4.2--Confirmation Light Mounting.** The confirmation light may be mounted as an assembly with the appropriate optical detector, utilizing conventional conduit and fittings in accordance with Section 722 of the Standard Specifications. When mast arm mounted, all wiring shall be routed internally to the mounting assembly.

**907-639.02.5--Rotating Beacon.** The rotating beacon indication is intended for use in traffic signal systems that employ EVP systems that utilize rotating beacons to notify the emergency vehicle operators that a preemption call has been received.

**907-639.02.5.1--General Construction.** The rotating beacon shall be constructed with a non-corroding polycarbonate base with combination mount with a flat base and 1-inch pipe mounting. The lens shall have an elliptical dome shape and shall provide a high light transmission and light output. The outer surface shall be smooth to minimize the accumulation of dust and dirt. A gasket seal shall be provided between the dome lens and the base. The rotating beacon assembly shall be nominally six and one-half inches (6½") tall and five and one-half inches (5½") wide at its maximum width. The rotating beacon shall have a single light source and shall provide the rotating effect by a rotating refractor within the assembly. The dome lens shall be BLUE in color.

**907-639.02.5.2--Rotating Beacon Mounting.** The rotating beacon shall be mounted at locations and at heights above the pole bases as shown on the plans. The rotating beacon shall be mounted in a vertical position, employing a single traffic signal bracket in accordance with Section 722, of the Standard Specifications on the bottom of the rotating beacon. When mounted on a steel pole with internal wiring, all wiring shall be internal to the bracket and the pole.

**907-639.03--Construction Requirements.**

**907-639.03.1--Railroad Preemption.** The Contractor shall secure all items that are required to complete the installation. The Contractor shall coordinate with the railroad company for the connection of the Railroad Signal Preemption to the railroad controller's contact closure termination point as indicated in the Plans. The Contractor shall contact the railroad company prior to starting any construction to obtain any requirements for the connection.

During construction, the Contractor shall meet all railroad requirements to provide the connection including:

- Boring, Jacking, or Trenching of casing pipe, conduit, roll pipe, or any other required materials.
- Conduit connections into cabinet.
- Contact closure cable connections on termination blocks.

When required by the railroad company and any agreements, the Contractor shall furnish a Flagger to accommodate work within the railroad right of way. The Contractor shall schedule all work to minimize time within the right of way.

**907-639.03.2--Type 1 and Type 2 Emergency Vehicle Preemption.**

**907-639.03.2.1--Vehicle Equipment.** Equipment shall be the responsibility of the local maintaining agency for all necessary equipment and installation.

**907-639.03.2.2--Intersection Equipment.** The Contractor shall install, configure, and demonstrate a fully functional Emergency Vehicle Preemption System as shown in the Plans. The Contractor shall install all equipment according to the manufacturer's recommendations. The Type 1 intersection equipment including, the multimode phase selector, intersection optical detector, associated optical detector cabling, and card rack shall be installed per the manufacturer's recommendations or as outlined in the plans and/or contract documents. The Type 2 intersection equipment including, the multimode phase selector, intersection Radio/GPS module, associated Radio/GPS cabling, and card rack shall be installed per the manufacturer's recommendations or as outlined in the plans and/or contract documents. All installation requirements of the equipment manufacturer shall be followed unless otherwise directed by the Engineer. All necessary equipment shall be mounted in the cabinet and configured according to the Plans, Contract Documents, and manufacturer's recommendations. The completed installation shall present a neat and positive appearance and shall not in any way interfere with the proper operation of the traffic signal system installation of which it is part.

**907-639.04--Method of Measurement.** Railroad Signal Preemption, Type 1 Optical Detector, Multimode Phase Selector, and Type 2 Radio/GPS Module will be measured per each. Type 1 Optical Detector Cable and Type 2 Radio/GPS Cable will be measured by the linear foot, which measurement will be computed horizontally and vertically along the pole, conduit or messenger cable which the electric cable is placed, from center to center of the several installations comprising the circuits. No extra length will be allowed within conduit for vertical changes in elevation of the conduit. No extra length will be allowed for cable inside signal heads, drip loops, or sag in aerial supported cable. The terminals for the measurements of lengths will be considered specifically as the center of the pull boxes, poles, signal heads or controller cabinets.

Confirmations Light and Rotating Beacon will be measured per each.

**907-639.05--Basis of Payment.** Railroad Signal Preemption, Type 1 Optical Detector, Multimode Phase Selector, Type 2 Radio/GPS Module, Type 1 Optical Detector Cable, and Type 2 Radio/GPS Cable, measured as prescribed above, will be paid for at the contract price per each or linear foot (as shown below), which price shall be full compensation for coordinating and accommodating railroad requirements, providing hardware, sealing; testing, cabling, connections, documentation, configuration, flagger, training, materials, labor, tools, equipment, and all other incidentals necessary to complete the work and provide a fully functional preemption system.

Confirmations Light and Rotating Beacon, measured as prescribed above, will be paid for at the contract unit price per each, which price shall be full compensation for furnishing, installing, connection and testing all materials; for pulling through conduit, mast arms and poles for attaching to messenger cable; for final cleanup; and for all labor, equipment, tools and incidentals necessary to complete the work.

Payment will be made under:

- 907-639-A: Railroad Signal Preemption - per each
- 907-639-B: Type 1 Optical Detector - per each
- 907-639-C: Type 1 Optical Detector Cable - per linear foot
- 907-639-D: Multimode Phase Selector - per each
- 907-639-E: Type 2 Radio/GPS Module - per each
- 907-639-F: Type 2 Radio/GPS Cable - per linear foot
- 907-639-G: Confirmation Light - per each
- 907-639-H: Rotating Beacon - per each

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-643-4

CODE: (SP)

DATE: 11/21/2022

SUBJECT: Video Vehicle Detection

Section 643, Video Vehicle Detection System, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

Delete Section 643 on pages 601 thru 628, and substitute the following.

## SECTION 907-643 - VIDEO VEHICLE DETECTION

**907-643.01--Description.** This section specifies the minimum requirements for Video Vehicle Detection (VVD) and Multi-Sensor Vehicle Detection (MSVD) furnished and installed in accordance with the design(s) for the location(s) designated on the project plans, in any related notice to bidders, or as directed. The work shall consist of providing all labor, materials, equipment, and incidentals necessary to furnish, install, test, and operate VVD and/or MSVD. The video vehicle detection system shall at a minimum use one or more cameras recommended by the manufacturer or an integrated thermal sensor and video analytics hardware and software to detect vehicle presence, provide a detection output, and generate volume, occupancy, and speed data.

Type 1 Video Vehicle Detection will provide presence or pulse detection of vehicles, bicycles, and pedestrians for Traffic Signal Controller inputs. There are two variations of Type 1 Video Vehicle Detection: Type 1A – camera with independent video detection processor, Type 1B – a single integrated camera with video detection processor. The work shall consist of providing all labor, materials, equipment, and incidentals necessary to furnish, install, and test the Video Vehicle Detection equipment, complete and ready for service.

Type 2 Video Vehicle Detection will provide presence or pulse detection of vehicles, bicycles, and pedestrians for Traffic Signal Controller inputs. Type 2 Video Vehicle Detection shall be designed to be span wire mounted. The work shall consist of providing all labor, materials, equipment, and incidentals necessary to furnish, install, and test the Video Vehicle Detection equipment, complete and ready for service.

Type 3 Video Vehicle Detection will provide presence or pulse detection and tracking of vehicles, bicycles, and pedestrians for Traffic Signal Controller inputs. Type 3 Video Vehicle Detection shall be a single fish-eye lens camera, designed to be mounted on signal pole or mast arm. The work shall consist of providing all labor, materials, equipment, and incidentals necessary to furnish, install, and test the Video Vehicle Detection equipment, complete and ready for service.

The Multi-Sensor Vehicle Detection (MSVD) will provide detection of vehicles on a roadway using a Multi-Sensor Detection for Traffic Signal Controller inputs. The Multi-Sensor shall utilize two (2) different sensors of different technologies, video imaging and radar, to detect and track

vehicles. The module shall process information from both video imaging and radar sensors simultaneously in real-time. The work shall consist of providing all labor, materials, equipment, and incidentals necessary to furnish, install, and test the Multi-Sensor Vehicle Detection equipment, complete and ready for service.

**907-643.02--Materials.**

**907-643.02.1--Materials Type 1 Video Vehicle Detection.** The Type 1 Video Vehicle Detection shall consist of power supply, video camera, mounting brackets, and lightning protection as recommended by the manufacturer, video detection processors/extension modules capable of processing the number of camera and phase combination video sources shown on the project plans or in the purchase order. In addition, Type 1B Video Vehicle Detector shall consist of a single integrated camera with video detection processor, a cabinet interface which mounts in a standard detector rack or as a standalone shelf mount unit.

**907-643.02.1.1--Functional Requirements for Type 1 Video Vehicle Detection.** The Type 1 Video Vehicle Detection configuration shall utilize video processors with one or more video inputs and one (1) video output, responding to specific site applications, camera locations and detection zones shown on the project plans. Video processors or interface modules shall be provided which plug directly into NEMA TS 1 and TS 2 detector racks without adapters. Extension modules which allow detection zones from one camera to be routed to other card slots shall also be provided if required. The system shall be Ethernet compatible with an RJ45 port. The Type 1 Video Vehicle Detection shall be able to detect vehicles and bicycles in multiple lanes using only the video image.

**907-643.02.1.2--Interface Type 1 Video Vehicle Detection.** The following interfaces shall be provided:

- 1) Video inputs that accept RS 170 (NTSC) signals from an external video source. A BNC type interface connector shall be provided and located on the front of the video processing unit.
- 2) A LED indicator to indicate the presence of the video signal. The LED shall illuminate upon valid video synchronization and turn off when the presence of a valid video signal is removed.
- 3) One (1) video output per processor module. The video output shall be RS 170 compliant and shall pass through the input video signal. The video output shall have the capability to show text and graphical overlays to aid in system setup. The overlays shall display real-time actuation of detection zones upon vehicle detection or presence. Control of the overlays and video switching shall also be provided through the serial communications port. The video output interface connector shall be BNC or RCA type. If RCA connector is used, an RCA to BNC adapter shall be provided.
- 4) A serial communications port on the front panel. The serial port shall be compliant with RS-232 or RS-422 electrical interfaces and shall use a DB9 or RJ45 type connector. The serial communications interface shall allow the user to remotely configure the system and/or to extract calculated vehicle/roadway information.
- 5) Interface software. The interface protocol shall support multi-drop or point-to- multipoint



communications. Each video detection sensor shall have the capability to be individually IP addressable either built in or with third party video server units.

- 6) Open collector contact closure outputs meeting NEMA TS-2 requirements. The open collector output will be used for vehicle detection indicators as well as discrete outputs for alarm conditions.
- 7) LED status indicators on the front panel. The LED's shall illuminate when a contact closure output occurs. Provide one output LED for each contact closure output.
- 8) A mouse compatible port (PS-2 or USB) on the front panel of the video processing unit. The mouse port shall be used as part of the system setup and configuration.
- 9) A Cabinet Interface shall be provided that is specifically designed to mount in a standard NEMA TS 1 and TS 2 detector rack without adapters or rewiring, or as a stand-alone shelf mount unit. The Interface shall operate in a temperature range from -31°F to +165°F and a humidity range from 0% to 95% relative humidity. The Cabinet Interface shall be powered by 100v to 240v AC, 50 or 60Hz. The front of the Interface shall include LED detection indications for each channel of detection. One BNC video output and detector test switches that allow the user to place calls on each channel

**907-643.02.1.3--Functionality Type 1 Video Vehicle Detection.** Detection zones shall be programmed via an on-board menu displayed on a video monitor and a pointing device connected to the video detection processor. The menu shall facilitate placement of detection zones and setting of zone parameters or to view system parameters. The video detection processor shall detect vehicles, bicycles, and pedestrians in real time as they travel across each detection zone. The video detection processor shall have an RS-232 (DB9 or RJ45) port for communications with an external computer. The video detection processor port shall be multi-drop capable.

It shall be possible to upload and save all configuration data including loop placement and save the file on a computer. It shall be possible to download a configuration file from a computer to the detection device.

The video detection processor shall accept new detection patterns from an external computer through the RS-232 port when the external computer uses the correct communications protocol for downloading detection patterns.

A Windows™ based software designed for local and remote connection shall be provided for video capture, real-time detection indication and detection zone modification capability. The video detection processor shall send its detection patterns to an external computer through the RS-232 port.

The video detection processor shall default to a safe condition, such as minimum recall, fixed recall or a constant call on each active detection channel, in the event of unacceptable interference with the video signal, low visibility conditions, or power failure.

The system shall be capable of automatically detecting a low-visibility condition such as fog and respond by placing all defined detection zones in a constant call mode. The system shall automatically revert to normal detection mode when the low-visibility condition no longer exists.

**907-643.02.1.4--Detection.** Type 1A shall have a minimum of 24 detection zones per camera input and each detection zone shall be capable of being sized to suit the site and the desired vehicle detection area. Type 1B shall have a minimum of 8 detection zones per camera input and each detection zone shall be capable of being sized to suit the site and the desired vehicle detection area.

A single detection zone shall be able to replace multiple inductive loops and the detection zones shall be OR'ed as the default or may be AND'ed together to indicate vehicle presence on a single phase of traffic movement.

Placement of detection zones shall be done by using only a pointing device, and a Graphical Interface built into the video detection processor and displayed on a video monitor, to draw the detection zones on the video image from each video camera. Detection zones created in this manner shall be compatible with the PC-based software provided with the system.

The video detection processor shall support bicycle type zones where the zone can differentiate between motorized vehicles and bicycles, producing a call for one but not the other. Bicycle zones shall only output when a bicycle is detected. The video detection processor shall provide the ability to assign a separate output channel for bicycle zones to allow traffic controllers to implement special bicycle timing for applications where the traffic controller has separate bicycle detection inputs. Bicycle zones shall have the ability to have extensions assigned to individual bicycle zones for applications where the traffic controller does not have bicycle specific detection inputs.

For Type 1A, six (6) additional count zones for bicycles shall be provided to accumulate bicycle counts at user specified intervals.

The video detection processor's memory shall be non-volatile to prevent data loss during power outages.

When a vehicle is detected crossing a detection zone, the corners or entire zone of the detection zone shall flash/change color on the video overlay display to confirm the detection of the vehicle. It shall be possible to record the operation of the unit in real time with the detection zones operating.

Detection shall be at least 98% accurate in all weather conditions, with slight degradation acceptable under adverse weather conditions (e.g. rain, snow, or fog) which reduce visibility.

The video detection processor shall maintain normal operation of existing detection zones when one (1) zone is being added or modified.

The video detection processor shall output a constant call on any detector channel corresponding to a zone being modified and shall resume normal operation upon completion.

Detection zones shall be directional to reduce false detections from objects traveling in directions other than the desired direction of travel in the detection area.

The video detection processor shall process the video input from each camera using a



microprocessor at 30 frames per second at one volt, peak to peak, 75 ohms, or EIA 170 NTSC video standard.

The video detection processor shall output minimum recall, fixed recall or constant call for each enabled detector output channel if a loss of video signal occurs. The recall behavior shall be user selectable for each output. The video detection processor shall output a constant call during the background "learning" period.

Detection zone outputs shall be configurable to allow the selection of presence, pulse, extend, and delay outputs. Timing parameters of pulse extend, and delay outputs shall be user definable between 0.1 to 25.0 seconds in increments of 0.1 seconds.

Type 1A shall have up to six (6) detection zones per camera view that have the capability to count the number of vehicles detected, measure classification, occupancy, and speed. The data values shall be internally stored within the processor module for later retrieval through the RS-232 port. The data collection interval shall be user definable in periods of 5, 15, 30, or 60 minutes or by intersection cycle. Real-time data shall be retrieved from the PC-based software provided with the system.

**907-643.02.1.5--Camera.** Type 1A cameras shall be completely compatible with the video detection processor and shall be certified by the manufacturer to ensure proper system operation.

Type 1B shall be a single integrated camera with built in video detection processor.

The Video Vehicle Detection shall produce accurate detector outputs under all roadway lighting conditions, regardless of time of day. The minimum range of scene luminance over which the camera shall produce a useable video image shall be the minimum range from nighttime to daytime, but not less than the range 0.009 to 930 foot-candles.

The camera shall use a color CCD sensing element with resolution of not less than 470 lines horizontal and 400 lines vertical.

The camera shall include mechanisms to compensate for changing of lighting by using an electronic shutter and/or auto-iris lens.

The camera shall include a variable focal length lens with factory preset focus that requires no field adjustment. Zooming of the camera lens to suit the site geometry by means of a portable interface device designed for that purpose. The horizontal field of view shall be adjustable. Camera configuration shall be customized for each approach based on field site conditions and the project plans.

The camera electronics shall include automatic gain control (AGC) to produce a satisfactory image at night.

The camera shall be housed in a weather-tight sealed enclosure. The housing shall be field rotatable to allow proper alignment between the camera and the traveled road surface.

The camera enclosure shall be equipped with a sunshield. The sunshield shall include a provision for water diversion to prevent water from flowing in the camera's field of view.

The camera enclosure shall include a thermostatically controlled heater to assure proper operation of the lens shutter at low temperatures and prevent moisture condensation on the optical faceplate of the enclosure. The heater shall directly heat the glass lens and require less than five (5) watts over the temperature range.

Power consumption of the camera shall be 15 watts or less under all conditions.

The camera enclosure shall be equipped with separate, weather-tight connections for power and setup video cables at the rear of the enclosure. These connections shall allow diagnostic testing and viewing of video at the camera while the camera is installed on a mast arm or pole using a lens adjustment module furnished under this bid item.

The video signal output by the camera shall in accordance with NTSC standards.

All necessary mounting brackets shall be mounted to pole shafts, mast arms, or other structures to mount cameras as indicated on the project plans. Mounting brackets shall result in a fixed-position mounting. Mounting Brackets shall be included at no additional cost.

**907-643.02.1.6--Video Cable.** The cable provided shall be as recommended by the manufacturer for optimal video detection performance. The power and video cable may be installed under the same outer jacket. The cable and installation tools shall be approved by the supplier and manufacturer's instructions must be followed to ensure proper connection.

**907-643.02.1.7--Power Cable.** The cable provided shall be as recommended by the manufacturer for optimal video detection performance.

Camera power cable shall be suitable for installation in conduit and in exposed sunlight environment, and UL listed.

The power and video cable may be installed under the same outer jacket. The cable and installation tools shall be approved by the supplier and manufacturer's instructions must be followed to ensure proper connection.

**907-643.02.1.8--Surge Protection.** Surge protection devices shall be provided for all new or added video detection devices as recommended by the manufacturer. A surge protection device (SPD) shall be installed at the point the video detection devices receive 120 volt power and connected in series with the circuits. SPDs shall be selected and installed according to recommendation from the device manufacturer. The units shall be configured with receptacles. The units shall have an internal fuse protection and shall provide common mode (L+N-G) protection.

Video and/or Power cable shall be protected with an inline surge suppressor as recommended by

the manufacturer or a panel mounted surge suppressor as recommended by the manufacturer or approved equal, installed and grounded per manufacturer's recommendations.

**907-643.02.1.9--Physical and Environmental Specifications.** Physical and Environmental Specifications shall be as follows.

**Video Vehicle Detection Processor:** The video vehicle detection processor shall operate reliably in a typical roadside traffic cabinet environment. Internal cabinet equipment and a video vehicle detection processor shall be provided that meets the environmental requirements of NEMA TS-2-2003 Section 2. If the processor is located in the sensor, it shall meet the same requirements.

**Video Camera Sensor:** The operating ambient temperature range shall be -30°F to 140°F. Additionally, a heater shall be included to prevent the formation of ice and condensation in cold weather. The heater shall not interfere with the operation of the video camera sensor electronics, or cause interference with the video signal.

**Vibration:** Vibrations shall meet the requirements of NEMA TS 2-2003 Section 2.1.9. **Shock:** Shock shall meet the requirements of NEMA TS 2-2003 Section 2.1.10.

**Acoustic Noise:** A video camera sensor and enclosure shall be provided that can withstand 150 dB for 30 minutes continuously, with no reduction in function or accuracy.

**907-643.02.2--Materials Type 2 Video Vehicle Detection.** The Type 2 Video Vehicle Detection shall be span wire mounted and consist of power supply, video camera, mounting brackets, and lightning protection as recommended by the manufacturer, video detection processors/extension modules capable of processing the number of camera and phase combination video sources shown on the project plans or in the purchase order

**907-643.02.2.1--Functional Requirements for Type 2 Video Vehicle Detection.** The Type 2 Video Vehicle Detection configuration shall utilize video processors with one or more video inputs and one (1) video output, responding to specific site applications, camera locations and detection zones shown on the project plans. Video processors or interface modules shall be provided which plug directly into NEMA TS 1 and TS 2 detector racks without adapters. Extension modules which allow detection zones from one camera to be routed to other card slots shall also be provided if required. The system shall be Ethernet compatible with an RJ45 port. The Type 2 Video Vehicle Detection shall be able to detect vehicles and bicycles in multiple lanes using only the video image.

**907-643.02.2.2--Interface Type 2 Video Vehicle Detection.** The following interfaces shall be provided:

- 1) Video inputs that accept RS 170 (NTSC) signals from an external video source. A BNC type interface connector shall be provided and located on the front of the video processing unit.
- 2) A LED indicator to indicate the presence of the video signal. The LED shall illuminate upon valid video synchronization and turn off when the presence of a valid video signal is removed.

- 3) One (1) video output per processor module. The video output shall be RS 170 compliant and shall pass through the input video signal. The video output shall have the capability to show text and graphical overlays to aid in system setup. The overlays shall display real-time actuation of detection zones upon vehicle detection or presence. Control of the overlays and video switching shall also be provided through the serial communications port. The video output interface connector shall be BNC or RCA type. If RCA connector is used, an RCA to BNC adapter shall be provided.
- 4) A serial communications port on the front panel. The serial port shall be compliant with RS-232 or RS-422 electrical interfaces and shall use a DB9 or RJ45 type connector. The serial communications interface shall allow the user to remotely configure the system and/or to extract calculated vehicle/roadway information.
- 5) Interface software. The interface protocol shall support multi-drop or point-to-multipoint communications. Each video detection sensor shall have the capability to be individually IP addressable either built in or with third party video server units.
- 6) Open collector contact closure outputs meeting NEMA TS 2 requirements. The open collector output will be used for vehicle detection indicators as well as discrete outputs for alarm conditions.
- 7) LED status indicators on the front panel. The LED's shall illuminate when a contact closure output occurs. Provide one output LED for each contact closure output.
- 8) A mouse compatible port (PS-2 or USB) on the front panel of the video processing unit. The mouse port shall be used as part of the system setup and configuration.
- 9) A Cabinet Interface shall be provided that is specifically designed to mount in a standard NEMA TS 1 and TS 2 detector rack without adapters or rewiring, or as a stand-alone shelf mount unit. The Interface shall operate in a temperature range from -31°F to +165°F and a humidity range from 0% to 95% relative humidity. The Cabinet Interface shall be powered by 100v to 240v AC, 50 or 60Hz. The front of the Interface shall include LED detection indications for each channel of detection. One BNC video output and detector test switches that allow the user to place calls on each channel

**907-643.02.2.3--Functionality Type 2 Video Vehicle Detection.** Detection zones shall be programmed via an on-board menu displayed on a video monitor and a pointing device connected to the video detection processor. The menu shall facilitate placement of detection zones and setting of zone parameters or to view system parameters. The video detection processor shall detect vehicles, bicycles, and pedestrians in real time as they travel across each detection zone. The video detection processor shall have an RS-232 (DB9 or RJ45) port for communications with an external computer. The video detection processor port shall be multi-drop capable.

It shall be possible to upload and save all configuration data including loop placement and save the file on a computer. It shall be possible to download a configuration file from a computer to the detection device.

The video detection processor shall accept new detection patterns from an external computer through the RS-232 port when the external computer uses the correct communications protocol for downloading detection patterns.

A Windows™ based software designed for local and remote connection shall be provided for

video capture, real-time detection indication and detection zone modification capability. The video detection processor shall send its detection patterns to an external computer through the RS-232 port.

The video detection processor shall default to a safe condition, such as minimum recall, fixed recall or a constant call on each active detection channel, in the event of unacceptable interference with the video signal, low visibility conditions, or power failure.

The system shall be capable of automatically detecting a low-visibility condition such as fog and respond by placing all defined detection zones in a constant call mode. The system shall automatically revert to normal detection mode when the low-visibility condition no longer exists.

**907-643.02.2.3.1--Functionality for Type 2 Video Vehicle Detection.** The Video Detection Processor (VDP) for the Type 2 Video Vehicle Detection shall employ Dynamic Zone Stabilization to provide motion tracking and compensation for swaying camera sensors mounted on dual or single span wires. The VDP shall include software that discriminately detects the presence of vehicles and bicycles in single or multiple lanes using only the video image. The VDP shall compensate for swaying motions by tracking the position of the stop bar for the approaching vehicle or bicycle movement. The VDP shall compensate for low frequency (cable sag) motion due to temperature changes during the day. The VDP shall compensate for moderate frequency motion induced by winds. The VDP shall compensate for up to  $\pm 5$  degrees of tilt from vertical without any adverse detection false calls or dropped calls.

**907-643.02.2.4--Detection.** Type 2 shall have a minimum of 24 detection zones per camera input shall be possible, and each detection zone shall be capable of being sized to suit the site and the desired vehicle detection area. .

A single detection zone shall be able to replace multiple inductive loops and the detection zones shall be OR'ed as the default or may be AND'ed together to indicate vehicle presence on a single phase of traffic movement.

Placement of detection zones shall be done by using only a pointing device, and a Graphical Interface built into the video detection processor and displayed on a video monitor, to draw the detection zones on the video image from each video camera. Detection zones created in this manner shall be compatible with the PC-based software provided with the system.

The video detection processor shall support bicycle type zones where the zone can differentiate between motorized vehicles and bicycles, producing a call for one but not the other. Bicycle zones shall only output when a bicycle is detected. The video detection processor shall provide the ability to assign a separate output channel for bicycle zones to allow traffic controllers to implement special bicycle timing for applications where the traffic controller has separate bicycle detection inputs. Bicycle zones shall have the ability to have extensions assigned to individual bicycle ones for applications where the traffic controller does not have bicycle specific detection inputs.

Six (6) additional count zones for bicycles shall be provided to accumulate bicycle counts at user

specified intervals.

The video detection processor's memory shall be non-volatile to prevent data loss during power outages.

When a vehicle is detected crossing a detection zone, the corners or entire zone of the detection zone shall flash/change color on the video overlay display to confirm the detection of the vehicle. It shall be possible to record the operation of the unit in real time with the detection zones operating.

Detection shall be at least 98% accurate in all weather conditions, with slight degradation acceptable under adverse weather conditions (e.g. rain, snow, or fog) which reduce visibility.

The video detection processor shall maintain normal operation of existing detection zones when one (1) zone is being added or modified.

The video detection processor shall output a constant call on any detector channel corresponding to a zone being modified and shall resume normal operation upon completion.

Detection zones shall be directional to reduce false detections from objects traveling in directions other than the desired direction of travel in the detection area.

The video detection processor shall process the video input from each camera using a microprocessor at 30 frames per second at one volt, peak to peak, 75 ohms, or EIA 170 NTSC video standard.

The video detection processor shall output minimum recall, fixed recall or constant call for each enabled detector output channel if a loss of video signal occurs. The recall behavior shall be user selectable for each output. The video detection processor shall output a constant call during the background "learning" period.

Detection zone outputs shall be configurable to allow the selection of presence, pulse, extend, and delay outputs. Timing parameters of pulse extend, and delay outputs shall be user definable between 0.1 to 25.0 seconds in increments of 0.1 seconds.

The processor shall have up to six (6) detection zones per camera view shall have the capability to count the number of vehicles detected, measure classification and speed. The data values shall be internally stored within the processor module for later retrieval through the RS-232 port. The data collection interval shall be user definable in periods of 5, 15, 30, or 60 minutes or by intersection cycle. Real-time data shall be retrieved from the PC-based software provided with the system.

**907-643.02.2.5--Camera.** Type 2 cameras shall be completely compatible with the video detection processor and shall be certified by the manufacturer to ensure proper system operation.

The Video Vehicle Detection shall produce accurate detector outputs under all roadway lighting conditions, regardless of time of day. The minimum range of scene luminance over which the camera shall produce a useable video image shall be the minimum range from nighttime to

daytime, but not less than the range 0.009 to 930 foot-candles.

The camera shall use a color CCD sensing element with resolution of not less than 470 lines horizontal and 400 lines vertical.

The camera shall include mechanisms to compensate for changing of lighting by using an electronic shutter and/or auto-iris lens.

The camera shall include a variable focal length lens with factory preset focus that requires no field adjustment. Zooming of the camera lens to suit the site geometry by means of a portable interface device designed for that purpose. The horizontal field of view shall be adjustable. Camera configuration shall be customized for each approach based on field site conditions and the project plans.

The camera electronics shall include automatic gain control (AGC) to produce a satisfactory image at night.

The camera shall be housed in a weather-tight sealed enclosure. The housing shall be field rotatable to allow proper alignment between the camera and the traveled road surface.

The camera enclosure shall be equipped with a sunshield. The sunshield shall include a provision for water diversion to prevent water from flowing in the camera's field of view.

The camera enclosure shall include a thermostatically controlled heater to assure proper operation of the lens shutter at low temperatures and prevent moisture condensation on the optical faceplate of the enclosure. The heater shall directly heat the glass lens and require less than five (5) watts over the temperature range.

Power consumption of the camera shall be 15 watts or less under all conditions.

The camera enclosure shall be equipped with separate, weather-tight connections for power and setup video cables at the rear of the enclosure. These connections shall allow diagnostic testing and viewing of video at the camera while the camera is installed on a mast arm or pole using a lens adjustment module furnished under this bid item.

The video signal output by the camera shall in accordance with NTSC standards.

All necessary mounting brackets shall be mounted to pole shafts, mast arms, or other structures to mount cameras as indicated on the project plans. Mounting brackets shall result in a fixed-position mounting. Mounting Brackets shall be included at no additional cost.

**907-643.02.2.6--Video Cable**. The cable provided shall be as recommended by the manufacturer for optimal video detection performance. The power and video cable may be installed under the same outer jacket. The cable and installation tools shall be approved by the supplier and manufacturer's instructions must be followed to ensure proper connection.



**907-643.02.2.7--Power Cable.** The cable provided shall be as recommended by the manufacturer for optimal video detection performance.

Camera power cable shall be suitable for installation in conduit and in exposed sunlight environment, and UL listed.

The power and video cable may be installed under the same outer jacket. The cable and installation tools shall be approved by the supplier and manufacturer's instructions must be followed to ensure proper connection.

**907-643.02.2.8--Surge Protection.** Surge protection devices shall be provided for all new or added video detection devices as recommended by the manufacturer.

Video and/or Power cable shall be protected with an inline surge suppressor as recommended by the manufacturer or a panel mounted surge suppressor as recommended by the manufacturer or approved equal, installed and grounded per manufacturer's recommendations.

**907-643.02.2.9--Physical and Environmental Specifications.** Physical and Environmental Specifications shall be as follows.

**Video Vehicle Detection Processor:** The video vehicle detection processor shall operate reliably in a typical roadside traffic cabinet environment. Internal cabinet equipment and a video vehicle detection processor shall be provided that meets the environmental requirements of NEMA TS 2-2003 Section 2. If the processor is located in the sensor, it shall meet the same requirements.

**Video Camera Sensor:** The operating ambient temperature range shall be -30°F to 140°F. Additionally, a heater shall be included to prevent the formation of ice and condensation in cold weather. Do not allow the heater to interfere with the operation of the video camera sensor electronics, or cause interference with the video signal.

**Vibration:** Vibrations shall meet the requirements of NEMA TS 2-2003 section 2.1.9. **Shock:** Shock shall meet the requirements of NEMA TS 2-2003 section 2.1 .10.

**Acoustic Noise:** A video camera sensor and enclosure shall be provided that can withstand 150 dB for 30 minutes continuously, with no reduction in function or accuracy.

**907-643.02.3--Materials Type 3 Video Vehicle Detection and Tracking System.** The Type 3 Video Vehicle Detection and Tracking System (VIVTDS) shall consist of the following:

- One VIVTDS processor capable of connecting with 1 to 8 sensors
- One or more VIVTDS sensors, with at least one sensor having a fisheye lens for omnidirectional viewing of the roadway or intersection.
- One surge protector junction unit, per each advanced/stop line sensor
- One mounting pole and bracket (90° pole per each fisheye sensor; or straight, vertical pole per each advanced/stop line sensor). Pole should be assembled in two (2) pieces (3' x 3' plus 7'



straight, vertical base)

- One ball-swivel, bracket, and surge protector junction unit, per each fisheye sensor
- One Ethernet Protection Module (surge protector located in the traffic cabinet), per each VIVTDS sensor
- VIVTDS interface cables to the traffic signal controller based on model/type.
- Optional portable field computer to configure and monitor system operations
- Optional computer to configure and monitor system operations at the TOC or other remote location
- Optional Ethernet Repeater to extend VIVTDS sensors beyond 300 feet
- Optional Fiber interconnect to extend VIVTDS sensors up to 2000 feet
- Optional POE Powered Switch for use with more than two sensors

**907-643.02.3.1--Functional Requirements for Type 3 Video Vehicle Detection.** The Type 3 Video Vehicle Detection configuration shall be for a system that views, captures, and derives data based on the objects that pass within the sensor field of view along a highway, road, ramp, or other commonly used transit pathway via processing video images. The detection of objects by a VIVTDS can be accessed and used by and for many applications, including:

- Vehicle detection and actuation at intersections
- Pedestrian Actuation
- Pedestrian Counting
- In the Box bicycle discrimination and clearance extension
- Bicycle Counting
- Highway flow monitoring
- Ramp metering
- Advanced detection
- Pedestrian crossing extensions
- Temporary construction zone detection
- Situational awareness of location area, including an intersection center
- Automated alerts and reports of potentially unsafe conditions, incidents, malfunctions, or signal timing inefficiencies
- Collecting and archiving traffic data on the Cloud for future analysis to improve performance by optimizing timing plans at intersections
- Non-recurring charges for Cloud Data access
- Occupancy-based vehicle actuation
- Signal Performance Metrics
- User-defined zone output pulses
- Onboard video recording and playback
- Open API for data access

The system shall have a modular electrical design and use Ethernet to connect and network with the different system components. Streaming video images, alerts, and data shall be transmitted from the field back to a Traffic Operations Center (TOC) via the systems client software and to the VIVTDS's cloud by using any or combination of the following:

- Fiber optic
- Wireless Radios
- WAN
- TCP/IP
- Optional Internal modem
- Any other means of commonly used communication practices and standards for digital content and information.

The VIVTDS client software shall provide graphical user interfaces between the administrator(s) and permissioned users of the system and the VIVTDS sensor(s) itself. The software shall allow the user to configure sites, conduct maintenance, monitor information relayed from the sensor(s), and provide access to real-time data, system and user defined alerts, and access to historical data collected by the sensor(s). The client software should be installed on a single personal computer or across a network of computers. One or more users will be able to access VIVTDS simultaneously.

**907-643.02.3.2--Processor Hardware.** The VIVTDS processor shall support 1 or 2 fisheye sensors, or if equipped with 1 fisheye sensor the VIVTDS processor should, at a minimum, be capable of simultaneously supporting up to four (4) additional VIVTDS sensors for special requirements such as advance detection or underpass detection.

The VIVTDS processor shall comply with NEMA standards, TS1, TS2 Type 1 and Type 2; 170/2070; and ITS. The VIVTDS processor shall provide the following inputs and outputs:

Type	Inputs	Outputs
TS1	24	24
TS2	16	64
170/2070	8	24
ITS	16	64

The VIVTDS processor will have at a minimum four (4) USB 3.0 ports for expansion flexibility and have an optional, built-in modem.

The VIVTDS processor shall be no more than 1U high with dimensions, excluding connectors, not to exceed 8.5" x 11.5" x 1.75" and weigh no more than 5.2 lbs. The unit shall have flexible mounting options including the ability to lie flat on a cabinet shelf, be mounted in a standard traffic cabinet rack with optional mounting ears or be installed vertically with optional base. The outer enclosure shall be a powdered coated aluminum.

**907-643.02.3.3--Type 3 Video Vehicle Detection System Software.** Each VIVTDS system shall include software for up to six (6) sensors for detecting and counting the vehicle's entrance and exit of the intersection. The VIVTDS system will also include software for communicating with the traffic controllers and other electronic devices.

Client software shall be included free of charge with each VIVTDS system and should be downloaded and run on any personal computer with a Windows 7 or newer operating system. The

client software at minimum should include management tools to perform the following:

- View, diagnose, configure, and reset individual sensor outputs
- View the status of inputs to enable setup and troubleshooting in the field
- Configure and view calls and phases
- The ability to create and define, as well as edit, vehicle zones, road masks, object masks, and pedestrian zones by drawing arbitrary shaped polygons using a computer
- The ability to detect and track vehicles, motorcycles, bicycles, and pedestrians through the entire 360-degree field of view
- Distinguish between bicycles and vehicles in the center of the intersection (The Box) and provide distinct detector calls to the traffic controller for each object type
- Provide system calls based on zone occupancy
- View the site's configuration history
- Publish and revert back to previous configuration
- View real-time image streaming from the sensor(s) within the software's Client interface
- Optionally access and use an API that is documented online and uses HTTP
- Enterprise security with user-based roles
- Ability to utilize LDAP for user access
- Provide System Alerts for diagnostic and administrative events

The VIVTDS system shall support optional performance data packages for purchase that provide count data, access to real time data, and system and user defined alerts. The performance data shall be accessible directly from the processor or from a remote computer with a network connection, or via a Cloud storage platform. The performance data shall include the following types of reports and alerts:

- Turning movement counts, including U-turns
- Length based vehicle classifications
- Incident reporting
- Volume
- 7 Day Volume
- Occupancy on Green
- Occupancy on Red
- Percentage of Arrivals on Green
- Percentage of Arrivals on Red
- Speed
- Pedestrian Counts
- Bicycle Turning Movements
- Bicycle Counts
- RTSP (H.264) streaming capability
- Wrong way vehicle detection
- Loss of visibility event
- Volume Exceeded

Reports should be exportable and downloadable in the following formats:

- PDF
- Excel
- Synchro Export – Turning Movement Counts

**907-643.02.3.4--Detection.** VIVTDS system shall provide real time vehicle detection (within 500 milliseconds (ms) of vehicle arrival). The system should detect the presence of vehicles for up to 64 detection zones per VIVTDS sensor. The detection zones shall be sensitive to the direction a vehicle travels and the direction to be detected by each detection zone shall be programmable by a client software user.

The VIVTDS system should provide a flexible detection zone placement anywhere within one hundred (150) feet of the VIVTDS sensors. Preferred presence detector configurations shall be arbitrarily shaped polygons, including simple boxes, drawn across lanes of traffic or placed in line with lanes of traffic. A single VIVTDS sensor should replace one or more conventional detectors. Advanced detection zones may be placed up to three hundred (300) feet from a Fisheye sensor when mounted at least forty (40) feet high.

Placement of detection zones will be done by means of a graphical interface using the MJPEG image of the roadway. The client software displays images of the detection zones overlaid on the video image of traffic while the VIVTDS processor is running. The detection zones, when operating, shall display outlined or filled, with a visible change indicating activation.

A laptop should be used to draw detection zones. Alternatively, a mouse, keyboard, and monitor may be connected directly to the processor to configure a site. The detection zones should be capable of being sized and shaped to provide optimal road coverage and detection. It should be possible to upload detector configurations to the VIVTDS processor and to retrieve the sensor configuration that is currently running in the VIVTDS processor through the client software. The configuration should also be retrievable from the VIVTDS system's cloud if properly backed up.

The user will be able to edit previously defined detector configurations in order to fine tune the detection zone placement size and shape. Once a detection configuration has been created, the system will provide a graphic display of the new configuration on its monitor. While this fine-tuning is being done, the sensor will be required to continue to operate from the sensor configuration, currently in place. A user should be able to use a system command to revert to previous configurations stored in the client software or on the VIVTDS system's cloud if properly backed up.

When a vehicle occupies a detection zone, the detection zone on the live video will indicate the presence of a vehicle, thereby verifying proper operation of the system.

The presence of the vehicle as well as the signal states will be indicated via colored LED lights on the front panel of VIVTDS processor. With the absence of images, the VIVTDS processor's display shall indicate proper operation of the detection zones.

Detection zones shall be sensitive to the direction of vehicle travel. The direction will be capable

of being detected by each detection zone and will be programmable by the user. The vehicle detection zones will not activate if a vehicle is traveling in any direction other than the one specified for detection in the zone. Cross-street and wrong way traffic shall not cause a false detection.

Detection zones will be capable of an optional user defined call to detect a side entrance (90° or less angled entrance).

The VIVTDS system will be able to reliably detect vehicle presence in the design field of view. The design field of view shall be defined as the sensor view when the image sensor is mounted thirty-five (35) feet (10.5 meters) or higher above the roadway, when the sensor is in front of all stop lines, no more than seventy-five (75) feet from the intersection center, and the beginning of the detection area is not greater than one hundred and fifty (150) feet from the image sensor.

Within this design field of view, the VIVTDS processor should be capable of setting up detection zones for point detection (equivalent to the operation of a 6' x 6' inductive loop). A VIVTDS sensor, placed at the proper mounting height, is able to monitor up to and including five (5) traffic lanes per approach simultaneously. A single fisheye sensor, placed at the proper mounting height, should be able to monitor detection zones in an intersection of five (5) approaches, at a minimum. Fisheye sensors mounted no less than forty (40) feet should be capable of advanced vehicle detection of up to three hundred (300) feet.

Detection accuracy of the VIVTDS system shall be comparable to properly operating inductive loops. Detection accuracy should include the presence of any vehicle in the defined detection zone regardless of the lane the vehicle is occupying. Occlusion produced by vehicles in the same or adjacent lanes shall not be considered a failure of the VIVTDS processor, but a limitation of the VIVTDS sensor placement.

Detection shall be 98% accurate with slight degradation possible under adverse weather or road conditions (i.e. rain, snow, fog). Detection will be expected for the entire design field of view on a lane by lane or by approach basis.

Equipment failure, either sensor or VIVTDS processor, shall result in constant vehicle detection on affected detection zones. The VIVTDS system will be required to have the ability to place a constant call to a specific zone, if said zone loses visibility, while simultaneously making calls in the traditional manner in the remaining zones.

**907-643.02.3.5--Camera.** The VIVTDS should have at least one downward-facing fisheye sensor capable of seeing the center of the intersection and have an omnidirectional line of site to track vehicles entering and exiting the intersection. Other required features shall include the following:

- Color images outputted into digital format as MJPEG images
- Camera lens shall not require adjustment and is always in focus
- A thermostatically controlled heater residing inside the enclosure to reduce the effects of ice and condensation
- Any plastics used in the enclosure shall have ultraviolet inhibitors
- A waterproof and dust tight aluminum enclosure

The sensor dimensions excluding connectors shall not exceed 9.9" x 7.9" (height x diameter). The weight of the sensor including the enclosure shall not exceed eight pounds. The VIVTDS sensor manufacturer shall provide a lifetime "always in focus" guarantee on the iconic bell-shaped fisheye camera. The sensor's mounting bracket shall utilize a two (2) piece, ten (10) foot 90° mounting pole. The sensor junction box should mount at the base of the vertical pole and allow for the installer to adjust the sensor's horizontal position with one hand and tighten the bracket without having to support the sensor simultaneously.

**907-643.02.3.5.1--Optional VIVTDS Sensors.** Certain projects will have special requirements or needs, such as advanced detection beyond three hundred (300) feet and/or stop line detection. In these instances, an additional VIVTDS sensor with a field of view of either 30° - 50° for stop line detection or a field of view of 9° - 18° for advanced detection should be used. The sensor dimensions excluding connectors and mounting bracket shall not exceed 8" x 15" x 3.5" and the weight should not exceed eight pounds. Other required features are the following:

- Color images outputted into digital format as MJPEG images
- A 5 – 50-mm varifocal lens set for the specific application
- A thermostatically controlled heater residing inside the enclosure to reduce the effects of ice and condensation
- A sun shield to minimize lens exposure to the sun
- A waterproof and dust tight powdered coated aluminum housing

The VIVTDS should support thermal imaging sensors for use in specific situations.

**907-643.02.3.6--Power.** The VIVTDS sensor(s) will use five (5) watts nominally and a maximum of fifty (50) watts with active heaters. The sensor(s) will be Power Over Ethernet (POE) and will only require a single shielded, burial grade, gel-filled CAT5e cable for both power and data or composite fiber cable.

Each VIVTDS sensor shall have its own surge protector junction unit and EPM surge protection unit in the traffic cabinet.

The VIVTDS processor shall operate within a range of 89 to 240 VAC, 60Hz single phase. Power to the VIVTDS processor is from the transient protected side of the AC power distribution system in the traffic control cabinet where the VIVTDS processor is installed.

**907-643.02.3.7--CAT5E Cable.** CAT5E cabling shall be a high performance shielded direct burial data cable capable of 350MHz bandwidth for data applications. The cabling shall consist of a 24 AWG solid core copper wire with 8 solid conductors in a gel-filled jacket. The jacket shall consist of linear low-density polyethylene (LLDPE) that is UV resistant and have a cable diameter of no more than 6.5 mm. The cable shall have easily identifiable striped pairs as follows:

- Orange-White, Orange
- Green-White, Green
- Blue-White, Blue

- Brown-White, Brown

The cable shall be rated at a minimum for 60 V.

The surge protector junction unit for the VIVTDS sensor shall provide protection against a transient pulse with a pulse shape of 8/20 $\mu$ s and a max current of 75A. The unit shall weigh no more than two (2) lbs.

The EPM, surge protection unit for the VIVTDS sensor, shall have at most a max impulse discharge current of 40 KA and an impedance of at least 100 ohms. The unit should have at least Line-Line and Line-Ground protection options, and the POE current should not exceed 1.8A.

**907-643.02.3.8--Composite Fiber.** Composite Fiber cable shall meet the following requirements:

- Multimode, OM3, Indoor-Outdoor rated
- Meet ICEA-S-83-597 Standard
- Four Fiber Strands and Two 16 AWG Copper Power Conductors

Fiber cable shall be terminated with FAST connect LC connectors and maintain a signal strength between -20 dBm and -24 dBm.

The Fiber cable shall connect the Fisheye Sensor and/or other Optional Sensors using PoE Media Converters.

PoE Media Converters shall meet the following requirements:

- Material: UV Stabilized, Polycarbonate/ASA Blend
- Environmental: -29° F - 165° F (-34° C - 74° C)
- IP66

**907-643.02.3.9--Physical and Environmental Specifications.** The VIVTDS processor will meet or exceed the NEMA TS-2 standard of -29° F - 165° F (-34° C - 74° C) and meet or exceed a 5-30Hz vibration test as well as a 10G shock test.

The VIVTDS processor shall operate properly in an environment with 0% to 95% relative humidity, non-condensing. The VIVTDS sensor(s) shall operate properly in an environment with 0% to 100% relative humidity.

**907-643.02.3.10--System Software Operation.** The VIVTDS must transmit and receive all information needed for sensor setup, to monitor vehicle detection, to view vehicle traffic flow, and to interpret stored data. The remote communications link between the VIVTDS processor shall not interfere with the on-street detection of the VIVTDS processor.

The user should be able to view the detection area in a horizon to horizon fisheye view or in a configurable four (4) pane flattened view on the same screen. Each view should be able to be customized by the user, with the ability to digitally pan-tilt-zoom.



**907-643.02.3.11--Installation and Training.** The supplier of the VIVTDS system shall supervise the installation and testing of the sensors, processor, and other sensor components.

System installers will be required to be certified by the system manufacturer. A manufacturer's instructional guide will not be considered an adequate substitute for practical, classroom training and formal certification by an approved agency.

However, the manufacturer shall provide an online user guide and an electronic copy of the user guide within the client software and on board the VIVTDS processor for reference.

Formal levels of factory authorized training are required for installers, contractors and system operators. All training must be certified by the VIVTDS system manufacturer.

**907-643.02.3.12--Warranty, Maintenance and Support.** The video detection system must be warranted to be free of defects in material and workmanship for a period of 3 years from date of shipment from the manufacturer's facility. During the warranty period, the system manufacturer will be required to repair with new or refurbished materials, or replace at no charge, any product containing a warranty defect provided the product is returned FOB to the supplier's factory or authorized repair site. Return product, product for repair, or product to be replaced under warranty by the supplier shall have prepaid transportation. This warranty does not apply to any products damaged by accident, improperly operated, abused, serviced by unauthorized personnel or unauthorized modification.

Ongoing software support by the manufacturer includes updates of the VIVTDS processor's engine and updates to the client software shall be provided free of charge for the life of the system.

**907-643.02.4--Materials Multi-Sensor Vehicle Detection.**

**907-643.02.4.1--General.** The Multi-Sensor Vehicle Detector shall utilize two (2) different sensors of different technologies, video imaging and radar, to detect and track licensed and unlicensed vehicles at distances up to 600 feet. The detector shall fuse vehicle information from the two sensors to provide highly accurate and precise detection for special or advanced applications.

The Multi-Sensor Vehicle Detector shall use a primary detector rack mounted processor to interface with the traffic control cabinet. The module shall process information from both video imaging and radar sensors simultaneously in real-time.

**907-643.02.4.2--Detector Configuration.** The proposed MSVD shall be available in various configurations to allow maximum deployment flexibility. Each configuration shall have an identical user interface for system setup and configuration. The communications protocol to each configuration shall be identical and shall be hardware platform independent.

The detector shall include software that detects vehicles in multiple lanes. Video imaging detection zones shall be defined using only an on-board video menu and a pointing device to place



the zones on a video image. Up to 24 video detection zones per camera view shall be available. Two (2) additional trigger zones for the radar sensor shall be available and be configurable by using the same system setup menu on the DP. A separate computer shall not be required to program the detection zones. A pre-programmed setup tool is required to align and input radar information and set the camera field of view (zoom and focus).

**907-643.02.4.3--Multi-Sensor Vehicle Detection Hardware.** The MSVD hardware shall consist of the following four (4) elements:

- 1) Video Imaging Camera Sensor
- 2) Radar Sensor
- 3) Sensor Data Combiner
- 4) Detection Processor

**907-643.02.4.3.1--Video Imaging Camera Sensor.** The video imaging camera sensor shall meet the following minimum requirements:

- To accommodate deployment flexibility, the MSVD camera sensor shall be compatible with the Data Processor platforms. The MSVD camera sensor shall be supplied by the MSVD manufacturer.
- The advanced camera enclosure shall utilize technology for the heating element of the front glass. The transparent coating shall not impact the visual acuity and shall be close to optically clear.
- Cable terminations at the data combiner for video and power shall not require crimping or special tools.
- The camera sensor shall allow the user to set the focus and field of view via Wi-Fi connectivity.
- The camera shall produce a useable video image of vehicles under all roadway lighting conditions, regardless of time of day. The minimum range of scene luminance over which the camera shall produce a useable video image shall be the minimum range from nighttime to daytime, but not less than the range 1.0 lux to 10,000 lux.
- The camera electronics shall include automatic gain control (AGC) to produce a satisfactory image at night.
- The imager luminance signal to noise ratio (S/N) shall be more than 50 dB with the automatic gain control (AGC) disabled.
- The imager shall employ three (3) dimensional dynamic noise reduction (3D-DNR) to remove unwanted image noise.
- The camera image shall employ wide dynamic range (WDR) technology to compensate for wide dynamic outdoor lighting conditions. The dynamic range shall be greater than 100 dB.
- The camera shall be digital signal processor (DSP) based and shall use a CCD sensing element and shall output color video with resolution of not less than 550 TV lines.
- The camera sensor shall include an electronic shutter control based upon average scene luminance and shall be equipped with an auto-iris lens that operates in tandem with the electronic shutter. The electronic shutter shall operate between the range of 1/1 to 1/10,000<sup>th</sup> second.
- The camera sensor shall utilize automatic white balance.

- The camera sensor shall include a variable focal length lens with variable focus that can be adjusted, without opening up the camera housing, to suit the site geometry by means of a portable interface device designed for that purpose and manufactured by the detection system supplier.
- The horizontal field of view shall be adjustable. This camera configuration may be used for the majority of detection approaches in order to minimize the setup time and spares required by the user. The lens shall be a minimum 10X zoom lens with a variable focal length.
- The lens shall also have an auto-focus feature with a manual override to facilitate ease of setup.
- The camera shall incorporate the use of preset positioning that store zoom and focus positioning information. The camera shall have the capability to recall the previously stored preset upon application of power.
- The camera shall be housed in a weather-tight sealed enclosure conforming to IP-67 specifications. The housing shall allow the camera to be rotated to allow proper alignment between the camera and the traveled road surface.
- The camera enclosure shall be equipped with a sunshield. The sunshield shall include a provision for water diversion to prevent water from flowing in the camera's field of view.
- The camera enclosure shall be designed so that the pan, tilt and rotation of the camera assembly can be accomplished independently without affecting the other settings.
- The camera enclosure shall include a proportionally controlled heater design that maximizes heat transfer to the lens. The output power of the heater shall vary with temperature, to assure proper operation of the lens functions at low temperatures and prevent moisture condensation on the optical faceplate of the enclosure.
- The glass face on the front of the enclosure shall have an anti-reflective coating to minimize light and image reflections.
- When mounted outdoors in the enclosure, the camera shall operate in a temperature range from -29°F to +165°F and a humidity range from 0% RH to 100% RH.
- Measurement of satisfactory video shall be based upon DP system operation.
- The camera sensor shall acquire its power from the sensor data combiner.
- Recommended camera placement height shall be 18 to 33 feet above the roadway, and over the traveled way on which vehicles are to be detected. For optimum detection the camera should be centered above the traveled roadway. The camera shall view approaching vehicles at a distance not to exceed 350 feet for reliable detection (height to distance ratio of 10:100). Camera placement and field of view (FOV) shall be unobstructed and as noted in the installation documentation provided by the supplier.
- The video signal shall be fully isolated from the camera enclosure and power cabling.
- A weather-proof protective cover shall be provided to protect all terminations at the camera.

**907-643.02.4.3.2--Radar Sensor.** The radar sensor shall meet the following minimum requirements:

- The radar sensor shall operate in the 24 GHz frequency band.
- The radar detection range shall be 600 feet minimum,  $\pm 5\%$ .
- The radar sensor shall be able to track up to 20 independent objects simultaneously.
- Object speed detection shall be within a range of zero (0) to 150 mph  $\pm 1.0$  mph.

- The radar sensor shall be able to detect vehicles in one (1) to four (4) traffic lanes.
- The radar sensor shall be housed in a weather-tight sealed enclosure conforming to IP-67 specifications. The housing shall allow the radar to be adjusted to allow proper alignment between the sensor and the traveled road surface.
- When mounted outdoors in the enclosure, the radar shall operate in a temperature range from -29°F to +165°F and a humidity range from 0% RH to 100% RH.
- The radar sensor shall communicate with the sensor data combiner.
- The radar sensor shall acquire its power from the sensor data combiner.
- Data and power cables between the radar sensor and sensor data combiner shall be fully isolated from the sensor enclosure.

**907-643.02.4.3.3--Multi-Sensor Vehicle Detection Assembly.** Multi-Sensor Vehicle Detection Assembly shall meet the following requirements:

- Both camera and radar sensors shall be housed in an overall, single enclosure assembly.
- The maximum power consumption for the Multi-Sensor Vehicle Detection Assembly shall be less than ten (10) watts typical, 20 watts peak.

**907-643.02.4.3.4--Sensor Data Combiner.** The sensor data combiner (if required) shall meet the following minimum requirements:

- A sensor data combiner that combines sensor information from both video and radar sensors shall be employed.
- Sensor data combiner shall supply primary power to each sensor unit.
- Sensor data combiner shall facilitate digital communications between the sensor data combiner and each of the sensor units.
- Sensor data combiner shall get its primary power from an AC power source using industry standard 3-conductor cabling.
- Sensor data combiner shall communicate with the detection processor using a single coax cable. Both video imaging and radar data shall use the single coax cable.
- The sensor data combiner shall also employ industry standard Wi-Fi connectivity for remote sensor system setup using a mobile programming device such as a netbook or tablet computer. Video camera and radar sensor shall be able to be configured independently.
- Sensor data signal shall be fully isolated from the mechanical enclosure and power cabling.
- Cable terminations at the sensor data combiner shall not require crimping tools.
- The Sensor Data Combiner shall be housed in a weather-tight sealed enclosure conforming to IP-67 specifications.

**907-643.02.4.3.5--Detection Processor.** The detection processor shall meet the following minimum requirements:

- Each sensor input shall accept RS170 (NTSC) or CCIR (PAL) signals from an external video source. The interface connector shall be BNC type and shall be located on the front of the processing unit. The sensor input shall have the capability to be terminated into 75-

ohms or high impedance (Hi-Z) using dip switches or software control from the user menu. The sensor input shall also facilitate the data from the radar sensor.

- A LED indicator shall be provided to indicate the presence of the sensor signal. The LED shall illuminate upon valid sensor synchronization and turn off when the presence of a valid sensor signal is removed.
- One (1) video output shall be provided. The video output shall be RS170 or CCIR compliant and shall pass through the input video signal. For multi-channel video input configurations, a momentary push-button shall be provided on the front panel to cycle through each input video channel. In the absence of a valid sensor signal, the channel shall be skipped and the next valid sensor signal shall be switched. The real time video output shall have the capability to show text and graphical overlays to aid in system setup. The video output interface connector shall be positive locking BNC type. Friction type (e.g. RCA type) connectors shall not be allowed.
- A communications port shall be provided on the front panel. The communications interface shall allow the user to remotely configure the system and/or to extract calculated vehicle/roadway information. The interface protocol shall be documented or interface software shall be provided. Each MSVD shall have the capability to be addressable. The DP shall support data rates of 1200 bps to 230,400 bps, inclusive.
- Open collector (contact closure) outputs shall be provided. Four (4) open collector outputs shall be provided for the single or dual channel rack-mount configuration. Additionally, the DP shall allow the use of extension modules to provide up to 24 open collector contact closures per camera input. Each open collector output shall be capable of sinking 30 mA at 24 VDC. Open collector outputs will be used for vehicle detection indicators as well as discrete outputs for alarm conditions. The DP outputs shall be compatible with industry standard detector racks assignments.
- Logic inputs such as delay/extend or delay inhibit shall be supported through the appropriate detector rack connector pin or front panel connector in the case of the I/O module. For DPs and extension modules, four (4) inputs shall be supported via detector rack interface. The I/O module shall accommodate eight (8) inputs through a 15-pin "D" connector.
- Detection status LEDs shall be provided on the front panel. The LEDs shall illuminate when a contact closure output occurs. The front panel of the DP shall have detector test switches to allow the user to manually place calls on each DP output channel. The test switch shall be able to place either a constant call or a momentary call depending on the position of the switch.
- A USB mouse port shall be provided on the front panel of the rack mount detection processing unit. The mouse port shall not require special mouse software drivers. The mouse port shall be used as part of system setup and configuration.
- Extension modules (if required) shall be connected to the DP by an 8-wire twisted-pair cable with modular RJ45 connectors. DP and EM communications shall be accommodated by methods using differential signals to reject electrically coupled noise.
- Extension modules (EM) shall be available to eliminate the need of rewiring the detector rack, by enabling the user to plug an extension module into the appropriate slot in the detector rack to provide additional open collector outputs. The extension module shall be available in both two (2) and four (4)-channel configurations. The DP and EM shall be specifically designed to mount in a standard detector rack, using the edge connector to obtain power,

provide contact closure outputs and accept logic inputs (e.g. delay/extend). No adapters shall be required to mount the DP or EM in a standard detector rack. Detector rack rewiring shall not be required.

- The DP shall utilize non-volatile memory technology to store on-board firmware and operational data.
- The DP shall enable the loading of modified or enhanced software through the EIA232 or USB port (using a USB thumb drive) and without modifying the DP hardware.
- The DP and EM shall be powered by 12 or 24 volts DC. DP and EM modules shall automatically compensate for either 12 or 24 VDC operation. DP power consumption shall not exceed 7.5 watts. The EM power consumption shall not exceed three (3) watts.
- The DP shall operate satisfactorily in a temperature range from -40°F to +165°F and a humidity range from zero (0) %RH to 95 %RH, non-condensing as set forth in NEMA specifications.
- A video surge suppresser shall be provided for each sensor input. The surge suppresser shall be appropriately grounded to the cabinet ground rod using AWG 14 minimum.

**907-643.02.4.4--Detection Software.** The detection software shall meet the following general system functions:

- Detection zones shall be programmed via an on board menu displayed on a video monitor and a pointing device connected to the DP. The menu shall facilitate placement of detection zones and setting of zone parameters or to view system parameters. A separate computer shall not be required for programming detection zones or to view system operation.
- The DP shall store up to three (3) different detection zone patterns in non-volatile memory. The DP can switch to any one of the three (3) different detection patterns within one (1) second of user request via menu selection with the pointing device. Each configuration shall be uniquely labeled and able to be edited by the user for identification. The currently active configuration indicator shall be displayed on the monitor.
- The DP shall detect vehicles in real time as they travel across each detection zone.
- The DP shall accept new detection patterns from an external computer through a communications port when the external computer uses the correct communications protocol for downloading detection patterns. A Windows™ based software designed for local or remote connection and providing video capture, real-time detection indication and detection zone modification capability shall be provided with the system.
- The DP system shall have the capability to automatically switch to any one of the stored configurations based on the time of day which shall be programmable by the user.
- The DP shall send its detection patterns to an external computer through the communications port when requested when the external computer uses the appropriate communications protocol for uploading detection patterns.
- The DP shall default to a safe condition, such as a constant call on each active detection channel, in the event of unacceptable interference or loss of the sensor signal.
- The system shall be capable of automatically detecting a low-visibility condition such as fog and respond by placing all effected detection zones in a constant call mode. A user-selected alarm output shall be active during the low-visibility condition that can be used to modify the controller operation if connected to the appropriate controller input modifier(s). The system shall automatically revert to normal detection mode when the low-visibility

condition no longer exists.

- Up to 24 detection zones per camera input shall be supported and each detection zone can be sized to suit the site and the desired vehicle detection region.
- The DP shall support two (2) independent trigger points for radar outputs for dilemma zone applications.
- The DP shall provide up to 24 open collector output channels per sensor input using one or more extension modules.
- A single detection zone shall be able to replace multiple inductive loops and the detection zones shall be OR'ed as the default or may be AND'ed together to indicate vehicle presence on a single approach of traffic movement.
- Placement of detection zones shall be done by using only a pointing device, and a graphical interface built into the DP and displayed on a video monitor or laptop computer to draw the detection zones on the video image from each video camera.
- When a vehicle is detected within a detection zone, a visual indication of the detection shall activate on the video overlay display to confirm the detection of the vehicle for the zone.
- Detection shall be at least 98% accurate in good weather conditions, with slight degradation possible under adverse weather conditions (e.g. rain, snow, or fog) which reduce visibility. Detection accuracy is dependent upon site geometry, camera placement, camera quality and detection zone location, and these accuracy levels do not include allowances for occlusion or poor video due to camera location or quality.
- The DP shall provide dynamic zone reconfiguration (DZR). DZR enables normal operation of existing detection zones when one zone is being added or modified during the setup process. The new zone configuration shall not go into effect until the configuration is saved by the operator.
- Detection zone setup shall not require site specific information such as latitude and longitude to be entered into the system.
- The DP shall process the video input from each camera at 30 frames per second. Multiple camera processors shall process all video inputs simultaneously.
- The DP shall output a constant call during the background learning period of no more than three (3) minutes.
- Detection zone outputs shall be configurable to allow the selection of presence, pulse, extend, and delay outputs. Timing parameters of pulse, extend, and delay outputs shall be user definable between 0.1 to 25.0 seconds.
- Up to six (6) video detection zones per sensor input shall have the capability to count the number of vehicles detected. The count value shall be internally stored for later retrieval through the communications port.
- In addition to the count type zone, the DP shall be able to calculate and/or acquire average speed and lane occupancy using both video and radar sensors. These values shall be stored in non-volatile memory for later retrieval.
- The DP shall have an "advance" zone type where detection outputs to the traffic controller are compensated for angular occlusion and distance.
- The user shall have the ability to enable or disable the display of the phase information on the video output.
- The DP shall have the capability to change the characteristics of a detection zone based on



external inputs such as signal phase. Each detection zone shall be able to switch from one zone type (i.e. presence, extension, pulse, etc.) to another zone type based on the signal state. For example, a zone may be a "count" zone when the phase is green but change to a "presence" zone type when the phase is not green. Another application would be zone type of "extension" when the signal phase is green and then "delay" when red.

- The DP shall aid the user in drawing additional detection zones by automatically drawing and placing zones at appropriate locations with only a single click of the mouse. When the user wishes to modify the location of a zone, the DP shall allow the user move a single zone, multiple zones or all zones simultaneously.
- On-screen zone identifiers shall be modifiable by the user. The user shall be allowed to select channel output assignments, zone type, input status, zone labels or zone numbers to be the identifier.
- For multiple camera input DPs, the user shall have the ability to enable automatic video output switching. The dwell time for each sensor input shall be user programmable.
- For the radar sensor zones the output can be triggered by presence of a vehicle only or by presence of a vehicle above a speed defined by the user.

**907-643.02.4.5--Multi-Sensor Cable.** The cable to be used between the Multi-Sensor Vehicle Detection Assembly and the DP in the traffic cabinet shall be per manufacturer's specifications. This cable shall be suitable for installation in conduit or overhead with appropriate span wire. BNC plug connectors shall be used where applicable. The cable, BNC connector, and crimping tool shall be approved by the supplier of the MSVD, and the manufacturer's instructions must be followed to ensure proper connection.

**907-643.02.4.6--Power Cable.** The power cabling shall be per manufacturer's specifications. The cabling shall comply with the National Electric Code, as well as local electrical codes.

**907-643.03--Construction Requirements.** The Construction and testing requirements for Type 1, Type 2, and Multi-Sensor Vehicle Detection are the same.

**907-643.03.1--General Requirements.** The Contractor shall perform the following:

- 1) Install all sensors, system processors and associated enclosures and equipment at the locations specified in the plans, in any related notice to bidders, per manufacturer's recommendations, or as directed.
- 2) Install all cabinet-mounted equipment in the intersection equipment cabinet or as specified in the plans.
- 3) Cabling from all sensors shall be installed in accordance with the manufacturer's recommendations.
- 4) Make all necessary adjustments and modifications to the total VVD/MSVD prior to requesting inspection for system/device acceptance.
- 5) Mount the sensors as per manufacturer's recommendations or as shown in the plans.
- 6) Mount the sensors so as to view approaching traffic unless otherwise directed.
- 7) Optimize the sensors location and zone of detection as directed by the Engineer, or authorized designee.
- 8) Adjust the sensor zoom lens to match the width of the road/detection area, and minimize lane

vehicle occlusion.

- 9) Fasten all other cabinet components, with hex-head or Phillips-head machine screws insulated with nuts (with locking washer or insert) or into tapped and threaded holes. Do not use self-tapping or self-threading fasteners.
- 10) Provide electrical cables for video, communications signaling and power supply between the cabinet and the VVD/MSVD image sensor cameras as recommended by the manufacturer, and as required for a fully functional System.

**907-643.03.2--Contractor Training.** Installation of the Video Vehicle Detection shall be as recommended by the manufacturer and performed by a Contractor trained and certified by the supplier. Where time does not reasonably permit training of the installing Contractor, a supplier factory representative shall supervise and assist a Contractor during installation of the Video Vehicle Detection.

Installation of the Multi-Sensor Vehicle Detection shall be as recommended by the supplier and performed by a Contractor with factory-certified installers and documented in installation materials provided by the supplier. Proof of factory certification shall be provided.

**907-643.03.3--Testing.** All equipment associated with the Video Vehicle Detection System shall undergo testing to verify conformance to requirements of the plans and these special provisions. All costs associated with testing shall be included in the overall contract price; no separate payment will be made for any testing.

**907-643.03.3.1--Standalone Acceptance Test (SAT).** The SAT shall be required and shall include videos of the approach with detection zones overlaid showing detector activations.

- 1) One (1) hour videos shall be made of each approach and compared to actual detection calls.
- 2) 30-minute videos shall be made starting 15 minutes prior to sunrise and sunset for each approach and compared to actual detection calls.
- 3) All videos shall be date and time stamped.
- 4) Provide all videos to the Engineer with a summary of the results included total calls, missed calls and false calls.
- 5) All test results must meet a 98% accuracy requirement.

The Contractor must demonstrate the accuracy requirements specified in Subsections 907-643.02.1.7 at selected intersections [after a sixty \(60\) day burn-in period for Type 1 and a thirty \(30\) day burn in period for Type 2 and MSDS](#). The intersections to be tested will be randomly selected by the Project Engineer.

**907-643.03.4--Warranty.** The Video Vehicle Detection shall be warranted to be free of manufacturer defects in materials and workmanship for a period of three (3) years from the date of final acceptance. Equipment covered by the manufacturer's warranties shall have the registration of that component placed in the Department'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 the Department 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.

The Multi-Sensor Vehicle Detector shall be warranted to be free of manufacturer defects in materials and workmanship for a period of three years (3) from the date of final acceptance.

During the warranty period, technical support shall be available from the supplier 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. 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.

**907-643.03.5--Training.** When called for in the Plans, 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 detection system shall, at a minimum, provide a 16-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.

**907-643.03.6--Maintenance and Technical Support.** The supplier shall maintain an adequate inventory of parts to support maintenance and repair of the detection system. 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 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.

The installation or training support shall be provided by a factory-authorized representative and shall be a minimum IMSA-Level II Certified Traffic Signal Technician.

All product documentation shall be written in the English language.

**907-643.04--Method of Measurement.** Video Vehicle Detection Sensor of the type specified will be measured as a unit per each.

Video Vehicle Detection Cable and/or Power Cable will be measured by the linear foot, measured

horizontally along the conduit, messenger cable or mast arm and vertically along the pole.

Video Vehicle Detection Training will be measured as a lump sum after the completion of all training.

Multi-Sensor Vehicle Detection of the type specified will be measured as a unit per each.

Multi-Sensor Detection Cable and/or Power Cable will be measured by the linear foot, measured horizontally along the conduit, messenger cable or mast arm and vertically along the pole.

**907-643.05--Basis of Payment.** Video Vehicle Detection Sensor, measured as prescribed above, will be paid for at the contract unit price per each, which price shall be full compensation for installation, system integration, documentation, system software, and testing of a complete video detection sensor site including video camera sensor/processor, the sensor environmental enclosure, attachment hardware and brackets, completion of all testing requirements, warranties and all work, equipment and appurtenances as required to provide and install a complete video detection system. The price bid shall also include all system documentation including: shop drawings, operations and maintenance manuals, wiring diagrams, block diagrams and other materials necessary to document the operation of the Video Vehicle Detection Sensor. This price shall be full compensation for all labor, tools, materials, equipment and incidentals necessary to complete the work and quality assurance.

Video Vehicle Detection Cable and/or Power Cable will be paid at the contract unit price per linear foot, which price shall be full compensation for all labor, materials, equipment tools, furnishing, installing, system integration, connections, testing, and all incidentals necessary to complete the work.

Video Vehicle Detection Training, measured as prescribed above, will be paid for at the contract unit lump sum price, which price shall be full compensation for all training costs including all coordination, materials, labor, training location costs, and all incidentals required to complete the training.

Multi-Sensor Vehicle Detection Sensor, measured as prescribed above, will be paid for at the contract unit price per each, which price shall be full compensation for installation, system integration, documentation, and testing of a complete Multi-Sensor Vehicle Detection Sensor site including video imaging camera sensor, radar sensor, sensor data combiner, detection processor, system software, the sensor environment enclosure, attachment hardware and brackets, completion of all testing requirements and all work, equipment and appurtenances as required to provide and install a complete Multi-Sensor Vehicle Detection Sensor. The price bid shall also include all system documentation including: shop drawings, operations and maintenance manuals, wiring diagrams, block diagrams and other materials necessary to document the operation of the multi-sensor detection system. This price shall be full compensation for all labor, tools, materials, equipment and incidentals necessary to complete the work.

Multi-Sensor Detection Cable and/or Power Cable will be paid at the contract unit price per linear foot, which price shall be full compensation for all labor, materials, equipment tools, furnishing,

installing, system integration, connections, testing, and all incidentals necessary to complete the work.

Payment will be made under:

- 907-643-A: Video Vehicle Detection Sensor, Type \_\_\_\_ - per each
- 907-643-B: Video Vehicle Detection Cable - linear foot
- 907-643-C: Video Vehicle Detection Power Cable - linear foot
- 907-643-D: Video Vehicle Detection Training - lump sum
- 907-643-E: Multi-Sensor Vehicle Detection Sensor - per each
- 907-643-F: Multi-Sensor Vehicle Detection Cable - linear foot
- 907-643-G: Multi-Sensor Vehicle Detection Power Cable - linear foot

## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-650-5

CODE: (SP)

DATE: 05/04/2023

SUBJECT: On-Street Video Equipment

Section 907-650, On-Street Video Equipment, is hereby added to and made part of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction as follows.

### SECTION 907-650 - ON-STREET VIDEO EQUIPMENT

**907-650.01--Description.** This work shall consist of providing all labor, materials, equipment, and incidentals necessary to furnish, install, test, train, and operate CCTV Camera Systems. CCTV Camera System shall provide TMC personnel with live streaming video of the roadway network via CCTV Camera Systems including both fixed and PTZ cameras. PTZ Signal Monitoring Camera shall provide Traffic Engineering personnel with live streaming video of the roadway network via CCTV Camera Systems utilizing a PTZcamera.

**907-650.02--Materials.** All materials furnished, assembled, fabricated or installed shall be new, corrosion resistant.

Support equipment for the CCTV Camera Systems shall be provided in a Type B ITS Equipment Cabinet as described in Section 660. For PTZ Signal Monitoring Camera, support equipment shall be house in existing or new Traffic Signal Cabinet.

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 PTZ Cameras shall be placed and installed at fixed locations to provide full coverage of the mainline travel lanes and shoulders.
- 2) CCTV Fixed Cameras shall be placed and installed at fixed locations 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 fixed cameras shall also be adjusted to the desired view of the surface streets.
- 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 their fixed locations.
- 4) All new PTZ and the Fixed cameras shall be provided as Ethernet IP-based or as indicated in project plan sheets or Notice to Bidders. If analog cameras are required, they shall conform to requirements detailed in Subsection 650.02.2, Analog Camera Unit.
- 5) The CCTV Camera System shall be capable of attended and unattended, continuous 24 hours per day operation at fixed sites.

- 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) PTZ and IP based cameras shall be capable of being remotely controlled and programmed.
- 8) All PTZ enclosures shall be provided with the ability to be pressurized for environmental protection.
- 9) PTZ Dome type cameras 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 PTZ 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) All IP Based CCTV cameras shall support the NTCIP 1205 v1.08 or later version if backward compatible 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 monochrome 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) The camera unit shall include integrated image stabilization.
- 8) Sensitivity: The camera shall maintain usable video under both day and nighttime lighting conditions.
- 9) Video output synchronization shall be 2 to 1 interlace and will observe the NTSC (color) and EIA RS-170 (black and white) standards.

- 10) Resolution: 470 lines horizontal and 350 TV lines vertical, NTSC equivalent.
- 11) Signal-to-noise ratio: 48 dB, minimum with AGC off, un-weighted, and 4.5MHz filter.
- 12) Video Signal Format: National Television Standards Committee (NTSC) composite video output of 1 Volt<sub>p-p</sub> at 75 ohms, unbalanced.

**907-650.02.3--Internet Protocol IP Camera Unit.** IP cameras shall provide the same functionality as the analog camera units specified in subsection 907-650.02.2, in addition to the following minimum requirements:

- 1) Power over Ethernet or 24 VAC Power Input.
- 2) Open Architecture.
- 3) Shall utilize H.264 (Video Coding Experts Group (VCEG)/Moving Picture Experts Group)Video Compression Technology types as directed by the Intelligent Transportation Systems Program Manager
- 4) Standard Definition (SD) Units Shall be capable of 2 simultaneous H.264 video streams.
  - a. The primary stream shall provide 480p at 30 fps and the ability to be reduced to D1 resolution at 30 fps.
  - b. The secondary stream shall provide a minimum CIF resolution 30fps.
- 5) High Definition Units (HD) Shall be capable of 2 simultaneous H.264 video streams.
  - a. The primary stream shall provide 720p at 30 fps at a minimum and the ability to be reduced to D1 resolution at 30 fps.
  - b. The secondary stream shall provide a minimum CIF resolution 30fps.
- 6) Image sensor: 1/3 inch charge-coupled device (CCD)
- 7) Shall be capable to take video snapshots in JPEG format and transfer image via FTP.
- 8) IP encoded streams and Video Compression Technology shall be compatible with the existing video streaming servers and decoders for the www.mdottraffic.com WEB site or as approved by the Intelligent Transportation Systems Program Manager.
- 9) Internet Protocols: TCP, UDP (Unicast, Multicast IGMP V2), UPnP, DNS, DHCP, RTP, NTP
- 10) Support Real Time Streaming Protocol (RTSP)
- 11) Multilevel Password Protection.
- 12) EDR (Extended Dynamic Range).
- 13) C/CS Lens Mount.
- 14) Backlight Compensation.
- 15) Low Profile Top/Bottom Mount.
- 16) BNC Service Connector. Tap shall be installed inside cabinet.

**907-650.02.4--PTZ 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:
  - a. Shall provide an optical zoom of 35X for analog dome cameras.
  - b. Shall provide a minimum optical zoom of 18X and a minimum digital zoom of 6X for IP PTZ cameras.
- 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--PTZ Enclosure.** The minimum PTZ 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 to



the manufactures recommended level with dry nitrogen. The notation “CAUTION – PRESSURIZED” shall be 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 PTZ dome enclosure shall consist of a two-piece (upper and lower half) dome.
- 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: From -40°C to +65°C (-40°F to +149°F). 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) At a minimum, dome enclosures shall be secured with a mounting plate/attachment designed to withstand a 90mph sustained wind speed with a 30% gust factor. For projects that are in areas with higher wind standards, the higher standard is required.

**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) For dome enclosed units, the unit shall provide a minimum continuous tilt (vertical) movement of 90 degrees from horizontal and continuous pan (horizontal) movement of 360 degrees. 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.
- 3) For separately housed tilt motor units (non-Dome Cameras), the unit shall provide a minimum continuous tilt (vertical) movement of +90° to -90° from horizontal and continuous pan (horizontal) movement of 360 degrees. Tilt speed shall be variable from zero up to 34 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 eight (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 MDOT ITS Engineer for review and approval.
- 9) Protocols: CCTV cameras shall support at a minimum the Pelco D and 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- 232,and/or 485 (user selectable), or shall provide a network interface port.
- 11) Serial communications interface shall be compatible with the Video Encoder serial port as defined in Section 907-665 .
- 12) Standard interface connectors shall be provided.
- 13) The local video input and output connections shall be the BNC type for analog cameras. IP Based Cameras should stream video over the Ethernet connection but include a BNC type connection for local testing, configuration, and calibration.
- 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.** The fixed camera lens shall meet the following minimum requirements.

- 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.** The fixed camera lens shall meet the following minimum requirements.

- 1) Designed for Outdoor Applications
- 2) Maintenance access for servicing
- 3) Environmental resistant and tamper proof meeting NEMA 4X or IP-66 rating requirements.
- 4) 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
- 5) The enclosure shall minimize glare and provide overexposure protection for the camera when pointed directly at the sun.
- 6) The enclosure shall be equipped with a heater, a defroster and a thermostat.
- 7) The camera equipment inside the enclosure shall meet all its specified requirements when operating under the following conditions:
  - a. Ambient Temperatures: -10°C to +50°C (14°F to +122°F). A heater/blower shall be used to maintain internal temperatures within the manufacturer required operating temperatures for their equipment.
  - b. Relative Humidity: 5% and 95%, non-condensing.
- 8) Total weight of CCTV cameras (including the housing, sunshield, and all internal components shall be less than 18 pounds.
- 9) The enclosure shall be secured with a mounting plate/attachment designed to withstand a 90mph sustained wind speed with a 30% gust factor. For projects that are in areas with higher wind standards, the higher standard is required.

**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.
- 5) IP fixed cameras shall receive Power over Ethernet (POE) with appropriate cabling.

**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 double braided (95% coverage) coaxial cable.
- 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, 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. Surge protection devices shall meet the requirements of the Notice to Bidders entitled "ITS General Requirements" as well as the requirements stated below.

- 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
- 8) Surge protection for the IP Fixed cameras shall include provisioning for the Power over ETHERNET (POE) cabling and voltages.

**907-650.02.14--PTZ Signal Monitoring Camera.** The PTZ Signal Monitoring Camera shall meet the following minimum requirements.

- 1) Single housing with a Fixed Camera and PTZ Camera that allows for tandem viewing from both camera lens
- 2) Designed for outdoor locations
- 3) Environmental resistant and tamper proof meeting NEMA 4X or IP-66 rating requirements
- 4) Sealed, pressurized dome enclosure and fixed camera enclosure that provides complete protection for the camera and lens assembly from moisture and airborne contaminants
- 5) The dome enclosure shall be constructed in such a way that unrestricted camera views can be obtained at all camera and lens positions.
- 6) Total weight of CCTV cameras (including the housing, sunshield, and all internal components shall be less than 14 pounds
- 7) High Quality 4 MP Resolution Imaging or better
- 8) Shall provide Low-Light performance with expansive night view for up to 400 ft IR distance
- 9) Minimum of 32x Optical Zoom and 16x Digital Zoom
- 10) Minimum 1/1.8" progressive scan CMOS sensor
- 11) Shall provide semi-auto, manual and auto focus
- 12) Shall support 24 VAC and Hi-PoE
- 13) The enclosure shall be equipped with a heater, a defroster and a thermostat
- 14) The Fixed Camera Lens shall have a minimum 79° Horizontal FOV and 42° Vertical FOV with a focal length of f/1.0.
- 15) The PTZ Camera Lens shall have a minimum 60° to 2.3° (wide-tele) Horizontal FOV with a focal length of f/1.5
- 16) Smart Features shall include:
  - a) Motion Detection
  - b) Alarm inputs and outputs
  - c) Region Entrance and Exit Detection
  - d) Manual and Panorama Tracking
  - e) Minimum of 32 Presets with Patrol and Pattern Scan
- 17) Up to 20 Simultaneous Live Views and 32 Users/Hosts
- 18) Shall support Internet Explorer, Chrome, Firefox and Safari Web Browsers
- 19) The camera equipment inside the enclosure shall meet all its specified requirements when operating under the following conditions:
  - a) Ambient Temperatures: -30°C to +65°C (-22°F to +149°F).
  - b) Relative Humidity: 5% and 95%, non-condensing.

c) Maximum 42 W Power Consumption including heater and IR light

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

- 1) The Contractor shall provide the MDOT with a written inventory of items received and the condition in which they were received. Inventory shall be inclusive of make, model, and serial numbers, MAC address, and installation GPS coordinates. All equipment shall be installed according to the manufacturer's recommendations or as directed by the MDOT.
- 2) Materials and associated accessories/adapters shall not be applied contrary to the manufacturer's recommendations and standard practices.
- 3) Shall include all materials needed to permanently mount the CCTV camera to the support structure as indicated in the plans.
- 4) 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.
- 5) Verify all wiring meets NEC requirements where applicable.
- 6) All above requirements apply to both new CCTV sites as well as sites where an existing CCTV is being replaced.
- 7) Any new, additional or updated drivers required for the existing ATMS software to communicate and control new CCTV installed by the Contractor shall be the responsibility of the Contractor.

**907-650.03.1--Testing.** All equipment associated with the CCTV Camera Systems site shall undergo testing to verify conformance to requirements of the plans and these special provisions. The Contractor shall conduct a Project Testing Program as required in the Notice to Bidders entitled "ITS General Requirements." All costs associated with the Project Testing Program shall be included in the overall contract price; no separate payment will be made for any testing.

**907-650.03.2--Submittals.** The submittal requirements defined in the Notice to Bidders entitled "ITS General Requirements" shall be met. All costs associated with submittals shall be included in the overall contract price; no separate payment will be made for any documenting and submitting.

**907-650.03.3--Quality Assurance.** The quality assurance requirements defined in the Notice to Bidders entitled "ITS General Requirements" shall be met. All costs associated with the quality assurance requirements shall be included in the overall contract price.

**907-650.03.4--Warranty.** At a minimum, the warranty requirements defined in the Notice to Bidders entitled "ITS General Requirements" shall be met. All costs associated with the warranty requirements shall be included in the overall contract price.

**907-650.03.5--Training.** The minimum training requirements shall be as defined in the Notice to Bidders entitled "General ITS Requirements."

**907-650.04--Method of Measurement.** On-Street Video Equipment will be measured per each camera installation.

On-Street Video Equipment Training shall be measured as a lump sum which shall include all coordination, materials, labor, training location costs, and all incidentals required to complete the training as described in the Notice to Bidders entitled "ITS General Requirements."

**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 inclusive of camera unit, housing, pan/tilt drive, receiver/driver, software driver, mounting hardware, any necessary enclosures, items necessary to mount the camera unit from a mast arm pole, steel strain pole, pole extension pipe, etc., for all installing, connecting, cutting, pulling and testing and for all equipment, tools, labor, all documentation and submittals, quality assurance, warranties, and incidentals necessary to complete the work and quality assurance.

Required cabinet facilities, including transformer and/or disconnects, will not be measured for separate payment.

Progress payments for the On-Street Video System will be paid as follows:

- 1) 50% of the contract unit price upon delivery of equipment and approval of any bench and/or pre-installation test results, as prescribed in Project Testing Program;
- 2) An additional 40% of the contract unit price upon approval of Stand Alone Acceptance Test results; and
- 3) Final 10% of the contract unit price upon Final Project Acceptance.

On-Street Video Equipment Training, measured as prescribed above, will be paid for at the contract unit lump sum price, which price shall be full compensation for all training costs including coordination, materials, labor, training location costs, and all incidentals required to complete the training as described in the Notice to Bidders entitled "ITS General Requirements."

Payment will be made under:

907-650-A: On-Street Video Equipment Type *	- per each
907-650-B: On-Street Video Equipment Training	- lump sum

\* PTZ, Fixed, Analog, IP Based, PTZ Signal Monitoring, etc.

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SPECIAL PROVISION NO. 907-653-1**

**CODE: (IS)**

**DATE: 11/15/2017**

**SUBJECT: Traffic and Street Name Signs**

Section 653, Traffic and Street Name Signs, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

**907-653.02--Materials.**

**907-653.02.1--Reflective Sheeting.** Delete the paragraph in Subsection 653.02.1 on page 637, and substitute the following.

Reflective sheeting for traffic and street name signs shall be Type XI retroreflective and of the color as specified in the plans.

**907-653.04--Method of Measurement.** Delete the sentence in the paragraph of Subsection 653.04 on page 638, and substitute the following.

Traffic sign and street name sign will be measured by the square foot, which measurement being inclusive of aluminum sign blank, applied reflective sheeting, mounting brackets and banding materials and begin inclusive of all materials, work and services necessary for a properly constructed sign.

**907-653.05--Basis of Payment.** Delete the pay items listed on page 638, and substitute the following.

907-653-A: Traffic Sign - per square foot

907-653-B: Street Name Sign - per square foot

## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-656-2

CODE: (SP)

DATE: 09/06/2023

SUBJECT: Dynamic Message Sign

Section 656, Dynamic Message Sign, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

### **907-656.02--Materials.**

**907-656.02.3--References.** In the first sentence of the first paragraph of Subsection 656.02.3 on page 639, change “incorporate” to “incorporates.”

In subparagraph 1), change “NEMA TS4-2004” to “NEMA TS-4, latest edition”.

### **907-656.02.6--Mechanical Construction.**

**907-656.02.6.4--Sign Housing Construction.** In subparagraph 10) in Subsection 656.02.6.4 on page 641, change “having” to “have.”

**907-656.02.9--Optical Components.** Delete the second paragraph of Subsection 656.02.9 on page 642, and substitute the following.

DMS pixels shall be constructed with discrete LEDs manufactured by Broadcom (formerly Avago Technologies), Toshiba Corporation, Nichia Corporation, OSRAM, EOI, or a manufacturer submitted and approved in writing by the Department.

### **907-656.02.11--Electronics and Electrical.**

#### **907-656.02.11.3--NTCIP Protocol and Command Sets.**

**907-656.02.11.3.6--Information Level.** In the fourth row of Table 1 in Subsection 656.02.11.3.6 on page 646, change “Shall be at least 1\*” to “Shall be at least 1” in the “Project Requirement” column.

### **907-656.03--Installation Requirements.**

Delete Subsection 656.03.2 on pages 651 thru 657, and substitute the following.

**907-656.03.2--Testing.** All equipment associated with the DMS site shall undergo testing to verify conformance to requirements of the plans and these special provisions. The Contractor shall conduct a Project Testing Program as required in the Notice to Bidders entitled “ITS General



Requirements.” All costs associated with the Project Testing Program shall be included in the overall contract price; no separate payment will be made for any testing.

**907-656.03.2.1--Pre-Installation Test (PIT).** In addition to the requirements set forth in the Notice to Bidders entitled “ITS General Requirements”, the Contractor shall, at a minimum, 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

**907-656.03.4--Warranty.** Delete the paragraph in Subsection 656.03.4 on page 657, and substitute the following.

At a minimum, the warranty requirements defined in the Notice to Bidders entitled “ITS General Requirements” shall be met.

Delete Subsection 656.03.5 on pages 657 and 656, and substitute the following.

**907-656.03.5--Training.** The minimum training requirements shall be as defined in the Notice to Bidders entitled “ITS General Requirements”.

**907-656.03.6--Maintenance and Technical Support.** Delete the paragraph in Subsection 656.03.6 on page 658, and substitute the following.

The minimum maintenance and technical support requirements shall be as defined in the Notice to Bidders entitled “ITS General Requirements”.

**907-656.04--Method of Measurement.** After the paragraph in Subsection 656.04 on page 658, add the following.

Dynamic Message Sign Training shall be measured as a lump sum, which shall include all coordination, materials, labor, training location costs, and all incidentals required to complete the training as described in the Notice to Bidders entitled “ITS General Requirements.”

**907-656.05--Basis of Payment.** Delete the first paragraph in Subsection 656.05 on page 658, and substitute the following.

Dynamic Message Sign, measured as prescribed above, will be paid for at the contract unit price per each, which price shall be full compensation for 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 requirements, warranties, all labor, tools, materials, equipment, appurtenances, and all incidentals necessary to complete the work for a complete and functional DMS including remote and local control of the sign.

After the last paragraph of Subsection 656.05 on page 658, add the following.

Dynamic Message Sign Training, measured as prescribed above, will be paid for at the contract unit lump sum price, which price shall be full compensation for all training costs including coordination, materials, labor, training location costs, and all incidentals required to complete the training as described in the Notice to Bidders entitled "ITS General Requirements."

Delete the pay items listed on page 658 and substitute the following.

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. 907-659-5

CODE: (IS)

DATE: 05/25/2021

SUBJECT: Traffic Management Center (TMC) Modifications

Section 907-659, Traffic Management Center (TMC) Modifications, is hereby added to and becomes part of the 2017 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.** This work consists of modifying the MDOT Statewide Traffic Management Center (TMC) located in the Information Systems Division on the 2<sup>rd</sup> Floor, at 401 North West Street, Jackson, Mississippi, 39201. Regional and City Traffic Management Centers may be located statewide. The following is a list of existing/planned centers and their addresses:

Northwest Regional Combined TMC – 8791 Northwest Drive, Southaven, Mississippi (Police Department)  
City of Ridgeland TOC – 100 West School Street , 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 Regional TMC – 16499 Hwy 49, Saucier, Mississippi (MDOT Lyman Project Office)  
Tupelo Regional TMC – 1909 N. Gloster Street, Tupelo, Mississippi (MDOT District 1 Headquarters)

Additional Traffic Management Centers may be added as needed.

**907-659.02--Blank.**

**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 or configuring signals in the existing Central Traffic Signal software system, or upgrading existing signal systems, 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 as well as MDOTs applicable Statewide or Regional Architecture.

**907-659.03.1.1--TMC Modifications - Software.** The Contractor shall initially use vendor supplied software to test all ITS systems installed, interfaced or configured on this project and demonstrate full compliance with the contract requirements. A minimum of two (2) licensed copies of each system of the vendor supplied software must be provided to MDOT upon completion of the testing for each component.

**907-659.03.1.2--MDOT ATMS Software.** The Contractor shall update the licenses and license keys for the existing MDOT ATMS software to include all ITS devices, existing and provided by the Contractor under this project, for which the existing ATMS has modules and device drivers. The Contractor is required to fully configure the existing ATMS software for operation, status monitoring, configuring, and control of the CCTV systems installed, interfaced or configured on this project. At a minimum, this shall include:

- Update and configure the existing map to show the locations of all ITS devices, existing and provided by the Contractor, for which the existing ATMS has modules and device drivers, including but not limited to CCTV systems, with dynamic icons.
- Install and configure all devices, existing and provided by the Contractor, for which the existing ATMS has modules and device drivers, including but not limited to CCTV systems, into the software's database.
- Configure the systems so the new devices shall send multiple bandwidth streams directly to the MDOT website and TMC video wall.

The Contractor is required to arrange for the ATMS vendor to be on-site to complete this configuration and provide the required testing to show that the software is fully functioning for each CCTV.

**907-659.03.1.3--TMC Modifications - Video Systems.** The Contractor shall provide, install, and integrate any needed video system equipment or video wall streaming servers for the existing video wall controller that shall be capable of displaying the video streams from the camera streams provided by the Contractor and displaying them as video windows on the existing video wall as controlled by the video wall controller through the ATMS software client or on the MDOT WEB page or VDMS system.

**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 mdottraffic.com purposes. This data shall include, but is not limited to, per vehicle raw data which shall be transmitted to and stored and managed by the ATMS. The traffic monitor systems shall be capable of utilizing **any combination of** loop, microloop, radar, Bluetooth, DSRC, 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 as well as MDOT's applicable Statewide or Regional Architecture.

**907-659.03.3--TMC Modifications – Installation Requirements.** All equipment shall be installed according to the manufacturer's recommendations, the Plans and as follows:

- 1) Any new, additional or updated drivers required for the existing ATMS software to communicate and control new devices installed by Contractor shall be the responsibility of the Contractor.
- 2) 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.
- 3) 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.

**907-659.03.4--Testing.** All equipment and software associated with the TMC modifications shall undergo testing to verify conformance to requirements of the plans and these special provisions. The Contractor shall conduct a Project Testing Program as required in the Notice to Bidders entitled "ITS General Requirements." All costs associated with the Project Testing Program shall be included in the overall contract price; no separate payment will be made for any testing.

**907-659.03.5--Submittals.** The submittal requirements defined in the Notice to Bidders entitled "ITS General Requirements" shall be met. All costs associated with submittals shall be included in the overall contract price; no separate payment will be made for any documenting and submitting.

**907-659.03.6--Quality Assurance.** The quality assurance requirements defined in the Notice to Bidders entitled "ITS General Requirements" shall be met. All costs associated with the quality assurance requirements shall be included in the overall contract price.

**907-659.03.7--Warranty.** At a minimum, the warranty requirements defined in the Notice to Bidders entitled "ITS General Requirements" shall be met. All costs associated with the warranty requirements shall be included in the overall contract price.

**907-659.03.8--Training.** The minimum training requirements shall be as defined in the Notice to Bidders entitled "ITS General Requirements" and shall cover the system architecture, operations, and maintenance of the TMC systems.

**907-659.04--Method of Measurement.** Traffic Management Center Modifications, Traffic Management Center Modifications – Monitor Systems, and Traffic Management Center Modifications – Software Only, 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, and Traffic Management Center Modifications – Monitor Systems, measured as prescribed above, will be paid for at the contract lump sum price, which price shall be full compensation for furnishing all

materials, all documentation and submittals, warranties, installing, connecting, cutting, pulling and testing, all equipment, tools, labor, quality assurance, and all incidentals necessary to complete the work.

Traffic Management Center Modifications – Software Only, measured as prescribed above, will be paid for at the contract lump sum price, which price shall be full compensation for incorporating or adjusting all ITS systems installed, interfaced or configured on this project into the existing ATMS system, for furnishing all materials, all documentation and submittals, testing, warranties, quality assurance, and all incidentals necessary to complete the work.

Traffic Management Center Modifications – Training, measured as prescribed above, will be paid for at the contract unit lump sum price, which price shall be full compensation for all training costs including coordination, materials, labor, training location costs, and all incidentals required to complete the training as described in the Notice to Bidders entitled “ITS General Requirements.”

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
- 907-659-D: Traffic Management Center Modifications – Software Only - lump sum

## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-661-6

CODE: (IS)

DATE: 05/25/2021

SUBJECT: Fiber Optic Cable (OSP)

Section 907-661, Fiber Optic Cable, is hereby added to and becomes part of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction as follows.

### SECTION 907-661 -- FIBER OPTIC CABLE (OSP)

**907-661.01--Description.** The work shall consist of the construction of the infrastructure required to install, replace, or upgrade 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.

#### 907-661.02--Materials.

**907-661.02.1--Single Mode Fiber Optic Cable (FO Cable).** The Contractor shall provide 72-count fiber optic cable, unless otherwise stated in the plans, that meets the following requirements:

- All-dielectric, outdoor hardened (outside plant – OSP), 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, unless otherwise stated in the plans
- Cable construction design that allows for no more than the number of active buffer tube positions
- Maximum diameter 0.48 inches
- Maximum weight 0.07 pounds per foot
- Attenuation shall not exceed 0.4 dB/km at 1310 nm and 0.3 dB/km at 1550 nm.

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" (if applicable, replace 72 with the actual number of fibers)

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"

**907-661.02.2--Single Mode 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, unless otherwise stated on the plans
- Corning Freedom LST All-Dielectric, Pirelli CentraLink, OFS Allwave, or approved equivalent cables shall be provided. This cable shall be designated as the building entry cable.
- Attenuation shall not exceed 0.4 dB/km at 1310 nm and 0.3 dB/km at 1550 nm.

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" - "72F SM" (if applicable, replace 72 with the actual number of fibers)

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

**907-661.02.3--Single Mode Fiber Optic Drop Cable (FO Drop Cable).** The Contractor shall provide 12-count Single Mode 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, LC 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 greater than 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- $\mu$ m coated fibers shall be up-jacketed to 1/8-inch using fan-out tubing. This tubing shall contain a 900- $\mu$ m Teflon inner tube, aramid yarn 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, **outdoor hardened**, 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 Freedom LST All-Dielectric, Pirelli CentraLink, OFS Allwave, 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

**907-661.02.4--Multimode Fiber Optic Drop Cable (MM FO Drop Cable).** The Contractor shall provide 12-count Multimode 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.

Cable Assembly shall be rated for outdoor environment and have operational temperature of -40°C to +70°C. Each connector shall have a minimum of a 1-inch strain relief boot. The Cable Assembly shall also be pre-terminated on one end.

Insertion loss for each connector shall not exceed 0.30 dB.

Attenuation shall not exceed 3 dB/km for 850 nm and 1dB/km for 1300 nm.

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.

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, outdoor hardened, 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 MM"

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

**907-661.02.5--Plenum Rated Nonmetallic Corrugated Raceway.** The Contractor shall provide plenum rated nonmetallic corrugated raceway inside buildings when cable is not in rigid conduit or when it is 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.

**907-661.02.6--Fiber Optic Splices.** All splices shall be created according to the latest version of the manufacturer's cable installation procedures unless otherwise noted in the plans or by the Project Engineer.

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

**907-661.02.7--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 LC compatible connectors for all fiber optic infrastructures.

Field-installed connectors shall not be used.

Adapter couplers shall not be used to change connector types.

Ceramic ferrule 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 LC 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.

**907-661.02.8--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 **all fibers of the fiber optic cable(s)**.

The Contractor shall provide wall/shelf mount 12-fiber distribution **cabinets** equipped with fiber optic connector modules in a 12-fiber configuration. These will be used in field equipment and communication cabinet locations. **Pre-terminated fiber distribution cabinets shall not be used without prior approval from Project Engineer.**

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 **a minimum of 72-fiber connectors** and capable of storing **a minimum of 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, 12¼ 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 a minimum of 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 outdoor hardened 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.

**907-661.02.9--OSP Closures for Aerial, Pole Mount, Pedestal and Hand Hold Environments.**

OSP closures for aerial, pole mount, pedestal and hand hole 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.

**907-661.02.10--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.

**907-661.02.11--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 907-661-A and 907-661-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- $\mu$ m buffered fiber, aramid yarn 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/km @ 1550 and have a total attenuation of less than .5 dB.

The Contractor shall be responsible to determine and provide attenuators with the proper attenuation to not exceed the optical budgets of the equipment connected by patch cables.

**907-661.02.12--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 **outdoor hardened** 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 on 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.

**907-661.02.13--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.

**907-661.02.14--Tracer Cable.** Tracer cable requirements as defined in Section 636, along with

the requirements in this specification, shall be met. Conduit detection wire shall be #10 AWG stranded copper, orange-insulated, THHN -THWN conductor.

**907-661.02.15--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)

**907-661.03--Construction Requirements.** All equipment shall be installed according to the manufacturer's recommendations, the Plans and as follows.

**907-661.03.1--General Requirements.** Fiber optic cable shall meet the following general requirements.

- a) The Contractor shall install all fiber optic infrastructures according to the manufacturer's recommended procedures and specifications.
- b) The Contractor shall provide all necessary interconnections, services and adjustments required for a complete and operable data transmission system.
- c) The Contractor shall ensure conduit is clean and undamaged prior to installing fiber optic cable.
- d) The Contractor shall install all fiber trunk, drop, and patch cables such that attenuation shall be less than 1.0 dB/km @ 1310 nm, 0.75 dB/km @ 1550.
- e) 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.
- f) 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.
- g) 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.



- h) 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 typically two times the pole height plus 15 feet.
- i) For aerial (not including aerial fiber in conduit attached to bridges) installations, the following minimum slack requirements shall apply:
  - For aerial slack storage at splice points, a radius controlling device 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 radius controlling devices 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.
- j) 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.
- k) 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- $\mu$ m tube, aramid strength members and an outer jacket, and shall be secured to the cable sheath.
- l) The minimum requirement for fiber protection inside wall mount or rack mount fiber enclosure shall be 900- $\mu$ m buffering, intrinsic to the cable in the case of tight buffered fibers, or in the case of 250- $\mu$ m coated fibers, a fan-out body and 900- $\mu$ m tubing secured to the buffer tube(s).
- m) When high airspeed blowing (HASB) method or piston method is used, ensure that the volume of air passing through the conduit does not exceed the conduit manufacturer's recommendation.
- n) The manufacturer's recommended maximum pulling tension shall not be exceeded. Pulling attachments shall be designed to not degrade the optical and mechanical characteristics of the fiber optic cable during installation.
- o) During installation, even if the tension specifications for the cable are not exceeded the first ten feet shall be discarded.
- p) Warning tape shall be placed 12 inches above the cable not to deviate  $\pm 18$  inches from the centerline of the optical cable. Warning tape shall be at least two inches wide and colored orange.

**907-661.03.2--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.

**907-661.03.3--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.

The Contractor shall ensure that the minimum depth of the cable is a minimum of 36 inches unless shown otherwise in plans.

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 in Type 5 pull boxes and occur at a minimum of 10,000 feet.

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.

**907-661.03.4--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
- Trunk cable in Surface Mounted pull box ..... 5 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 Surface Mounted pull box, not terminated in a splice closure .....5 feet
- Drop cable in Type 5 pull box, terminated in a splice closure with the trunk cable ..... 100 feet
- Drop cable in Surface Mounted pull box, terminated in a splice closure with the trunk cable ..... 5 feet
- Trunk cable end in Type 5 pull box ..... 200 feet
- Drop cable terminated in same splice closure as trunk cable end ..... 200 feet
- Trunk cable end in Surface Mounted pull box ..... 10 feet

The Contractor shall label each pull box with a numbered disk obtained from the Traffic Engineering Division. The disk shall be installed in accordance with the [manufacturer's](#) 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.

**907-661.03.5--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

**907-661.03.6--Tracer Cable.** Tracer cable requirements as defined in Section 636 Electrical Cable, along with the requirements in this specification, shall be met. The Contractor shall install one tracer cable where one or more conduits are installed. Tracer cable is required for all installation methods, including trenching, directional boring, or plowing. Conduit or Fiber Optic Cable with preinstalled tracer cable shall not be used without prior approval from Project Engineer.

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

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

The tracer cable 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 tracer cable shall be coiled and secured in each pull box or vault.

When two or more tracer cables are in any pull box, the Contractor shall mechanically splice all tracer cable together.

Tracer cable is required in drop cable conduits.

A tracer cable surge protection system shall be furnished and installed. Tracer cables shall be attached to surge protection systems designed to dissipate high transient voltages or other electrical surges. The tracer cable surge protection system shall be grounded to a driven rod within 10 feet of the system using AWG #6 single conductor wire as detailed in the plans. 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.

**907-661.03.7--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 907-661-A and 907-661-B.

The Contractor must notify the Project Engineer in writing no less than ten (10) days in advance of doing any work to existing fiber optic cable. Before any work can begin the Contractor must

have obtained approval from the Project Engineer.

**907-661.03.8--Replace Fiber Optic Cable.** In locations specified in the Plans, the Contractor shall be required to remove and replace existing fiber optic cable with new fiber optic cable. The new fiber optic cable shall be an equivalent cable having the same cable type, assembly, connectors, size, construction, buffer tube construction, temperature characteristics, tensile strength, and optical characteristics. The cable type and mode shall be the same unless specified as otherwise in the Plans or Notice to Bidders. The new cable shall be a compatible replacement having equivalent or improved link characteristics. The Contractor shall install the cable as per manufacturer application and recommendations and adhere to the Installation Requirements and Testing specifications as stated herein. No separate payment will be made for this work. The cost for pulling new fiber optic cable for cable replacement, and splicing/terminating all fibers shall be included in the cost of pay item 907-661-D.

**907-661.03.9--Replace Fiber Optic Drop Cable.** In locations specified in the Plans, the Contractor shall be required to remove and replace existing fiber optic drop cable with new fiber optic drop cable. The new fiber optic drop cable shall be an equivalent cable having the same cable type, assembly, connectors, size, construction, buffer tube construction, temperature characteristics, tensile strength, and optical characteristics. The cable type and mode shall be the same unless specified as otherwise in the Plans or Notice to Bidders. The new cable shall be a compatible replacement having equivalent or improved link characteristics. The Contractor is required to install the cable as per manufacturer application and recommendations and adhere to the Installation Requirements and Testing specifications as stated herein. No separate payment will be made for this work. The cost for pulling new fiber optic drop cable for cable replacement, and splicing/terminating all fibers shall be included in the cost of pay item 907-661-E.

**907-661.03.10--Upgrade Fiber Optic Cable.** In locations specified in the Plans, the Contractor shall be required to upgrade existing fiber optic cable to new cable that adheres to the respective cable specification and requirements. The cable type and mode shall be the same unless specified as otherwise in the Plans or Notice to Bidders. The cable upgrade shall be treated as a new cable installation and adhere to all corresponding specifications and requirements stated herein. No separate payment will be made for this work. The cost for pulling new fiber optic to upgrade existing cable, and splicing/terminating all fibers shall be included in the cost of pay item 907-661-G.

**907-661.03.11--Fiber Optic Connections at Existing Communication Nodes.** In some locations, the Contractor shall be required to pull new fiber optic cable into an existing communications hut. 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 907-661-A and 907-661-B.

**907-661.03.12--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 907-661.02.8) 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 LC/LC 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.

**907-661.03.13--Testing.** The fiber optic infrastructure shall undergo testing to verify conformance to requirements of the plans and these special provisions. The Contractor shall conduct a Project Testing Program as required in the Notice to Bidders entitled "ITS General Requirements." All costs associated with the Project Testing Program shall be included in the overall contract price; no separate payment will be made for any testing.

**907-661.03.13.1--Pre-Installation Test (PIT).** In addition to the requirements set forth in the Notice to Bidders entitled "ITS General Requirements", the Contractor shall, at a minimum, 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.

**907-661.03.13.2--Standalone Acceptance Test (SAT).** In addition to the requirements set forth in the Notice to Bidders entitled "ITS General Requirements", the Contractor shall, at a minimum, 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.

Tracer Cable shall undergo testing to verify conformance to requirements of the plans and these special provisions. A continuity or tone test shall be performed after installation to confirm that a continuous run of tracer cable was installed for the full length of the conduit runs.

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 cannot start until the Traffic Engineering ITS Department is satisfied with the installation.

**907-661.03.14--Submittals.** The submittal requirements defined in the Notice to Bidders entitled "ITS General Requirements", along with the requirements below and throughout this specification, shall be met. All costs associated with submittals shall be included in the overall contract price; no separate payment will be made for any documenting and submitting.

**907-661.03.15--Quality Assurance.** The quality assurance requirements defined in the Notice to Bidders entitled "ITS General Requirements" shall be met. All costs associated with the quality assurance requirements shall be included in the overall contract price.

**907-661.03.16--Warranty.** At a minimum, the warranty requirements defined in the Notice to Bidders entitled "ITS General Requirements" shall be met.

**907-661.03.17--Training.** The minimum training requirements shall be as defined in the Notice to Bidders entitled "ITS General Requirements."

**907-661.04--Method of Measurement.** Fiber optic cable of the type specified will be measured by the linear foot, and shall be obtained by accurate measurement of the runs including horizontally, vertically, aerially along the messenger cable, from the trunk line to the controller cabinet, and with liberal allowances made for slack in boxes, as indicated in the plans.

The cost for all fiber optic work, equipment and testing shall be included in the bid price for fiber optic cable.

All required cabinet facilities shall not be measured for separate payment. All standard or special fiber optic modems, fan out boxes, connectors, termination cabinets, patch cords, raceways, splicing devices, splicing, 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.



Fiber Optic Cable Training shall be measured as a lump sum which shall include all coordination, materials, labor, training location costs, and all incidentals required to complete the training as described in the Notice to Bidders entitled "ITS General Requirements."

**907-661.05--Basis of Payment.** Fiber optic 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 documentation and submittals, warranties, furnishing all materials, for all installing, connecting, cutting, pulling and testing, all equipment, tools, labor, quality assurance, and all incidentals necessary to complete the work.

Fiber Optic Cable Training, measured as prescribed above, will be paid for at the contract unit lump sum price, which price shall be full compensation for all training costs including coordination, materials, labor, training location costs, and all incidentals required to complete the training as described in the Notice to Bidders entitled "ITS General Requirements."

Payment will be made under:

- 907-661-A: Fiber Optic Cable, \* - per linear foot
- 907-661-B: Fiber Optic Drop Cable, \* - per linear foot
- 907-661-D: Replace Fiber Optic Cable, \* - per linear foot
- 907-661-E: Replace Fiber Optic Drop Cable, \* - per linear foot
- 907-661-G: Upgrade Fiber Optic Cable, \* - per linear foot
- 907-661-H Fiber Optic Cable Training - lump sum

\* Indicate the type of cable. Cable may be aerially supported as indicated in the plans.

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

## SUPPLEMENT TO SPECIAL PROVISION NO. 907-663-5

**DATE:** 07/13/2021

**SUBJECT:** Networking Equipment

### **907-663.02--Materials.**

#### **907-663.02.3--Cell Modem.**

**907-663.02.3.1--Functional Requirements.** Before the first sentence of Subsection 907-663.02.3.1 on page 11, add the following.

MDOT construction projects which require WAN (Wide Area Networks) telecommunications communications back to any one of the traffic management centers, will need a WAN circuit installed. MDOT does not expect the Contractor to establish the metro E data circuit on behalf of MDOT. However, MDOT requires that the Contractor provides the Information Systems Division network manager or the manger's team with either the E911 physical address, if already established, or the accurate latitude and longitude coordinates of where the data circuit and cabinet will reside at least 4 or 5 months before the construction stakeholders are ready to test data connectivity. MDOT will use this information to establish an E911 address if necessary, and/or order the metro E circuit from cSpire telecommunications. MDOT must receive this information as soon as possible because it takes a few months for cSpire or any telecommunications company to establish and install the circuit. The Contractor should also understand that cSpire will not install the circuit if the cabinet and power where the circuit will reside is not installed at the time they are ready to install it.

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-663-5

CODE: (IS)

DATE: 05/25/2021

SUBJECT: Networking Equipment

Section 907-663, [Networking Equipment](#), is hereby added to and made part of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction as follows.

## SECTION 907-663 -- NETWORKING EQUIPMENT

**907-663.01--Description.** This section specifies the minimum requirements for providing networking communication equipment, including network switches, terminal servers, fiber optic modems, cell modems, and associated cabling, furnished and installed.

Network Switches are divided into three (3) categories; Layer 2 hardened, Layer 3 hardened, and Layer 3 non-hardened. There can be multiple types per category such as Type A, B, C etc. Types will be defined by options based on versions and numbers of ports, and/or additional modules such as built in fiber modems, wireless components, and terminal servers. The number of specific port versions will also be defined by plan requirements, NTBs, and Special Provisions.

Field and core hardened category switches shall be environmentally hardened devices.. These switches support Intelligent Transportation Elements deployed on arterial streets and the highway system where network switches are required for communications but HVAC systems are not available for environmental control. Elements include but are not limited to traffic signals, dynamic message signs, surveillance cameras, and vehicle detection systems. Field and core non-hardened category switches will support the Intelligent Transportation System and be installed in the Traffic Management Center and Communications Huts which are environmentally controlled.

This section also specifies the minimum requirements for stand alone and network switch module terminal servers, stand alone and network switch module cellular modems, and Ethernet Network cable. The terminal servers shall be hardened. 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. Cellular modems shall be used to communicate via a cellular network to remote sites such as portable traffic signal sites, portable CMS, smart work zones, ITS site locations, or devices that need serial or Ethernet communication that can be provided over cellular service.

The Ethernet network cable will be installed in conduit and cabinets between elements that are within 300 feet of each other to eliminate the need for two hardened switches. The work shall consist of providing all labor, materials, equipment, and incidentals necessary to furnish, install, and test the networking equipment.

**907-663.02--Materials.** Network switches, terminal servers, cell modems, and associated cabling will be placed in the field device cabinets and shall meet the following requirements.

**907-663.02.1--Network Switch Requirements.** All network switches shall adhere to the following minimum requirements.

- 1) Field switch optical ports shall meet the following:
  - a. The minimum optical budget between transmit and received ports shall be 18dB.
  - b. Shall include LC connector types.
  - c. Optical receiver maximum input power level shall not be exceeded.
  - d. Optical attenuators shall be added as needed; fiber optic attenuator patch cords shall be in accordance with Section 657 of the Standard Specifications. It is the Contractor's responsibility to determine where attenuators are needed and shall be included in the cost of the switch.
  - e. The Contractor shall be required to measure the optical power on each optical port to ensure that power entering the receiver is within the acceptable power budget of the optical port.
  - f. Optical interface equipment shall operate at 1310 nm.
- 2) Operate from 100 VAC to 200 VAC.
- 3) Meet the IEEE 802.3 (10Mbps Ethernet) standard.
- 4) Meet the IEEE 802.3u (Fast Ethernet 100 Mbps) standard.
- 5) Meet the IEEE 802.3x (Full Duplex with Flow Control) standard.
- 6) Meet the IEEE 802.1p (Priority Queuing) standard.
- 7) Meet the IEEE 802.1Q (VLAN) standard per port for up to four VLAN's.
- 8) Meet the IEEE 802.1w (Rapid Spanning Tree Protocol) standard.
- 9) Meet the IEEE 802.3ad (Port Trunking) standard for a minimum of two groups of four ports.
- 10) The field switches shall meet IEEE 802.3D (Spanning Tree Protocol) standard.
- 11) Capable of mirroring any port to any other port within the switch.
- 12) Password manageable through:
  - a. SNMP
  - b. Telnet/CLI
  - c. HTTP (Embedded Web Server) with Secure Sockets Layer (SSL)
- 13) Full implementation of SNMPv1 and SNMPv2c.
- 14) Full implementation of GVRP (Generic VLAN Registration Protocol).
- 15) Full implementation of IGMP and IGMP snooping.
- 16) Minimum MTBF of 100,000 hrs using Bellcore TS-332 standard.
- 17) Full implementation of RFC 783 (TFTP) to allow remote firmware upgrades.
- 18) UL approved.
- 19) The field switch shall provide LED status indicators as follows:
  - 1) power on and off
  - 2) network status per port (transmit, receive, link, speed)
- 20) Unused ports (copper and optical) shall be covered with rubber or plastic dust caps/covers.
- 21) Switches Types that are required to be Environmentally Hardened shall meet the following environmental requirements:
  - a. The field switches [this excludes Types C, E and F] shall operate between -34° to +74°C, including power supply.
  - b. The field switches [this excludes Types C, E and F] shall operate from 10% to 90% non-condensing humidity.

**907-663.02.1.1--Layer 2 Network Switch.** Layer 2 network switches shall be provided in locations where only Layer 2 network functionality is required. These locations will generally be field site locations. Layer 2 network switches shall adhere to the following minimum requirements.

- 1) Shall be environmental hardened
- 2) 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.
- 3) 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.

**907-663.02.1.1.1--Type A Network Switch.** Type A network switches shall be a layer 2 network switch at minimum and shall be environmentally hardened. The Type A shall be provided in situations where a minimal number of interface ports are required. The Type A switch shall adhere to the following minimum requirements in addition to the Layer 2 network switch requirements.

- 1) Minimum of six 10/100/1000 Base-TX ports. Each port shall connect via RJ-45 connector.
- 2) Minimum of two 1000 Base Long Reach optical ports.

**907-663.02.1.1.2--Type B Network Switch.** Type B network switches shall be a Layer 2 network switch at minimum and shall be environmentally hardened. The Type B shall be provided in situation where minimal number of interface ports are required. The Type B switch shall adhere to the following minimum requirements in addition to the Layer 2 network switch requirements.

- 1) Minimum of twelve (12) 10/100/1000 Base-TX ports. Each port shall connect via RJ-45 connector.
- 2) Minimum of two (2) 1000 Base Long Reach optical ports.

**907-663.02.1.2--Layer 3 Network Switch.** Layer 3 network switches shall be provided in locations where Layer 2 and Layer 3 network functionality is required. These locations will generally be Environmental Controlled Field HUBs, TMC equipment rooms, and control rooms. Where Layer 3 Network Switching is required but Environmental Control is not available, Environmentally Hardened Type Layer 3 switches shall be provided. In addition to meeting the general network Requirements, Layer 3 Switches have the following additional Requirements:

- 1) Each switch shall provide Layer 2 and Layer 3 switching and routing services.
- 2) Each switch shall meet the IEEE 802.1d (Virtual Bridge) standard.
- 3) Each switch shall meet the IEEE 802.1x (authentication) standard.

**907-663.02.1.2.1--Type C Network Switch Requirements.** The Type C network switch, which is a base core switch, will be installed in the communication hubs and shall meet the following requirements:

- 1) Each switch shall be populated with modules including the following features and capabilities:
  - a. Minimum of 64Gbps/48Mpps module Bandwidth

- b. **Minimum** of 8-GE uplink ports available per network switch assembly. The Contractor shall provide an uplink SFP optical module compatible with the interface for the uplink as indicated in the Location & Configuration of Communication Nodes notice to bidders for each uplink
- c. In one (or more) modules: 24 Ethernet 10/100/1000 RJ-45 ports
- 2) Optical receiver maximum input power level shall not be exceeded.
- 3) Optical attenuators shall be added as needed; fiber optic attenuator patch cords shall be in accordance with Section 657 of the Standard Specifications. It is the Contractor's responsibility to determine where attenuators are needed and shall be included in the cost of the switch.
- 4) **19" rack mountable.**
- 5) Supports 10 gigabit ethernet of SFP optics.
- 6) NEBS Level 3 compliant.
- 7) Meet the requirements of :
  - a. IEEE 802.3z
  - b. IEEE 802.3ab
  - c. IEEE 802.1Q
  - d. GR-20-CORE: Generic requirements for Optical Fiber and Optical Fiber Cable
  - e. GR-326-CORE: Generic Requirements for **Singlemode**
- 8) Full implementation of BGPv4 protocol as outlined by RFCs: 4271, 6286, 6608, 6793, 7606, 7705, 8212
- 9) Full implementation of OSPF protocol as outlined by RFCs: 2178, 1583, 1587, 1745, 1765, 1850, 2154, 2328, 1850, 1997, 2385, 2439, 2842, 2918, 2370.
- 10) Capable of mirroring any port to any other port within the switch.
- 11) Password manageable through:
  - a. SSH (Secure Shell)
- 12) Full implementation of MLD (Multicast Listener Discovery).
- 13) Full implementation of IGMPv2.
- 14) Full implementation of PIM-SM and PIM-DM.
- 15) Comply with FCC 47 CRF Part 15 Class A emissions.
- 16) Bandwidth flow rate limiting policing support per port.
- 17) Full security implementation of
  - a. Support SSH, 802.1x (rel 2)
  - b. Access Control Lists (ACL's)
  - c. RADIUS authentication
  - d. TACACS+ authentication
- 18) The power supply units shall be hot swappable.

**907-663.02.1.2.1.1--Type C1 Network Switch Requirements.** The Type C1 network switch will be installed in communication hubs where a maximum total of 4 pair/(8 strands) of fiber optic cable will be actively in use or in environmentally controlled wireless towers and shall meet the following requirements:

- 1) Each switch shall be populated with an 4-port SFP gigabit ethernet module and also include the following features and capabilities:
  - a. **Minimum of 88Gbps Switching Capacity and 480Gbps Stacking Bandwidth**

- b. In one (or more) Fiber SFP-based module(s): a minimum of 8 1000Base-X (SFP-based) compatible access ports which may also be used as uplink ports. The Contractor shall provide whichever is greater between a minimum number of SFP optic modules to interface to the fiber as indicated in the plans and NTBs, or a minimum of eight (8) and shall meet the following minimum requirements:
  - i. Optical budget of 18dB
  - ii. Switch shall be stackable and contain dual power supplies
  - iii. Same optical wavelength as Type A & B switches
  - iv. Same optical transmitter power as Type A & B switches
- 2) Non-Chassis based switch
- 3) Operate from 23° to 113°F.
- 4) RIPng, OSPFv6, and EIGRPv6 support
- 5) Full implementation of GMRP (Generic Multicast Registration Protocol).
- 6) Have redundant power supplies installed.

**907-663.02.1.2.1.2--Type C2 Network Switch Requirements.** The Type C2 network switch will be installed in the Communication Hubs where a minimum total of 5 pair/ (10 strands) of fiber optic cable will be actively in use. This type switch may also be installed in environmentally controlled wireless towers if the minimum total of 5 pair/(10 strands) fiber optic cable in-use rule applies. This type switch shall also meet the following requirements:

- 1) Each switch shall be populated with three (3) modules including the following features and capabilities:
  - a. In one (or more) Fiber SFP-based module(s): a minimum of 48 1000Base-X (SFP-based) compatible access ports and a minimum of 8 1000Base-X (SFP-based) uplink ports. The Contractor shall provide whichever is greater between a minimum number of SFP optic modules to interface to the fiber as indicated in the plans and NTBs, or a minimum of 14 and shall meet the following minimum requirements:
    - i. Optical budget of 18dB
    - ii. Hot-swappable network modules
    - iii. Same optical wavelength as Type A & B switches
    - iv. Same optical transmitter power as Type A & B switches
- 2) Operate from 10 to 90% non-condensing humidity
- 3) Operate from 32° to 104°F.
- 4) Designed as a chassis with easy to remove modules.
- 5) Chassis backplane shall be passive.
- 6) All modules shall be hot-swappable.
- 7) Must have installed redundant power supplies in which each supports a minimum of 4200 watts.
- 8) Switch assembly shall have a minimum of three (3) module slots.
- 9) Blank covers for all remaining slots.

**907-663.02.1.2.1.3--Type C3 Network Switch Requirements.** The Type C3 network switch will be installed in the communication hubs where a minimum total of 5 pair/(10 strands) of fiber optic cable will be actively in use. This type switch may also be installed in environmentally controlled wireless towers if the minimum total of 5 pair/(10 strands) fiber optic cable in-use rule applies. This type switch shall also meet the following requirements:



- 1) Each switch shall be populated with modules including the following features and capabilities:
  - a. Redundant Layer 2/3 switching and routing services
  - b. In one (or more) Fiber SFP-based module(s): a minimum of 48 1000Base-X (SFP-based) compatible access ports and a minimum of 8 1000Base-X (SFP-based) uplink ports. The Contractor shall provide whichever is greater between a minimum number of SFP optic modules to interface to the fiber as indicated in the plans and NTBs, or a minimum of 14 and shall meet the following minimum requirements:
    - i. Optical budget of 18dB
    - ii. Hot-swappable network modules
    - iii. Same optical wavelength as Type A & B switches
    - iv. Same optical transmitter power as Type A & B switches
- 2) Operate from 32° to 104°F.
- 3) Operate from 10 to 90% non-condensing humidity
- 4) Designed as a chassis with easy to remove modules.
- 5) Chassis backplane shall be passive.
- 6) All modules shall be hot-swappable.
- 7) Must have installed redundant power supplies in which each supports a minimum of 4200 watts.
- 8) Switch assembly shall have a minimum of 6 module slots.
- 9) Blank covers for all remaining slots.

**907-663.02.1.2.1.4--Type C4 Network Switch Requirements.** The Type C4 network switch will be installed in the communication hubs where no less than 21 pairs/(42 strands) of fiber optic cables will be active and in use and shall meet the following requirements:

- 1) Each switch shall be populated with modules including the following features and capabilities:
  - a. Redundant Layer 2/3 switching and routing services
  - b. The switch chassis shall be capable of accommodating up to 440 Gbps per slot.
  - c. In one (or more) Fiber SFP-based module(s): a minimum of 48 1000Base-X (SFP-based) compatible access ports and a minimum of 8 1000Base-X (SFP-based) uplink ports. The Contractor shall provide whichever is greater between a minimum number of SFP optic modules to interface to the fiber as indicated in the plans and NTBs, or a minimum of 14 and shall meet the following minimum requirements:
    - i. Optical budget of 18dB
    - ii. Hot-swappable network modules
    - iii. Same optical wavelength as Type A & B switches
    - iv. Same optical transmitter power as Type A & B switches
- 2) Operate from 32° to 104°F.
- 3) Supports relative humidity - Ambient (noncondensing) operating: 5% to 90%
- 4) Designed as a chassis with easy to remove modules.
- 5) Chassis backplane shall be passive.
- 6) All modules shall be hot-swappable.
- 7) Must have installed dual-redundant (4) power supplies in which each supports a minimum of 3000 watts.



- 8) Switch assembly shall have a minimum of seven (7) module slots.
- 9) Blank covers for all remaining slots.

**907-663.02.1.2.2--Type D Network Switch Requirements.** The Type D network switch shall be of chassis design. The switch shall be able to accept a minimum of four (4) different types of modular cards. The Type D network switch shall meet the minimum requirements specified below:

- 1) The switch shall be chassis designed with a minimum of four (4) module slots.
- 2) Each switch shall be able to accept the following type modules:
  - a. Ethernet module:
    - i. A minimum number of six (6) 10/100Base-TX compatible RJ45 ports.
    - ii. The Contractor shall provide the minimum number of modules necessary to meet or exceed the required number of ports as indicated in the plans and NTBs.
    - iii. Total required bandwidth per chassis shall not exceed 10 Gbps
  - b. Fiber based modules:
    - i. The module shall accept SFP type fiber modules.
    - ii. The Contractor shall supply any necessary fiber modules that meet the requirements of speed, type of fiber, and link budget connection.
    - iii. The Contractor shall provide the minimum number of modules necessary to meet or exceed the required number of ports as indicated in the plans and NTBs.
  - c. WAN module:
    - i. T1, DS3 or Metro Ethernet Interface (as per NTB or project plans)
      - 1) The Interface shall be T1, DS3 or Metro Ethernet
      - 2) The ports shall connect via RJ45 connector.
    - ii. Cellular Interface
      - 1) Contractor shall provide information to the Project Engineer to enable activation of the modem.
      - 2) Contractor shall get prior approval from the Project Engineer on selection of cellular radio type (HSPA/EVDO)
  - d. Terminal Server module:
    - i. Module that meets terminal server requirements Subsection 663.02.6
  - e. Power Supply module:
    - i. The power module provided shall be “screw terminal block” type. No pluggable terminal block.
    - ii. Input power: Same as Type A and Type B switches.
    - iii. Power module shall be hot-swappable.
    - iv. The Contractor shall supply the necessary amount of power supplies to meet power requirements for all cards installed and the chassis itself
- 3) Software license shall be provided to match functionality of installed modules.
- 4) Shall be DIN or Panel mountable.
- 5) Password manageable through:
  - a. SSHv2 (Secure Shell)
- 6) Full implementation of VRRP.
- 7) Comply with FCC 47 CRF Part 15 Class A emissions.
- 8) Bandwidth flow rate limiting policing support per port.
- 9) Full security implementation of

- a. Support SSH2, 802.1x (rel 2)
  - b. Access Control Lists (ACL's)
  - c. RADIUS
- 10) Blank covers for all remaining slots.
- 11) Electronic surfaces shall be covered with conformal coating for additional environmental protection.

**907-663.02.1.2.3--Type E Network Switch Requirements.** The Type E network switch will be installed in locations where multiple backbone fibers converge or high concentration of ports are needed for a field location but need a hardened switch and shall meet the following requirements:

- 1) Each switch shall be populated with redundant switch fabric modules that meet the following minimum requirements:
  - a. Minimum of 2-GE uplinks available per card with a minimum capability to expand to eight (8). The Contractor shall provide an uplink SFP optical module compatible with the interface for the uplink as indicated in the Notice to Bidders entitled "Location & Configuration of Communication Nodes" for each uplink.
- 2) The Contractor will need to determine port count configuration based on the project plans for the Type E switch. Optical interfaces shall include 1000 Base-X (SFP-based module(s)) with a minimum of four (4) ports. The Contractor shall provide whichever is greater between a minimum number of SFP optic modules to interface to the fiber as indicated in the plans and NTBs, or a minimum of six (6) and shall have a minimum Optical budget of 18dB and be the same optical wavelength as Type A & B switches.
  - a. Optical receiver maximum input power level shall not be exceeded.
  - b. Optical attenuators shall be added as needed; fiber optic attenuator patch cords shall be in accordance with Section 657 of the Standard Specifications. It is the Contractor's responsibility to determine where attenuators are needed and shall be included in the cost of the switch.
- 3) Include a minimum of eight (8) Ethernet 10/100/1000 ports
- 4) Include a minimum of four (4) SFP ports must support 1000-Base-X/10 gigabit-ethernet-optics.
- 5) 19" rack mountable.
- 6) Chassis backplane shall be passive.
- 7) Meet the requirements of :
  - a. IEEE 802.3z
  - b. IEEE 802.3ah
  - c. IEEE 802.1Q
  - d. GR-20-CORE: Generic requirements for Optical Fiber and Optical Fiber Cable
  - e. GR-326-CORE: Generic Requirements for Singlemode
- 8) Full implementation of BGPv4 protocol as outlined by RFCs: 4271, 6286, 6608, 6793, 7606, 7705, 8212
- 9) Full implementation of OSPF protocol as outlined by RFCs: 2178, 1583, 1587, 1745, 1765, 1850, 2154, 2328, 1850, 1997, 2385, 2439, 2842, 2918, 2370.
- 10) Capable of mirroring any port to any other port within the switch.
- 11) Password manageable through:
  - a. SSHv2 (Secure Shell)
- 12) Full implementation of GMRP (Generic Multicast Registration Protocol).

- 13) Full implementation of IGMPv2.
- 14) Full implementation of PIM-SM and PIM-DM.
- 15) Full implementation of DVMRPv3.
- 16) Full implementation of VRRP.
- 17) Comply with FCC 47 CRF Part 15 Class A emissions.
- 18) Bandwidth flow rate limiting policing support per port.
- 19) Full security implementation of
  - a. Support SSH2, 802.1x (rel 2)
  - b. Access Control Lists (ACL's)
  - c. RADIUS
  - d. TACACS
- 20) Have redundant power supplies installed.
- 21) Blank covers for all remaining slots.
- 22) Have options or modules to add a terminal server as specified in Subsection 663.02.2
- 23) Have options or modules to add a cellular interface as specified in Subsection 663.02.3

**907-663.02.1.2.3.1--Type E1 Network Switch Requirements.** The Type E1 network switch will be installed in locations where multiple backbone fibers converge or a high concentration of ports are needed for a field location and a hardened switch is required and shall meet the following requirements:

- 1) Each switch shall be populated with redundant switch fabric modules that meet the following minimum requirements:
  - a. 56 to 64Gbps switching bandwidth/41.67 mpps with 64byte packets
- 2) Based from the project plans, the Contractor must determine the appropriate configuration of port types and count by selecting one of the options below:
  - a. Include a minimum of 12 10/100/1000 ethernet ports and a minimum of 16 optical 1000Base-X(SFP-Based).
  - b. Include a minimum of 24 10/100/1000 ethernet ports and a minimum of 4 optical 1000 base-X (SFP-Based).
- 3) Operate from -45° to +75°C.
- 4) Operate relative humidity of 5% to 95% noncondensing

**907-663.02.1.2.3.2--Type E2 Network Switch Requirements.** The Type E2 network switch will be installed in locations where multiple backbone fibers converge or a high concentration of ports are needed for a field location, a hardened switch and larger bandwidth are needed, and shall meet the following requirements:

- 1) Each switch shall be populated with redundant switch fabric modules that meet the following minimum requirements:
  - a. 128Gbps switching bandwidth/41.67 mpps with 64byte forwarding rate
- 2) Based from the project plans, the Contractor must determine the appropriate configuration of port types and count by selecting one of the options below:
  - A. Include a minimum of 12 10/100/1000 ethernet ports and a minimum of 12 optical 1000Base-X(SFP-Based).
  - B. Include a minimum of 12 10/100/1000 ethernet ports and a minimum of 16 optical 1000 base-X (SFP-Based).

- 3) Supports 10 gigabit ethernet of SFP optics.
- 4) Operate from -40° to +85°C.
- 5) Operate relative humidity of 0% to 95% noncondensing

**907-663.02.1.2.4--Type F Network Switch Requirements.** The Type F network switch will be Layer 3 switches installed in field locations with wireless communications or access points and shall meet the following requirements:

- 1) Each switch shall be populated with switch modules that meet the following minimum requirements:
  - a. 20Gbps Aggregate Bandwidth
  - b. **Minimum** of 4-GE uplinks available per switch with a minimum of 2 being fiber ports. The Contractor shall provide an uplink SFP optical module compatible with the interface for the uplink as indicated in the **Notice to Bidders** entitled "Location & Configuration of Communication Nodes" for each uplink.
  - c. SD flash port for swappable Management Card configuration
  - d. Supports High Density Power over Ethernet (PoE) for up to 8 devices
  - e. Supports Cisco Common Industrial Protocol (CIP)
  - f. Support of SCADA (Supervisory Control And Data Acquisition) connectivity.
  - g. Can be supported with IP services.<sup>[RJMc1]</sup>
- 2) In addition to the uplink ports, interfaces ports shall include:
  - a. 8 PoE 10/100/1000
  - b. 4 SFP ports
    - i. Optical receiver maximum input power level shall not be exceeded.
    - ii. Optical attenuators shall be added as needed; fiber optic attenuator patch cords shall be in accordance with Section 657 of the Standard Specifications. It is the Contractor's responsibility to determine where attenuators are needed and shall be included in the cost of the switch.
- 3) **DIN** Rail Mountable.
- 4) Operate from -40° to +70°C.
- 5) Operate from 5% to 95% non-condensing humidity
- 6) Supports IEEE 802.1AE MACsec, Security Group Access Control Lists (SGACL)
- 7) RIPng, OSPFv6, and EIGRPv6 support
- 8) Full implementation of IGMPv2.
- 9) Full implementation of PIM-SM and PIM-DM.
- 10) Supports Redundant DC input voltage
- 11) Power supplies with PoE support and 6' minimum power cord(s).

**907-663.02.2--Terminal Server.** Terminal server shall adhere to the following minimum requirements.

- 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).

**907-663.02.3--Cell Modem.** Cellular **modem** and associated equipment shall be new and constructed using the highest quality, commercially available components and techniques to assure high reliability and minimum maintenance and meet the following requirements.

**907-663.02.3.1--Functional Requirements.** Cellular **modem**, antenna, wiring assemble, configuration software, and installation necessary shall be provided and furnished for a working cellular wireless communication connection in accordance with plans and specifications and compatible with the requirements of the MDOT system, and the wireless service carrier used by MDOT. Unless otherwise indicated on the plans, all items that are required to complete the installation and ensure an operational system shall be supplied by the Contractor whether listed above or not. Items required but not listed above shall be at no direct pay. All components supplied by the Contractor are the responsibility of the Contractor. It shall be the responsibility of the Contractor to properly configure and deliver a working cellular communications system. It shall be the responsibility of the Contractor to determine the final configuration of all electrical connections. Cellular account setup shall be coordinated with MDOT Traffic Engineering Division. Warranty and cellular carrier account shall be transferred into MDOT's name upon acceptance of the project.

**907-663.02.3.2--Cellular Modem System.** The **Cellular Modem** shall adhere to the following minimum requirements.

- 1) Model and **type** provided shall be pre-approved on a MDOT cellular service carrier.

- 2) Highest available on a MDOT cellular service carrier of 4G, EVO, or higher service.
- 3) Minimum of one 10/100 Base-T RJ45 Ethernet port
- 4) Minimum of one RS-232 serial port
- 5) Minimum of one external antenna connector
- 6) GPS Data available
  - a. Acquisition Time under 2 seconds
  - b. Accuracy: under 5m 90% of time
  - c. Tracking Sensitivity: -161 dBm
- 7) Device Configuration and Management Software via web interface.
- 8) Communications and Protocols supported:
  - a. Network: TCP/IP, UDP/IP, DNS
  - b. NAT and DHCP routing with VLAN, VRRP, and Static Routes configurable
  - c. Includes TELNET, SMTP, SNMP, SMS sessions and services
  - d. Serial: TCP/UDP PAD Mode, Modbus (ASCII,
  - e. GPS: NMEA V3.0, TAIP, RAP
  - f. Provides VPN security with up to 5 tunnels
- 9) Provides event reporting for GPS/AVL, Network Parameters, Data Usage, Time, Power, and Device Temperature over SMS, SNMP, or Email, SNMP.
- 10) Input Voltage: 10 to 36 VDC
- 11) Operating Temperature of -30° to +70°C

**907-663.02.4--Ethernet Network Cable.** Ethernet network cables shall adhere to the following minimum requirements.

- 1) 4 Pair #24 AWG STP Category 6, Category 5e, or other ethernet cable (generally meeting Category 6 Specifications, the applicable requirements of Subsection 722.03 and approved by MDOT) as per manufacturer's recommendations.
- 2) These items are paid for as ethernet network cable installed between cabinets and does not apply to other patch cords installed inside cabinets or huts.
- 3) Supplied ethernet network cable shall be suitable for use outdoors in ducts and as a minimum meet the following requirements:
  - a. Fully water blocked
  - b. Conforms to the National Electrical Code Article 800
  - c. UL 1581 certified
  - d. Voltage Rating 300 Volts or greater
  - e. Operating and installation temperature (-4°F to 140°F)
  - f. The allowable bend radius must be 10 times the Cable's Outside Diameter or smaller
  - g. Recommended for 1000Base-T applications for a distance of 100 meters.

**907-663.02.4.1--Ethernet Patch Cords.** The ethernet patch cords shall be furnished and installed as needed to connect the network switches with other equipment. Ethernet patch cords shall be considered an incidental component for this project and furnished and installed as needed to provide a functional system. Ethernet 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, Category 5e, or other Ethernet cable (generally meeting Category 6 Specifications and approved by MDOT) as required by the manufacturer.
- 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 5e or Category 6 performance criteria.
- 6) Length as needed. Excessive slack is not permitted.

**907-663.02.5--Submittals.** The submittal requirements defined in the Notice to Bidders entitled “ITS General Requirements”, along with the requirements below and throughout this specification, shall be met. All costs associated with submittals shall be included in the overall contract price; no separate payment will be made for any documenting and submitting.

The Contractor shall provide project submittals for network switches including scheduling requirements. The project submittals for network switches, terminal servers, cellular modems, and fiber optic modems 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.

**907-663.03--Construction Requirements.** All networking equipment shall be installed according to the manufacturer’s recommendations, the Plans and as follows:

- 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 Ethernet patch cords and fiber optic patch cords for a complete and functional installation.
- 5) Ethernet network cable installed in conduit shall be installed and terminated per the manufacturers recommended procedures. Slack Ethernet network cable shall be provided in pullboxes as indicated in the plans.
- 6) 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 663.03.4 of this document.

- 7) The Contractor shall provide the MDOT with a written inventory of items received and the condition in which they were received. Inventory shall be inclusive of make, model, and serial numbers, MAC address, and installation GPS coordinates. All equipment shall be installed according to the manufacturer's recommendations or as directed by the MDOT.
- 8) Any new, additional or updated drivers required for the existing ATMS software to communicate and control new [networking equipment](#) installed by the Contractor shall be the responsibility of the Contractor.

**907-663.03.1--Switch Configuration Requirements.** The Contractor shall configure network switches 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) The Type D switch configuration shall be as outline in the Project plans and details.
- 4) 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.
- 5) The Switches shall be configured to enable multicasting and turn on multicast protocols.
- 6) The Contractor may submit an alternate switch configuration to the ITS Engineer for review and approval. The ITS 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.
- 7) The Contractor shall submit an electronic copy of all final and approved configurations of all switches to the Project [Engineer](#) and to the ITS Engineer.

**907-663.03.2--Testing.** All [networking equipment](#) shall undergo testing to verify conformance to [requirements of the plans and these special provisions](#). The Contractor shall conduct a Project Testing Program as required in the Notice to Bidders entitled "ITS General Requirements." All costs associated with the Project Testing Program shall be included in the overall contract price; no separate payment will be made for any testing.

**907-663.03.3--Documentation.** As-built Plans showing switch configuration and connections shall be provided to the Project Engineer and ITS Engineer in electronic format.

The Contractor shall submit documentation and proof of measured optical power budgets to all optical links of all type switches. All equipment and software must be fully functional and pass a Final Inspection by the ITS Manager and Project Engineer before being accepted by the MDOT

**907-663.03.4--Warranty** At a minimum, the warranty requirements defined in the Notice to Bidders entitled "ITS General Requirements" or this specification, whichever is longer, shall be met. All costs associated with the warranty requirements shall be included in the overall contract



price.

**907-663.03.5--Training.** The minimum training requirements shall be as defined in the Notice to Bidders entitled "ITS General Requirements."

**907-663.03.6--Quality Assurance.** The quality assurance requirements defined in the Notice to Bidders entitled "ITS General Requirements" shall be met. All costs associated with the quality assurance requirements shall be included in the overall contract price.

**907-663.04--Method of Measurement.** Network switches of the type specified will be measured per each installation as specified in the Project plans. Such measurement shall be inclusive of 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, Ethernet patch cords and all incidental components, attachment hardware, mounting shelf and hardware, testing requirements, warranties and all work, equipment and appurtenances as required to provide a fully functional switch ready for use. Type C, Type D, and Type E network switch module cards shall be specified per Project plans or NTBs for each site location. It 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.

Terminal server will be measured per each installation. Such measurement shall be inclusive of furnishing, installing, system integration and testing of a Terminal Server including all incidental components, attachment hardware, mounting shelf and hardware, testing requirements, warranties, and all work, equipment and appurtenances as required to provide a fully functional Terminal Server ready for use.

Cellular modem shall be measured per each and will include the, modem, antenna, reset timers, cabling, factory and manufacturing inspection, testing, storage, packaging, shipping, warranty, and all work, equipment, and appurtenances as required to effect the full operation and control of the cellular modem complete in place and ready for use.

Ethernet network cable, installed in conduit, will be measured by the linear foot, and shall be obtained by accurate measurement of the runs including horizontally, vertically, aerially along the messenger cable, from the device to the device cabinet, and with liberal allowances made for slack in boxes, as indicated in the plans.

Network equipment training shall be measured as a lump sum which shall include all coordination, materials, labor, training location costs, and all incidentals required to complete the training as described in the Notice to Bidders entitled "ITS General Requirements."

**907-663.05--Basis of Payment.** Network switches, terminal servers, cell modems and fiber optic modems, measured as prescribed above, will be paid for at the contract unit price bid per each. The price shall be full compensation for documentation and submittals, warranties, testing, all labor, tools, materials, equipment, quality assurance, and all incidentals necessary to complete the work.

Ethernet network cable installed between cabinets will be paid for by linear foot measured horizontally.

Network equipment training, measured as prescribed above, will be paid for at the contract unit lump sum price, which price shall be full compensation for all training costs including coordination, materials, labor, training location costs, submittals, and all incidentals required to complete the training as described in the Notice to Bidders entitled "ITS General Requirements."

Payment will be made under:

- 907-663-A: Network Switch, Type \_\_\_ - per each
- 907-663-B: Terminal Server - per each
- 907-663-C Cellular Modem - per each
- 907-663-D: Ethernet Network Cable, Installed in Conduit - per linear foot
- 907-663-E: Network Equipment Training - lump sum

## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-700-1

CODE: (IS)

DATE: 10/25/2022

SUBJECT: Materials and Tests

Section 700, Materials and Tests, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

After Subsection 700.01 on page 713, add the following.

**907-700.01.1--Buy America Materials Sourcing Requirements for Construction Materials.**

As related to the requirements in Subsection 907-106.14, Construction Materials shall include an article or material that is or consists primarily of non-ferrous metals; plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables); glass (including optic glass); lumber; or drywall. Construction Materials which are exempt from the requirements in Subsection 907-106.14 include the following: cement or cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives.

For Construction Materials, both the final manufacturing process and the manufacturing stage immediately preceding the final manufacturing process shall occur domestically.

**907-700.01.2--Compliance Requirements.** Prior to incorporation into the work, the Contractor shall furnish the Project Engineer with certificates of compliance documenting conformance to the requirements of Subsection 907-106.14.

The certificates shall be on the Supplier's/Manufacturer's letterhead, containing the following:

- Project number
- Name of manufacturer and address of manufacture location
- Material description
- Batch number / Heat number / Lot number
- Bill of lading number
- Date received
- "I certify each material listed on this certificate to be permanently incorporated in this project has been manufactured domestically."
- Signature of an authorized representative of the Supplier/Manufacturer

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-701-3

CODE: (IS)

DATE: 05/04/2021

SUBJECT: Hydraulic Cement

Section 701, Hydraulic Cement, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

**907-701.01--General.** In the first sentence of the second paragraph of Subsection 701.01 on page 718, change “mills” to “plants.”

In the second sentence of the sixth paragraph of Subsection 701.01 on pages 718 and 719, change “shall” to “will.”

**907-701.02--Portland Cement.**

**907-701.02.1-General.**

**907-701.02.1.2--Alkali Content.** Delete the sentence in Subsection 701.02.1.2 on page 719, and substitute the following.

When used in portland cement concrete, the total alkali contribution from all cement types in this Subsection shall not exceed 4.0 lb. per cubic yard of concrete calculated as follows:

$$\text{lb alkali per cu Yd} = \frac{(\text{lb cement per cu Yd}) \times (\% \text{Na}_2\text{O equivalent in cement})}{100}$$

In the above calculation, the maximum cement alkali content reported on the cement mill certificate shall be used. An example calculation can be found in the Department’s *Concrete Field Manual*.

**907-701.02.2--Replacement by Other Cementitious Materials.** Delete the paragraph in Subsection 701.02.2 on page 719, and substitute the following.

The maximum replacement of cement by weight is 25% for fly ash or 50% for ground granulated blast furnace slag (GGBFS). Replacement contents below 20% for fly ash or 45% for GGBFS may be used, but will not be given any special considerations, such as the maximum acceptance temperature for portland cement concrete containing pozzolans in Subsection 804.02.13.1.5. Special considerations shall only apply for replacement of cement by fly ash or GGBFS.

Delete Subsection 701.02.2.1 on pages 719 and 720, and substitute the following.

**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 or GGBFS shall be as follows in Table 1. Class C fly ash shall not be used as a replacement for cement in any of the sulfate exposure conditions listed in Table 1.

**Table 1- Cementitious Materials for Soluble Sulfate Conditions or Seawater**

Sulfate Exposure	Water-soluble sulfate (SO <sub>4</sub> ) in soil, % by mass	Sulfate (SO <sub>4</sub> ) in water, ppm	Cementitious material required
Moderate and Seawater	0.10 - 0.20	150 - 1,500	Type I cement with one of the following replacements of cement by weight: 24.5 - 25.0% Class F fly ash, or 49.5 - 50.0% GGBFS or Type II <sup>**</sup> cement
Severe	0.20 - 2.00	1,500 - 10,000	Type I cement with a replacement by weight of 49.5 - 50.0% GGBFS, or Type II <sup>*</sup> cement with one of the following replacements of cement by weight: 24.5 - 25.0% Class F fly ash, or 49.5 - 50.0% GGBFS

\* Type III cement conforming to AASHTO M85 with a maximum 8% tricalcium aluminate (C<sub>3</sub>A) may be used in lieu of Type II cement as allowed in Subsection 701.02.1; this cement is given the designation “Type III(MS).”

\*\* Class F fly ash or GGBFS may be added as a replacement for cement as allowed in Subsection 907-701.02.2.

Delete Subsection 701.02.2.2 on page 720, and substitute the following.

**907-701.02.2.2--Portland 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 701.02.2.1.

**907-701.04--Blended Hydraulic Cement.**

**907-701.04.1--General.** Delete Subsection 701.04.1.1 on page 720, and substitute the following.

**907-701.04.1.1--Types of Blended Hydraulic Cement.** Blended hydraulic cements (blended cements) shall be of the following types and conform to AASHTO M 240:

- Type II – Portland-limestone cement
- Type IP – Portland-pozzolan cement
- Type IS – Portland blast-furnace slag cement

Blended cement Types II, IP, and IS meeting the “MS” sulfate resistance requirement listed in AASHTO M 240, Table 3 shall have the “(MS)” suffix added to the type designation.

**907-701.04.1.2--Alkali Content.** Delete the sentence in Subsection 701.04.1.2 on page 720, and substitute the following.

All blended cement types shall be made with clinker that would result in cement meeting the requirements of Subsection 701.02.1.2 when used in the production of AASHTO M 85, Type I or Type II cement.

The blended cement manufacturer shall include the percent equivalent alkalis as Na<sub>2</sub>O on their cement mill reports.

When calculating the total alkali contribution with blended cements, use the equivalent alkali content of the base portland cement. An example calculation for cases where blended cements are used can be found in the Department’s *Concrete Field Manual*.

**907-701.04.2--Replacement by Other Cementitious Materials.** Delete the paragraph in Subsection 701.04.2 on page 720, and substitute the following.

The maximum replacement of blended cement Type II by weight is 35% for fly ash or 50% for GGBFS. Replacement contents below 20% for fly ash or 45% for GGBFS may be used, but will not be given any special considerations, such as the maximum acceptance temperature for blended cement concrete containing pozzolans in Subsection 804.02.13.1.5. Special considerations shall only apply for replacement of blended cement by fly ash or GGBFS.

No additional cementitious materials, such as portland cement, blended cement, fly ash, GGBFS, or others, shall be added to or as a replacement for blended cement Types IP and IS.

Delete Subsection 701.04.2.1 on pages 720 and 721, and substitute the following.

**907-701.04.2.1--Blended Cement Concrete Exposed to Soluble Sulfate Conditions or Seawater.** When blended 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 or GGBFS shall be as follows in Table 2. Class C fly ash shall not be used as a replacement for cement in any of the sulfate exposure conditions listed in Table 2.

**Table 2- Cementitious Materials for Soluble Sulfate Conditions or Seawater**

Sulfate Exposure	Water-soluble sulfate (SO <sub>4</sub> ) in soil, % by mass	Sulfate (SO <sub>4</sub> ) in water, ppm	Cementitious material required
Moderate and Seawater	0.10 - 0.20	150 - 1,500	Type IL (MS) * cement, Type IL cement with one of the following replacements of cement by weight: 24.5 - 35.0% Class F fly ash, or 49.5 - 50.0% GGBFS, Type IP (MS) cement, or Type IS (MS) cement
Severe	0.20 - 2.00	1,500 - 10,000	Type IL cement with a replacement of cement by weight of 49.5 - 50.0% GGBFS, or Type IL (MS) cement with one of following replacements of cement by weight: 24.5 - 35.0% Class F fly ash, or 49.5 - 50.0% GGBFS

\* Class F fly ash or GGBFS may be added as a replacement for cement as allowed in Subsection 907-701.04.2.

Delete Subsection 701.04.2.2 on page 721, and substitute the following.

**907-701.04.2.2--Blended Cement for Soil Stabilization Exposed to Soluble Sulfate Conditions or Seawater.** When blended 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 701.04.2.1.

Delete Subsection 701.04.3 on page 721.

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SPECIAL PROVISION NO. 907-702-4**

**CODE: (IS)**

**DATE: 09/11/2018**

**SUBJECT: Bituminous Materials**

Section 702, Bituminous Materials, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

**907-702.04--Sampling.** Delete the sentence in Subsection 702.04 on page 722, and substitute the following.

Sampling of bituminous materials shall be as set out in AASHTO R 66.

**907-702.07--Emulsified Asphalt.** Delete the last sentence in Subsection 702.07 on page 724, and substitute the following.

Asphalt for fog seal shall conform to the requirements of Subsection 907-702.12, Table V.

**907-702.12--Tables.** Delete Table V in Subsection 702.12 on page 729, and substitute the following.

**TABLE V  
SPECIFICATION FOR FOG SEAL**

Test Requirements	LD-7		CHPF-1		Test Method
	Min.	Max.	Min.	Max.	
Viscosity, Saybolt Furol, @ 25°C, Sec.	10	100	-	100	AASHTO T 72
Storage Stability Test, 24 hr, %	-	1	-	1	AASHTO T 59
Settlement, 5 day, %	-	5	-	-	AASHTO T 59
Oil Distillate, %	-	1	-	-	AASHTO T 59
Sieve Test, % *	-	0.3	-	0.1	AASHTO T 59
Residue by Distillation, %	40	-	40	-	AASHTO T 59
<b>Test on Residue from Distillation</b>					
Penetration @ 25°C, 100g, 5 sec	-	20	40	90	AASHTO T 49
Softening Point, °C	65	-	-	-	ASTM D 36
Solubility in trichloroethylene, %	97.5	-	-	-	AASHTO T 44
Elastic Recovery @ 25°C, %	-	-	40	-	AASHTO T 301
Original DSR @ 82° (G*/Sinδ, 10 rad/sec)	1	-	-	-	AASHTO T 111

\* The Sieve Test result is tested for reporting purposes only and may be waived if no application problems are present in the field.



MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-703-2

CODE: (SP)

DATE: 11/29/2022

SUBJECT: Gradation

Section 703, Aggregates, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

**907-703.03--Coarse Aggregates for Hydraulic Cement Concrete.**

**907-703.03.2--Detail Requirements.**

**907-703.03.2.4--Gradation.** In the table in Subsection 703.03.2.4 on page 734, add 100 for the percent passing by weight on the 1½-inch sieve for Size No. 67 aggregates.

Delete Note 2 under the table in Subsection 703.03.2.4 on page 734, and substitute the following.

Note <sup>2</sup> – 100 percent shall pass the 1-inch sieve for Size 67 used in Class F and Class FX concrete.

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SPECIAL PROVISION NO. 907-705-1**

**CODE: (IS)**

**DATE: 06/13/2018**

**SUBJECT: Stone Riprap**

Section 705, Stone Blanket Protection and Filter Blanket Materials, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

**907-705.04--Stone Riprap.** Delete the last sentence of the first paragraph of Subsection 705.04 on page 750, and substitute the following.

Quality requirements for rock to be furnished under these specifications will come from a pre-approved source and be visually approved prior to use.

## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-707-3

CODE: (IS)

DATE: 10/27/2021

SUBJECT: Joint Materials

Section 707, Joint Materials, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

### 907-707.02--Joint Filler.

907-707.02.2--Preformed Sponge, Rubber, Cork and Closed-Cell Polypropylene Foam Joint Fillers for concrete Paving and Structural Constructions. Delete the two paragraphs of Subsection 707.02.2 on page 755, and substitute the following.

Preformed joint filler shall conform to AASHTO M 153 for sponge, rubber, and cork and tested according to ASTM D545. The type required will be indicated on the plans.

Closed-cell polypropylene foam shall conform to the requirements in ASTM D8139 and tested in accordance with ASTM D545.

907-707.02.3--Wood. Delete paragraph (b) of Subsection 707.02.3 on page 755, and substitute the following:

- (b) Dimensions shall be as shown on the plans. Dimensions shown on the plans are “dressed” sizes in accordance with Table 3 of the American Softwood Lumber Standard, SP-20. At the discretion of the Engineer, a 3/4-inch dressed board may be used in lieu of a 1-inch dressed board. A tolerance of plus or minus 1/16 inch thickness and plus or minus 1/8 inch width will be permitted. For slip-form paving a tolerance of minus 1/4 inch on each end in length will be permitted.

907-707.06--Flexible Plastic Gasket for Joining Conduit. Delete the third paragraph of Subsection 707.06 on page 756, and substitute the following.

The Department may require the performance test described in ASTM C 990.

## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-708-4

CODE: (IS)

DATE: 09/21/2021

SUBJECT: Concrete Pipe

Section 708, Non-Metal Structures and Cattlepasses, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

### **907-708.02--Concrete Pipe.**

#### **907-708.02.1--Materials for Use in Concrete Pipe.**

**907-708.02.1.2--Fly Ash.** Delete Subsection 708.02.1.2 on page 758, and substitute the following.

Fly ash conforming to the requirements of Subsection 714.05 may be used to replace hydraulic cement on a one to one replacement rate. If a type IL cement conforming to the requirements of Subsection 701.04 is used, the fly ash replacement shall not exceed 35% by weight of the cement. For all other Types of cement, the fly ash replacement rate shall not exceed 25% by weight of hydraulic cement.

**907-708.02.3--Exceptions to AASHTO Standard Specifications.** After Subsection 708.02.3.7 on page 760, add the following.

**907-708.02.3.8--Lifting Device.** In lieu of lift holes, the producer may cast an approved lifting device in the pipe during the manufacturing process. Should a lifting device be included with the pipe, the Contractor shall cut off or grind down the lifting device flush with the pipe surface after placement of the pipe. The area around the lifting device shall be coated with a sealer approved by the Engineer.

**907-708.02.5--Reinforced Concrete Pipe.** Delete the second paragraph in Subsection 708.02.5 on page 760, and substitute the following.

**907-708.02.5.1--Class V Pipe With Diameter 54 Inches and Greater.** Class V pipe with diameters of 54 inches and larger shall meet the requirements of AASHTO M 170 or M 242 as modified by Subsection 708.02 and herein.

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SPECIAL PROVISION NO. 907-711-2**

**CODE: (IS)**

**DATE: 09/11/2018**

**SUBJECT: Plain Steel Wire**

Section 711, Reinforcement and Wire Rope, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

**907-711.02--Deformed and Plain Carbon-Steel Bars for Concrete Reinforcing.**

**907-711.02.3--Steel Welded and Non-Welded Wire Reinforcement, Plain and Deformed, for Concrete.**

**907-711.02.3.1--Plain Steel Wire.** Delete the sentence in Subsection 711.02.3.1 on pages 780 and 781, and substitute the following.

Plain steel wire and plain steel welded wire shall conform to the requirements of AASHTO M 336.

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-712-1

CODE: (SP)

DATE: 12/07/2021

SUBJECT: Fence and Guardrail

Section 712, Fence and Guardrail, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

**907-712.01--General.** After the sentence in Subsection 712.01 on page 785, add the following.

All materials' inspection, testing, and certification will be performed in accordance with the requirements of the current version of the Department's *Materials Division Inspection, Testing, and Certification Manual*.

Delete Subsections 712.02 and 712.03 on page 785, and substitute the following.

**907-712.02--Barbed Wire.** Barbed wire shall conform to the requirements of AASHTO M 280. In the coastal counties of Hancock, Harrison, and Jackson, either Coating Type Z Class 3 or Coating Type A shall be furnished. In all other areas of the State, either Coating Type Z Class 1, Coating Type Z Class 3, Coating Type ZA Class 60, or Coating Type A shall be furnished.

**907-712.03--Metallic-Coated, Steel Woven Wire Fence Fabric.** Woven wire fencing (i.e., "hog wire") shall conform to the requirements of AASHTO M 279. In the coastal counties of Hancock, Harrison, and Jackson, either Coating Type Z Class 3 or Coating Type A shall be furnished. In all other areas of the State, either Coating Type Z Class 1, Coating Type Z Class 3, Coating Type ZA Class 60, or Coating Type A shall be furnished.

**907-712.04--Chain Link Fence.** Delete Subsections 712.04.1 thru 712.04.7 on pages 785 & 786, and substitute the following.

**907-712.04.1--Fabric.** In the coastal counties of Hancock, Harrison, and Jackson, either Type I Class D, Type II, Type III, or Type IV fabrics shall be furnished. In all other areas of the State, either Type I Class C, Type I Class D, Type II, Type III, or Type IV fabrics shall be furnished.

**907-712.04.2--Tie Wire.** Tie wire shall be of the same material as the fencing wire being used, shall be of good commercial quality, and shall meet the requirements of AASHTO M 181. Either Type I, Type II, Type III, or Type IV tie wire shall be furnished.

**907-712.04.3--Tension Wire.** Tension wire shall be of the same material as the fencing wire being used, shall be of good commercial quality, and shall meet the requirements of AASHTO M 181. In the coastal counties of Hancock, Harrison, and Jackson, either Type I Class 3, Type II, Type III, or Type IV tension shall be furnished. In all other areas of the State, either Type II, Type III, Type IV, or Type I Classes 1, 2, or 3 tension wires shall be furnished.

**907-712.04.4--Posts Rails, Gate Frames, and Expansion Sleeves.** Posts, rails, gate frames, and expansion sleeves shall conform to the requirements for posts in Subsection 712.05.2, unless otherwise designated in the contract.

**907-712.04.5--Miscellaneous Fittings and Hardware.** Miscellaneous fittings and hardware shall conform to the requirements of Subsection 712.16.

**907-712.05--Fence Posts and Braces.**

**907-712.05.1--Treated Timber Posts and Braces.**

**907-712.05.1.1--General.** Delete the third, fourth, fifth, and sixth paragraphs of Subsection 712.05.1.1 on page 787, and substitute the following.

All wood posts and braces shall be treated in accordance with Subsections 718.03 and 718.04.

**907-712.05.1.2--Round Posts.** Delete the last sentence of the last paragraph of Subsection 712.05.1.2 on page 788.

**907-712.05.1.3--Sawed Posts.** Delete the last sentence of the paragraph of Subsection 712.05.1.3 on page 788.

**907-712.05.1.4--Sawed Braces.** Delete the last sentence of the paragraph of Subsection 712.05.1.4 on page 788.

Delete Subsection 712.05.2 on page 788, and substitute the following.

**907-712.05.2--Metal Posts.**

**907-712.05.2.1--Round Steel Pipe.** Round steel pipe shall meet the requirements of AASHTO M 181, either Grade 1 (i.e., meeting the requirements in ASTM F 1083) or Grade 2 (i.e., meeting the requirements of ASTM F 1043).

Round steel pipe shall be sized in accordance with NPS (nominal pipe size) designations as shown on Plans, and not according to the outer or inner pipe diameter.

**907-712.05.2.2--Steel Fence Post and Assemblies, Hot-Wrought.** Steel posts with the following section shapes, Tee, channel or U, and Y-Bar shall meet the requirements of AASHTO M 281, galvanized in accordance with the requirements of AASHTO M 111, unless otherwise specified in the contract. Acceptance of these steel posts shall be by certification from the manufacturer, producer, supplier, or fabricator, as applicable.

**907-712.05.2.3--Blank.**

**907-712.05.2.4--Steel H-Beam Posts.** Steel H-Beam posts shall be produced from structural quality weldable steel having a minimum yield strength of 45,000 psi and shall be galvanized in accordance with ASTM A 123. Steel H-Beam line posts shall be 2.250 inches by 1.625 inches and shall weigh 3.43 pounds per foot. A tolerance of plus or minus 5.0 percent is allowed for

weight per foot. A tolerance of plus or minus 1.0 percent is allowed for dimensions.

**907-712.05.2.5--Aluminum-Alloy Posts and Assemblies.** Round aluminum-alloy posts shall meet the requirements of ASTM B 241, Alloy 6061, T6. Aluminum-Alloy H-Beam posts shall meet the requirements of ASTM B 221, Alloy 6061, T6.

**907-712.05.2.6--Formed Steel Section Posts.** Formed steel section posts, "C" sections, shall be formed from sheet steel conforming to ASTM A 1011, Grade 45, and shall be galvanized in accordance with ASTM A 123.

**907-712.06--Guard and Guardrail Posts.**

**907-712.06.2--Treated Wood Posts.**

**907-712.06.2.1--Square Posts.** Delete the paragraph in Subsection 712.06.2.1 on page 789, and substitute the following.

All square posts shall be inspected for conformance with Section 712.05, except that the posts may be rough and shall be within  $\pm 3/8$ " of the dimensions shown on the plans.

**907-712.06.2.2--Round Posts.** Delete the paragraph in Subsection 712.06.2.2 on page 789, and substitute the following.

All round posts shall be inspected for conformance with Section 712.05, except that the posts shall be of the shape and dimensions shown on the plans.

**907-712.06.5--Treated Wood Blocks for Use with Metal Guardrail Posts.** Delete the paragraphs of Subsection 712.06.5 on pages 789 & 790, and substitute the following.

Treated wood blocks for use with metal guardrail posts shall be within  $\pm 3/8$ " of the size and dimensions shown on the plans, except that a minus tolerance shall not be allowed for the slotted width in which the metal post must fit.

Delete Subsection 712.16 on page 791, and substitute the following.

**907-712.16--Hardware.** All ferrous metal hardware for fencing such as bolts, nuts, washers, and metal straps shall be as specified on the plans and galvanizing shall not be less than 1.0 ounce per square foot of uncoated area. Aluminum coated hardware shall be coated with aluminum meeting the requirements of AASHTO M 181 for aluminum coating and at the rate of not less than 0.4 ounces per square foot of uncoated area.

Aluminum alloy hardware shall conform to the requirements of ASTM B 221 for extruded aluminum alloy 6063, T6. The finished members shall be of uniform quality.

Aluminum-zinc coated hardware shall be coated with an aluminum-zinc alloy meeting the chemical requirements and weight of coating specified for aluminum-zinc alloy coated metal gates.



## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-714-3

CODE: (SP)

DATE: 08/31/2021

SUBJECT: Miscellaneous Materials

Section 714, Miscellaneous Materials, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

**907-714.01--Water.**

**907-714.01.1--General.** Delete the last sentence of the second paragraph in Subsection 714.01.1 on page 794.

**907-714.01.2--Water for Use in Concrete.** Delete Subsection 714.01.2 on page 794, and substitute the following:

Water from municipal sources is permitted be used as mixing water in concrete, mortar, and grout without Department testing. Water from non-municipal water sources used in mixing of concrete, mortar, and grout which does not meet the requirements in Subsection 714.01.1 shall be tested for conformance as required in AASHTO M157, Table 1 and Table 2.

**907-714.01.3--Water for Use in Chemically Stabilized Based.** Delete the first sentence of first paragraph in Subsection 714.01.3 on page 794, and substitute the following:

Water used in the construction of bases that contain cement, lime, or other chemical additive shall be as set out in Subsection 714.01.1. Water from municipal sources is permitted to be used without testing for conformance to the requirements below. If water is not from a municipal source, it shall not contain impurities in excess of the following limits:

Delete Subsection 714.01.6 on page 795, and substitute the following.

**907-714.01.6--Blank.**

**907-714.05--Fly Ash.**

**907-714.05.1--General.** Delete the first sentence of the fifth paragraph in Subsection 714.05.1 on page 797.

**907-714.13--Geotextiles.**

**907-714.13.11--Tables.** Delete Table 1 in Subsection 714.13.11 on page 813, and substitute the following.

**Table 1 - Geotextiles**

Type Designation	I <sup>1</sup> Sediment Control	II <sup>1</sup> Control	III Drainage	IV Paving	V Separation & Drainage		VI Separation, Stabilization & Reinforcement		VIII High Strength	IX High Strength	Test Method
					Woven	Non-Woven	Woven	Non-Woven			
Grab Strength (lb)	50	90	110	90	200	280	180	450	280	280	ASTM D 4632
Elongation (%)	----	50% max @ 45 lb	20% min	50% min @ break	50% min	50% max	50% min	50% max	50% min	50% min	ASTM D 4632
Seam Strength (lb)	----	----	70	----	180	240	160	400	240	240	ASTM D 4632
Puncture Strength (lb)	----	----	40	----	80	110	75	180	115	115	ASTM D 6241
Trapezoidal Tear (lb)	----	----	40	----	80	100	70	150	100	100	ASTM D 4533
Asphalt Retention (gal/yd <sup>2</sup> )	----	----	----	0.2	----	----	----	----	----	----	ASTM D 6140
Permittivity (sec <sup>-1</sup> ) min	0.05	0.05	0.5	----	0.2	0.2	0.2	0.2	0.2	0.2	ASTM D 4491
AOS Woven (mm) max	0.60	0.60	0.6	----	0.6	0.43	----	0.43	----	----	ASTM D 4751
AOS Non-Woven (mm) max	0.84	0.84	0.43	----	0.43	----	0.43	----	0.43	0.43	----
Tensile Strength after UV (% Retained)	70% @ 500 hr	70% @ 500 hr	50% @ 500 hr	----	50% @ 500 hr	50% @ 500 hr	50% @ 500 hr	50% @ 500 hr	50% @ 500 hr	50% @ 500 hr	ASTM D 4355
Melting Point °(F)	----	----	----	325	----	----	----	----	----	----	ASTM D 276
Minimum Ultimate Tensile Strength <sup>3</sup> (lb/in)	----	----	----	----	----	----	----	----	660	2000	ASTM D 4595

Notes: 1 - All property values, with the exception of apparent opening size (AOS), represent minimum average roll values in the weakest principal direction. Values for AOS represent the maximum average roll values, 2 - Values not identified in this table should meet manufacturer certification for the use and application, 3 - Machine direction

Delete Subsection 714.15 on pages 816 and 817 and substitute the following.

**907-714.15--Geogrids.**

**907-714.15.1--General.** A geogrid is defined as a geosynthetic formed by a regular network of connected elements with apertures greater than 0.25 inch to allow interlocking with surrounding soil, rock, and other surrounding materials to function primarily as reinforcement.

Geogrid shall be manufactured from an expanded strain hardened monolithic polymer sheet composed of one or more synthetic polymers and shall be mildew resistant and inert to biological degradation and naturally encountered chemicals, alkalis and acids. The geogrid shall contain stabilizers and/or inhibitors, or a resistance finish or covering to make it resistant to deterioration from direct sunlight, ultraviolet rays, and heat.

Geogrid manufacturers shall participate in and be in compliance with the American Association of State Highway Transportation Officials (AASHTO) National Transportation Product Evaluation Program's (NTPEP) Geosynthetics audit program. Geogrid shall meet the requirements of Table II for the application and type shown on the plans and shall be selected from the Department's Approved Lists.

**907-714.15.1.1--Geogrid for Retaining Walls and Reinforced Soil Slopes.** Geogrid for retaining walls and reinforced soil slopes shall be creep tested in accordance with AASHTO R69 and meet Long Term Design Load, Minimum Ultimate Tensile Strength, and open area criteria listed in Table II. Manufacturers shall perform at least one long-term creep test for no less than 10,000 hours in accordance to ASTM D 5262 for each polymer or composition of polymers from which the geogrid is produced. The long-term design load that shall be reported for design use, shall be that load at which no more than 10% strain occurs over a 100-year design life of the geogrid, as calculated in accordance with AASHTO R69. Long-term design loads shall be reported unfactored, and the AASHTO strength reduction factors (Durability and Installation, and safety factors) will be considered by the Department's Geotechnical Branch on a site specific design basis.

**907-714.15.1.2--Geogrid for Subgrade Stabilization.** Geogrid for subgrade stabilization shall meet Minimum Ultimate Tensile Strength and open area criteria listed in Table II.

**907-714.15.2--Marking, Shipment, and Storage.** Each roll or container of geogrid shall be visibly labeled with the name of the manufacturer, trade name of the product, lot number, and quantity of material. In addition, each roll or container shall be clearly tagged to show the type designation that corresponds to that required by the plans. During shipment and storage the geogrid shall be protected from direct sunlight, and temperatures above 120°F or below 0°F. The geogrid shall either be wrapped and maintained in a heavy duty protective covering or stored in a safe enclosed area to protect from damage during prolonged storage.

**907-714.15.3--Manufacturer Certification.** The Contractor shall furnish the Engineer three copies of the manufacturer's certified test reports indicating that the geogrid furnished conforms to the requirements of the specifications and is of the same composition as the originally approved

by the Department.

**907-714.15.4--Acceptance Sampling and Testing.** Final acceptance of each shipment will be based upon results of tests performed by the Department on verification samples submitted from the project, as compared to the manufacturer's certified test reports. The Engineer will select one roll or container at random from each shipment for sampling. As sample extending full width of the randomly selected roll or container and being at least five (5) square yards in area will be obtained and submitted by the Engineer. All material samples shall be provided at no cost to the State.

**TABLE II  
GEOGRIDS**

Physical Properties	Type Designation						Test Method
	I	II	III	IV	V	VI	
Long Term Design Load <sup>1</sup> , pounds per foot, Machine Direction	250	500	750	1500	2500	3500	AASHTO R69, ASTM D5262
Minimum Ultimate Tensile Strength <sup>2</sup> , pounds per foot, Machine Direction	500	1000	1500	3000	5000	7000	ASTM D6637
Open Area, percent	70	70	50	50	50	50	Direct Measurement

<sup>1</sup> Minimum design criteria requirement.

<sup>2</sup> Minimum Average Roll Value (MARV).

## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-718-1

CODE: (SP)

DATE: 12/07/2021

SUBJECT: Timber and Dimension Lumber

Section 718, Timber and Dimension Lumber, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

Delete the Subsections in Section 718 on pages 836 thru 838, and substitute the following.

**907-718.01--General.** All timber and dimension lumber shall be Southern pine and shall conform in all respects to applicable requirements of AASHTO M 168. The Department reserves the right to sample and to test all materials at any time; all inspection, testing, and certification of materials will be performed in accordance with the requirements of the current version of the Department's *Materials Division Inspection, Testing, and Certification Manual*.

Timber and dimension lumber shall be furnished in the sizes shown on the plans or as specified. Unless otherwise specified, timber and dimension lumber shall be No. 1, or better, graded according to the latest American Lumber Standards.

Only one type of preservative shall be used for the treatment of materials for any one class of construction on a project, unless otherwise specified.

Where treated timber and dimensional lumber is to be used in non-highway construction or use, such as decking, handrails in walking trails, or in any manner where general public exposure by touch is possible, the treatment requirements will be as per project plans and/or approved by the State Materials Engineer.

**907-718.02--Untreated Timber and Dimension Lumber.** Untreated timber and dimension lumber shall conform to the requirements of AASHTO M 168.

**907-718.03--Treated Timber and Dimension Lumber.** Timber and dimension lumber to be treated shall meet the requirements herein specified and shall be treated as specified. Treated timber or dimensional lumber will not be accepted for use unless it has been inspected by an authorized representative of the Department and found to be satisfactory after treatment.

**907-718.03.1--Blank.**

**907-718.03.2--Treatment.**

**907-718.03.2.1--General.** All materials shall be treated in accordance with AASHTO M 133 unless otherwise directed by the Environmental Protection Agency (EPA).

**907-718.03.2.2--Blank.**

**907-718.03.2.3--Inspection.** Treated timber and dimension lumber shall be inspected by an authorized representative of the Department before being incorporated into the work. Treatment reports shall be provided to the Department for each lot of material supplied.

**907-718.03.3--Blank.**

**907-718.03.4--Storage of Treated Material.** All material treated for stock shall be stacked as compactly as possible on a well-drained surface. Material shall be supported on sills spaced as necessary, not to exceed 10 foot intervals and shall have at least one foot of air space beneath the stacks.

All materials treated with preservatives for use in buildings and applications where painting is required shall be dried after treatment. The treated wood shall be dried in accordance with American Lumber Standards.

**907-718.04--Preservative.** Preservatives shall be as specified in AASHTO M 133 unless otherwise directed by the Environmental Protection Agency (EPA).

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SPECIAL PROVISION NO. 907-720-2**

**CODE: (IS)**

**DATE: 09/11/2018**

**SUBJECT: Acceptance Procedure for Glass Beads**

Section 720, Pavement Marking Materials, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

**907-720.01--Glass Beads.**

**907-720.01.4--Acceptance Procedures.** Delete the last sentence of the paragraph in Subsection 720.01.4 on page 841, and substitute the following.

Acceptance sampling and testing of glass beads will be in accordance with the Department's Materials Division Inspection, Testing, and Certification Manual, Section 2.9.2 -- Glass Beads.

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

**SPECIAL PROVISION NO. 907-721-4**

**CODE: (IS)**

**DATE: 04/19/2022**

**SUBJECT: Materials for Signing**

Section 721, Materials for Signing, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follows.

**907-721.06--Reflective Sheeting.**

**907-721.06.2--Performance Requirements.** Delete Table 4 and Table 5 in Subsection 721.06.2 on pages 860 & 861, and substitute the following.

**MINIMUM COEFFICIENTS OF RETROREFLECTION  
Candela per foot candle per square foot (cd/ft<sup>2</sup>)  
Per ASTM Designation D4956**

**TABLE 4  
Type IX Sheeting**

Observation Angle	Entrance Angle	White	Yellow	Green	Red	Blue	Fluorescent Yellow/Green	Fluorescent Yellow	Fluorescent Orange
0.2°	-4.0°	380	285	38	76	17	300	230	115
0.2°	+30.0°	215	162	22	43	10	170	130	65
0.5°	-4.0°	240	180	24	48	11	190	145	72
0.5°	+30.0°	135	100	14	27	6.0	110	81	41
1.0°	-4.0°	80	60	8.0	16	3.6	64	48	24
1.0°	+30.0°	45	34	4.5	9.0	2.0	36	27	14

**TABLE 5  
Type XI Sheeting**

Observation Angle	Entrance Angle	White	Yellow	Green	Red	Blue	Brown	Fluorescent Yellow/Green	Fluorescent Yellow	Fluorescent Orange
0.2°	-4.0°	580	435	58	87	26	17	460	350	175
0.2°	+30.0°	220	165	22	33	10	7.0	180	130	66
0.5°	-4.0°	420	315	42	63	19	13	340	250	125
0.5°	+30.0°	150	110	15	23	7.0	5.0	120	90	45
1.0°	-4.0°	120	90	12	18	5.0	4.0	96	72	36
1.0°	+30.0°	45	34	5.0	7.0	2.0	1.0	36	27	14

After Subsection 721.10 on page 864, add the following.

**907-721.11--Digital Applied Printing.** The following addresses the requirements for digitally printed finished retroreflective traffic control signs on flat sheet aluminum and digitally printed traffic sign faces intended to be applied to a sign substrate.

**907-721.11.1--Digitally Printed Ink Systems.** Traffic signs must be produced using components, and processes that comply with the retroreflective sheeting manufacturer’s recommendations.



Digital printed ink systems used to print traffic signs must meet and comply with daytime and nighttime chromaticity (color standards) as recognized in ASTM D4956 “Standard Specification for Retroreflective Sheeting for Traffic Control.”

Digital printed ink systems must meet 70% of the initial retroreflectivity specifications of each respective reflective film color as found in ASTM D4956 “Standard Specification for Retroreflective Sheeting for Traffic Control.”

Prior to fabrication and preferably at the preconstruction meeting, the Contractor shall advise the Project Engineer in writing as to which signs on the project will be digitally printed and which ones will be screen printed. The Contractor shall submit to the Project Engineer certifications for all digitally printed signs, which will be forwarded to the State Traffic Engineer for review.

**907-721.11.2--Protective Overlay Film.** Permanent traffic signs printed with digital ink systems will be fabricated with a full sign protective overlay film designed to provide a smooth surface needed for retroreflectivity, and to protect the sign from fading and UV degradation. The overlamine shall comply with the retroreflective sheeting manufacturer’s recommendations to ensure proper adhesion and transparency and will also meet the reflective film durability as identified in Table 1.

**Table 1  
Retroreflective Film Minimum Durability Requirements**

<b>ASTM D4956 Type</b>	<b>Full Sign Replacement Term (years)</b>	<b>Sheeting Replacement Term (years)</b>
IV	7	10
VIII	7	10
IX	7	12
XI	7	12

Temporary signs used in work zones printed with black ink only will not require a protective overlay film as long as the finished sign is warranted for a minimum outdoor durability of three years by the sheeting manufacturer.

**907-721.11.3--Inspection.** During fabrication, the Contractor shall provide sufficient testing and quality control throughout fabrication to insure good workmanship. Once the material has been received, it may be subject to random testing to ensure compliance with all requirements. If any test samples do not conform to the requirements, the entire order may be returned at the vendor’s expense.

**907-721.11.4--Traffic Sign Performance Warranty Provisions.** Based on the ASTM Type of sheeting specified, traffic control signs shall be warranted for the duration shown in Table 1. The Contractor shall supply a copy of the warranty document with complete details of terms and conditions upon request of the Department.

**907-721.11.5--Certified Digital Sign Fabricator.** Sign fabricators using digital imaging methods to produce regulated traffic signs must be certified by the reflective sheeting manufacturer whose materials are used to produce the delivered signs.

Certified sign fabricators must undergo an audit process by the sheeting manufacturer to ensure they have the proper equipment, manufacturing capabilities, manufacturing application processes and the materials required to fulfill the sheeting manufacturer's warranty obligations. Sign fabricators must recertify annually with reflective sheeting manufacturers or utilize a 3<sup>rd</sup> party certifier approved by the reflective sheeting manufacturer.

The Contractor shall submit proof of Sign Fabricator Certification as issued by the retroreflective sign sheeting manufacturer to the Project Engineer upon delivery of the signs, or with the Shop Drawings.

# MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-722-1

CODE: (IS)

DATE: 11/15/2017

SUBJECT: Materials for Traffic Signal Installation

Section 722, Materials for Traffic Signal Installation, of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction is hereby amended as follow.

**907-722.02.3--Design Strength Requirements.** Delete Subsection 722.02.3 on pages 864 thru 866, and substitute the following.

Unless specified otherwise in the plans, poles shall meet the requirements of the AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*, as specified in the plans with all interim supplements. All components of the assemblies shall be designed to the following:

- Importance Factor: 1.0; 50 year mean recurrence interval
- Basic Wind Speed (3 second gust): As shown on the project plans
- Minimum Gust Effect Factor: 1.14
- Fatigue Category: II
- Ice Loading: As shown on the project plans
- Natural Wind Gust Pressure Loads: Included
- Truck Induced Gust Pressure Loads: Not included
- Galloping: Not included

**907-722.02.5--Mast Arms for Traffic Signal and Equipment Poles.** Delete the first four sentences of the third paragraph of Subsection 722.02.5 on page 867, and substitute the following.

Anchor base plates must meet the minimum requirements of ASTM A36 or ASTM A709 Grade 36 or ASTM A572 Grade 50 and must be welded to the shaft by either telescoped with two continuous arc welds or by back up ring using full penetration welds.. Flange plate shall telescope the large end of the arm and be welded by either two (2) continuous arc welds, one (1) being on the outside of the plate, adjacent to the shaft, and the other one (1) on the inside at the end of the tubular cross section or by back up ring using full penetration welds. The thru-bolt flange plate or tapped flange plate supporting the mast arm shall be welded to the pole near the top and supported side plate tangent to the pole and gusset plates both top and bottom. The thru-bolt or tapped flange plate must be sufficient to develop the full capacity of the connecting bolts.

**907-722.03--Electric Cable.** Delete the paragraphs for Loop Detector Wire and Loop Detector Lead-in Cable in Subsection 722.03 on page 869.

Delete the first sentence of “Communication Cable” in Subsection 722.03 on page 870, and substitute the following.

Communication cables shall be as per the manufacturer's recommendation.

**907-722.05.4--Type III or Type IV Rigid Non-Metallic Conduit.** After the last sentence of Subsection 722.05.4 on page 871, add the following.

Schedule 40 conduit shall be used unless otherwise noted in the plans.

Delete the title of Subsection 722.13.3 on page 876, and substitute the following.

**907-722.13.3--Power Service Pedestal.**

Delete the first paragraph of Subsection 722.13.3 on page 876, and substitute the following.

The pedestal shall be of NEMA Type 3R rainproof construction and shall be UL Listed as "Enclosed Industrial Control Equipment" (UL 508A). External construction shall comply with UL50 requirements and shall be unpainted aluminum.

Nominal size of the pedestal shall be 48"H x 16"W x 16"D.

Pedestal shall have a voltage rating or 120v/240v single phase with an Amperage rating of 800A.

After the first sentence of the seventh paragraph of Subsection 722.13.3 on page 876, add the following.

An outdoor rated heavy duty combination lock shall be provided to lock the customer compartment door.

**907-722.14.1.3--Optical System.** Delete the sixteenth paragraph of Subsection 722.14.1.3 on page 879, and substitute the following.

The signal module on-board circuitry shall include voltage surge protection to withstand high-repetition noise transients and low-repetition high-energy transients as stated in Section 2.1.6, NEMA Standard TS 2, 1992.

Delete the last sentence of the seventeenth paragraph of Subsection 722.14.1.3 on page 879, and substitute the following.

Load switches shall be compatible with NEMA TS 1 or later, or Model 170-1989 or later.

Delete Subsection 722.14.5 on page 882, and substitute the following.

**907-722.14.5--Blank.**

Delete Subsections 722.14.7 and 722.14.8 on page 882.

## MISSISSIPPI DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION NO. 907-899-1

CODE: (SP)

DATE: 01/17/2017

SUBJECT: Railway-Highway Provisions

Section 907-899, Railway-Highway Provisions, is hereby added to and made part of the 2017 Edition of the Mississippi Standard Specifications for Road and Bridge Construction as follows:

### SECTION 907-899--RAILWAY-HIGHWAY PROVISIONS

**907-899.01--Description.** This special provision addresses the Contractor's involvement with railroad flagging, Contractor Safety Orientation, Contractor Background Investigation, Contractor Roadway Worker on Track Safety Program and Safety Action Plan, and any other requirements set forth by the Railroad and any attached Exhibits.

Prior to bidding, the Contractor shall read and comply with the requirements of the Railroad and any attached Exhibits. The Contractor shall contact the Railroad concerning insurance coverage requirements, Railroad flagging costs, Contractor Safety Orientation, Contractor Background Investigation, Contractor Roadway Worker on Track Safety Program and Safety Action Plan, and any other requirements set forth by the Railroad and any attached Exhibits. In case the railroad requires coverage over and above that required by the Standard Specifications, the railroad requirements shall be met.

If in the opinion of the RAILROAD, the presence of an authorized representative of the RAILROAD is required to supervise the same, the RAILROAD shall render bills to the Contractor for all expenses incurred by it for such supervision. This includes all labor costs for flagmen or cable locate supplied by the RAILROAD to protect RAILROAD operation, and for the full cost of furnishing, installation and later removal of any temporary supports for said tracks, as the RAILROAD's Chief Engineer's Office may deem necessary.

**It will be the Contractor's responsibility to pay all bills associated with the Railroad requirements and any attached Exhibits.**

A cable locate of RAILROAD owned facilities may be required to identify and protect Signal & Communication cables that have been installed to provide power, signal control, wayside communications. These cables are vital to a safe and reliable railway operation. The cable locate will be performed by a qualified RAILROAD employee.

Outside Contractors are prohibited from driving on, along, or across any track that does not have a RAILROAD installed crossing. They may utilize an existing public crossing. The practice of allowing rubber tired equipment to operate over track with no crossing has been banned.

The Contractor shall complete and process any required forms addressed by the Railroad or any attached Exhibits. The Contractor shall not commence or carry on any form of work on, under, above or within the designated distance from the Railroad track prior to getting approval from the Railroad.

**907-899.02--Blank.**

**907-899.03--Construction Requirements.** The Contractor shall read and comply with the requirements of the Railroad and any attached Exhibits.

**907-899.04--Method of Measurement.** Railway-highway provisions will be measured as a unit lump sum quantity. Measurement for payment will be in accordance with the following schedule:

- a) On the first estimate, twenty five percent (25%) of the amount bid for Railway Highway Provision will be paid.
- b) When twenty five percent (25%) of the original contract amount is earned from all direct pay items, fifty percent (50%) of the amount bid for Railway Highway Provision will be paid.
- c) When fifty percent (50%) of the original contract amount is earned from all direct pay items, one hundred percent (100%) of the amount bid for Railway Highway Provision will be paid.

**907-899.05--Basis of Payment.** Railway-highway provisions, measured as prescribed above, will be paid for at the contract lump sum price, which price shall be payment in full for all insurance coverage requirements, railroad flagging costs, Contractor safety orientation, Contractor background investigation, Contractor safety programs and plans, and any other requirements set forth by the Railroad and any attached Exhibits, and other incidentals necessary to complete the requirements of this work.

Payment will be made under:

907-899-A: Railway-Highway Provisions

- lump sum

## **SPECIAL PROVISION NO. 906-8**

### **Training Special Provision**

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). Additional information regarding On the Job Training (OJT), Forms, and *Exhibits* are available at the following website.

<http://www.gomdot.com/Divisions/CivilRights/Resources.aspx>

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 trainee hours 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, the Contractor shall determine how many, if any, of the trainee hours 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 transportation agency for approval an OJT Trainee Schedule Form indicating the number of trainees to be trained in each selected classification, training program to be used and start date of training for each classification. Furthermore, the Contractor shall provide a Trainee Enrollment Form for each trainee enrolled. The Contractor will be credited for each trainee employed 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 they take 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/she has successfully completed a training course leading to journeyman status or in which he/she 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 transportation 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.

Except as otherwise noted below, the Contractor will be reimbursed \$5.00 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.

No payment shall be made to the Contractor if failure to provide the required training 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 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 the work classification or until the trainee has completed the training program. It is not required that all trainees be on board for the entire length of the contract. A Contractor's responsibility will have been fulfilled under this Training Special Provision if the Contractor 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 being followed 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 to include an OJT Trainee Monthly Report form and an OJT Trainee Termination Report form when appropriately documenting performance under this Training Special Provision.

### **Contractor's Responsibility**



1. Provide On-the-Job Training aimed at developing full journeymen in the type of trade or job classification involved. Accordingly, the Contractor shall make every effort to enroll minority trainees and women (e.g., 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.
2. Contractors are expected to fulfill their obligations under the Training Special Provisions. Those obligations will be considered fulfilled if Contractors have provided acceptable training to the number of trainees specified in the OJT Plan.
3. Upon deciding to sub-contract out a portion of the contract work, determine how many, if any, of the trainees are to be trained by the sub-Contractor. The Contractor however, shall retain the primary responsibility for meeting the training requirements imposed by the special provision. Additionally, the Contractor will ensure that the Training Special Provision is made applicable to such sub-contract. Training and upgrading of minorities and women toward journeymen status is a primary objective of the Training Special Provision.
4. Prior to commencing construction (no more than 60 days from the date of the Notice to Proceed), the Contractor shall submit to the State Transportation Agency (STA) (MDOT) for approval the Trainee Schedule Form indicating the number of trainees to be trained in each selected classification and any appropriate attachments representing their training program or OJT Plan (*See Exhibit 1*) to be used. The Contractor shall also submit Trainee Enrollment Forms for each trainee to be trained (*See Exhibit 2*). Contractors should submit the above-mentioned forms as their OJT Plan to the Project Engineer who will in turn forward on to the Office of Civil Rights for Approval.
5. Designate and make known at the preconstruction conference to the Office of Civil Rights and the Project Engineer the name of the company **Equal Employment Officer (EEO Officer)/Designated Representative** who will have the responsibility for and must be capable of effectively administering and promoting an active Contractor program of equal employment opportunity and who must be assigned adequate authority and responsibility to do so. These individuals should have the authority to sign monthly trainee enrollment/time reports.
6. **Implement the EEO policy** and contractual responsibilities to provide equal employment opportunity in each grade and classification of employment. To assure that the preceding policy is adhered to, the following actions will be taken as a minimum:
  - a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six (6) months.
  - b. Ensure that supervisors brief all employees which include trainees on company EEO Policies.
7. Utilize the following procedures to request additional training classifications not presently approved by the STA for assignment to the OJT for training.
  - a. Initially, for a “trainee” to be trained, there must be a “journeyman” on the project site to train the employee. The “trainer” can be a supervisor, foreman or another employee in the “trainee classification” who already is a “journeyman”.

- b. If a classification is not on the “Wage Determination” included in the contract, a written request for an additional classification should be submitted by the Contractor to the Project Engineer.
- c. Preferably, the request (written) should originate in the Project Office so that they will know that the Contractor has applied for the needed classification and that payrolls will not be delayed. The Project Office will ensure that they have been given the project number, Contractor, subcontractor, craft and rate and will submit to the Office of Civil Rights.

For documentation purposes it is recommended to the Contractor that the request for additional classifications should be written and addressed to the Office of Civil Rights that states in concise manner the need for the new classification in lieu of using an existing classification within the OJT Manual. In addition, the training program with required hours and job description similar to the OJT Manual.

- d. After receipt of the Request for Additional Classification, the OJT Coordinator will:
    - 1. Review for preliminary approval and submit a new Trainee Schedule Form to the Contractor for signature.
    - 2. Upon receipt of the signed form from the Project Office/Contractor, a cover letter is attached to the appropriate documentation. The cover letter and documentation are transmitted to Department of Labor (DOL) in Washington D.C. requesting concurrence of the new classification.
  - e. If an individual is hired for the requested classification during the time frame when the STA (OJT Coordinator) is awaiting approval, the individual will be paid at the proposed wage rate.
  - f. If the DOL does not agree with the proposed classification and wage rate, the DOL will make a determination on the appropriate wage rate for the classification. The Labor Compliance Officer will make a copy of the letter and attach a cover letter which cites the recommendation and rationale for the disapproval.
  - g. If the DOL approves the request, a letter will be sent to the STA (OJT Coordinator) citing approval and the accompanying wage rate. The OJT Coordinator will make a copy of the approval letter and attach a cover letter which cites the approval of the classification and wage rate. This letter is sent to the Contractor and all “paper copies” listed at the end of the cover letter.
8. Begin training as soon as possible after the start date indicated on the Trainee Schedule Form for work utilizing the skill involved. In addition, if training does not begin at the preceding time, a written explanation will be given to the Project Engineer citing the rationale and time frame when training will commence on the project. The trainee should be briefed (furnished a copy) at this juncture on the training program for which he/she has started to ensure understanding of the phases of work and wage rates within each section of the program.
9. After commencement of work at the project site, the Contractor shall implement the following **Trainee Wage Rates** according to the Davis Bacon rules.

Normally, trainees are paid a percentage of journeyman's wages (Davis Bacon rates). The following payment plan is required in the FHWA Training Special Provision;

- a. Sixty percent (60%) of the journeyman's wages for the first half of the training period;
  - b. Seventy-five percent (75%) of the journeyman's wages for the third quarter of the training period; and
  - c. Ninety percent (90%) of the journeyman's wages for the last quarter of the training period.
10. Indicate on the payroll records the trainer i.e. roller operator trainer for a given classification.
  11. Recruit a replacement for the trainee when training obligations have not been met on a project provided that there are enough work hours remaining on the project as well as time within the work phase to complete training. Contractors will document in writing all Good Faith Efforts (GFE) in accordance with FHWA Form 1273 Section II 4a- 4e Recruitment and 6a-6d Training and Promotions) (*See Exhibit 9*). The Contractor must submit documentation of GFE i.e. efforts made to hire replacements for trainees who terminated their training program to the Office of Civil Rights. The GFE will be compiled into a letter which is attached to the MDOT Monthly Training Report and submitted to the along a MDOT Termination Report (*See Exhibit 4*) that includes the names/reasons of individuals who separated from the company during the respective reporting period. The GFE will be evaluated to determine if it is sufficient or insufficient. The Project Engineer will forward documentation to the Office of Civil Rights within five (5) days of receipt.
  12. Transferring trainees from one federal-aid project to another.
    - a. Contractors are to make written requests for transferring trainees from one federal-aid project to another federal aid project and submit to the Project Engineer to be forwarded to the Office of Civil Rights for review and approval.
    - b. In addition, if trainees are approved for transfer, the gaining project must have the same training classification approved for that project. The Contractor must provide documentation i.e. written letter that the gaining project will have sufficient work time to complete training requirements.
    - c. All hours trained by employees on a project other than their originally assigned project without the proper transfer approval will not be counted towards the OJT obligation for that project. If the OJT obligation is not met, the prime Contractor will have to show good faith efforts in fulfilling this portion of the contract requirement.
  13. Utilize and submit monthly trainee reports (*See Exhibit 3*) to document training activities to the respective Project Engineer. Monthly training reports should be accurate, concise and include the following items:

- a. Report Period (month) – the date at the top of the training report reflects the month and year the trainee received the training (not the date the report was completed by the Contractor)
  - b. Project Number – project number on the certified payroll and training report should match
  - c. Contractor Name
  - d. County
  - e. Trainee Name
  - f. Job Classification/Hours Required – obtained from OJT Manual - certified payrolls and training reports should match
  - g. Hours required – obtained from OJT Manual should match the Job Classification
  - h. Date Training Started/Terminated – inserted by the Contractor
  - i. Hours trained for the month – training performed this month on federal aid projects and inserted by a respective week ending date i.e. Sunday
  - j. Hours to date – all training annotated on report for previous and current month
  - k. Hours training remaining – subtraction of total training hours to date from training hours required
  - l. Trainee wage rate – Contractor cite the appropriate wage rate for phase of training
  - m. Original signatures and dates for respective training period citing trainee, trainer, and Company EEO Officer/Designated Representative
  - n. Every applicable field on the training report is completed
14. Monthly training reports intended for submission to the MDOT Central Office should cite activities illustrated in the individual training forms received from project personnel. [Failure of the Contractor to submit monthly trainee reports may result in the estimate not being processed and paid.](#) Monthly Training Reports should be submitted to the Project Engineer within fifteen (15) days of the current month with data covering the previous month's activities. However, if monthly training reports are not submitted within this time frame, the Contractor will provide written explanation to the Project Engineer citing the reason for the delay. In addition, a copy of this documentation will be provided to the MDOT Office of Civil Rights within ten (10) days of receipt by the Project Engineer.
15. Provide the trainee with a certification (*See Exhibit 7*) showing the type and length of training satisfactorily completed.
16. Retain all EEO records, i.e. employment breakdown by race and craft on a project, recruitment and hiring of minority and females for a period of three (3) years following the completion of contract work and shall be available at reasonable times and places for inspection by authorized representatives of the STA and the FHWA.

17. Submit an annual report to the STA each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form PR 1391 (*See Exhibit 8*). Contractors are provided an annual notice for this reporting requirement.
18. Periodically evaluate the effectiveness of their OJT Programs and trainees' progress within the training program. Based on these evaluations, forward comments / recommendations through the Project Engineer to the Office of Civil Rights for improving or correcting deficiencies in the training program.

# SECTION 905 - PROPOSAL

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 any 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.

I (We) acknowledge that this proposal will be found irregular and/or non-responsive unless a certified check, cashier's check, or Proposal Guaranty Bond in the amount as required in the Advertisement (or, by law) is submitted electronically with the proposal or is delivered to the Contract Administration Engineer prior to the bid opening time specified in the advertisement.

**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.

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) shall submit electronically with our proposal or deliver prior to the bid opening time 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.

**SECTION 905 -- PROPOSAL (CONTINUED)**

I (We) hereby certify by digital signature and electronic submission via Bid Express of the Section 905 proposal below, that all certifications, disclosures and affidavits incorporated herein are deemed to be duly executed in the aggregate, fully enforceable and binding upon delivery of the bid proposal. I (We) further acknowledge that this certification shall not extend to the bid bond or alternate security which must be separately executed for the benefit of the Commission. This signature does not cure deficiencies in any required certifications, disclosures and/or affidavits. I (We) also acknowledge the right of the Commission to require full and final execution on any certification, disclosure or affidavit contained in the proposal at the Commission's election upon award. Failure to so execute at the Commission's request within the time allowed in the Standard Specifications for execution of all contract documents will result in forfeiture of the bid bond or alternate security.

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.



Add 2 Lanes on US 49 from O'Neal Road to north of School Road, known as Federal Aid Project No. BRNH-0008-01(154) / 102111301 in Harrison County.

Line no.	Item Code	Adj Code	Quantity	Units	Description[Fixed Unit Price]
<b>Roadway Items</b>					
0010	201-A001		1	Lump Sum	Clearing and Grubbing
0020	201-B001		1	Acre	Clearing and Grubbing
0030	202-A001		1	Lump Sum	Removal of Obstructions
0040	202-B004		6,776	Square Yard	Removal of Asphalt Driveways, All Depths
0050	202-B006		20,860	Square Yard	Removal of Asphalt Paved Shoulders, All Depths
0060	202-B007		23,807	Square Yard	Removal of Asphalt Pavement, All Depths
0070	202-B052		1,536	Square Yard	Removal of Concrete Driveways, All Depths
0080	202-B057		9	Each	Removal of Concrete Junction Box, Manhole and Inlet, All Sizes
0090	202-B068		189	Square Yard	Removal of Concrete Pavement Punchouts, 9" Depth
0100	202-B073		983	Square Yard	Removal of Concrete Pavement, All Depths
0110	202-B089		1,263	Linear Feet	Removal of Curb &/or Curb and Gutter, All Types
0120	202-B126		3,591	Linear Feet	Removal of Fence, All Types
0130	202-B129		9	Each	Removal of Flared End Section, All Sizes
0140	202-B191		4,758	Linear Feet	Removal of Pipe, 8" And Above
0150	202-B206		57	Each	Removal of Right-Of-Way Marker
0160	202-B215		165	Each	Removal of Sign Including Post & Footing
0170	202-B240		77,320	Linear Feet	Removal of Traffic Stripe
0180	203-A001	(E)	80,596	Cubic Yard	Unclassified Excavation, FM, AH
0190	203-EX038	(E)	500	Cubic Yard	Borrow Excavation, AH, LVM, Class B7-6
0200	203-G001	(E)	41,491	Cubic Yard	Excess Excavation, FM, AH
0210	206-A001	(S)	5,587	Cubic Yard	Structure Excavation
0220	206-B001	(E)	610	Cubic Yard	Select Material for Undercuts, Contractor Furnished, FM
0230	209-A005		131,428	Square Yard	Geotextile Stabilization, Type V, Non-Woven
0240	211-B001	(E)	500	Cubic Yard	Topsoil for Slope Treatment, Contractor Furnished
0250	213-C001		24	Ton	Superphosphate
0260	216-A001		7,119	Square Yard	Solid Sodding
0270	217-A001		5,005	Square Yard	Ditch Liner
0280	219-A001		142	Thousand Gallon	Watering (\$20.00)
0290	220-A001		47	Acre	Insect Pest Control (\$30.00)
0300	223-A001		16	Acre	Mowing (\$50.00)
0310	225-A001		47	Acre	Grassing
0320	225-B001		24	Ton	Agricultural Limestone
0330	225-C001		94	Ton	Mulch, Vegetative Mulch
0340	226-A001		47	Acre	Temporary Grassing
0350	235-A001		406	Each	Temporary Erosion Checks



Line no.	Item Code	Adj Code	Quantity	Units	Description	Fixed Unit Price
0360	236-A008		15	Each	Silt Basin, Type D	
0370	236-B004		15	Each	Maintenance and Removal of Existing Silt Basins, Type D	
0380	237-A002		2,005	Linear Feet	Wattles, 20"	
0390	246-B001		835	Each	Rockbags	
0400	403-A003	(BA1)	5,856	Ton	12.5-mm, ST, Asphalt Pavement	
0410	403-A004	(BA1)	11,764	Ton	19-mm, HT, Asphalt Pavement	
0420	403-A006	(BA1)	22,331	Ton	19-mm, ST, Asphalt Pavement	
0430	403-A015	(BA1)	5,826	Ton	9.5-mm, ST, Asphalt Pavement	
0440	406-D001		6,198	Square Yard	Fine Milling of Bituminous Pavement, All Depths	
0450	407-A001	(A2)	33,695	Gallon	Asphalt for Tack Coat	
0460	423-A001		15	Mile	Rumble Strips, Ground In	
0470	501-D001		132	Linear Feet	Expansion Joints, With Dowels	
0480	503-A003	(C)	189	Square Yard	9" and Variable Reinforced Concrete Pavement, Broom Finish	
0490	503-B001		124	Linear Feet	Saw Cut, Longitudinal Joints	
0500	503-C010		75,978	Linear Feet	Saw Cut, Full Depth	
0510	503-D001		21	Cubic Yard	Concrete for Base Repair	
0520	503-E002		141	Each	Tie Bars, No. 5 Deformed Drilled and Epoxied or Grouted	
0530	503-F002		99	Each	1" Smooth Dowel Bars, Drilled & Epoxied or Grouted	
0540	601-A001	(S)	127	Cubic Yard	Class "B" Structural Concrete	
0550	601-B001	(S)	3,955	Cubic Yard	Class "B" Structural Concrete, Minor Structures	
0560	602-A001	(S)	38,188	Pounds	Reinforcing Steel	
0570	603-ALT003	(S)	1,702	Linear Feet	18" Type A Alternate Pipe	
0580	603-ALT006	(S)	728	Linear Feet	24" Type A Alternate Pipe	
0590	603-ALT009	(S)	308	Linear Feet	30" Type A Alternate Pipe	
0600	603-ALT011	(S)	48	Linear Feet	36" Type A Alternate Pipe	
0610	603-ALT016	(S)	136	Linear Feet	48" Type A Alternate Pipe	
0620	603-CA012	(S)	3,935	Linear Feet	18" Reinforced Concrete Pipe, Class III, Rubber Type Gaskets	
0630	603-CA023	(S)	132	Linear Feet	18" Reinforced Concrete Pipe, Class V, Rubber Type Gaskets	
0640	603-CA027	(S)	584	Linear Feet	24" Reinforced Concrete Pipe, Class III, Rubber Type Gaskets	
0650	603-CA039	(S)	308	Linear Feet	24" Reinforced Concrete Pipe, Class V, Rubber Type Gaskets	
0660	603-CA041	(S)	282	Linear Feet	30" Reinforced Concrete Pipe, Class III, Rubber Type Gaskets	
0670	603-CA054	(S)	130	Linear Feet	30" Reinforced Concrete Pipe, Class V, Rubber Type Gaskets	
0680	603-CA056	(S)	80	Linear Feet	36" Reinforced Concrete Pipe, Class III, Rubber Type Gaskets	
0690	603-CA077	(S)	52	Linear Feet	48" Reinforced Concrete Pipe, Class III, Rubber Type Gaskets	
0700	603-CB003	(S)	16	Each	18" Reinforced Concrete End Section	
0710	603-CB004	(S)	14	Each	24" Reinforced Concrete End Section	
0720	603-CB005	(S)	6	Each	30" Reinforced Concrete End Section	
0730	603-CB006	(S)	1	Each	36" Reinforced Concrete End Section	

Line no.	Item Code	Adj Code	Quantity	Units	Description Fixed Unit Price
0740	603-CB008	(S)	1	Each	48" Reinforced Concrete End Section
0750	603-CE003	(S)	304	Linear Feet	22" x 13" Concrete Arch Pipe, Class A III, Flexible Plastic Gaskets
0760	603-CE009	(S)	96	Linear Feet	29" x 18" Concrete Arch Pipe, Class A III, Flexible Plastic Gaskets
0770	603-CE019	(S)	752	Linear Feet	44" x 27" Concrete Arch Pipe, Class A III, Flexible Plastic Gaskets
0780	603-CE024	(S)	224	Linear Feet	51" x 31" Concrete Arch Pipe, Class A III, Flexible Plastic Gaskets
0790	603-CE029	(S)	152	Linear Feet	58" x 36" Concrete Arch Pipe, Class A III, Flexible Plastic Gaskets
0800	603-CF002	(S)	1	Each	22" x 13" Concrete Arch Pipe End Section
0810	603-CF005	(S)	18	Each	44" x 27" Concrete Arch Pipe End Section
0820	603-CF006	(S)	4	Each	51" x 31" Concrete Arch Pipe End Section
0830	603-CF007	(S)	3	Each	58" x 36" Concrete Arch Pipe End Section
0840	604-A001		1,220	Pounds	Castings
0850	604-B001		6,511	Pounds	Gratings
0860	605-W001	(GY)	9	Cubic Yard	Filter Material for Combination Storm Drain and/or Underdrains, Type A, FM
0870	606-B002		800	Linear Feet	Guard Rail, Class A, Type 1, 'W' Beam
0880	606-B009		768	Linear Feet	Guard Rail, Class A, Type 1, Metal Post
0890	606-C001		4	Each	Guard Rail, Cable Anchor Type 1, Metal Post
0900	606-C003		4	Each	Guard Rail, Cable Anchor, Type 1
0910	606-E001		4	Each	Guard Rail, Terminal End Section
0920	606-E007		4	Each	Guard Rail, Terminal End Section, Non-Flared
0930	609-B002	(S)	347	Linear Feet	Concrete Curb, Header
0940	609-D003	(S)	3,684	Linear Feet	Combination Concrete Curb and Gutter Type 2
0950	609-D004	(S)	1,458	Linear Feet	Combination Concrete Curb and Gutter Type 2 Modified
0960	609-D012	(S)	12,381	Linear Feet	Combination Concrete Curb and Gutter Type 3A Modified
0970	612-B001		41	Cubic Yard	Flowable Fill, Non-Excavatable
0980	614-B001	(S)	679	Square Yard	Concrete Driveway, With Reinforcement
0990	616-A001	(S)	272	Square Yard	Concrete Median and/or Island Pavement, 10-inch
1000	616-A003	(S)	2,698	Square Yard	Concrete Median and/or Island Pavement, 12-inch
1010	616-A004	(S)	5,672	Square Yard	Concrete Median and/or Island Pavement, 4-inch
1020	617-A001		179	Each	Right-of-Way Marker
1030	618-A001		1	Lump Sum	Maintenance of Traffic
1040	619-A1001		16	Mile	Temporary Traffic Stripe, Continuous White
1050	619-A2001		16	Mile	Temporary Traffic Stripe, Continuous Yellow
1060	619-A3001		23	Mile	Temporary Traffic Stripe, Skip White
1070	619-A4001		154	Linear Feet	Temporary Traffic Stripe, Skip Yellow
1080	619-A5001		47,108	Linear Feet	Temporary Traffic Stripe, Detail
1090	619-A6001		900	Square Feet	Temporary Traffic Stripe, Legend
1100	619-A6002		4,951	Linear Feet	Temporary Traffic Stripe, Legend
1110	619-D1001		74	Square Feet	Standard Roadside Construction Signs, Less than 10 Square Feet

Line no.	Item Code	Adj Code	Quantity	Units	Description[Fixed Unit Price]
1120	619-D2001		2,464	Square Feet	Standard Roadside Construction Signs, 10 Square Feet or More
1130	619-F1002		15,402	Linear Feet	Portable Median Barrier
1140	619-F2002		15,402	Linear Feet	Remove and Reset Portable Median Barrier
1150	619-G4005		560	Linear Feet	Barricades, Type III, Single Faced
1160	619-G5001		602	Each	Free Standing Plastic Drums
1170	619-G7001		24	Each	Warning Lights, Type "B"
1180	620-A001		1	Lump Sum	Mobilization
1190	626-A001		12	Mile	6" Thermoplastic Double Drop Traffic Stripe, Skip White
1200	626-C002		5	Mile	6" Thermoplastic Double Drop Edge Stripe, Continuous White
1210	626-D002		77	Linear Feet	6" Thermoplastic Double Drop Traffic Stripe, Skip Yellow
1220	626-E002		6,976	Linear Feet	6" Thermoplastic Double Drop Traffic Stripe, Continuous Yellow
1230	626-F001		5	Mile	6" Thermoplastic Double Drop Edge Stripe, Continuous Yellow
1240	626-G004		40,396	Linear Feet	Thermoplastic Double Drop Detail Stripe, White
1250	626-G005		14,058	Linear Feet	Thermoplastic Double Drop Detail Stripe, Yellow
1260	626-H001		3,685	Square Feet	Thermoplastic Double Drop Legend, White
1270	626-H002		3,998	Linear Feet	Thermoplastic Double Drop Legend, White
1280	627-J001		114	Each	Two-Way Clear Reflective High Performance Raised Markers
1290	627-K001		2,271	Each	Red-Clear Reflective High Performance Raised Markers
1300	627-L001		305	Each	Two-Way Yellow Reflective High Performance Raised Markers
1310	630-A001		271	Square Feet	Standard Roadside Signs, Sheet Aluminum, 0.080" Thickness
1320	630-A003		1,221	Square Feet	Standard Roadside Signs, Sheet Aluminum, 0.125" Thickness
1330	630-B002		352	Square Feet	Interstate Directional Signs, Bolted Extruded Aluminum Panels, Ground Mounted
1340	630-B003		1,341	Square Feet	Interstate Directional Signs, Bolted Extruded Aluminum Panels, Overhead Mounted
1350	630-C001		45	Linear Feet	Square Tube Posts, 4.0 lb/ft
1360	630-C003		1,087	Linear Feet	Steel U-Section Posts, 3.0 lb/ft
1370	630-D006		39	Linear Feet	Structural Steel Beams, W6 x 12
1380	630-D007		107	Linear Feet	Structural Steel Beams, W6 x 15
1390	630-D008		62	Linear Feet	Structural Steel Beams, W6 x 9
1400	630-E001		223	Pounds	Structural Steel Angles & Bars, 3 1/2" x 3 1/2" x 1/4" Angles
1410	630-E004		876	Pounds	Structural Steel Angles & Bars, 7/16" x 2 1/2" Flat Bar
1420	630-F003		30	Each	Delineators, Flexible Post Mounted, Crossover, Type II
1430	630-F006		114	Each	Delineators, Guard Rail, White
1440	630-F011		34	Each	Delineators, Post Mounted, Double Yellow
1450	630-I003		1	Lump Sum	Metal Overhead Sign Supports, Assembly No. 1, Contractor Designed
1460	630-I015		1	Lump Sum	Metal Overhead Sign Supports, Assembly No. 2, Contractor Designed
1470	630-K001		423	Linear Feet	Welded & Seamless Steel Pipe Posts, 3 1/2"

Line no.	Item Code	Adj Code	Quantity	Units	Description Fixed Unit Price
1480	630-K003		305	Linear Feet	Welded & Seamless Steel Pipe Posts, 4"
1490	635-A059		27	Each	Traffic Signal Head, Type 1
1500	635-A061		7	Each	Traffic Signal Head, Type 2
1510	635-A065		2	Each	Traffic Signal Head, Type 2 FYA
1520	635-A070		7	Each	Traffic Signal Head, Type 3
1530	635-A073		6	Each	Traffic Signal Head, Type 4
1540	638-A006		6	Each	Flasher Assembly, Prepare To Stop
1550	647-A001		1	Lump Sum	Removal of Existing Traffic Signal Equipment
1560	660-A003		2	Each	Equipment Cabinet, Type B
1570	660-A004		3	Each	Equipment Cabinet, Type C
1580	699-A001		1	Lump Sum	Roadway Construction Stakes
1590	815-A002	(S)	3,889	Ton	Loose Riprap, Size 100
1600	815-A007	(S)	616	Ton	Loose Riprap, Size 300
1610	815-E001	(S)	4,444	Square Yard	Geotextile under Riprap
1620	815-F002	(S)	231	Ton	Sediment Control Stone
1630	907-234-A001		23,208	Linear Feet	Temporary Silt Fence
1640	907-234-D001		6	Each	Inlet Siltation Guard
1650	907-240-A001		9,474	Square Yard	Interlocking Flexible Block Erosion Control System
1660	907-405-A001	(BA1)	14,922	Ton	Stone Matrix Asphalt, 9.5 mm Mixture
1670	907-405-A002	(BA1)	20,053	Ton	Stone Matrix Asphalt, 12.5 mm Mixture
1680	907-413-E001		13,450	Linear Feet	Sawing and Sealing Transverse Joints in Asphalt Pavement
1690	907-618-M2001		1,500	Hours	Work Zone Law Enforcement (\$60.00)
1700	907-619-E3001		8	Each	Changeable Message Sign
1710	907-630-L001		1	Lump Sum	Pedestal Sign Support, Assembly No 1, Contractor Designed
1720	907-630-L002		1	Lump Sum	Pedestal Sign Support, Assembly No 2, Contractor Designed
1730	907-632-A010		1	Each	Solid State Traffic Cabinet Assembly, Type IV Cabinet, Type 1 Controller
1740	907-632-C001		4	Each	Modify Existing Traffic Signal Cabinet Assembly
1750	907-632-J001		4	Each	Power Service Pedestal
1760	907-633-A001		1	Each	Uninterruptable Power Supply
1770	907-634-A042		2	Each	Traffic Signal Equipment Pole, Type II(L), 30' Shaft, 30' Arm
1780	907-634-A047		2	Each	Traffic Signal Equipment Pole, Type II(L), 30' Shaft, 55' Arm
1790	907-634-A048		2	Each	Traffic Signal Equipment Pole, Type II(L), 30' Shaft, 60' Arm
1800	907-634-A083		1	Each	Traffic Signal Equipment Pole, Type II, 17' Shaft, 45' Arm
1810	907-634-A140		1	Each	Traffic Signal Equipment Pole, Type II, 40' Shaft, 35' Arm
1820	907-634-A274		1	Each	Traffic Signal Equipment Pole, Type III(L), 30' Shaft, 50' & 75' Arm
1830	907-634-A344		1	Each	Traffic Signal Equipment Pole, Type III(L), 40' Shaft, 55' & 65' Arm
1840	907-634-C002		40	Cubic Yard	Pole Foundations, Class "DS" Concrete

Line no.	Item Code	Adj Code	Quantity	Units	Description[Fixed Unit Price]
1850	907-634-D003		150	Linear Feet	Slip Casing, 36" Diameter
1860	907-634-E001		2	Each	Camera Pole with Foundation, 50' Pole
1870	907-634-PP005		2	Each	Traffic Signal Equipment Pole Air Ground
1880	907-636-B002		800	Linear Feet	Electric Cable, Underground in Conduit, IMSA 20-1, AWG 1/0, 4 Conductor
1890	907-636-B012		1,035	Linear Feet	Electric Cable, Underground in Conduit, IMSA 20-1, AWG 14, 3 Conductor
1900	907-636-B014		3,664	Linear Feet	Electric Cable, Underground in Conduit, IMSA 20-1, AWG 14, 5 Conductor
1910	907-636-B016		3,635	Linear Feet	Electric Cable, Underground in Conduit, IMSA 20-1, AWG 14, 8 Conductor
1920	907-636-B038		2,744	Linear Feet	Electric Cable, Underground in Conduit, THHN, AWG #10, 3 Conductor
1930	907-636-B053		1,535	Linear Feet	Electric Cable, Underground in Conduit, THHN, AWG #6, 3 Conductor
1940	907-636-D006		96	Linear Feet	Electric Cable, Aerial Supported in Conduit, IMSA 20-1, AWG 14, 5 Conductor
1950	907-636-D008		740	Linear Feet	Electric Cable, Aerial Supported in Conduit, IMSA 20-1, AWG 14, 8 Conductor
1960	907-636-D020		40	Linear Feet	Electric Cable, Aerial Supported in Conduit, THHN, AWG #6, 3 Conductor
1970	907-637-A002		30	Each	Pullbox Enclosure, Type 2
1980	907-637-A003		5	Each	Pullbox Enclosure, Type 3
1990	907-637-A004		16	Each	Pullbox Enclosure, Type 4
2000	907-637-A005		15	Each	Pullbox Enclosure, Type 5
2010	907-637-C028		2,350	Linear Feet	Traffic Signal Conduit, Underground, Type 4, 2"
2020	907-637-C030		30	Linear Feet	Traffic Signal Conduit, Underground, Type 4, 3"
2030	907-637-D002		1,615	Linear Feet	Traffic Signal Conduit, Underground Drilled or Jacked, Rolled Pipe, 2"
2040	907-637-D003		2,579	Linear Feet	Traffic Signal Conduit, Underground Drilled or Jacked, Rolled Pipe, 3"
2050	907-637-I001		21,670	Linear Feet	Traffic Signal Conduit Bank, Underground, Drilled or Jacked, Rolled Pipe, 2 @ 2"
2060	907-637-K001		910	Linear Feet	Traffic Signal Conduit Bank, Aerial Supported, Type 1, 2 @ 2"
2070	907-639-J001		1	Each	Type 3 Intersection Device
2080	907-643-A004		12	Each	Video Vehicle Detection Sensor, Type 1A
2090	907-643-B001		5,392	Linear Feet	Video Vehicle Detection Cable
2100	907-643-E001		2	Each	Multi-Sensor Vehicle Detection Sensor
2110	907-643-F001		443	Linear Feet	Multi-Sensor Vehicle Detection Cable
2120	907-650-A002		6	Each	On Street Video Equipment, Fixed Type
2130	907-650-A003		4	Each	On Street Video Equipment, PTZ Type
2140	907-650-A004		4	Each	On Street Video Equipment, PTZ Type, Signal Monitoring
2150	907-653-A001		119	Square Feet	Traffic Sign
2160	907-653-B001		57	Square Feet	Street Name Sign

Line no.	Item Code	Adj Code	Quantity	Units	Description Fixed Unit Price
2170	907-656-A002		2	Each	Dynamic Message Sign, Type 2
2180	907-659-A001		1	Lump Sum	Traffic Management Center Modifications
2190	907-661-A004		21,725	Linear Feet	Fiber Optic Cable, 72 SM
2200	907-661-B002		2,865	Linear Feet	Fiber Optic Drop Cable, 12 SM
2210	907-663-A001		4	Each	Network Switch, Type A
2220	907-663-A005		1	Each	Network Switch, Type E
2230	907-663-D001		1,035	Linear Feet	Category 6 Cable, Installed in Conduit
2240	907-899-A001		1	Lump Sum	Railway-Highway Provisions
2250	907-906001		1,040	Hours	Trainees (\$5.00)
<b>ALTERNATE GROUP AA NUMBER 1</b>					
2260	304-F001	(GT)	80,636	Ton	3/4" and Down Crushed Stone Base
<b>ALTERNATE GROUP AA NUMBER 2</b>					
2270	304-F002	(GT)	80,636	Ton	Size 610 Crushed Stone Base
<b>ALTERNATE GROUP AA NUMBER 3</b>					
2280	304-F003	(GT)	80,636	Ton	Size 825B Crushed Stone Base
<b>ALTERNATE GROUP BB NUMBER 1</b>					
2290	605-W002	(GY)	162	Cubic Yard	Filter Material for Combination Storm Drain and/or Underdrains, Type B, FM
<b>ALTERNATE GROUP BB NUMBER 2</b>					
2300	605-W003	(GY)	162	Cubic Yard	Filter Material for Combination Storm Drain and/or Underdrains, Type C, FM

SECTION 905 - COMBINATION BID PROPOSAL (Continued)

**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.

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) agree to complete each contract on or before its specified completion date.

\*\*\*\*\*

**COMBINATION BID PROPOSAL**

This proposal is tendered as one part of a Combination Bid Proposal utilizing option \_\_\_\* of Subsection 102.11 on the following contracts:

\* Option to be shown as either (a), (b), or (c).

	<u>Project No.</u>	<u>County</u>	<u>Project No.</u>	<u>County</u>
1.	_____	_____	6.	_____
2.	_____	_____	7.	_____
3.	_____	_____	8.	_____
4.	_____	_____	9.	_____
5.	_____	_____	10.	_____

(a) If Combination A has been selected, your Combination Bid is complete.

(b) If Combination B has been selected, then complete the following page.

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.					

For Informational Purposes Only



SECTION 905 - COMBINATION BID PROPOSAL (Continued)

Project Number	Pay Item Number	Unit	Unit Price Reduction	Total Item Reduction	Total Contract Reduction
9.					
10.					

(c) If Combination C has been selected, then initial and complete ONE of the following.

\_\_\_\_\_ 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.



**Certification with regard to the Performance of Previous  
Contracts or Subcontracts subject to the Equal Opportunity  
Clause and the filing of Required Reports**

The Bidder hereby certifies that he has \_\_\_\_\_, has not \_\_\_\_\_, participated in a previous contract or subcontract subject to the Equal Opportunity Clause, as required by Executive Orders 10925, 11114, or 11246, and that he has \_\_\_\_\_, has not \_\_\_\_\_, filed with the Joint Reporting Committee, the Director of the Office of Federal Contract Compliance, a Federal Government contracting or administering agency, or the former President's Committee on Equal Employment Opportunity, all reports due under the applicable filing requirements.

\_\_\_\_\_  
(COMPANY)

DATE: \_\_\_\_\_

NOTE: The above certification is required by the Equal Employment Opportunity Regulations of the Secretary of Labor (41 CFR 60-1.7 (b) (1)), and must be submitted by bidders and proposed subcontractors only in connection with contracts and subcontracts which are subject to the Equal Opportunity Clause. Contracts and Subcontracts which are exempt from the Equal Opportunity Clause are set forth in 41 CFR 60-1.5. (Generally only contracts or subcontracts of \$10,000 or under are exempt.)

Currently, Standard Form 100 (EEO-1) is the only report required by the Executive Orders or their implementing regulations.

Proposed prime Contractors and Subcontractors who have participated in a previous contract or subcontract subject to the Executive orders and have not filed the required reports should note that 41 CFR 60-1.7 (b) (1) prevents the award of contracts and subcontracts unless such Contractors submit a report covering the delinquent period or such other period specified by the Federal Highway Administration or by the Director, Office of Federal Contract Compliance, U. S. Department of Labor.

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**  
**CERTIFICATION**

I, \_\_\_\_\_,  
(Name of person signing bid)

individually, and in my capacity as \_\_\_\_\_ of  
(Title of person signing bid)

\_\_\_\_\_ 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. **BRNH-0008-01(154)/ 102111301000**

in **Harrison** 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:

- a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
- b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
- c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in (b) above; and
- d) Have not within a three-year period preceding this application/ proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

Do exceptions exist and are made a part thereof? Yes / No

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.

The bidder further certifies that the certification requirements contained in Section XI of Form FHWA 1273, will be or have been included in all subcontracts, material supply agreements, purchase orders, etc. except those procurement contracts for goods or services that are expected to be less than the Federal procurement small purchase threshold fixed at 10 U.S.C. 2304(g) and 41 U.S.C. 253(g) (currently \$25,000) which are excluded from the certification requirements.

The bidder further certifies, to the best of his or her knowledge and belief, that:

1) No Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this contract, Standard Form-LLL, Disclosure Form to Report Lobbying, in accordance with its instructions will be completed and submitted.

The certification contained in (1) and (2) above is a material representation of fact upon which reliance is placed and a prerequisite imposed by Section 1352, Title 31, U.S. Code prior to entering into this contract. Failure to comply shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000. The bidder shall include the language of the certification in all subcontracts exceeding \$100,000 and all subcontractors shall certify and disclose accordingly.

All of the foregoing is true and correct.

Executed on \_\_\_\_\_

\_\_\_\_\_  
Signature

**MISSISSIPPI DEPARTMENT OF TRANSPORTATION**

SAM.GOV Registration and Unique Entity ID

Bidders are advised that the Prime Contractor must register and maintain a current registration in the **System for Award Management** (<http://sam.gov>) at all times during the project. Upon registration, the Contractor will be assigned a SAM Unique Entity ID.

Bidders are advised that prior to the award of this contract, they MUST be registered in the System for Award Management.

I (We) acknowledge that this contract cannot be awarded if I (We) are not registered in the System for Award Management prior to the award of this contract. \_\_\_\_\_ (Yes / No)

I (We) have a SAM Unique Entity ID. \_\_\_\_\_ (Yes / No)

SAM Unique Entity ID: \_\_\_\_\_

Company Name: \_\_\_\_\_

Company e-mail address: \_\_\_\_\_

SECTION 902

CONTRACT FOR BRNH-0008-01(154)/ 102111301000

LOCATED IN THE COUNTY(IES) OF Harrison

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 \_\_\_\_\_

Signed and sealed in the presence of:  
(names and addresses of witnesses)

Executive Director

\_\_\_\_\_

Secretary to the Commission

Award authorized by the Mississippi Transportation Commission in session on the \_\_\_ day of \_\_\_\_\_, \_\_\_\_\_, Minute Book No. \_\_\_\_\_, Page No. \_\_\_\_\_.

**SECTION 903**  
**PERFORMANCE AND PAYMENT BOND**

CONTRACT BOND FOR: BRNH-0008-01(154)/ 102111301000

LOCATED IN THE COUNTY(IES) OF: Harrison

STATE OF MISSISSIPPI,  
COUNTY OF HINDS

Know all men by these presents: that we, \_\_\_\_\_  
(Contractor)  
\_\_\_\_\_ Principal, a \_\_\_\_\_

residing at \_\_\_\_\_ in the State of \_\_\_\_\_

and \_\_\_\_\_

(Surety)  
residing at \_\_\_\_\_ in the State of \_\_\_\_\_,

authorized to do business in the State of Mississippi, under the laws thereof, as surety, effective as of the contract date shown below, 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.

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.

_____	_____
(Contractors) Principal	Surety
By _____	By _____
	(Signature) Attorney in Fact
	Address _____
	_____
Title _____	_____
(Contractor's Seal)	(Printed) MS Agent
	_____
	(Signature) MS Agent
	Address _____
	_____
	_____
	(Surety Seal)
	_____
	Mississippi Insurance ID Number





# BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we \_\_\_\_\_  
Contractor

\_\_\_\_\_  
Address

\_\_\_\_\_  
City, State ZIP

As principal, hereinafter called the Principal, and \_\_\_\_\_  
Surety

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 **Add 2 Lanes on US 49 from O'Neal Road to north of School Road, known as Federal Aid Project No. BRNH-0008-01(154) / 102111301 in Harrison County.**

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 \_\_\_\_\_, 20\_\_

\_\_\_\_\_  
(Principal)

(Seal)

\_\_\_\_\_  
(Witness) (Name) By: \_\_\_\_\_ (Title)

\_\_\_\_\_  
(Surety) (Seal)

\_\_\_\_\_  
(Witness) (Attorney-in-Fact) By: \_\_\_\_\_

\_\_\_\_\_  
(MS Agent)

\_\_\_\_\_  
Mississippi Insurance ID Number

MISSISSIPPI DEPARTMENT OF TRANSPORTATION  
OFFICE OF CIVIL RIGHTS  
JACKSON, MISSISSIPPI

LIST OF FIRMS SUBMITTING QUOTES

I/we received quotes from the following firms on:

Letting Date: **November 28, 2023**

Project No: **BRNH-0008-01(154)/ 102111301000**

County: **Harrison**

Disadvantaged Business Enterprise (DBE) Regulations as stated in 49 CFR 26.11 require the Mississippi Department of Transportation (MDOT) to create and maintain a comprehensive list of all firms quoting/bidding subcontracts on prime contracts and quoting/bidding subcontracts on federally-funded transportation projects. For every firm, we require the following information:

Firm Name: \_\_\_\_\_  
Contact Name/Title: \_\_\_\_\_  
Firm Mailing Address: \_\_\_\_\_  
Phone Number: \_\_\_\_\_  
\_\_\_\_\_ DBE Firm \_\_\_\_\_ Non-DBE Firm

Firm Name: \_\_\_\_\_  
Contact Name/Title: \_\_\_\_\_  
Firm Mailing Address: \_\_\_\_\_  
Phone Number: \_\_\_\_\_  
\_\_\_\_\_ DBE Firm \_\_\_\_\_ Non-DBE Firm

Firm Name: \_\_\_\_\_  
Contact Name/Title: \_\_\_\_\_  
Firm Mailing Address: \_\_\_\_\_  
Phone Number: \_\_\_\_\_  
\_\_\_\_\_ DBE Firm \_\_\_\_\_ Non-DBE Firm

Firm Name: \_\_\_\_\_  
Contact Name/Title: \_\_\_\_\_  
Firm Mailing Address: \_\_\_\_\_  
Phone Number: \_\_\_\_\_  
\_\_\_\_\_ DBE Firm \_\_\_\_\_ Non-DBE Firm

Firm Name: \_\_\_\_\_  
Contact Name/Title: \_\_\_\_\_  
Firm Mailing Address: \_\_\_\_\_  
Phone Number: \_\_\_\_\_  
\_\_\_\_\_ DBE Firm \_\_\_\_\_ Non-DBE Firm

\_\_\_\_\_  
SUBMITTED BY (Signature)

\_\_\_\_\_  
FIRM NAME