STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

CONSTRUCTION PROPOSAL

FEDERAL AID PROJECT

STATE PROJECT NO. 737-55-0003
HOUMA ITS DEPLOYMENT – PHASE 3
TERREBONNE PARISH

STATE OF LOUISIANA
EDWIN L. LANTZER
REG. No. 24733
REGISTERED PROFESSIONAL ENGINEER IN MECHANICAL ENGINEERING

Edwin Lantzer
22 SEPTEMBER 2009

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NOTICE TO CONTRACTORS (07/09)

Electronic bids and electronic bid bonds for the following project will be downloaded by the Department of Transportation and Development (DOTD) on **Wednesday, October 28, 2009**. **Paper bids and paper bid bonds will not be accepted.** Electronic bids and electronic bid bonds must be submitted through www.bidx.com prior to the electronic bidding deadline. Beginning at 10:00 a.m., all bids will be downloaded and posted online at http://www.dotd.la.gov/cgi-bin/construction.asp. No bids are accepted after 10:00 a.m.

DBE GOAL PROJECT
STATE PROJECT NO. 737-55-0003
FEDERAL AID PROJECT NO. 5505(503)
DESCRIPTION: HOUMA ITS DEPLOYMENT – PHASE 3
PARISH: TERREBONNE
TYPE: INSTALL FIBER OPTIC NETWORK AND RELATED WORK.
LIMITS: State Project No. 737-55-0003: LOCATED AT VARIOUS SITES AS DESCRIBED IN THE PLANS.
ESTIMATED COST RANGE: $1,000,000 to $2,500,000
PROJECT ENGINEER: GISCLAIR, GARY; 4920 Imperial Drive, Houma, LA 70360, (985) 858-2406.
PROJECT MANAGER: DELANEY, ELIZABETH.

Bids must be prepared and submitted in accordance with Section 102 of the 2006 Louisiana Standard Specifications for Roads and Bridges as amended by the project specifications, and must include all information required by the proposal.

NOTICE TO CONTRACTORS (CONTINUED)

Plans and proposals are available in electronic format ONLY. All Plans, Proposals, Addenda, Amendments, Letters of Clarification, and Withdrawal Notices will be posted online. **Paper notices will not be distributed.** Construction proposal information may be accessed via the Internet at www.dotd.la.gov. From the LA DOTD home page, select the following options: **Doing Business with DOTD**, then **Construction Letting Information**. Once the **Construction Letting Information** page appears, find the **Notice to Contractors** box. From the drop down menu, select the appropriate letting date and press the "Go To" button to open the page, which provides a listing of all projects to be let and a **Construction Proposal Documents** link for each project. All project specific notices are found here. **It will be the responsibility of the bidder to check for updates.** Additionally, plans and specifications may be seen at the Project Engineer's office. Upon request, the Project Engineer will show the project site.

All questions concerning the plans shall be submitted via the Electronic Plans Distribution Center known as **Falcon**. Questions submitted within 96 hours of the bid deadline may not be answered prior to bidding. Falcon may be accessed via the Internet at www.dotd.la.gov. From the home page, select ***Doing Business with DOTD*** from the left-hand menu, then select ***Construction Letting Information*** on the pop-up menu. On the Construction Letting Information page, select the link, ***DOTD's Plan Room***. Login to Falcon (or request an ID if a first-time user). Once logged in, you will have access to view Project Information, submit a question concerning the project, and view the plans. All submitted questions will be forwarded by email to the Project Manager and the Project Engineer for a response.

The U. S. Department of Transportation (DOT) operates a toll free "Hotline" Monday through Friday, 8:00 a.m. to 5:00 p.m., eastern time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should call 1-800-424-9071. All information will be treated confidentially and caller anonymity will be respected.

GENERAL BIDDING REQUIREMENTS (08/06): The specifications, contract and bonds governing the construction of the work are the 2006 Edition of the Louisiana Standard Specifications for Roads and Bridges, together with any supplementary specifications and special provisions attached to this proposal.

Bids shall be prepared and submitted in accordance with Section 102 of the Standard Specifications.

The plans herein referred to are the plans approved and marked with the project number, route and Parish, together with all standard or special designs that may be included in such plans. The bidder declares that the only parties interested in this proposal as principals are those named herein; that this proposal is made without collusion or combination of any kind with any other person, firm, association, or corporation, or any member or officer thereof; that careful examination has been made of the site of the proposed work, the plans, Standard Specifications, supplementary specifications and special provisions above mentioned, and the form of contract and payment, performance, and retainage bond; that the bidder agrees, if this proposal is accepted, to provide all necessary machinery, tools, apparatus and other means of construction and will do all work and furnish all material specified in the contract, in the manner and time therein prescribed and in accordance with the requirements therein set forth; and agrees to accept as full compensation therefore, the amount of the summation of the products of the quantities of work and material incorporated in the completed project, as determined by the engineer, multiplied by the respective unit prices herein bid.

It is understood by the bidder that the quantities given in this proposal are a fair approximation of the amount of work to be done and that the sum of the products of the approximate quantities multiplied by the respective unit prices bid shall constitute gross sum bid, which sum shall be used in comparison of bids and awarding of the contract.

The bidder further agrees to perform all extra and force account work that may be required on the basis provided in the specifications.

The bidder further agrees that within 15 calendar days after the contract has been transmitted to him, he will execute the contract and furnish the Department satisfactory surety bonds.

If this proposal is accepted and the bidder fails to execute the contract and furnish bonds as above provided, the proposal guaranty shall become the property of the Department; otherwise, said proposal guaranty will be returned to the bidder; all in accordance with Subsection 103.04.

MANDATORY ELECTRONIC BIDS AND ELECTRONIC BID BONDS SUBMISSION (10/08): This project requires mandatory electronic bidding. All Specifications, whether Standard, Supplemental or Special Provisions, are hereby amended to delete any references regarding paper bids and the ability to submit paper bid forms.

The contractor shall register online to be placed on the Louisiana Department of Transportation and Development (LA DOTD) prospective bidders list or for information only list.

Modifications to proposal documents will be posted on the Department's website at the following URL address: www.dotd.la.gov/cgi-bin/construction.asp.

LA DOTD shall not be responsible if the bidder cannot complete and submit a bid due to failure or incomplete delivery of the files submitted via the internet.

DBE PARTICIPATION IN FEDERAL AID CONSTRUCTION CONTRACTS (02/07): This project is a DBE goal project. In accordance with the Required Contract Provisions for DBE Participation in Federal Aid Construction Contracts elsewhere herein, the DBE goal for approved subcontracting work on this project is 10.0 percent of the total contract bid price. The contractor shall submit DOTD Form OMF-1A (Request to Sublet) and have it approved by the Department before any subcontract work is done on the project. Only those businesses certified by the Department as Disadvantaged Business Enterprises (DBEs) may be utilized in fulfillment of the DBE goal requirement. Such businesses are those certified by the Louisiana Unified Certification Program on the basis of ownership and control by persons found to be socially and economically disadvantaged in accordance with Section 8(a) of the Small Business Act, as amended and Title 49, Code of Federal Regulations, Part 26 (49 CFR 26).

BUY AMERICA PROVISIONS (03/95): Pursuant to the "Buy America Provisions" of the Surface Transportation Assistance Act (STAA) of 1982 as promulgated by current FHWA regulation 23 CFR 635.410 and the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) amendment to (STAA), all steel and iron materials permanently installed on this project shall be manufactured, including application of a coating, in the United States, unless a waiver of these provisions is granted. Coating includes all processes which protect or enhance the value of the material to which the coating is applied. The request for waiver must be presented in writing to the Department by the contractor. Such waiver may be granted if it is determined that:

(1) The application of Buy America Provisions would be inconsistent with the public interest or

(2) Such materials are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality.

Minimal use of foreign steel and iron materials will be allowed without waiver provided the cost of these materials does not exceed 0.1 percent of the total contract cost or $2,500, whichever is greater; however, the contractor shall make written request to the DOTD Construction Engineering Administrator for permission to use such foreign materials and shall furnish a listing of the materials, their monetary value, and their origin and place of production.

The burden of proof for the origin and place of production and any request for waiver is the responsibility of the contractor.

Prior to the use of steel and iron materials in the project, the contractor shall furnish Mill Test Reports to the engineer for such steel and iron materials, accompanied by a notarized certification stating that the Mill Test Reports represent the steel and iron materials to be furnished and that such materials were produced and fabricated in the United States.

Pig iron and processed, pelletized, and reduced iron ore are exempt from the Buy America Provisions.

MAINTENANCE OF TRAFFIC (11/13/08): Subsection 104.03 of the 2006 Standard Specifications is amended to include the following requirements.

The contractor shall provide for and maintain through and local traffic at all times and shall conduct his operations in such manner as to cause the least possible interference with traffic at junctions with roads, streets and driveways.

Between October 1 and January 31, the contractor shall maintain the highway in a condition suitable for large scale sugar cane hauling operations and prior thereto shall perform only those items which will not interfere with the condition of the highway for heavy hauling

operations. During this period, the contractor shall provide all equipment and material necessary to keep the highway in satisfactory condition. If the contractor does not properly maintain the highway, the Department reserves the right to maintain same with its own equipment, labor and material and deduct costs of such maintenance from payments for the work. If it becomes necessary to suspend construction operations for heavy hauling during the sugar cane season, contract time will not be assessed for said period of suspension; however, maintenance of traffic shall be continued by the contractor during such period of suspension.

PUBLIC CONVENIENCE AND SAFETY (09/05): Subsection 107.07 of the Standard Specifications is amended to include the following.

The procurement of police officers for public safety during construction shall be in accordance with the Department's Policy for Use of Police Officers in Construction/Maintenance Work Zones. The DOTD project engineer shall determine the need for police officers to assist in controlling traffic in a particular work zone. The number of officers needed, the tasks they will perform, and their location within the work zone will vary as a function of the zone type. Police officers shall be placed at strategic locations at times during construction as determined by the DOTD project engineer.

The three types of law enforcement services are Police Presence, Police Enforcement and Police Traffic Control. Police Presence is defined as the use of police officers at the beginning of the active work zone area utilizing their blue lights to gain the attention of drivers. Police Enforcement is utilized when enforcement is required to enhance the safe operation of the work zone. Police Traffic Control is to be used in detour / diversion situations.

The DOTD project engineer will extend an invitation to the appropriate Louisiana State Police (LSP) Troop Commander to attend the pre-construction conference.

Prior to commencing the work on the project, the contractor shall contact the LSP Troop Commander to obtain law enforcement services of police officers during construction. If the LSP Troop is unable to provide law enforcement services for the project work zone, the LSP Troop Commander or the contractor will extend the invitation to the appropriate local law enforcement authorities.

Police officers will report directly to the contractor. However, the contractor will not have the authority to direct the placement of the police officer or the patrol vehicle in situations that are contrary to established procedures and/or could endanger the police officer. The DOTD project engineer will make the final determination on all issues regarding police officer responsibility in work zones.

Prior to the beginning of the shift, the contractor shall provide a daily work zone briefing to the police officer. For major changes in traffic patterns, advanced notification shall be provided to the police agency working the detail. This information should also be provided to the motoring public through the DOTD district and / or the LSP Troop.

The contractor shall pay for law enforcement services provided by the police officers based on the hourly wage and vehicle rate fee schedule below. The Department will reimburse the contractor monthly for the incurred cost. The contractor shall furnish time record documentation with the request for reimbursement. The provisions of Subsection 109.04 shall not apply to this reimbursement.

The agreed upon fee schedule for police officers in the work zone is as follows:

$25 per vehicle per day - vehicle use fee

$40 per hour per officer (one officer per vehicle) (minimum 2 hours).

PROSECUTION OF WORK (12/08): Subsection 108.04, Prosecution of Work of the Standard Specifications as amended by the supplemental specifications thereto, is further amended as follows.

108.04 PROSECUTION OF WORK.

Subpart (a), General is deleted and the following substituted.

(a) General: The contractor shall provide sufficient materials, equipment and labor to complete the project in accordance with the plans and specifications within the contract time. If the completed work is behind the approved progress schedule, the contractor shall take immediate steps to restore satisfactory progress and shall not transfer equipment or forces from uncompleted work without prior notice to, and approval of, the engineer. Each item of work shall be prosecuted to completion without delay. If prosecution of the work is discontinued for an extended period of time, the contractor shall give the engineer written notice at least 24 hours before resuming operations. The contractor's progress will be determined monthly at the time of each partial estimate, and will be based on the total amount earned by the contractor as reflected by the partial estimate. If the contractor's progress is behind more than 20 percent behind the elapsed contract time, the contractor may be notified that he is not prosecuting the work in an acceptable manner. If requested by the Department the contractor must meet with and provide the project engineer with an acceptable written plan which details how the contractor will re-gain lost progress and prosecute remaining work. If the contractor's progress is more than 30 percent behind the elapsed contract time, the contractor and the surety will be notified that he is not prosecuting the work in an acceptable manner. The contractor must meet with and provide the project engineer with an acceptable written plan which details how the contractor will re-gain lost progress and prosecute remaining work.

Subpart (b), Disqualification is deleted and the following substituted.

(b) Disqualification: A contractor who is in default in accordance with Subsection 108.09(a)(1) of and progress is deficient by 10 percent or more shall be immediately disqualified. The contractor shall remain disqualified until the project has received a final inspection and has been recommended for final acceptance. Should the surety or the Department take over prosecution of the work, the contractor shall remain disqualified for a period of one year from the completion of the project, unless debarment proceedings are instituted.

During the period of disqualification, the contractor will not be permitted to bid on contracts nor be approved as a subcontractor on contracts. Any bid submitted by the contractor during the period of disqualification will not be considered and will be returned.

PAYMENT ADJUSTMENT (05/06): Section 109, Measurement and Payment of the Standard Specifications is amended to add the following.

This project is not designated for payment adjustments for asphalt cements or fuels.

TRAFFIC SIGNALS (04/09): Section 736 of the 2006 Standard Specifications, as amended by the supplemental specifications thereto is amended as follows:

Subsection 736.13, Vehicle and Pedestrian Signal Heads is amended by deleting the third paragraph and adding the following paragraphs.

All signal heads on mast arms shall be required to have a backplate conforming to Subsection 1020.01(f).

Each LED traffic signal lamp unit in the signal head shall be connected to an individual wire from the controller.

CONCRETE CURING MATERIALS, ADMIXTURES AND SPECIAL FINISHES (04/09). Section 1011 of the 2006 Standard Specifications is amended as follows.

Subsection 1011.01, Curing Materials is amended to delete paragraphs (b), (c), (d), and (e) and substitute the following:

(b) Moist Cure Materials:

(1) Sheet materials for curing concrete shall meet the physical and performance requirements of AASHTO M 171.

(2) Burlap Cloth made from Jute or Kenaf shall comply with AASHTO M 182, Class 3.

TRAFFIC SIGNALS (06/09): Section 1020, Traffic Signals of the 2006 Standard Specifications as amended by the supplemental specifications is further amended as follows.

Subsection 1020.01, Traffic Signal Heads is amended as follows.

Heading (c), Optical Unit; Subheading (2), 12-inch (300 mm) LED Traffic Signal Lamp Unit (Mast Arm and Span Wire Mount) is deleted and the following substituted:

(2) 12-inch (300 mm) LED Traffic Signal Lamp Unit (Mast Arm and Span Wire Mount):

a. General: All LED traffic signal lamp units shall conform to the latest versions of the Institute of Transportation Engineers (ITE) Vehicle Traffic Control Signal Heads (VTCSH) LED Vehicle Arrow Traffic Signal Supplement standard, the ITE, VTCSH LED Circular Signal Supplement standard, and this specification.

The LED traffic signal lamp unit shall be designed as a retrofit replacement for existing signal lamps, which will not require any special tools for installation. The 12-inch (300 mm) retrofit replacement LED traffic signal lamp unit shall fit into existing traffic signal housings without modifications. Installation of a retrofit replacement LED traffic signal lamp unit into existing signal housing shall only require removal of the existing lens, reflector, and incandescent lamp, fitting of the new unit securely in the housing door, and connecting to existing electrical wiring or terminal block by means of simple connectors.

If proper orientation of the LED traffic signal lamp unit is required for optimum performance, prominent and permanent directional marking(s), an "UP arrow" or equivalent, for correct indexing and orientation shall exist on the unit.

The manufacturer's name, serial number, manufactured date (minimum month and year) and other necessary identification shall be permanently marked on the backside of the LED traffic signal lamp unit. A label shall be placed on the unit certifying compliance with the above ITE standards.

Any deviation to product design after testing and approval by the Department shall constitute a new model and must have a new model number. The new model must be submitted for acceptance. Random testing of average production LED traffic signal lamp units will be conducted to ensure compliance with this specification.

b. Physical and Mechanical Requirements: The LED traffic signal lamp unit shall be a single, self-contained device, not requiring on-site assembly for installation into existing traffic signal housing.

The assembly and manufacturing process for the LED traffic signal lamp units shall ensure that all internal LEDs and electronic components are adequately supported to withstand mechanical shock and vibration from high winds and other sources.

Each LED traffic signal lamp unit shall be comprised of a UV stabilized polymeric outer shell, multiple LED light sources, and a regulated power supply. LEDs shall be mounted on a polycarbonate positioning plate or PC board.

Each LED traffic signal lamp unit shall have a clear lens with the incandescent look (individual LEDs should not be directly visible). Tinted lenses are not acceptable.

c. Optical and Light Output Requirements: The LEDs shall be manufactured using Aluminum-Indium-Gallium-Phosphide (AlInGaP) technology or other LEDs with lower susceptibility to temperature degradation than Aluminum-Gallium-Arsenic (AlGaAs). AlGaAs LEDs will not be allowed.

Designs that require LEDs to be operated at currents greater than the LED manufacturer's recommended drive current will not be allowed. The color of the LED traffic signal lamp units will be shown on the plans.

Each LED traffic signal lamp unit shall meet minimum laboratory light intensity values and light output distribution as described in ITE. VTCSHs LED Supplements for a minimum period of sixty (60) months, based on DOTD TCS 42 normal use in traffic signal operation over an operating temperature range of -40°C to +74°C.

Measured chromaticity coordinates of LED traffic signal lamp units shall conform to the chromaticity requirements detailed in the ITE standards listed in heading (a) for a minimum period of 60 months.

LED traffic signal lamp units tested or submitted for testing shall be representative of typical production units. Optical testing shall be performed with LED units mounted in standard traffic signal sections without visors or hoods attached to the signal sections.

A copy of the lab test report from an independent lab for each LED traffic signal lamp model shall include light intensity values at each ITE specific distribution test point. The lab report shall document current, voltage, and total harmonic distortion (THD) for each test point. The power factor (PF) associated with each model shall be documented.

d. Electrical: Each LED traffic signal lamp unit shall incorporate a regulated power supply that will electrically protect the LEDs and maintain a safe and reliable operation. The power supply shall provide capacitor filtered DC regulated current to the LEDs according to the LED manufacturer's specifications. Design of the power supply shall be such that the failure of an individual component, or any combination of components, cannot cause the signal to be illuminated after AC power is removed. LED traffic signal lamp units shall be operationally compatible with TSl, TS2, and 2070 controllers, conflict monitors with plus features, and malfunction management units currently used by the Department.

Circular and arrow LED traffic signal lamp units shall be designed to sense a loss of light output due to catastrophic LED failure and react in compliance with the failed state impedance provision of the ITE VTCSHs Circular Signal Supplement (latest edition).

Two, captive, color coded, 600V 18 AWG minimum jacketed wires, 3 feet (1 m) long, conforming to the National Electrical Code, rated for service at 105°C, are to be provided for an electrical connection. The LED traffic signal lamp units shall have on-board circuitry, including

voltage surge protection, to withstand high-repetition noise transients and low-repetition high-energy transients as stated in Section 2.1.8, NEMA Standard TS 2-2003, except voltage shall be 2000V instead of 1000V. The DOTD TCS 42 3 of 6 OCT 2008 circuitry shall also be able to withstand high-repetition low-energy transients as stated in Section 2.1.6, NEMA Standard TS 2-2003.

e. Environmental Requirements: Environmental requirements shall meet or exceed ITE VTCSHs LED Standard Supplements (latest edition).

The LED traffic signal lamp units shall be rated for use in the ambient operating temperature range of -40°C to +74°C.

The LED traffic signal lamp units shall be dust and moisture tight to protect all internal LED and electrical components.

The LED traffic signal lamp units shall consist of a housing that is a sealed watertight enclosure that eliminates dirt contamination and allows for safe handling and operation in all weather conditions. Moisture resistance testing shall be performed on LED signal modules in conformance with the requirements in the ITE VTCSHs LED Standard Supplements. Evidence of internal moisture after testing shall be cause for rejection.

f. Production Testing Requirements: A quality assurance (QA) program must be in place at the manufacturer's facility to ensure product reliability in accordance with ITE VTCSHs LED Standard Supplements.

Each new LED traffic signal lamp unit shall be energized for a minimum of 24 hours at nominal operating voltage (120V AC RMS) at room temperature in order to cause any electronic infant mortality to occur, and to ensure electronic component reliability prior to shipment.

g. Certifications: The contractor shall provide a copy of a test report certified by an independent laboratory accredited by the American Association for Laboratory Accreditation (A2LA) within the electrical field. The certification shall state that the LED traffic signal lamp model submitted meets or exceeds the latest ITE VTCSH LED Supplemental Standards. The laboratory report should include documentation of tests and verification of compliance to the additional provisions of this standard. Tests performed by the independent lab shall follow all the instructions documented in the latest ITE VTCSH Circular and Vehicle Arrow Traffic Signal Supplement.

h. Warranty: The contractor shall submit the contact name, address, telephone number and e-mail address or webpage for the representative, manufacturer, or distributor for warranty repair.

Manufacturer must comply with all requirements of the following warranty.
The manufacturer or supplier shall submit a letter of compliance prior to the delivery of any units indicating understanding and willingness to abide by the provisions of this specification.

If requested by the Department, the manufacturer shall supply schematics for all electronics.

The manufacturer or supplier shall provide name and telephone number of the person to contact regarding potential claims under the provisions of this warranty. The compliance letter shall be addressed to:

Louisiana Department of Transportation and Development
Section 45, Traffic Operations
ATTN: Signal Engineering
7686 Tom Drive
Baton Rouge, Louisiana 70806

The LED traffic signal lamp units shall be warranted against any failure due to design, workmanship, material defects, or intensity within the first 60 months from date of delivery. LED traffic signal lamp units shall meet or exceed minimum requirements of this specification for a period of no less than 60 months from date of delivery. Repair or full replacement will be required if a LED traffic signal lamp unit fails to operate as specified under normal operating conditions. Repaired or replaced LED traffic signal lamp units will be provided at no cost to the Department. The replaced or repaired LED traffic signal lamp units will inherit the remainder of the failed LED traffic signal lamp unit's warranty. LED traffic signal lamp units shall be repaired or replaced within 5 business days after receipt of failed LED traffic signal lamp unit/s at no cost to the Department with the exception of shipping the failed LED traffic signal lamp units to the vendor or manufacturer. The cost of shipping the LED traffic signal lamp units back to the Department shall be borne by the vendor or manufacturer.

If a LED traffic signal lamp unit fails with no visible damage to electronic / electrical components or wiring (not including fuses or components designed to act as a fuse), then the LED traffic signal unit is considered to have failed under normal operating conditions. A blown fuse or a component acting as a fuse, without any other permanent failure to electrical / electronic components shall be considered to have failed under normal operating conditions. Acts of God will not be accepted as excusable unit failures without visible damage.

The manufacturer/provider shall submit a certification document with each lot or shipment stating that the LED traffic signal lamp units provided meet all the requirements of this specification. The certification document shall show individual lot numbers and manufacture dates.

i. Quality Assurance: The Department may perform random sample testing on shipments.

Optical testing shall be performed with the module mounted in a standard traffic signal section, but without a visor or hood attached to the section housing. The number of modules tested shall be determined by the quantity of each model in the shipment. The sample size shall conform to ANSI/ASQC 21.4. DOTD Traffic Operations shall determine the sampling parameters to be used for the random sample testing. All parameters of the specification may be tested on the modules. Acceptance or rejection of the shipment shall conform to ANSI/ASQC 21.4 for random sampled shipments.

The Department reserves the right to select a sample from the field during the warranty period and perform tests to determine extended compliance and / or deterioration of the LED traffic signal lamp units.

An awarded contract may be terminated if the Department observes a 5 percent or greater unit failure rate within a period of 90 days after the units are placed into operation.

Heading (f), Backplates is deleted and the following substituted.

(f) Backplates: Backplates shall be designed to fit the combination of sections of each signal face. Backplates shall be flat aluminum alloy at least 0.05 inch (1.3 mm) (No. 18 gage) thick with rounded corners and shall withstand distortion in 70 mph (115 km/h) winds and shall be firmly attached to each signal face to withstand the above wind load and to permit the opening of any signal door independent from the other doors in the signal face. Width of backplates shall extend a minimum of 5 1/2 inches (140 mm) from the signal head on all 4 sides or as specified on the plans. Backplates shall be furnished with an oven baked dull black enamel finish on the front and back. Backplates shall also be furnished with a 3 inch (75 mm) yellow reflective strip around the perimeter conforming to ASTM D4956 Type X.

Subsection 1020.04, Poles for Traffic Signal Systems is amended as follows.

Heading (b), Steel Signal Support Pole is deleted and the following substituted.

(b) Steel Signal Support Pole:

(1) General: Poles and fittings shall be in accordance with the plans and shall be galvanized in accordance with ASTM A 123 and A 153. Poles shall be suitable for a minimum horizontal load of 4,000 pounds (1800 kg) applied 1 foot (300 mm) below the top of pole.

(2) Pole Shaft: The pole shaft shall have a minimum base diameter of 11 inches (280 mm) and a maximum base diameter of 11 3/4 inches (295 mm). The pole shaft shall be tapered to 7 1/2 inch (191 mm) minimum to 8 1/2 inch (216 mm) maximum diameter at the top. The pole shaft may have a round or octagonal cross section. A removable cap shall be used to cover the top of the pole shaft.

The pole shall be designed so that its maximum deflection is as shown in Table 1020-6.

Table 1020-6
Steel Pole Deflection

Pole Length, ft (m)	Maximum Deflection, in/100 lb (mm/50 kg)
26 (7.9)	0.25 (7.0)
28 (8.5)	0.30 (8.4)
30 (9.1)	0.38 (10.6)

The pole base shall have the manufacturer's name and pole height stenciled on it and shall be readable from the outside of the pole. The stencil shall be legible after galvanizing.

(3) Hand Holes and Bosses: A hand hole shall be provided approximately 18 inches (450 mm) above the base with approximate dimensions of 4 inches by 6 1/2 inches (100 mm by 165 mm) and cover shall be provided. The cover shall be restrained to the pole with a 15 inch (380 mm) No. 35 stainless steel chain fastened to the cover and to the inside of the hand hole so that the chain will be inside the pole after the cover is installed on the pole. There shall be no sharp edges on the cover, in the hand hole, or in the pole. The cover shall have the manufacturer's name and the pole height stenciled on it, readable from the outside of the pole. The stencil shall be legible after galvanizing. The hand hole strain bar shall be formed to provide a mechanical lock against the hand hole to prevent turning. No obstructions shall be in the hand hole with the cover removed. A grounding nut (1/2 inch (13 mm)-13NC) shall be welded to the inside of the shaft 90 degrees left and horizontal from the hand hole. A grounding lug shall be provided with each pole.

All poles shall have one 1-inch (25 mm) and one 3-inch (75 mm) boss centered on a horizontal line 18 inches (450 mm) from the base and one 1-inch (25 mm) and two 3-inch bosses 18 inches (450 mm) from the top. When facing the bosses, the 1-inch (25 mm) boss shall be 35 degrees (±3 degrees) to the right of the 3-inch (75 mm) boss. The 3-inch (75 mm) boss shall be located 180 degrees from the hand hole. The bosses at the top of the pole shall be in line with the bosses at the bottom. The poles shall be shipped with all bosses plugged using galvanized steel conduit plugs installed to full thread depth. On octagonal poles the 3-inch boss shall be centered on one face that is parallel to one edge of the base plate.

NS-ITS ITEMS: These items are described in the Technical Specification as included elsewhere in the construction proposal:

Payment will be at the unit contract price under the following:
NS-ITS-04000, Fiber Optic Marker, per each.
NS-ITS-04010, Pulling Fiber Optic Cable Through Existing Conduit, per linear foot.
NS-ITS-04020, Fiber Optic Cable, SM, Furnish & Install, 13-48 Fibers, per linear foot.
NS-ITS-04035, Fiber Optic Fan Out Kits, SM, 12 Strand, Furnish & Install, per each.
NS-ITS-04180, Fiber Optic Connection, Install, Splice, per each.
NS-ITS-04200, Fiber Optic Connection, Termination, Furnish & Install, per each.
NS-ITS-04250, Fiber Optic Drop Cable, SM, 12 Strand, Furnish & Install, per linear foot.
NS-ITS-04255, Fiber Optic Drop Cable, SM, 12 Strand (Plen), Furnish & Install, per linear foot.
NS-ITS-04270, Fiber Optic Drop Cable, SM, 24 Strand (Plen), Furnish & Install, per linear foot.
NS-ITS-04290, Fiber Optic Patch Cord, SM, 2 Strand, Furnish & Install, per each.
NS-ITS-04295, Fiber Optic Patch Cord, SM, 2 Strand, Furnish & Install, per each.
NS-ITS-04360, Fiber Optic Connection Splice Tray, Furnish & Install, per each.
NS-ITS-05020, Splice Closure, Indoor, Furnish & Install, per each.
NS-ITS- 05025, Splice Closure, Outdoor, Furnish & Install, per each.
NS-ITS-06020, Pullbox, In-Ground, Furnish & Install-New, per each.
NS-ITS-06300, Environmentally Sealed Enclosure, per each.
NS-ITS-07020, ITS Controller Cabinet, Pole Mount, Furnish & Install, per each.
NS-ITS-08010, 95' Pole & Foundation, Furnish & Install, per each.
NS-ITS-09280, Backbone Wireless Transceiver, Unlicensed, Furnish & Install, per each.
NS-ITS-09340, Local Wireless Transceiver, Furnish & Install, per each.
NS-ITS-09600, Contact Closure Fiber Transceiver, Furnish & Install, per each.
NS-ITS-10060, Electrical Service, per each.
NS-ITS-10065, ½" RGS Conduit, per linear foot.
NS-ITS-10380, Pole Riser Assembly, per each.
NSOITS-10400, Building Riser Assembly, per each.
NS-ITS-10420, Core/Hole Wall Penetration, per each.
NS-ITS-10440, J-Hooks and Wire Raceway, per linear foot.
NS-ITS-12000, Communications System Integration, per lump sum.
NS-ITS-13100, Wiring Diagrams, per lump sum.
NS-ITS-13120, Equipment Assembly Drawing, per lump sum.
NS-ITS-13140, Cabinet & Rack Wiring Diagrams, per lump sum.
NS-ITS-13160, Electrical Schematic, Wiring, & Logic Diagrams, per lump sum.

NS-ITS-13180, ITS Connection Diagrams, per lump sum.
NS-ITS-13200, As-Builts As Built Plan Sheets, Hard Copy and Electronic Format, per lump sum.
NS-ITS-14000, Flasher Assembly, per each.

CONTRACT TIME (03/05): The entire contract shall be completed in all details and ready for final acceptance in accordance with Subsection 105.17(b) within two hundred seventy (270) working days.

Prior to assessment of contract time, the contractor will be allowed 30 calendar days from the date stipulated in the Notice to Proceed to commence with portions of the contract work including but not limited to assembly periods, preparatory work for materials fabrications such as test piles, or other activities which hinder progress in the beginning stages of construction. Prior to issuance of the Notice to Proceed, the Department will consider extending the assembly period upon written request from the contractor justifying the need for additional time.

The contractor shall be responsible for maintenance of traffic from the beginning of the assembly period. During the assembly period, the contractor will be allowed to do patching and other maintenance work necessary to maintain the roadway with no time charges when approved by the engineer.

If the contractor begins regular construction operations prior to expiration of the assembly period, the assessment of contract time will commence at the time construction operations are begun.

LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
SUPPLEMENTAL SPECIFICATIONS
(FOR 2006 STANDARD SPECIFICATIONS)

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LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
SUPPLEMENTAL SPECIFICATIONS

The 2006 Louisiana Standard Specifications for Roads and Bridges and supplemental specifications thereto are amended as follows.

PART I – GENERAL PROVISIONS

SECTION 101 – GENERAL INFORMATION, DEFINITIONS, AND TERMS:

Subsection 101.03 – Definitions (07/07), Pages 3 – 13.

Delete the definition for "Proposal/Bid Guaranty" and substitute the following.

Proposal / Bid Guaranty. The required security furnished with a bid. The only form of security acceptable is a Bid Bond.

SECTION 102 – BIDDING REQUIREMENTS:

Subsection 102.09 – Proposal / Bid Guaranty (07/07), Page 19.

Delete the contents of this subsection and substitute the following.

PROPOSAL/BID GUARANTY. Each bid shall be accompanied by a proposal/bid guaranty in an amount not less than five percent of the total bid amount when the bidder's total bid amount as calculated by the Department in accordance with Subsection 103.01 is greater than $50,000. No proposal/bid guaranty is required for projects when the bidder's total bid amount as calculated by the Department is $50,000 or less. The official total bid amount for projects that include alternates is the total of the bidder's base bid and all alternates bid on and accepted by the Department. The proposal/bid guaranty submitted by the bidder shall be a bid bond made payable to the contracting agency as specified on the bid bond form provided in the construction proposal. No other form of security will be accepted.

The bid bond shall be on the "Bid Bond" form provided in the construction proposal, on a form that is materially the same in all respects to the "Bid Bond" form provided, or on an electronic form that has received Department approval prior to submission. The bid bond shall be filled in completely, shall be signed by an authorized officer, owner or partner of the bidding entity, or each entity representing a joint venture; shall be signed by the surety's agent or attorney-in-fact; and shall be accompanied by a notarized document granting general power of attorney to the surety's signer. The bid bond shall not contain any provisions that limit the face amount of the bond.

The bid bond will be written by a surety or insurance company that is in good standing and currently licensed to write surety bonds in the State of Louisiana by the Louisiana Department of Insurance and also conform to the requirements of LSA-R.S. 48:253.

All signatures required on the bid bond may be original, mechanical reproductions, facsimiles or electronic. Electronic bonds issued in conjunction with electronic bids must have written Departmental approval prior to use. The Department will make a listing of approved electronic sureties providers on the Bidx.com site.

SECTION 107 – LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC:
Subsection 107.05 – Federal Aid Participation (04/08), Pages 57 and 58.

Delete the second paragraph.

SECTION 108 – PROSECUTION AND PROGRESS:
Subsection 108.04 – Prosecution of Work (03/05) Pages 74 and 75.

Add the following sentence to the third paragraph of Heading (b).

Should the surety or the Department take over prosecution of the work, the contractor shall remain disqualified for a period of one year from the completion of the project, unless debarment proceedings are instituted.

When the Department of Transportation and Development is not the contracting agency on the project, the second paragraph under Heading (c) is deleted.

PART II – EARTHWORK

SECTION 202 – REMOVING OR RELOCATING STRUCTURES AND OBSTRUCTIONS:
Subsection 202.06 – Plugging or Relocating Existing Water Wells (03/04), Page 105.

Delete the first sentence and substitute the following.

All abandoned wells shall be plugged and sealed at the locations shown on the plans, or as directed by the engineer, in accordance with the "Water Well Rules, Regulations, and Standards, State of Louisiana." This document is available at the Department of Transportation and Development, Water Resources Section, P. O. Box 94245, Baton Rouge, Louisiana 70804-9245. The Water Resource Section's telephone number is (225) 274-4172.

PART III – BASE COURSES

SECTION 302 – CLASS II BASE COURSE:
Subsection 302.01 – Description (12/08), Page 150.

Add the following to the third paragraph:

(6) Blended Calcium Sulfate

Subsection 302.02 – Materials (12/08), Pages 150 and 151.

Add the following to the first paragraph:

Blended Calcium Sulfate	1003.01 & 1003.03 (e)

Subsection 302.04 – General Construction Requirements (12/08), Page 152.

Add the following:

Blended calcium sulfate will be allowed in areas of new alignment, fill areas, and cut areas less than one foot.

In cut areas greater than one foot (300 mm), an additional one foot (300 mm) of undercut will be required prior to placement of BCS. The additional undercut area shall be replaced with non-plastic sand embankment and encapsulated with a Class D geotextile fabric. The additional

non-plastic material, geotextile fabric, and undercut shall be at no additional cost to the Department.

Blended calcium sulfate will not be allowed in areas needed to facilitate traffic control or when a soil cement base course is specified in the plans. Blended calcium sulfate shall not be placed within 10 feet (3.0 m) of metal drainage structures. The contractor will be allowed to substitute any untreated Class II base course material listed in Subsection 302.01. Flowable fill under Section 710, or other approved backfill material in Section 701 shall be used to backfill the drainage structure.

Subsection 302.05 – Mixing (08/06) (12/08), Pages 152 and 153.

Delete the first sentence of Subheading (b)(1), In-Place Mixing, and substitute the following.

In-place mixing shall conform to Heading (a)(1) except that the percentage of Type I portland cement required will be 6 percent by volume.

Add Heading (d) as follows:

(d) Blended Calcium Sulfate: Calcium sulfate shall be blended with an approved aggregate or lime prior to placement. The blended calcium sulfate material shall be uniformly mixed and sampled from dedicated stockpiles. Gradation sampling in accordance with Subsection 1003.03 shall be taken from the dedicated stockpiles at the point of material origin.

Subsection 302.06 – Transporting and Placing on Subgrade (12/08), Page154.

Add the following:

Water shall be added or other suitable means taken to prevent dust during the transporting and placing of dry blended calcium sulfate.

Subsection 302.07 - Compacting and Finishing (12/08), Pages 154 and 155.

Add Heading (e) as follows:

(e) Blended Calcium Sulfate: Blended calcium sulfate shall be placed and spread on the subgrade and compacted to produce layers not exceeding 12 inches (300 mm) compacted thickness. During placement the material shall be thoroughly wetted by application of water to maintain 2 to 4 percent above optimum moisture. After application of water, allow the moisture to reach equilibrium in the base before applying rolling techniques. Rolling of BCS is required to the edge of the embankment or subgrade. Each layer shall be compacted to at least 95 percent of maximum dry density or compacted by an approved established rolling pattern determined by the project engineer before the next layer is placed. Optimum moisture and maximum density shall be determined in accordance with DOTD TR 418 Method G modified to include a maximum drying temperature of 140°F (60°C).

Add Heading (f) as follows:

(f) Proof Rolling: Proof rolling shall be done by a load of 25 tons (25 Mg) in a 12 to 14 cubic yard (9 to 10.5 cubic meters) tandem dump truck with ten wheels or approved loaded truck

determined by the project engineer. Proof rolling shall be a minimum of 5 passes in each direction at the same locations and at a maximum vehicle speed of 3 mph (4.8 km/h).

All BCS base will be tested by proof rolling prior to placement of surfacing material, including asphalt binder. Any irregularities or soft spots shall be corrected prior to placement of the surfacing material. Any rain event on the project site between the proof rolling and placement of the surfacing will require an additional proof rolling as noted above.

Subsection 302.09 – Protection and Curing (12/08), Page 155.

Add Heading (c) as follows:

(c) Blended Calcium Sulfate: Protection and curing of blended calcium sulfate shall be in accordance with Subsection 302.09(b).

Subsection 302.12 – Acceptance Requirements (12/08), Pages 156 – 161.

Add the following to Heading (a):

The acceptance requirements for blended calcium sulfate base course shall be the same as stone base course with the following modifications. Upon completion of compaction operations, the density will be determined in accordance with DOTD TR 401 except that all moisture content determinations for density calculations shall be conducted by oven drying the material for 24 hours at 140°F (60°C). A forced draft type oven capable of maintaining the temperature shall be provided by the contractor for field moisture content determination for density control.

SECTION 305 – SUBGRADE LAYER:

Subsection 305.06 – Payment (01/08), Page 184.

Delete this subsection and substitute the following.

305.06 Payment. Payment for subgrade layer will be made at the contract unit price which includes lime, lime treatment, cement, cement treatment, water, stone, recycled portland cement concrete, crushed slag, blended calcium sulfate, asphaltic concrete, and asphalt curing membrane or prime coat, subject to the payment adjustment provisions of Section 1002 for specification deviations of asphalt materials and Subsection 303.11(a) for density deficiencies of cement treated materials. Adjustments in pay for increase or decrease in the percent cement ordered by the engineer will be in accordance with Subsection 303.13. Adjustments in pay for increase or decrease in the percent lime ordered by the engineer will be based on the price of lime shown on paid invoices (total of all charges). The Materials and Testing Section will provide the payment adjustment percentage for properties of asphalt materials.

Payment for geotextile fabric will be included in the contract unit price for subgrade layer.

Payment will be made under:

Item No.	Pay Item	Pay Unit
305-01	Subgrade Layer _____in (mm) Thick	Square Yard (Sq m)

SECTION 307 – PERMEABLE BASES:

Subsection 307.02 – Materials (09/07), Pages 187 and 188.

Delete Heading (b), Asphalt and substitute the following.

(b) Asphalt: The asphalt for asphalt treated permeable base shall be an approved polymer modified asphalt cement, PG 76-22m, or PG 82-22rm complying with Section 1002. The percentage of asphalt cement shall be 2.0 percent to 4.0 percent by weight (mass) of the total mixture. Asphalt cement content and mixing process shall be such that all aggregates are visibly coated. The mixture shall retain 90 percent coating when tested in accordance with DOTD TR 317.

A job mix formula shall be submitted and approved in accordance with Section 502.

SECTION 308 – IN-PLACE CEMENT TREATED BASE COURSE:

All Subsections within Section 308 – (07/07), Pages 191 – 198.

Whenever the reference to "DOTD TR-432, Method D" is used, it shall mean "DOTD TR-432".

PART V – ASPHALTIC PAVEMENTS

SECTION 502 – SUPERPAVE ASPHALTIC CONCRETE MIXTURES:

Subsection 502.02 – Materials (08/06) (11/07), Pages 210 – 213.

Delete Table 502-2, Superpave Asphalt Cement Usage under Subheading (a) and substitute the following.

Table 502-2
Superpave Asphalt Cement Usage

Current Traffic Load Level	Mixture Type	Grade of Asphalt Cement
Level 1	Wearing Course	PG 70-22m
	Binder Course	PG 70-22m
	Base Course	PG 64-22
Level 2	Wearing Course	PG 76-22m
	Binder Course	PG 76-22m
Level A	Incidental Paving	PG 70-22m

Note: A PG 82-22 rm, Waste Tire Rubber Modified Asphalt, may be substituted for any other grade of asphalt cement.

Delete Table 502-3, Aggregate Friction Rating under Subheading (c)(1) and substitute the following.

Table 502-3
Aggregate Friction Rating

Friction Rating	Allowable Usage
I	All mixtures
II	All mixtures
III	All mixtures, except travel lane wearing courses with plan ADT greater than 7000[1]
IV	All mixtures, except travel lane wearing courses[2]

[1] When plan current average daily traffic (ADT) is greater than 7000, blending of Friction Rating III aggregates and Friction Rating I and/or II aggregates will be allowed for travel lane wearing courses at the following percentages. At least 30 percent by weight (mass) of the total aggregates shall have a Friction Rating of I, or at least 50 percent by weight (mass) of the total aggregate shall have a Friction Rating of II. The frictional aggregates used to obtain the required percentages shall not have more than 10 percent passing the No. 8 (2.36 mm) sieve.

[2] When the average daily traffic (ADT) is less than 2500, blending of Friction Rating IV aggregates with Friction Rating I and/or II aggregates will be allowed for travel lane wearing courses at the following percentages. At least 50 percent by weight (mass) of the total aggregate in the mixture shall have a Friction Rating of I or II. The frictional aggregates used to obtain the required percentages shall not have more than 10 percent passing the No. 8 (2.36 mm) sieve.

Subsection 502.14 – Lot Sizes (11/07), Pages 232 and 233.

Delete the first sentence of the first paragraph and substitute the following.

A lot is a segment of continuous production of asphaltic concrete mixture from the same job mix formula produced for the Department at a specific plant, delivered to a specific DOTD project.

SECTION 508 – STONE MATRIX ASPHALT:

Subsection 508.01 – Description (09/07), Page 274.

Delete this subsection and substitute the following.

508.01 DESCRIPTION. This work consists of furnishing and constructing Stone Matrix Asphalt (SMA) which is a plant mixed asphalt concrete wearing course for high traffic applications. This mixture is a rut resistant hot mix design with stone on stone contact. The mixture shall be composed of a PG 76-22m, or PG 82-22rm asphalt cement and a gap graded coarse aggregate structure. Mineral filler and/or fibers shall be used to control draindown. This work shall be in accordance with these specifications, plan details, and as directed. All requirements of Section 502 apply to Stone Matrix Asphalt, except as modified herein. All plant and paving equipment and processes must meet the requirements of Section 503.

Mixture used for shoulder may be Stone Matrix Asphalt or any mixture type shown in Table 502-5.

Subsection 508.02 – Materials (09/07), Page 274.

Delete the contents of Subheading (a), Asphalt Cement and substitute the following.

(a) Asphalt Cement: Asphalt cement shall be PG 76-22m, or PG 82-22rm as listed on QPL 41 and complying with Section 1002.

PART VI – RIGID PAVEMENT

SECTION 602 – PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION:

Subsection 602.17 – Payment (09/07), Pages 341 – 344.

Delete the last paragraph of Subheadings (d), Full Depth Corner Patching of Jointed Concrete Pavement, (e) Full Depth Patching of Jointed Concrete Pavement, and (g) Patching Continuously Reinforced Concrete Pavement, and substitute the following.

Payment for deteriorated base course removed as directed by the engineer and replaced with concrete will be made as follows: The value per inch (mm) thickness will be determined by dividing the contract unit price per square yard (sq m) by the plan thickness. Thickness of patches will be measured from the surface that exists at the time of patching. Payment for the additional thickness will be made at 50 percent of the value per inch (mm) thus determined.

PART VII – INCIDENTAL CONSTRUCTION

SECTION 701 – CULVERTS AND STORM DRAINS:

All Subsections within Section 701 (08/07), Pages 347 – 358.

Delete Section 701, Culverts and Storm Drains and substitute the following.

SECTION 701
CULVERTS AND STORM DRAINS

701.01 DESCRIPTION. This work consists of furnishing, installing, and cleaning pipe, pipe arch, storm drains and sewers, also referred to as culverts or conduit, in accordance with these specifications and in conformity with lines and grades shown on the plans or established.

701.02 MATERIALS. Materials shall comply with the following sections and subsections:

Usable Soil	203.06(a)
Selected Soil	203.06(b)
Plastic Soil Blanket	203.10
Mortar	702.02
Flowable Fill	710
Portland Cement Concrete	901
Reclaimed Asphaltic Pavement (RAP)	1003.01 & 1003.04(d)
Stone	1003.03(b)
Recycled Portland Cement Concrete	1003.03(c)
Granular Material	1003.07
Bedding Material	1003.08
Concrete Sewer Pipe	1006.02
Reinforced Concrete Pipe	1006.03
Reinforced Concrete Pipe Arch	1006.04
Gasket Materials	1006.06
Plastic Pipe	1006.07
Split Plastic Coupling Bands	1006.07(d)(4)
Plastic Yard Drain Pipe	1006.09
Bituminous Coated Corrugated Steel Pipe and Pipe Arch	1007.02
Structural Plate for Pipe, Pipe Arch and Arch	1007.04
Corrugated Aluminum Pipe and Pipe Arch	1007.05
Coupling Bands	1007.09
Reinforcing Steel	1009
Geotextile Fabric	1019

(a) Side Drain Pipe or Side Drain Pipe Arch: When the item for Side Drain Pipe or Side Drain Pipe Arch is included in the contract, the contractor has the option of furnishing reinforced concrete pipe or reinforced concrete pipe arch, corrugated metal pipe or corrugated metal pipe arch, or plastic pipe, as allowed by EDSM II.2.1.1 or unless otherwise specified.

(b) Cross Drain Pipe or Cross Drain Pipe Arch: When the item for Cross Drain Pipe or Cross Drain Pipe Arch is included in the contract, the contractor has the option of furnishing reinforced concrete pipe or reinforced concrete pipe arch, corrugated metal pipe or corrugated metal pipe arch, or plastic pipe, as allowed by EDSM II.2.1.1 or unless otherwise specified.

(c) Storm Drain Pipe or Storm Drain Pipe Arch: When the item for Storm Drain Pipe or Storm Drain Pipe Arch is included in the contract, the contractor has the option of furnishing reinforced concrete pipe or reinforced concrete pipe arch, or plastic pipe, as allowed by EDSM II.2.1.1 or unless otherwise specified.

(d) Yard Drain Pipe: When the item for Yard Drain Pipe is included in the contract, the contractor has the option of furnishing concrete sewer pipe, plastic yard drain pipe or plastic pipe in accordance with Section 1006 unless otherwise specified.

(e) Material Type Abbreviations:

(1) Reinforced Concrete Pipe:

RCP	Reinforced Concrete Pipe
RCPA	Reinforced Concrete Pipe Arch

(2) Corrugated Metal Pipe:

CAP	Corrugated Aluminum Pipe
CAPA	Corrugated Aluminum Pipe Arch
CMP	Corrugated Metal Pipe
CMPA	Corrugated Metal Pipe Arch
CSP	Corrugated Steel Pipe
CSPA	Corrugated Steel Pipe Arch
BCCSP	Bituminous Coated Corrugated Steel Pipe
BCCSPA	Bituminous Coated Corrugated Steel Pipe Arch

(3) Plastic Pipe:

PP	Plastic Pipe
PVCP	Polyvinyl Chloride Pipe
RPVCP	Ribbed Polyvinyl Chloride Pipe
CPEPDW	Corrugated Polyethylene Pipe Double Wall

(f) Joint Type Abbreviations:

T1	Type 1 Joint
T2	Type 2 Joint
T3	Type 3 Joint

(g) Quality Assurance for Pipe: Manufacturing plants will be periodically inspected for compliance with specified manufacturing methods, and material samples will be randomly obtained for laboratory testing for verification of manufacturing lots. Materials approved at the manufacturing plant will be subject to visual acceptance inspections at the jobsite or point of delivery.

701.03 EXCAVATION. For all pipe, when the sides of the trench are stable as evidenced by the sides of the trench being able to maintain a vertical cut face, the minimum trench width at the bottom of the excavation will be 18 inches (460mm) on either side of the outside diameter of the pipe. If the sides of the trench are unstable, the width of the trench at the bottom of the excavation, for plastic or metal pipe, shall be a minimum width of at least 18 inches (460mm) or one pipe diameter on each side of the outside diameter of the pipe, which ever is greater. Surplus material or excavated material that does not conform to the requirements of Subsection 203.06(a) shall be satisfactorily disposed of in accordance with Subsection 202.02. Moisture controls including backfill materials selection and dewatering using sumps, wells, well points or other approved processes may be necessary to control excess moisture during excavation, installation of bedding, over-excavated trench backfilling, pipe placement and pipe backfill.

(a) Over-excavation: When unsuitable soils as defined in Subsection 203.04 or a stable, non-yielding foundation cannot be obtained at the established pipe grade, or at the grade established for placement of the bedding, unstable or unsuitable soils below this grade shall be removed and replaced with granular material meeting the requirements of Subsection 1003.07,

bedding materials meeting the requirements of Subsection 1003.08 or Type A backfill. All granular, backfill materials placed below the established pipe or bedding grade shall be placed in lifts not exceeding 8 inches (200 mm) thick and sufficiently compacted by hand or a dynamic mechanical hand compaction device over the surface of each lift to form a stable, non-yielding foundation at the surface of the established bedding or pipe grade.

When rock is encountered, it shall be removed below grade and replaced with material complying with Subsection 1003.07, bedding materials meeting the requirements of Subsection 1003.08 or Type A backfill. The compacted earth cushion shall have a thickness under the pipe of at least 1/2 inch per foot (40 mm/m) of fill height over the top of the pipe with a minimum thickness of 8 inches (200 mm). All granular, backfill materials placed below the established pipe or bedding grade shall be placed in lifts not exceeding 8 inches (200 mm) thick and sufficiently compacted by hand or a dynamic mechanical hand operated compaction device over the surface of each lift to form a stable, non-yielding foundation at the surface of the established bedding or pipe grade.

Materials used to backfill in an over-excavated portion of a trench do not require encasement in a Geotextile Fabric.

Density of approved materials placed in over-excavated trenches will not be measured or determined.

701.04 FORMING PIPE BED. Bedding material, when specified, shall be constructed in accordance with Section 726. Materials allowed for bedding shall be as specified in Subsection 1003.08 or may be Type A backfill materials. When bedding materials are specified, additional excavation shall be performed below established pipe grade and the bedding material placed in lifts not exceeding 8 inches (200 mm) thick and lightly compacted by hand or a dynamic hand compaction device over the surface of each lift.

When the bottom of the pipe is not laid in a trench but is constructed above natural soils, a uniform bed shall be constructed as specified for the bottom of a trench.

Density of approved bedding materials will not be measured or determined.

701.05 LAYING PIPE. Pipe laying shall begin at the downstream end of the line. The pipe shall be in contact with the foundation throughout its length. Bell or groove ends of pipe and outside circumferential laps of riveted metal pipe shall be placed facing upstream. Riveted seam metal pipe shall be placed with longitudinal laps at sides. Pipes in each continuous line shall have the same wall thickness. Metal pipes provided with lifting lugs shall be handled only by these lugs.

After pipe has been laid and before backfill is placed, the engineer will inspect the pipe for alignment, grade, integrity of joints, and coating damage.

701.06 JOINING PIPE.

(a) Joint Usage:

(1) Type 1 (T1) joints shall be used for side drains under drives and similar installations.

(2) Type 2 (T2) joints shall be used for cross drains under roadways, including turnouts.

(3) Type 3 (T3) joints shall be used for closed storm drain systems, flumes and siphons.

(b) Concrete Pipe: Concrete pipe may be either bell and spigot, or tongue and groove. The method of joining pipe sections shall be such that ends are fully entered and inner surfaces are flush and even.

An approved mechanical pipe puller shall be used for joining pipes over 36 inches (900 mm) in diameter. For pipe 36 inches (900 mm) or less in diameter, any approved method for joining pipe may be used which does not damage the pipe.

Joints shall comply with Subsection 1006.05, and shall be sealed with gasket material installed in accordance with the manufacturer's recommendations.

(c) Metal Pipe: Metal pipe shall be firmly joined by coupling bands. Bands shall be centered over the joint.

For Type 1 joints, approved gasket material shall be placed in one corrugation recess on each side of the joint at the coupling band and on each band connection in such manner to prevent leakage.

When Type 2 or 3 joints are specified, joining of metal pipe sections shall conform to the following provisions:

(1) General: Band joints shall be sealed with gasket material. Gasket material shall be placed in accordance with the plan details.

(2) Circular Section: Connecting bands shall be of an approved design and shall be installed in accordance with plan details.

(3) Arch Section: Connecting bands shall be a minimum of 12 inches (300 mm) wide for pipe arch less than 36 inches (900 mm) round equivalent diameter, and a minimum of 21 inches (525 mm) wide for 36 inches (900 mm) round equivalent diameter pipe arch and greater. Bands shall be connected at the ends by approved angle or strap connections. Connecting bands used for 36 inches (900 mm) round equivalent diameter pipe arch and above shall be 2-piece bands.

(d) Plastic Pipe: Joints for plastic pipe shall be either bell and spigot or split coupling bands.

(1) Bell and Spigot Type Joint System: The method of joining pipe sections shall be such that ends are fully entered and inner surfaces are flush and even.

Any approved method for joining pipe may be used which does not damage the pipe.

Joints shall be approved and shall be sealed with a gasket system utilizing gasket material complying with Subsection 1006.06(a).

(2) Split Coupling Type Joint System: Split coupling bands shall comply with all dimensional and material requirements of Subsection 1006.07. The bands shall be centered over the joint. The split coupling band shall be secured to the pipe with a minimum of five stainless steel or other approved corrosion resistant bands.

Joints shall be approved and shall be sealed with gasket material. Gasket material shall be placed in the first two corrugation recesses on each side of the pipe connections. Gasket

material shall also be placed on each band connection to prevent leakage. When flexible plastic gasket material is used it shall be a minimum of 1/2 inch (13 mm) in size. The bands shall be tightened to create overlap of the band and shall adequately compress the gasket material.

(e) Connections: Approved connections shall be used when joining new pipes to existing pipes. When concrete collars are required in order to extend the ends of existing pipes that have been damaged or to join different types or sizes of pipes, the concrete collars shall be constructed in accordance with plan details, the applicable requirements of Section 901, and as directed.

(f) Geotextile Fabric, Pipe Joints: For concrete, metal and plastic pipes, Types 2 and 3 joints shall be wrapped with geotextile fabric for a minimum of 12 inches (300 mm) on each side of joint for pipe 36 inches (900 mm) or less in diameter and a minimum of 18 inches (450 mm) on each side of the joint for pipe greater than 36 inches (900 mm) in diameter. Ends of the fabric shall be lapped at least 10 inches (250 mm). The edges and ends of fabric shall be suitably secured for the entire circumference of the pipe.

701.07 RELAYING PIPE. If specified or directed, existing pipes shall be removed and suitable sections relaid as specified for new pipes.

701.08 BACKFILLING.

(a) General: Prior to backfilling, pipes found to be damaged or out of alignment or grade shall be removed and reinstalled, or replaced.

Type A backfill material shall be stone, recycled portland cement concrete, flowable fill, or RAP.

Type B backfill materials are selected soils. Where Type B backfill materials are called for, Type A backfill materials may be substituted.

When corrugated metal pipe is used, the backfill material shall be tested and shall have a resistivity greater than 1500 ohm-cm and a pH greater than 5 when tested in accordance with DOTD TR 429 and DOTD TR 430 respectively.

When Type A backfill material is used, geotextile fabric surrounding this backfill shall be placed in accordance with Subsection 726.03 between the aggregate backfill material and all other natural or placed soils in the trench or embankment. Care shall be taken to prevent damage to geotextile fabric during placement of backfill material. For concrete pipe, the fabric shall enclose not only the initial backfill but shall be wrapped over the top of the pipe with at least 12 inches (300 mm) of overlap.

When a trench box or trench sheeting is used in unstable soils and/or for worker safety, and when moved during backfilling operations, filling and additional compaction of the disturbed zone of backfill must take place immediately and in a manner acceptable to the engineer.

Initial backfill is a structural backfill encasing the pipe from the bottom of the pipe to the springline for concrete pipe and to a point one foot (0.3 m) above the top of the pipe for both metal and plastic pipe. Final backfill is not a structural backfill and shall extend from the top of the initial backfill to the top of the natural ground or subgrade in cut areas or to the top of existing ground in fill areas. Any fill required above the final backfill is considered and treated as embankment.

(b) Backfill Applications: For projects using A+B+C bidding method where rigid and flexible pavement alternates are considered, backfill application (2) below, "Cross Drains Under Flexible Pavements", shall apply for either rigid or flexible pavements.

(1) Under Concrete Pavements: Type B backfill may be used as initial and final backfill for all pipes, culverts or drains under concrete pavements. Placement and compaction shall be as specified in Heading (d) below.

(2) Cross Drains Under Flexible Pavements: All reaches, exclusive of those portions of the pipe which are under shoulders, of cross drains and all other culverts, pipes or drains that cross the centerlines of the new roadway or centerlines of existing roadways, such as intersections and are under flexible pavements shall receive an initial backfill of Type A material. Type B backfill materials may be used as final backfill for all pipes. Placement and compaction shall be as specified in Heading (c) and (d) below. Where the subgrade is above existing ground, embankment material as specified for the remainder of the project shall be used from the top of the final backfill to the top of the established embankment grade.

(3) Other Drains Under Flexible Pavements: All reaches of all culverts, pipes or drains under flexible pavements that do not cross the centerlines of new roadway or centerlines of existing roadways, and exclusive of those portions of the pipe which are totally under shoulders, shall receive an initial and final backfill of Type B material. Placement and compaction shall be as specified in Heading (d) below. Where the subgrade is above existing ground, embankment material as specified for the remainder of the project shall be used from the top of the final backfill to the top of the established embankment grade.

(4) Other Areas: All culverts, pipes or drains in nonpaved areas or paved areas that serve as driveways or shoulders shall receive an initial and final backfill of Type B material. Placement and compaction shall be as specified in Heading (d) below.

(5) Pipes Subject to Construction Traffic; The embankment or pipe backfill shall be constructed to a minimum of 24 inches (600 mm) over the pipe before heavy construction equipment is allowed to cross the installation. Where practical, installations with less than 24 inches (600 mm) of cover over the top of the pipe shall be constructed after heavy hauling is completed over the pipe location. After completion of hauling operations, the contractor shall remove excess cover material. Pipe damaged by hauling and backfilling operations shall be removed and reinstalled, or replaced, at no direct pay.

(c) Placement and Compaction; Type A Backfill: For all pipes, culverts and conduits under paved and nonpaved areas, where Type A backfill material is used, the Type A backfill shall be thoroughly hand compacted under the pipe haunches and then dynamically compacted in layers not exceeding 8 inches (200 mm) compacted thickness. Compaction under the haunches of the pipe shall initially be by hand tamping or other acceptable means, until a level is reached that the dynamic tamping can commence. Each lift shall be compacted by applying at least eight passes of a hand operated, dynamic mechanical compaction device over the surface of each lift. With approval of the engineer, layer thickness may be increased to 12 inches (300 mm) with verification of satisfactory installation and performance. If flowable fill is used it shall be furnished, placed and consolidated in accordance with Section 710. The contractor shall control placement operations during initial backfill operations so as not to damage protective coatings on metal pipes. The contractor shall repair damaged coatings at no additional pay.

(d) Placement and Compaction; Type B Backfill: For all pipes, culverts and conduits, where Type B backfill is allowed, the Type B material shall be placed in layers not exceeding 8 inches (200 mm) compacted thickness. Compaction shall be with suitable mechanical equipment. With approval of the engineer, layer thickness may be increased to 12 inches (300 mm) with verification of satisfactory installation and performance.

(e) Placement and Compaction; Trenchless or Partial Trench Condition: All pipes, culverts, drains and conduits placed with any portion of the pipe above existing ground must also comply with Subsections (a),(b) (c) and (d) above for the portion of the pipe within a trench and that portion of the pipe not constructed in a trench. The width of initial and final backfill of that portion above existing ground and not within a trench will be constructed to such a width that the requirements for placement, compaction and density are met.

(f) Density Requirements: The in place density of Type A backfill materials and bedding materials, will not be measured or determined. Type A backfill, exclusive of RAP and flowable fill, shall be placed at or near optimum moisture content determined in accordance with DOTD TR 415 or 418. RAP materials shall be placed and compacted in a slightly moist condition.

The maximum dry density of initial or final Type B backfill under all paved areas which are to be under traffic will be determined in accordance with DOTD TR 415 or TR 418 and in-place density determined in accordance with DOTD TR 401. Initial and final Type B backfill under all paved areas, under traffic, shall be placed at or near optimum moisture content determined in accordance with DOTD TR 415 or TR 418. Each layer shall be compacted by approved methods prior to the placement of a subsequent layer. The engineer will approve the compaction method based upon validation that such method, including moisture control, will achieve at least 95 percent of maximum dry density as determined in accordance with DOTD TR 401. With approval of the engineer, density testing may be waived on subsequent layers with backfill installation in accordance with approved compaction methods and continued satisfactory performance.

Initial and final backfill in unpaved areas or paved areas such as shoulders or driveways, shall be placed evenly and compacted along the length of the culvert, pipe or drain from the top of the initial backfill to the top of the subgrade. Layered backfill shall be compacted at least to the density of the adjoining existing soils or the compaction required of the laterally adjoining layers of soil immediately outside the trench for embankment elevations. Initial and final backfill shall be placed and compacted at or near optimum moisture content determined in accordance with DOTD TR 415 or TR 418.

701.09 INSPECTION OF PIPES. After completion of embankment and prior to roadway surfacing, the engineer shall inspect pipes for proper alignment and integrity of joints. Any misaligned pipe or defective joints shall be corrected by the contractor at no direct pay.

(a) Plastic Pipe: Installed plastic pipe shall be tested to ensure that vertical deflections do not exceed 5.0 percent. Maximum allowable deflections shall be governed by the mandrel requirements stated herein.

Deflection tests shall be performed no sooner than 30 calendar days after installation and compaction of backfill. The pipe shall be cleaned and inspected for offsets and obstructions prior to testing.

For pipe 36 inches (900 mm) and less in diameter, a mandrel shall be pulled through the pipe by hand to ensure that maximum allowable deflections have not been exceeded. The mandrel shall be approved by the engineer prior to use. Use of an unapproved mandrel or a mandrel altered or modified after approval will invalidate the test. If the mandrel fails to pass, the pipe is overdeflected.

Unless otherwise permitted, overdeflected pipe shall be uncovered and, if not damaged, reinstalled. Damaged pipe shall not be reinstalled, but shall be removed and replaced with new pipe. Any pipe subjected to any method or process other than removal, which attempts, even successfully, to reduce or cure any overdeflection, shall be removed and replaced with new pipe.

The mandrel shall be a rigid, nonadjustable, odd-numbered legged (minimum 9 legs) mandrel having a length not less than its nominal diameter or 24 inches (600 mm), whichever is less. The minimum diameter at any point shall be 5.0 percent less than the base inside diameter of the pipe being tested. The mandrel shall be fabricated of steel, aluminum or other approved material fitted with pulling rings at each end. The nominal pipe size and outside diameter of the mandrel shall be stamped or engraved on some segment other than a runner. A suitable carrying case shall be furnished.

For pipe larger than 36 inches (900 mm) in diameter, deflection shall be determined by a method approved by the engineer. If a mandrel is selected, the minimum diameter, length, and other requirements shall conform to the above requirements.

Mandrel testing shall be conducted by the contractor in the presence of the engineer. Mandrel testing shall be at no direct pay.

(b) Metal Pipe: If the inside diameter of metal pipe or rise dimension of metal pipe arch deflects more than 5.0 percent from original dimensions, they shall be removed and reinstalled, unless they do not rebound or are damaged. Pipe or pipe arch which are damaged or do not rebound shall be removed and replaced at no direct pay. Measurement of deflection will be made by the engineer away from rerolled ends.

701.10 CLEANING PIPES.

(a) Existing Pipes: Pipes designated to be cleaned shall be cleaned of soil, debris and other materials to the invert of the pipe. Designated pipes shall be cleaned by approved methods that will not damage the pipes. Any damage caused by the contractor's operations shall be satisfactorily repaired at no direct pay.

Removed soil, debris and other materials shall be disposed of in accordance with Subsection 202.02 or as otherwise approved in writing.

(b) Contractor Installed Pipes: Prior to final acceptance, pipes shall be cleaned of all debris and soil to the invert of the pipe at no direct pay.

Removed soil, debris and other materials shall be disposed of in accordance with Subsection 202.02 or as otherwise approved in writing.

701.11 STUBBING AND PLUGGING PIPES. When it is required that pipes be plugged, such plugs shall be constructed of Class R concrete complying with Section 901. Thickness of plug and method of construction shall be as directed.

When new pipes are to be stubbed into new or existing pipes or other structures, the connection shall be made with approved mortar complying with Subsection 702.02.

701.12 MEASUREMENT. Pipe, both new and relaid, will be measured in linear feet (lin m) as follows unless stated otherwise.

(a) Pipe not confined by fixed structures will be measured by the number of joints at the nominal length of each joint.

(b) Pipe confined by fixed structures will be measured along the pipe between the termini of pipe in structure walls.

(c) Pipe confined by a fixed structure on one end and unconfined at the other end will be measured along the pipe from the terminus of pipe in the structure wall to the unconfined end of pipe.

(d) Fabricating of pipe tees, elbows and other fittings will be measured per each fitting. The length of pipe in such fittings will be included in the pay length measurement of pipes of which they form a part.

(e) Excavation required for installation of pipes will not be measured for payment, except as otherwise specified in Subsection 203.14.

(f) Furnishing and placing backfill material below existing ground level for pipes will not be measured for payment. Backfill material needed to complete backfill above natural ground and around pipes that extend above natural ground will be measured and payment will be made under applicable earthwork items. When specified, flowable fill will be measured and paid for in accordance with Section 710.

(g) Plugging and stubbing of pipes will not be measured for payment.

(h) Cleaning existing pipes will be measured by the length of pipe cleaned and accepted.

(i) Concrete collars will be measured per each.

701.13 PAYMENT.

(a) Payment for pipe will be made at the contract unit price per linear foot (lin m) of the types and sizes specified.

When plastic pipe is specified on the plans or elected to be used by the contractor, payment will be made at the contract unit price per linear foot (lin m) of the types and sizes specified in accordance with the payment schedule of Table 701-1.

Table 701-1
Payment Schedule for Plastic Pipe

Percent Payment	Stage of Completeness
75	After placement and backfill has been completed
25	After the pipe has met vertical deflection requirements in accordance with Subsection 701.09(a)

(b) Payment for fabricating pipe tees, elbows and other fittings will be made at the contract unit price per each fitting.

(c) When unstable conditions are encountered, the additional excavation will not be measured for payment; however, the additional materials furnished and placed for the pipe foundation will be measured and paid for as follows:

(1) Granular Materials: Payment will be made under the embankment item. The net section volume of the materials will be multiplied by 3 to determine the pay volume. When the contract does not include a pay item for embankment, payment will be made in accordance with Subsection 104.02.

(2) Bedding Material: Measurement and payment will be made in accordance with Section 726. When the contract does not include a pay item for bedding material, payment will be made in accordance with Subsection 104.02.

(d) Payment for cleaning existing pipes will be made at the contract unit price per linear foot (lin m).

(e) Payment for concrete collars will be made at the contract unit price per each.

Payment will be made under:

Item No.	Pay Item	Pay Unit
701-01	Cross Drain Pipe (Size & Type)	Linear Foot (Lin m)
701-02	Cross Drain Pipe Arch (Size & Type)	Linear Foot (Lin m)
701-03	Storm Drain Pipe (Size & Type)	Linear Foot (Lin m)
701-04	Storm Drain Pipe Arch (Size & Type)	Linear Foot (Lin m)
701-05	Side Drain Pipe (Size)	Linear Foot (Lin m)
701-06	Side Drain Pipe Arch (Size)	Linear Foot (Lin m)
701-07	Yard Drain Pipe (Size)	Linear Foot (Lin m)
701-08	Relaying Pipe	Linear Foot (Lin m)
701-09	Fabricating Pipe Fittings	Each
701-10	Reinforced Concrete Pipe (Extension)	Linear Foot (Lin m)
701-11	Reinforced Concrete Pipe Arch (Extension)	Linear Foot (Lin m)
701-12	Corrugated Metal Pipe (Extension)	Linear Foot (Lin m)
701-13	Corrugated Metal Pipe Arch (Extension)	Linear Foot (Lin m)

701-14	Cleaning Existing Pipes	Linear Foot (Lin m)
701-15	Concrete Collar	Each
701-16	Plastic Pipe (Extension)	Linear Foot (Lin m)

SECTION 704 – GUARD RAIL:

Subsection 704.03 – General Construction Requirements (01/05), Pages 368 and 369.

Add the following to Heading (d), Guard Rail End Treatments.

All end treatments shall bear a label indicating the manufacturer and exact product name of the end treatment along with its assigned NCHRP 350 test level. This label shall resist weathering and shall be permanently affixed to the railing in such a way as to be readily visible.

SECTION 706 – CONCRETE WALKS, DRIVES AND INCIDENTAL PAVING:

All Subsections within Section 706 (04/08), Pages 375 – 377.

Delete Section 706, Concrete Walks, Drives and Incidental Paving and substitute the following.

SECTION 706
CONCRETE WALKS, DRIVES AND INCIDENTAL PAVING

706.01 DESCRIPTION. This work consists of furnishing and constructing portland cement concrete walks, handicapped curb ramps, drives and incidental paving slabs in accordance with these specifications and in conformity with lines, grades and dimensions shown on the plans or established.

706.02 MATERIALS. Materials shall comply with the following Section or Subsections.

Portland Cement Concrete (Class M)	901
Joint Filler	1005.01(c)
Reinforcing Steel	1009.01
Curing Materials	1011.01

706.03 CONSTRUCTION REQUIREMENTS.

(a) Excavation: Excavation shall be made to required depth and width. The top of the subgrade shall be shaped and compacted to a firm, even surface conforming to the section shown on the plans. Unsuitable material shall be removed and disposed of in accordance with Subsection 202.02 and replaced with approved material at no direct pay.

(b) Forms: Forms shall be of wood or metal and shall extend the full depth of concrete. Forms shall be straight, clean and of sufficient strength to resist the pressure of concrete. Bracing of forms shall be such that forms remain in horizontal and vertical alignment until their removal.

Concrete may be placed by slip-form methods. Slip-formed concrete shall be placed with an approved machine designed to spread, vibrate, consolidate and finish concrete in one pass of the machine in such manner that minimum hand finishing is necessary. Sliding forms shall be

rigidly held together to prevent spreading of forms. After the passing of the side forms there shall be no noticeable slumping of concrete.

(c) Subgrade: The subgrade shall be thoroughly moistened immediately prior to placing concrete.

(d) Placing and Finishing: Concrete shall be placed on the subgrade, struck off to required thickness and tamped sufficiently to bring the mortar to the surface. The surface shall be finished with a wood float or steel trowel followed by brushing to a slightly rough finish. Joints and edges shall be rounded with an edging tool having a 1/4-inch (6 mm) radius.

(e) Joints:

(1) Expansion Joints: Expansion joints shall be filled with 1/2 inch (13 mm) thick preformed expansion joint filler. Expansion joints shall be installed at maximum 100-foot (30 m) intervals, and between intersecting paving and any fixed structure such as a building, bridge or curbing, and between intersecting paving and the handicapped curb ramps. Expansion joint material shall extend for the full width and depth of paving.

(2) Weakened Plane: Weakened planes shall be formed by a jointing tool or other acceptable means. Weakened planes shall extend into concrete for at least 1/4 of the depth and shall be approximately 1/8 inch (3 mm) wide.

a. Walks: Spacing of weakened planes for walks shall be equal to the width of walk.

b. Drives: A longitudinal weakened plane shall be formed along the centerline of drives more than 16 feet (5 m) wide, and transverse weakened planes shall be formed at not more than 16-foot (5 m) intervals.

c. Incidental Paving: Weakened planes for incidental paving shall be formed at intervals not exceeding 30 times the thickness of the concrete in length or width. Incidental paving poured adjacent to jointed concrete shall be jointed to match existing joints, with intermediate joints formed as necessary not to exceed the maximum joint spacing.

(3) Construction Joints: Construction joints shall be formed around manholes, utility poles, etc., extending into paving and 1/4 inch (6 mm) thick preformed expansion joint filler shall be installed in these joints.

(4) Tie-ins: Tie-ins of existing concrete shall be made by full depth sawing at no direct pay.

(f) Curing: Concrete shall be cured in accordance with Subsection 601.10.

(g) Detectable Warning Surface for Handicap Ramps and At-Grade Sidewalk Intersections: Sidewalks, when intersecting with roadways, shall be equipped with a detectable warning surface system consisting of raised truncated domes as a transition between the sidewalk and the street as required by the Americans with Disabilities Act, 28 CFR Part 36, ADA Standards for Accessible Design.

Detectable warnings (truncated domes) shall be installed on the ramp surface over the full width of the ramp throat for a distance of 24 inches (600 mm) in the direction of travel from the back of the curb. Detectable warnings (truncated domes) shall also be installed on at-grade sidewalks intersecting with roadways for a distance of 36 inches (900 mm) in the direction of travel from the end of the sidewalk. Truncated domes shall be laid out on a square grid in order to allow enough space for wheelchairs to roll between the domes.

Light reflectance of the truncated domes and the underlying surface must meet the 70 percent contrast requirement of ADAAG.

706.04 MEASUREMENT. Quantities of concrete walks, drives and incidental paving slabs for payment will be the design quantities as specified on the plans and adjustments thereto. Design quantities will be adjusted if the engineer makes changes to adjust to field conditions, if design errors are proven or if design changes are made. Design areas are based on the horizontal dimensions shown on the plans. Excavation, backfill, reinforcing steel and joint materials will not be measured for payment.

Handicapped curb ramps, including the detectable surface warning system, will be measured per each.

Detectable surface warning systems for at-grade sidewalk intersection will not be measured for payment.

706.05 PAYMENT. Payment for concrete walks, drives and incidental paving will be made on a lot basis at the contract unit price per square yard (sq m), adjusted in accordance with the following provisions. Payment for each lot will be made in accordance with Table 901-6. Size, sampling, and testing of each concrete lot shall be in accordance with the Materials Sampling Manual.

Payment for handicapped curb ramps, including the detectable surface warning system, will be made by each and shall include, but not limited to, curb transitions, detectable warning system, gutter, landing and base.

Payment will be made under:

Item No.	Pay Item	Pay Unit
706-01	Concrete Walk (inch (mm) Thick)	Square Yard (Sq m)
706-02	Concrete Drive (inch (mm) Thick)	Square Yard (Sq m)
706-03	Incidental Concrete Paving (inch (mm) Thick	Square Yard (Sq m)
706-04	Handicapped Curb Ramps	Each

SECTION 713 – TEMPORARY TRAFFIC CONTROL:

Subsection 713.06 – Pavement Markings (08/06), Pages 400 – 403.

Delete Table 713-1, Temporary Pavement Markings and substitute the following.

Table 713-1
Temporary Pavement Markings[1,2]

		Two-lane Highways	Undivided Multilane Highways	Divided Multilane Highways
SHORT TERM	ADT<1500; or ADT>1500 and time<3 days	Lane lines 4-foot (1.2 m) tape on 40-foot (12 m) centers; with "Do Not Pass" and "Pass With Care" signs as required		
	ADT>1500; Time>3 days and<2 weeks	Lane lines 4-foot (1.2-m) tape on 40-foot (12-m) centers with no passing zone markings		
	All ADT's with time <2 weeks		Lane lines 4-foot (1.2m) tape on 40-foot (12 m) centers; double yellow centerline	Lane lines 4-foot (1.2 m) tape on 40-foot (12 m) centers
LONG TERM	All ADT's with time >2 weeks	Standard lane lines, no-passing zone markings, legends and symbols and when pavement width is 22 feet (6.7 m) or greater, edge lines	Standard lane lines, centerlines, edge lines, and legends and symbols	Standard lane lines, centerlines, edge lines, and legends and symbols.

[1]No-passing zones shall be delineated as indicated whenever a project is open to traffic.

[2]On all Asphaltic Surface Treatments that are open to traffic and used as a final wearing course or as an interlayer, temporary pavement markings (tabs) on 20-foot (6 m) centers shall be used, in lieu of the 4-foot (1.2 m) tape, on 40-foot (12 m) centers.

SECTION 719 – LANDSCAPING:

Subsection 719.06 – Construction Methods (03/09), Pages 429 – 432.

Delete the first paragraph of Heading (a), Seasonal Operations and substitute the following.

Unless otherwise directed by the engineer in writing, the planting season is between November 1 and April 15.

SECTION 729 – TRAFFIC SIGNS AND DEVICES:

Subsection 729.02 – Materials (04/08), Pages 456 and 457.

Delete the contents of Heading (a), Sign and Marker Sheeting, and substitute the following.

(a) Sign and Marker Sheeting: Sheeting material for sign panels, delineators, barricades and other markers shall comply with Section 1015. All permanent signs shall meet the requirements of ASTM D 4956, Type X.

Subsection 729.04, Fabrication of Sign Panels and Markers (04/08), Pages 458 – 460.

Delete the third paragraph of Heading (c), Sheeting Application and substitute the following.

ASTM D 4956 Type X reflective sheeting shall be applied with an orientation determined by the engineer to obtain the optimum entrance angle performance. Fabricated vertical splices in ASTM D 4956 Type X reflective sheeting will be allowed only when the horizontal dimension of the sign face or attached shield is in excess of the maximum manufactured width of the sheeting. Fabricated vertical splices in ASTM D 4956 Type X reflective sheeting will also be allowed when the specified orientation will create excessive sheeting waste.

SECTION 730 – ELECTRICAL SYSTEMS:

Subsection 730.04 – Drawings and Equipment Submittals (03/09), Pages 468 and 469.

Delete the third sentence of Heading (b), As-Built Drawings and substitute the following:

The drawings shall show the exact location of the underground wiring, light poles, junction boxes, under roadway crossings, service poles, controllers, disconnects, and conduit or cables.

Subsection 730.08 – Measurement (03/09), Pages 470 – 472.

Delete Heading (e), Jacked or Bored Casing and substitute the following:

(e) Jacked or Bored Casing: Jacked or bored casings will be measured by the linear foot (lin m) of casing furnished and installed, which will include the casing, fittings, and required excavation and backfill.

Add the following:

(t) Modular Breakaway Cable System: Modular breakaway electrical cable systems for low mast light poles shall be measured per each and shall include all materials, labor, equipment, and tools necessary to furnish and install a complete system in accordance with the plans and specifications.

(u) Disconnect: Disconnects shall be measured per each and shall include all materials, labor, equipment, and tools necessary to furnish and install this item in accordance with the plans and specifications.

(v) Duct Markers: Duct markers shall be measured per each and shall include all materials, labor, equipment, and tools necessary to furnish and install this item in accordance with the plans and specifications.

(w) Underground Marker Tape: Marker tape shall be measured per linear foot and shall include all materials, labor, equipment, tools necessary to furnish and install this item in accordance with the plans and specifications.

Subsection 730.09, Payment (03/09), Pages 472 and 473.

Add the following pay items.

Item No.	Pay Item	Pay Unit
730-19	Modular Breakaway Cable System	Each
730-20	Disconnect (Type)	Each
730-21	Duct Marker (Type)	Each
730-22	Underground Marker Tape (Size and Type)	Linear Foot (Lin m)

SECTION 732 – PLASTIC PAVEMENT MARKINGS:

Subsection 732.03 - Construction Requirements for Plastic Pavement Marking Material (09/07), Pages 478 – 481.

Delete the first paragraph of Heading (a), Equipment for Standard (Flat) Thermoplastic Marking Material and the substitute the following:

(a) Equipment for Standard (Flat) Thermoplastic Marking Material: The application equipment shall consist of an extrusion die or a ribbon gun that simultaneously deposits and shapes lines at a thickness of 90 mils (2.3 mm) or greater on the pavement surface. When restriping onto existing thermoplastic markings, only a ribbon gun shall be used. Finished markings shall be continuous and uniform in shape, and have clear and sharp dimensions. Applicators shall be capable of producing various widths of traffic markings. Applicators shall produce sharply defined lines and provide means for cleanly cutting off stripe ends and applying broken lines. The ribbon extrusion die or shaping die shall not be more than 2 inches (50 mm) above the roadway surface during application. A spray application will only be allowed when applying 40 mil (1.0 mm) thermoplastic.

Delete Heading (e), Application of Surface Primer and substitute the following:

(e) Application of Surface Primer: A single component surface primer will be required prior to placement of preformed plastic markings over an existing painted stripe, over oxidized asphalt, or when striping over existing thermoplastic on portland cement concrete surfaces unless otherwise directed by the engineer. A two component epoxy primer sealer will be required prior to placement of thermoplastic materials on portland cement concrete surfaces unless otherwise directed by the engineer.

SECTION 804 – DRIVEN PILES:

Subsection 804.08 – Construction Requirements (04/07), Pages548 – 554.

Delete the first sentence of Heading (a), Preboring and substitute the following.

Preboring by augering, wet-rotary drilling, or other methods used to facilitate pile driving will not be permitted unless specified in the plans or allowed by the engineer.

Delete the first sentence of Heading (b), Jetting and substitute the following.

Jetting will not be permitted unless allowed in the plans or allowed by the engineer.

SECTION 813 – CONCRETE APPROACH SLABS:

Subsection 813.03 – Embankment (06/08), Pages 688 – 690.

Delete the third paragraph and substitute the following:

When specified, the approach slab shall be placed on a layer of bedding material in accordance with plan details. Bedding material shall be placed and compacted as directed and covered with approved polyethylene film of at least 6-mil (150 μm) nominal thickness.

SECTION 901 – PORTLAND CEMENT CONCRETE:

Subsection 901.06 – Quality Control of Concrete (08/06), Pages 726 – 731.

Add the following to the contents of Heading (b), Quality Control Tests.

The contractor shall be responsible for monitoring the components (cement, mineral and chemical admixtures, aggregates) in their mix to protect against any changes due to component variations. As component shipments arrive, the contractor shall verify slump, air content and set time by testing at ambient temperatures. The contractor shall make adjustments to the mix design to rectify any changes which would adversely affect constructability, concrete placement or the specifications. The contractor shall submit test results to the Department for review each day of paving. Testing to validate component consistency will be documented on the control logs. Conformance or variation in mix parameters (workability, set times, air content, etc.) shall be noted on the control logs. The contractor shall provide a copy of the proposed testing plan to the engineer for record. Acceptance of the plan does not relieve the contractor's responsibility for consistency.

Subsection 901.08 – Composition of Concrete (12/05), Pages 732 – 734.

Add the following to Heading (a).

The blended cement containing up to 50 percent of grade 100 or grade 120 ground granulated blast-furnace slag must be in compliance with Subsection 1001.04 for portland blast-furnace slag cement.

SECTION 1001 – HYDRAULIC CEMENT:

Subsection 1001.01 – Portland Cement (09/07). Page 749.

Delete the contents of this subsection and substitute the following.

1001.01 PORTLAND CEMENT. Portland cement shall be from an approved source listed in QPL 7 and shall comply with AASHTO M 85.

Alkali content calculated as sodium oxide equivalent shall not exceed 0.60 percent by weight for all types of cement.

SECTION 1002 – ASPHALT MATERIALS AND ADDITIVES:

Subsection 1002.02 – Asphalt Material Additives (04/08), Pages 750 – 760.

Delete Table 1002-1, Performance Graded Asphalt Cements and substitute the following.

Table 1002-1
Performance Graded Asphalt Cements

Property	AASHTO Test Method	PG82-22rm[6]	PG76-22m	PG70-22m	PG64-22	PG58-28
		Spec.	Spec.	Spec.	Spec.	Spec.
Tests on Original Binder:						
Rotational Viscosity @ 135°C, Pa·s [1]	T 316	3.0	3.0	3.0	3.0	3.0
Dynamic Shear, 10 rad/s, G*/Sin Delta, kPa	T 315	1.00+ @ 82°C	1.00+ @ 76°C	1.00+ @ 70°C	1.30+ @ 64°C	1.00+ @ 58°C
Flash Point, °C	T 48	232+	232+	232+	232+	232+
Solubility, % [2]	T 44	N/A	99.0+	99.0+	99.0+	99.0+
Separation of Polymer, 163°C, 48 hours, degree C difference in R & B from top to bottom [5]	ASTM D 7173 AASHTO T 53	---	2-	2-	---	---
Force Ductility Ratio (f_2/f_1, 4°C, 5 cm/min., f_2 @ 30 cm elongation)[3]	T 300	---	0.30+	---	---	---
Force Ductility, (4°C, 5 cm/min, 30 cm elongation, kg)[3]	T 300	---	---	0.23+	---	---
Tests on Rolling Thin Film Oven Residue:	T 240					
Mass loss, %	T 240	1.00-	1.00-	1.00-	1.00-	1.00-
Dynamic Shear, 10 rad/s, G*/Sin Delta, kPa	T 315	2.20+ @ 82°C	2.20+ @76°C	2.20+ @ 70°C	2.20+ @ 64°C	2.20+ @ 58°C
Elastic Recovery, 25°C, 10 cm elongation, % [4]	T 301	60+	60+	40+	---	---
Ductility, 25°C, 5 cm/min, cm	T 51	---	---	---	90+	---
Tests on Pressure Aging Vessel Residue:	R 28					
Dynamic Shear, @ 25°C, 10 rad/s, G* Sin Delta, kPa	T 315	5000-	5000-	5000-	5000-	5000- @ 19°C
Bending Beam Creep Stiffness, S, MPa @ -12°C.	T 313	300-	300-	300-	300-	300- @ -18°C
Bending Beam Creep Slope, m value, @ -12°C	T 313	0.300+	0.300+	0.300+	0.300+	0.300+ @ -18°C

[1]The rotational viscosity will be measured to determine product uniformity. The rotational viscosity measured by the supplier shall be noted on the Certificate of Delivery. A binder having a rotational viscosity of 3.0 Pa·s or less will typically have adequate mixing and pumping capabilities. Binders with rotational viscosity values higher than 3.0 Pa·s should be used with caution and only after consulting with the supplier as to any special handling procedures and guarantees of mixing and pumping capabilities.

[2]Not all polymers are soluble in the specified solvents. If the polymer modified asphalt digested in the solvent will not pass the filter media, a sample of the base asphalt used in making the polymer modified asphalt should be tested for solubility. If the solubility of the base asphalt is at least 99.0%, the material will be considered as passing.

[3]AASHTO T 300 except the second peak (f_2) is defined as the stress at 30 cm elongation.

[4]AASHTO T 301 except elongation shall be 10 cm.

[5]Prepare samples per ASTM D 7173. Determine softening point of top and bottom per AASHTO T 53.

[6]The quality assurance plan for this product will require the contractors who use this material to submit written documentation of tank cleaning annually. Contractors must have tank mixers. Written certificates of analysis from the asphalt binder supplier confirming rubber source and size distribution of rubber used shall be furnished to the Materials Laboratory.

Add the following Table 1002-12, Anionic Trackless Tack Coat Grade NTSS-1HM.

Table 1002-12
Anionic Trackless Tack Coat Grade NTSS-1HM

Property	AASHTO Test Method	Specification Deviation	
		100% Pay	50% Pay or Remove[1]
Viscosity, Saybolt Furol @ 25°C, s	T 59	15 - 100	---
Storage Stability, 24 Hour, %	T 59	1.0-	---
Settlement, 5 Days, %	T 59	5.0-	---
Residue by Distillation, %	T 59	50+	49-
Oil Distillate, %	T 59	1.0-	---
Sieve Test[2], (Retained on the 850 µm), %	T 59	0.3-	---
Tests on Residue			
Penetration @ 25°C, 100g, 5s, dmm	T 49	20-	---
Softening Point, Ring and Ball, °C	T 53	65+	64-
Solubility, %	T 44	97.5+	---
DSR @ 82°C; G*/Sin δ, 10 rad / s, kPa	T 315	1.0+	---

[1] At the option of Engineer.

[2] Sieve tests may be waived if no application problems are present in the field.

SECTION 1003 – AGGREGATES:

Subsection 1003.02 – Aggregates for Portland Cement Concrete and Mortar (07/07), Pages 763 – 766.

Delete the contents of Heading (c), Aggregates for Types B and D Pavements, and substitute the following.

(c) Aggregates for Types B and D Pavements: For the combined aggregates for the proposed portland cement concrete pavement mix, the percent retained based on the dry weight (mass) of the total aggregates shall meet the requirements of Table 1003-1A for the type of

pavement specified in the plans. Additionally, the sum of the percents retained on any two adjacent sieves so designated in the table shall be at least 12 percent of the total combined aggregates. The maximum amounts by weight (mass) of deleterious materials for the total aggregate shall be the same as shown in Subsection 1003.02(b).

Table 1003-1A
Aggregates for Types B and D Pavements

U.S. Sieve	Metric Sieve	Percent Retained of Total Combined Aggregates	
		Pavement Type	
		Type B	Type D
2 1/2 inch	63 mm	0	0
2 inch	50 mm	0	0-20
1 1/2 inch	37.5 mm	0-20	0-20
1 inch	25.0 mm	0-20	5-20
3/4 inch	19.0 mm	5-20	5-20
1/2 inch	12.5 mm	5-20	5-20
3/8 inch	9.5 mm	5-20	5-20
No. 4	4.75 mm	5-20	5-20
No. 8	2.36 mm	5-20	5-20
No. 16	1.18 mm	5-20	5-20
No. 30	600 µm	5-20	5-20
No. 50	300 µm	0-20	0-20
No. 100	150 µm	0-20	0-20
No. 200	75 µm	0-5	0-5
Note: For the sieves in the shaded areas, the sum of any two adjacent sieves shall be a minimum of 12 percent of the total combined aggregates.			

Each type of aggregate to be used in the proposed mixture shall be sampled and tested individually. The percent of total combined aggregates retained shall be determined mathematically based on the proportions of the combined aggregate blend. All gradation calculations shall be based on percent of dry weight (mass).

Subsection 1003.03 – Base Course Aggregates (07/08), Page 767 – 768.

Add the following:

(e) Blended Calcium Sulfate: When blended calcium sulfate base course material is allowed on the plans, it shall consist of calcium sulfate from a source approved by the Materials and Testing Section and be blended with an approved aggregate or lime. The source shall have a quality control program approved by the Materials and Testing Section. The source shall have been given environmental clearance by the Department of Environmental Quality for the intended use, and written evidence of such environmental clearance shall be on file at the Materials and Testing Section. DOTD monitoring for compliance with environmental regulations will be limited to the pH testing stated herein below. The blended material shall be

non-plastic and reasonably free from organic and foreign matter. The pH shall be a minimum of 5.0 when tested in accordance with DOTD TR 430. Re-evaluation will be required if the source of the aggregate or lime that is blended with the calcium sulfate changes.

Blended calcium sulfate material used as base course shall comply with the following gradation requirements when tested in accordance with DOTD TR 113, modified to include a maximum drying temperature of 140°F (60°C). Sampling shall be taken from an approved stockpile at the point of origin.

U.S. Sieve	Metric Sieve	Percent Passing
1-1/2 inch	37.5 mm	60 - 100
1 inch	25.0 mm	40 - 80
3/4 inch	19.0 mm	30 - 70
No. 4	4.75 mm	20 - 65
No. 200	75 µm	0 - 25

Blended calcium sulfate shall be sampled in accordance with the requirements for stone in Section 302 of the Materials Sampling Manual.

Subsection 1003.09 – Nonplastic Embankment (03/09), Pages 775 and 776.

Delete Heading (b) and substitute the following.

(b) Stone: Stone shall be coarse stone from a source listed on QPL 2. For applications requiring lightweight embankment, the stone shall have a dry rodded unit weight (mass) of no greater than 95 pounds per cubic foot (1520 kg/cu m) when tested in accordance with AASHTO T19. Stone shall comply with the following gradation:

U.S. Sieve	Metric Sieve	Percent Passing
2 inch	50 mm	100
1 1/2 inch	37.5 mm	85 - 100
3/4 inch	19.0 mm	35 - 88
No. 4	4.75 mm	0 - 10

SECTION 1005 – JOINT MATERIALS FOR PAVEMENTS AND STRUCTURES:

Subsection 1005.04 – Combination Joint Former/Sealer (11/05), Pages 782 and 783.

Delete Heading (a) and substitute the following.

(a) Description: This joint former/sealer is intended for use in simultaneously forming and sealing a weakened plane in portland cement concrete pavements.

The material shall consist of an elastomeric strip permanently bonded either mechanically or chemically at the top of each of two rigid plastic side frames and covered with a removable

plastic top cap. Side frames shall be of such configuration that when the sealer is inserted into plastic concrete and vibrated, a permanent bond forms between side frames and concrete.

Delete Heading (b)(1) and substitute the following.

(1) Elastomer: The elastomer strip portion of the material shall be manufactured from vulcanized elastomeric compound using polymerized chloroprene or thermoplastic vulcanizate as the base polymer, and shall comply with the following requirements:

Property	ASTM Test Method	Requirements	
		Polymerized Chloroprene	Thermoplastic Vulcanizate
Tensile Strength, kPa, Min.	D 412	12,400	7,400
Elongation at Break, % Min.	D 412	200	400
Hardness, Shore A	D 2240	65 ± 10	65 ± 10
Properties after Aging, 70 h @ 100°C	D 573		
Tensile Strength, % Loss, Max.		20	20
Elongation, % loss, Max.		25	25
Hardness, pts. increase, Max.		10	10
Ozone Resistance, 20% strain or bentloop, 300 pphm in air, 70 h @ 40°C	D 1149	no cracks	no cracks
Oil Swell, IRM 903, 70 h @ 100°C, wt change, % Max.	D 471	45	75

Delete Headings (b)(2) and (b)(3) and substitute the following:

(2) Bond of Elastomer to Plastic: The force required to shear the elastomer from the plastic shall be a minimum of 5.0 pounds per linear inch (90 g/mm) of sealer when tested in accordance with DOTD TR 636.

(3) Bond of Plastic to Cement Mortar: This bond will be evaluated and shall meet the following requirements:

The force required to separate the cement mortar from the plastic shall be a minimum of 5.0 pounds per linear inch (90 g/mm) of sealer when tested in accordance with DOTD TR 636.

SECTION 1006 – CONCRETE AND PLASTIC PIPE:

Subsection 1006.09 – Plastic Yard Drain Pipe (06/07), Page 789.

Delete the contents of Subheading (a)(3), Ribbed Polyvinyl Chloride Pipe (RPVCP) and substitute the following.

Ribbed Polyvinyl Chloride Pipe (RPVCP): Ribbed Polyvinyl Chloride Pipe shall comply with ASTM F 794, Series 46 or ASTM F 949 (46 psi).

SECTION 1013 – METALS:

Subsection 1013.09 – Steel Piles (08/06) Page 822.

Delete the title and references to "Steel Piles" in this subsection and substitute "Steel H Piles".

SECTION 1015 – SIGNS AND PAVEMENT MARKINGS:

Subsection 1015.04 – Sign Panels (05/07), Pages 832 and 833.

Delete the contents of Heading (a), Permanent Sign Panels and substitute the following.

(a) Permanent Sign Panels: Flat panels shall be aluminum sheets or plates complying with ASTM B 209, Alloy 6061-T6 or Alloy 5052-H38. Extruded aluminum panels shall comply with ASTM B 221 (ASTM B 221M), Alloy 6063-T6 and after fabrication, have a flatness equal to or less than 0.031 inch per foot of length and 0.004 inch per inch of width.

Subsection 1015.05 - Reflective Sheeting (04/08), Pages 833 – 838.

Delete the contents of this subsection and substitute the following:

1015.05 REFLECTIVE SHEETING.

(a) Permanent and Temporary Standard Sheeting: Reflective sheeting shall be one of the following standard types as specified on the plans and complying with ASTM D 4956 except as modified herein. Permanent warning, regulatory, guide and supplemental guide sign sheeting shall meet the requirements of ASTM D 4956 Type X. Reflective sheeting for temporary signs and devices shall meet the requirements of ASTM D 4956 Type III except as noted in Subsection 1015.05(f). Reflective sheeting shall be an approved product listed in QPL 13.

Type III - A high-intensity retroreflective sheeting that is typically encapsulated glass-bead retroreflective material.

Type VI - An elastomeric high-intensity retroreflective sheeting without adhesive. This sheeting is typically a vinyl microprismatic retroreflective material.

Type X - A super high-intensity retroreflective sheeting having highest retroreflectivity characteristics at medium distances. This sheeting is typically an unmetalized microprismatic retroreflective element material.

(b) Fluorescent Pink Retroreflective Sheeting: Signs for temporary control of traffic through incident management areas shall be Type VI fluorescent pink retroreflective sheeting and shall comply with the MUTCD. Temporary traffic control signs for incident management shall be placed to notify motorists of upcoming incidents on the roadway, and shall be removed from public view once the incident has been managed. Physical properties shall comply with ASTM D 4956. Photometric properties shall be as follows.

(1) Retroreflectivity: Minimum Coefficients of Retroreflection shall be as specified in Table 1015-1.

Table 1015-1
Coefficients of Retroreflection for Fluorescent Pink Sheeting[1]

Observation Angle, degrees	Entrance Angle, degrees	Fluorescent Pink
0.2	-4	100
0.2	+30	40
0.5	-4	40
0.5	+30	15

[1]Minimum Coefficient of Retroreflection (R_A) (cd $lx^{-1} m^{-2}$)

(2) Color and Daytime Luminance: Color Chromaticity Coordinates and Daytime Luminance Factors shall be as specified in Table 1015-2.

Table 1015-2
Fluorescent Pink Color Specifications Limits (Daytime)

Chromaticity Coordinates (corner points) [1]								Luminance Factor, min.
1		2		3		4		Y%
x	y	x	y	x	y	x	y	25
0.450	0.270	0.590	0.350	0.644	0.290	0.536	0.230	

[1]The four pairs of chromaticity coordinates measured with CIE 2° Standard Observer and 45/0 (0/45) geometry and CIE D65 Standard Illuminant.

(c) Adhesive Classes: The adhesive required for retroreflective sheeting shall be Class 1 (pressure sensitive) as specified in ASTM D 4956.

(d) Accelerated Weathering: Reflective sheeting, when processed, applied and cleaned in accordance with the manufacturer's recommendations shall perform in accordance with the accelerated weathering standards in Table 1015-3.

Table 1015-3
Accelerated Weathering Standards[1]

Type	Retroreflectivity[2]				Colorfastness[3]	
	Orange/ Fluorescent Orange		All colors, except orange/Fluorescent Orange		Orange/ Fluorescent Orange	All colors, except orange/Fluorescent Orange
III	1 year	80[4]	3 years	80[4]	1 year	3 years
III (for drums)	1 year	80[4]	1 year	80[4]	1 year	1 year
VI	1/2 year	50[5]	1/2 year	50[5]	1/2 year	1/2 year
X	1 year	80[6]	3 years	80[6]	1 year	3 years

[1]At an angle of 45° from the horizontal and facing south in accordance with ASTM G 7 at an approved test facility in Louisiana or South Florida.
[2]Percent retained retroreflectivity of referenced table after the outdoor test exposure time specified.
[3]Colors shall conform to the color specification limits of ASTM D 4956 after the outdoor test exposure time specified.
[4]ASTM D 4956, Table 8.
[5]ASTM D 4956, Table 13.
[6]ASTM D 4956, Table 4.

(e) Expected Sign Life Data and Performance: The sheeting manufacturer shall supply expected retroreflectivity service life curves for each of the following sign sheeting colors: white, green, blue, brown, red, and yellow. The service life curves shall be plots of the 95 percent expected life plotted on an x-y graph with life years on the x-axis and retroreflectivity on the y-axis. The expected life shall account for worst case installations, equivalent to an installation in South Louisiana with the sign facing to the South. The sheeting manufacturer shall also supply a table of expected life values taken from the service life curves for Revision Number 2 to the 2003 Edition of the MUTCD minimum reflectivity requirements published in the Federal Register on December 21, 2007. Reflective sheeting for signs, when processed, applied and cleaned in accordance with the manufacturer's recommendations shall perform outdoors in accordance with the performance standards in Table 1015-4.

Table 1015-4
Reflective Sheeting Performance Standards

Type	Retroreflectivity[1] -- Durability[2]				Colorfastness[3]
	Orange/ Fluorescent Orange		All colors, except orange/Fluorescent Orange		
III	3 years	80[4]	10 years	80[4]	3 years
X	3 years	80[5]	7years	80[5]	3 years

[1]Percent retained retroreflectivity of referenced table after installation and the field exposure time specified.
[2]All sheeting shall maintain its structural integrity, adhesion and functionality after installation and the field exposure time specified.
[3]All colors shall conform to the color specification limits of ASTM D 4956 after installation and the field exposure time specified.
[4]ASTM D4956, Table 8.
[5]ASTM D 4956, Table 4.

(f) Temporary Signs, Barricades, Channelizing Devices, Drums and Cones: Reflective sheeting for temporary signs, barricades and channelizing devices, shall meet the requirements of ASTM D 4956, Type III except that temporary warning construction signs used on the mainline of freeways and expressways shall be fluorescent orange and meet the requirements of ASTM D 4956, Type X.

Reflective sheeting for vertical panels shall meet the requirements of ASTM D 4956, Type III.

Reflective sheeting for drums shall be a minimum of 6 inches (150 mm) wide and shall meet the requirements of ASTM D 4956, Type III, and the Supplementary Requirement S2 for Reboundable Sheeting as specified in ASTM D 4956. Reflective sheeting for traffic cone collars shall meet the requirements of ASTM D 4956, Type III or Type VI.

(g) Sheeting Guaranty. The contractor shall provide the Department with a guaranty from the sheeting manufacturer stating that if the retroreflective sheeting fails to comply with the performance requirements of this subsection, the sheeting manufacturer shall do the following:

Table 1015-5
Manufacturer's Guaranty-Reflective Sheeting

Type	Manufacturer shall restore the sign face in its field location to its original effectiveness at no cost to the Department if failure occurs during the time period[1] as specified below		Manufacturer shall replace the sheeting required to restore the sign face to its original effectiveness at no cost to the Department if failure occurs during the time period[1] as specified below
	Orange/Fluorescent Orange	All colors, except orange/Fluorescent Orange	All colors, except orange/Fluorescent Orange
III	<3 years	<7 years	7-10 years
X	<3 years	<5 years	5-7 years

[1] From the date of sign installation.

Replacement sheeting for sign faces, material, and labor shall carry the unexpired guaranty of the sheeting for which it replaces.

The sign fabricator shall be responsible for dating all signs with the month and year of fabrication at the time of sign fabrication. This date shall constitute the start of the guaranty obligation period.

Subsection 1015.11 - Preformed Plastic Pavement Marking Tape (06/07), Pages 842 – 844.

Delete the contents of this subsection and substitute the following.

1015.11 PREFORMED PLASTIC PAVEMENT MARKING TAPE.

(a) General: Preformed plastic pavement marking tape shall be approved products listed on QPL 64 and shall comply with ASTM D4505 Retroreflectivity Level I or Level II, or DOTD Intersection Grade (as specified below), except as modified herein. The marking tape shall be Class 2 or 3. The type and color shall be in accordance with the plans and the MUTCD.

(b) Thickness: All preformed plastic pavement marking tape shall have a minimum overall thickness of 0.060 inches (1.5 mm) when tested without the adhesive.

(c) Friction Resistance: The surface of the Retroreflectivity Level II preformed plastic pavement marking tape shall provide a minimum frictional resistance value of 35 British Polish Number (BPN) when tested according to ASTM E303. The surface of the Retroreflectivity Level I and DOTD Intersection Grade preformed plastic pavement marking tape shall provide a minimum frictional resistance value of 45 BPN when tested according to ASTM E303. Values for the Retroreflectivity Level I material with a raised surface pattern as defined in ASTM D4505 are calculated by averaging values taken at downweb and at a 45 degrees angle from downweb.

(d) Retroreflective Requirements: The preformed plastic pavement marking tape shall have the minimum initial specific luminance values shown in Table 1015-7 when measured in accordance with ASTM D 4061.

Table 1015-7
Specific Luminance of Preformed Plastic Tape

Type	Observation Angle, degrees	Entrance Angle, degrees	Specific Luminance (mcd/sq m/lx)	
			White	Yellow
Retroreflectivity Level I	1.05	88.76	500	300
DOTD Intersection Grade	1.05	88.76	375	250
Retroreflectivity Level II	1.05	88.76	250	175

(e) Durability Requirements: The DOTD Intersection Grade preformed plastic pavement marking tape shall show no appreciable fading, lifting or shrinkage for a least 12 months after placement when placed in accordance with the manufacturer's recommended procedures on pavement surfaces having a daily traffic count not to exceed 15,000 ADT per lane.

The Retroreflectivity Level I preformed plastic pavement marking tape shall show no appreciable fading, lifting or shrinkage for a least 4 years after placement for longitudinal lines and at least 2 years after placement for symbols and legends.

The Retroreflectivity Level I preformed plastic pavement marking tape shall also retain the following reflectance values for the time period detailed in Table 1015-8.

Table 1015-8
Retained Specific Luminance for Retroreflectivity Level I
Preformed Plastic Pavement Marking Tape

Time	Observation Angle, degrees	Entrance Angle, degrees	Specific Luminance (mcd/sq m/lx)	
			White	Yellow
1 year	1.05	88.76	400	240
4 years (2 years for symbols and legend)	1.05	88.76	100	100

(f) Plastic Pavement Marking Tape Guaranty (DOTD Intersection Grade and Retroreflectivity Level I): If the plastic pavement marking tape fails to comply with the performance and durability requirements of this subsection within 12 months for DOTD Intersection Grade and 4 years for Retroreflectivity Level I, the manufacturer shall replace the plastic pavement marking material at no cost to the Department.

SECTION 1020 – TRAFFIC SIGNALS:

Subsection 1020.01 – Traffic Signal Heads (06/07), Pages 873 – 884.

Delete the contents of Heading (a), General Requirements and substitute the following.

(a) General Requirements: Traffic signal sections, beacon sections and pedestrian signal sections shall be of the adjustable type. Materials and construction of each section shall be the same.

Signals shall be constructed for either 8 or 12-inch (200 mm or 300 mm) lens in accordance with the plans. Signal sections shall have three to five sections per face and beacon sections have only one section per face. Signal sections and associated brackets shall be finished inside and out with two coats of high grade dark olive green enamel, color number 14056 according to Federal Standard No. 595b with each coat independently baked. Visors shall be coated green on the outside and black on the inside. Edges shall be deburred and smooth with no sharp edges.

Subsection 1020.04 – Poles for Traffic Signal Systems (06/07), Pages 890 – 894.

Delete the sixth paragraph of Heading (a), Pedestal Support Signal Poles, and substitute the following.

Pedestals shall be finished with at least one coat of rustproofing primer, applied to a clean surface and one coat of dark olive green enamel, color number 14056 according to Federal Standard No. 595.

LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
SUPPLEMENTAL SPECIFICATIONS

FEMALE AND MINORITY PARTICIPATION IN CONSTRUCTION

The following notice shall be included in, and shall be a part of, all solicitations for offers and bids on all federal and federally assisted construction contracts or subcontracts in excess of $10,000 to be performed in geographical areas designated by the director of OFCCP. Execution of the contract by the successful bidder and any subsequent subcontracts will be considered the contractor's and subcontractor's commitment to the EEO provisions contained in this notice.

NOTICE OF REQUIREMENT 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 goals for minority and female participation, expressed in percentage terms for the contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

AREA	PARISH OR COUNTY	GOAL (%)
	FEMALE PARTICIPATION	
-	All Covered Areas	6.9
	MINORITY PARTICIPATION (UNDER NEW ORLEANS PLAN)	
-	* See Note Below	20 to 23
	MINORITY PARTICIPATION (NOT UNDER NEW ORLEANS PLAN)	
1	Jefferson LA, Orleans LA, St. Bernard LA, St. Tammany LA	31.0
2	Assumption LA, Lafourche LA, Plaquemines LA, St. Charles LA, St. James LA, St. John the Baptist LA, Tangipahoa LA, Terrebonne LA, Washington LA, Forrest MS, Lamar MS, Marion MS, Pearl River MS, Perry MS, Pike MS, Walthall MS	27.7
3	Ascension LA, East Baton Rouge LA, Livingston LA, West Baton Rouge, LA	26.1
4	Concordia LA, East Feliciana LA, Iberville, LA, Pointe Coupee LA, St. Helena LA, West Feliciana LA, Adams MS, Amite MS, Wilkinson, MS	30.4
5	Lafayette LA	20.6
6	Acadia LA, Evangeline LA, Iberia LA, St. Landry LA, St. Martin LA, St. Mary LA, Vermillion LA	24.1
7	Calcasieu LA	19.3
8	Allen LA, Beauregard LA, Cameron LA, Jefferson Davis LA, Vernon LA	17.8
9	Grant LA, Rapides LA	25.7
10	Avoyelles LA, Bienville LA, Bossier LA, Caddo LA, Claiborne LA, DeSoto LA, Natchitoches LA, Red River LA, Sabine LA, Webster LA, Winn LA	29.3
11	Ouachita LA	22.8
12	Caldwell LA, Catahoula LA, East Carroll LA, Franklin LA, Jackson LA, LaSalle LA, Lincoln LA, Madison LA, Morehouse LA, Richland LA, Tensas LA, Union LA, West Carroll LA,	27.9

*These goals apply only to those contractors signatory to the New Orleans Plan and only with respect to those trades which have unions participating in said Plan. The New Orleans Plan Covered Area is as follows: The parishes of Orleans, Jefferson, St. Bernard, St. Tammany, St. Charles, St. John the Baptist, Plaquemines, Washington, Terrebonne, Tangipahoa (that area east of the Illinois Central Railroad), Livingston (that area southeast of the line from a point off the Livingston and Tangipahoa Parish line adjacent from New Orleans and Baton Rouge), St. James (that area southeast of a line drawn from the Town of Gramercy to the point of intersection of St. James, Lafourche and Assumption Parishes), and Lafourche.

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 is also subject to the goals for both its federally involved and non-federally involved construction.

The contractor's compliance with the Executive Order and the regulations in 41 CFR 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 established for the geographical area where the contract resulting from this solicitation is to be performed. 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 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 purpose of meeting the contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The contractor shall provide written notification to the Regional Administrator of the Office of Federal Contract Compliance Programs (555 Griffin Square Building, Dallas, TX 75202) within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract. The notification shall list the name, address and telephone number of the subcontractor; employer identification number; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and geographical area in which the contract is to be performed.

4. As used in this Notice and in the contract, the "covered area" is that area shown in the foregoing table in which the project is located.

The following Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246) shall be included in, and shall be a part of, all solicitations for offers and bids on all federal and federally assisted construction contracts or subcontracts in excess of $10,000. Execution of the contract by the successful bidder and any

subsequent subcontracts will be considered the contractor's and subcontractor's commitment to the EEO provisions contained in these Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246).

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246)

1. As used in these specifications:
   a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;
   b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
   c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U. S. Treasury Department Form 941.
   d. "Minority" includes:
      (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
      (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
      (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
      (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. If the contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any construction trade, he shall include in each subcontract in excess of $10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation.

3. If the contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each contractor or subcontractor participating in an approved Plan is required to comply with his obligations under the EEO clause, and to make good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other contractor or subcontractors toward a goal in an

approved Plan does not excuse any covered contractor's or subcontractor's failure to take good faith efforts to achieve the Plan goals.

4. The contractor shall implement the specific affirmative action standards provided in paragraphs 7a through 7p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered construction contractors performing construction work in geographical areas where they do not have a federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any OFCCP office or from federal procurement contracting officers. The contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the contractor has a collective bargaining agreement, to refer either minorities or women, shall excuse the contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the contractor during the training period, and the contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U. S. Department of Labor.

7. The contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the contractor's compliance with these specifications will be based on his effort to achieve maximum results from its actions. The contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

a. Ensure and maintain a working environment free of harassment, intimidation and coercion at all sites, and in all facilities at which the contractor's employees are assigned to work. The contractor, where possible, will assign 2 or more women to each construction project. The contractor shall ensure that all foremen, superintendents and other on-site supervisory personnel are aware of and carry out the contractor's obligation to maintain such a working environment with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to

community organizations when the contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the contractor by the union or, if referred, not employed by the contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the contractor has taken.

d. Provide immediate written notification to the Director when the union or unions with which the contractor has a collective bargaining agreement has not referred to the contractor a minority person or woman set by the contractor, or when the contractor has other information that the union referral process has impeded the contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the contractor's employment needs, especially those programs funded or approved by the Department of Labor. The contractor shall provide notice of these programs to the sources compiled under 7b above.

f. Disseminate the contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the contractor in meeting his EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as superintendent, general foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the contractor's EEO policy externally by including it in ny advertising in the news media, including minority and female news media, and providing written notification to and discussing the contractor's EEO policy with other contractors and subcontractors with whom the contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the contractor's recruitment area and employment needs. Not later than 1 month prior to the date for the acceptance of

applications for apprenticeship or other training by any recruitment source, the contractor shall send written notification to organizations such as the above describing the openings, screening procedures and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women, and where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a contractor's workforce.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR 60-3.

l. Conduct, at least annually, an inventory and evaluation of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are non-segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling its obligations under 7a through 7p of these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the contractor's minority and female workforce participation, makes a good faith effort to meet his goals and timetables and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the contractor. The obligation to comply, however, is the contractor's and failure of such a group to fulfill an obligation shall not be a defense for the contractor's noncompliance.

9. A goal for minorities and a separate goal for women have been established. The contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the contractor may be in violation of the Executive Order if a group is employed

in a substantially disparate manner (for example, even though the contractor has achieved its goals for women generally, the contractor may be in violation of the Executive Order if a minority group of women in underutilized).

10. The contractor shall not use the goals or affirmative action standards to discriminate against any person because of race, color, religion, sex or national origin.

11. The contractor shall not enter into a subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The contractor, in fulfilling his obligations under these specifications, shall implement specific affirmative actions steps, at least as extensive as the standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the contractor fails to comply with the requirements of the Executive Order, the implementing regulations or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors will not be required to maintain separate records.

15. Nothing herein shall be construed as a limitation on the application of other laws which establish different standards of compliance or on the application of requirements for hiring of local or other area residents (e.g., those under the Pubic Works Employment Act of 1977 and the Community Development Block Grant Program).

16. In addition to the reporting requirements set forth elsewhere in this contract, the contractor and subcontractors holding subcontracts (not including material suppliers) in excess of $10,000

shall submit for every month of July during which work is performed, employment data as contained under Form FHWA-1391 in accordance with instructions included thereon.

LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
SUPPLEMENTAL SPECIFICATIONS

NEW ORLEANS PLAN

Each bidder, contractor or subcontractor (hereinafter called the contractor) must fully comply with these bid conditions as to each construction trade intended to be used on this construction contract and all other construction work (both federal and nonfederal) in New Orleans Plan Area during the performance of this contract or subcontract. The contractor commits to the minority and female employment utilization goals set forth herein and all other requirements, terms and conditions expressed herein by submitting a properly signed bid.

The contractor shall appoint a company executive to assume the responsibility for implementation of the requirements, terms and conditions of these bid conditions.

These specifications implementing the New Orleans Plan for employment of minorities and females have been imposed by the U. S. Department of Labor by order on September 8, 1971, as amended, for all nonexempt federal and federally assisted construction contracts to be awarded in the area of jurisdiction of the Southeast Louisiana Building and Construction Trades Council in the City of New Orleans and Southeast Louisiana. This area consists of the parishes of Orleans, Jefferson, St. Bernard, St. Tammany, St. Charles, St. John the Baptist, Plaquemines, Washington, Terrebonne, Tangipahoa (that area east of the Illinois Central Railroad), Livingston (that area southeast of the line from a point off the Livingston and Tangipahoa Parish line adjacent from New Orleans and Baton Rouge), St. James (that area southeast of a line drawn from the Town of Gramercy to the point of intersection of St. James, Lafourche and Assumption Parishes), and Lafourche.

The provisions of these bid conditions apply to contractors which are party to collective bargaining agreements with labor organizations which together have agreed to the New Orleans Area Construction Program (hereinafter called the New Orleans Plan) for equal opportunity and have jointly made a commitment to goals of minority and female utilization. The New Orleans Plan is a voluntary agreement between (1) Southeast Louisiana Building and Construction Trades Council; (2) contractors and subcontractors who are signatory to the New Orleans Plan; (3) the Urban League of Greater New Orleans and representatives of the minority community; and (4) the City of New Orleans. The New Orleans Plan, together with all implementing agreements that have been and may hereafter be developed pursuant thereto, are incorporated herein by reference.

The requirements set forth herein shall constitute the specific affirmative action requirements for activities under this contract and supplement the equal employment opportunity requirements set forth in the Required Contract Provisions.

The contractor and all subcontractors holding contracts in excess of $10,000 shall comply with the following minimum requirement activities of equal employment opportunity. The contractor shall include these requirements in every subcontract in excess of $10,000 with such modification of language as necessary to make them binding on the subcontractor.

Each contractor and subcontractor shall submit a monthly employment utilization report, Standard Form 257, covering the contractor's entire work force employed on all contracts (both federal and nonfederal) held in the New Orleans Area. In addition, a list of the federal and nonfederal contracts which are covered by the report shall be furnished. The report shall be submitted to the engineer no later than the 10th day following the end of the month being reported. The report shall end on the next to the last Saturday in the month being reported and shall reflect all hours worked between this date and the close out date in the preceding month. Copies of all payrolls and personnel data shall be retained for 3 years after final acceptance of the project. These records and documents, or copies thereof, shall be made available at reasonable times and places for inspection by an authorized representative of the State or Federal Government and shall be submitted upon request with any other compliance information which such representative may require.

In addition to the reporting requirements set forth above, the contractor and the subcontractors holding subcontracts, not including material suppliers, in excess of $10,000 shall submit for every month of July during which work is performed, employment data as contained under Form FHWA-1391, and in accordance with the instructions included thereon.

A contractor may be in compliance with these bid conditions by its participation in the New Orleans Plan and applicable provisions contained in the "Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246)" and Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246).

LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS

I. GENERAL

1. 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.

2. Except as otherwise provided for in each section, the contractor shall insert in each subcontract all of the stipulations contained in these Required Contract Provisions, and further require their inclusion in any lower tier subcontract or purchase order that may in turn be made. The Required Contract Provisions shall not be incorporated by reference in any case. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with these Required Contract Provisions.

3. A breach of any of the stipulations contained in these Required Contract Provisions shall be sufficient grounds for termination of the contract.

4. A breach of the following clauses of the Required Contract Provisions may also be grounds for debarment as provided in 29 CFR 5.12:

Section I, paragraph 2;
Section IV, paragraphs 1, 2, 3, 4, and 7;
Section V, paragraphs 1 and 2a through 2g.

5. Disputes arising out of the labor standards provisions of Section IV (except paragraph 5) and Section V of these Required Contract Provisions shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor (DOL) as set forth in 29 CFR 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 DOL, or the contractor's employees or their representatives.

6. **Selection of Labor:** During the performance of this contract, the contractor shall not:

a. discriminate against labor from any other State, possession, or territory of the United States (except for employment preference for Appalachian contracts, when applicable, as specified in Attachment A), or

b. employ convict labor for any purpose within the limits of the project unless it is labor performed by convicts who are on parole, supervised release, or probation.

II. NONDISCRIMINATION

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $10,000 or more.)

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 (28 CFR 35, 29 CFR 1630 and 41 CFR 60) 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 Equal Opportunity Construction Contract Specifications set forth under 41 CFR 60-4.3 and the provisions of the American Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 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 State highway agency (SHA) and the Federal Government in carrying out EEO obligations and in their review of his/her activities under the contract.

b. The contractor will accept as his 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, 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, preapprenticeship, and/or on-the-job training."

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

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 minority group employees.

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 minority groups 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 minority group applicants. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group 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, he is expected to observe the provisions of that agreement to the extent that the system permits the contractor's compliance with EEO contract provisions. (The DOL has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)

c. The contractor will encourage his present employees to refer minority group applicants for employment. Information and procedures with regard to referring minority group 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, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure 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 his 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 his avenues of appeal.

6. **Training and Promotion:**

a. The contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.

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. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision.

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 minority group and women employees 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 his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. 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 best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.

b. The contractor will use best 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, 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 SHA 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 minority and women 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, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The DOL has held that it shall be no excuse that the union with which the contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) 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 SHA.

8. **Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment.

a. The contractor shall notify all potential subcontractors and suppliers of his/her EEO obligations under this contract.

b. Disadvantaged business enterprises (DBE), as defined in 49 CFR 23, shall have equal opportunity to compete for and perform subcontracts which the contractor enters into pursuant to this contract. The contractor will use his best efforts to solicit bids from and to utilize DBE subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of DBE construction firms from SHA personnel.

c. The contractor will use his best efforts to ensure subcontractor compliance with their EEO obligations.

9. **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 completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the SHA and the FHWA.

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

(1) The number 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;

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees; and

(4) The progress and efforts being made in securing the services of DBE subcontractors or subcontractors with meaningful minority and female representation among their employees.

b. The contractors will submit an annual report to the SHA 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. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data.

III. NONSEGREGATED FACILITIES

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $10,000 or more.)

a. By submission of this bid, the execution of this contract or subcontract, or the consummation of this material supply agreement or purchase order, as appropriate, the bidder, Federal-aid construction contractor, subcontractor, material supplier, or vendor, as appropriate, certifies that the firm does not maintain or provide for its employees any segregated facilities at any of its establishments, and that the firm does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The firm agrees that a breach of this certification is a violation of the EEO provisions of this contract. The firm further certifies that no employee will be denied access to adequate facilities on the basis of sex or disability.

b. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, timeclocks, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are, in fact, segregated on the basis of race, color, religion, national origin, age or disability, because of habit, local custom, or otherwise. The only exception will be for the disabled when the demands for accessibility override (e.g. disabled parking).

c. The contractor agrees that it has obtained or will obtain identical certification from proposed subcontractors or material suppliers prior to award of subcontracts or consummation of material supply agreements of $10,000 or more and that it will retain such certifications in its files.

IV. PAYMENT OF PREDETERMINED MINIMUM WAGE

(Applicable to all Federal-aid construction contracts exceeding $2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural minor collectors, which are exempt.)

1. **General:**

a. All mechanics and laborers 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 (29 CFR 3) issued by the Secretary of Labor under the Copeland Act (40 U.S.C. 276c)] the full amounts of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment. The payment shall be computed at wage rates not less than those contained in the wage determination of the Secretary of Labor (hereinafter "the wage determination") which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor or its subcontractors and such laborers and mechanics. The wage determination (including any additional classifications and wage rates conformed under paragraph 2 of this Section IV and the DOL poster (WH-1321) or Form FHWA-1495) 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. For the purpose of this Section, contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act (40 U.S.C. 276a) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of Section IV, paragraph 3b, hereof. Also, for the purpose of this Section, 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 paragraphs 4 and 5 of this Section IV.

b. 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.

c. All rulings and interpretations of the Davis-Bacon Act and related acts contained in 29 CFR 1, 3, and 5 are herein incorporated by reference in this contract.

2. **Classification:**

a. The SHA contracting officer shall require that any class of laborers or mechanics employed under the contract, which is not listed in the wage determination, shall be classified in conformance with the wage determination.

b. The contracting officer shall approve an additional classification, wage rate and fringe benefits only when the following criteria have been met:

(1) the work to be performed by the additional classification requested is not performed by a classification in the wage determination;

(2) the additional classification is utilized in the area by the construction industry;

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

(4) with respect to helpers, when such a classification prevails in the area in which the work is performed.

c. If the contractor or subcontractors, as appropriate, the laborers and mechanics (if known) to be employed in the additional classification 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 DOL, Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, D.C. 20210. The Wage and Hour 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.

d. In the event the contractor or subcontractors, as appropriate, the laborers or mechanics to be employed in the additional 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 Wage and Hour Administrator for determination. Said 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

e. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 2c or 2d of this Section IV shall be paid to all workers performing work in the additional classification from the first day on which work is performed in the classification.

3. **Payment of Fringe Benefits:**

a. 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 or subcontractors, as appropriate, shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly case equivalent thereof.

b. If the contractor or subcontractor, as appropriate, does not make payments to a trustee or other third person, he/she may consider as a 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.

4. **Apprentices and Trainees (Programs of the U.S. DOL) and Helpers:**

a. *Apprentices:*

(1) 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 DOL, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, or if a person is employed in his/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 Bureau of Apprenticeship and Training or a State

apprenticeship agency (where appropriate) to be eligible for probationary employment as an apprentice.

(2) The allowable ratio of apprentices to journeyman-level employees 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 employee 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 listed in 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 or subcontractor 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-level hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

(3) 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 journeyman-level 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 for the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

(4) In the event the Bureau of Apprenticeship and Training, or a State apprenticeship agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor or subcontractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the comparable work performed by regular employees until an acceptable program is approved.

b. *Trainees:*

(1) 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 DOL, Employment and Training Administration.

(2) The ratio of trainees to journeyman-level employees on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. 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.

(3) Every trainee must be paid at not less than the rate specified in the approved program for his/her level of progress, expressed as a percentage of the journeyman-level 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-level wage rate on the wage determination which provides for less than full fringe benefits for apprentices, in which case such trainees shall receive the same fringe benefits as apprentices.

(4) In the event the Employment and Training Administration withdraws approval of a training program, the contractor or subcontractor 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. *Helpers*:

Helpers will be permitted to work on a project if the helper classification is specified and defined on the applicable wage determination or is approved pursuant to the conformance procedure set forth in Section IV.2. Any worker listed on a payroll at a helper wage rate, who is not a helper under a approved definition, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed.

5. **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. 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.

6. **Withholding:**

The SHA shall upon its own action or upon written request of an authorized representative of the DOL withhold, or cause to be withheld, from the contractor or subcontractor 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, as 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 SHA contracting officer 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.

7. **Overtime Requirements:**

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers, mechanics, watchmen, or guards (including apprentices, trainees, and helpers described in paragraphs 4 and 5 above) shall require or permit any laborer, mechanic, watchman, or guard in any workweek in which he/she is employed on such work, to work in excess of 40 hours in such workweek unless such laborer, mechanic, watchman, or guard receives compensation at a rate not less than

one-and-one-half times his/her basic rate of pay for all hours worked in excess of 40 hours in such workweek.

8. **Violation:**

Liability for Unpaid Wages; Liquidated Damages: In the event of any violation of the clause set forth in paragraph 7 above, the contractor and any subcontractor responsible thereof shall be liable to the affected employee for his/her 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, mechanic, watchman, or guard employed in violation of the clause set forth in paragraph 7, in the sum of $10 for each calendar day on which such employee was required or permitted to work in excess of the standard work week of 40 hours without payment of the overtime wages required by the clause set forth in paragraph 7.

9. **Withholding for Unpaid Wages and Liquidated Damages:**

The SHA shall upon its own action or upon written request of any authorized representative of the DOL withhold, or cause to be withheld, from any monies 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 8 above.

V. STATEMENTS AND PAYROLLS

(Applicable to all Federal-aid construction contracts exceeding $2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural collectors, which are exempt.)

1. **Compliance with Copeland Regulations (29 CFR 3):**

The contractor shall comply with the Copeland Regulations of the Secretary of Labor which are herein incorporated by reference.

2. **Payrolls and Payroll Records:**

a. Payrolls and basic records relating thereto shall be maintained by the contractor and each subcontractor during the course of the work and preserved for a period of 3 years from the date of completion of the contract for all laborers, mechanics, apprentices, trainees, watchmen, helpers, and guards working at the site of the work.

b. The payroll records shall contain the name, social security number, and address of each such employee; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalent thereof 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. In addition, for Appalachian contracts, the payroll records shall contain a notation indicating whether the employee does, or does not, normally reside in the labor area as defined in Attachment A, paragraph 1. Whenever the Secretary of Labor, pursuant to Section IV, paragraph 3b, has found 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 and each subcontractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, that the plan or program has been communicated in writing to the laborers or mechanics affected, and show the cost anticipated or the actual cost incurred in providing benefits. Contractors or subcontractors employing apprentices or trainees undef approved programs shall maintain written evidence of the registration of apprentices and trainees, and ratios and wage rates prescribed in the applicable programs.

c. Each contractor and subcontractor shall furnish, each week in which any contract work is performed, to the SHA resident engineer a payroll of wages paid each of its employees (including apprentices, trainees, and helpers described in Section IV, paragraphs 4 and 5, and watchmen and guards engaged on work during the preceding weekly payroll period). The payroll submitted shall set out accurately and completely all of the information required to be maintained under paragraph 2b of this Section V. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal stock number 029-005-0014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

d. Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his/her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) that the payroll for the payroll period contains the information required to be maintained under paragraph 2b of this Section V and that such information is correct and complete;

(2) that such laborer or mechanic (including each apprentice, trainee, and helper) 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 the Regulations, 29 CFR 3;

(3) that each laborer or mechanic has been paid not less that the applicable wage rate and fringe benefits or cash equivalent for the classification of worked performed, as specified in the applicable wage determination incorporated into the contract.

e. 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 2d of this Section V.

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

g. The contractor or subcontractor shall make the records required under paragraph 2b of this Section V available for inspection, copying, or transcription by authorized representatives of the SHA, the FHWA, or the DOL, 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 SHA, the FHWA, the DOL, or all

may, after written notice to the contractor, sponsor, applicant, or owner, take such actions 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.

VI. RECORD OF MATERIALS, SUPPLIES, AND LABOR

1. On all Federal-aid contracts on the National Highway System, except those which provide solely for the installation of protective devices at railroad grade crossings, those which are constructed on a force account or direct labor basis, highway beautification contracts, and contracts for which the total final construction cost for roadway and bridge is less than $1,000,000 (23 CFR 635) the contractor shall:

a. Become familiar with the list of specific materials and supplies contained in Form FHWA-47, "Statement of Materials and Labor Used by Contractor of Highway Construction Involving Federal Funds," prior to the commencement of work under this contract.

b. Maintain a record of the total cost of all materials and supplies purchased for and incorporated in the work, and also of the quantities of those specific materials and supplies listed on Form FHWA-47, and in the units shown on Form FHWA-47.

c. Furnish, upon the completion of the contract, to the SHA resident engineer on Form FHWA-47 together with the data required in paragraph 1b relative to materials and supplies, a final labor summary of all contract work indicating the total hours worked and the total amount earned.

2. At the prime contractor's option, either a single report covering all contract work or separate reports for the contractor and for each subcontract shall be submitted.

VII. SUBLETTING OR ASSIGNING THE CONTRACT

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 State. 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).

a. "Its own organization" shall be construed to include only workers employed and paid directly 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, assignee, or agent of the prime contractor.

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 on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph 1 of Section VII 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. 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 SHA 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 SHA 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 SHA has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

VIII. SAFETY: ACCIDENT PREVENTION

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 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the SHA 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.

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 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. 333).

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. 333).

IX. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

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, the following notice shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

Notice to all Personnel engaged on Federal-Aid Highway Projects

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 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined not more that $10,000 or imprisoned not more than 5 years or both."

X. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

(Applicable to all Federal-aid construction contracts and to all related subcontracts of $100,000 or more.)

By submission of this bid or the execution of this contract, or subcontract, as appropriate, the bidder, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any facility that is or will be utilized in the performance of this contract, unless such contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Pub.L. 92-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Pub.L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 CFR 15) is not listed, on the date of contract award, on the U.S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 CFR 15.20.

2. That the firm agrees to comply and remain in compliance with all the requirements of Section 114 of the Clean Air Act and Section 308 of the Federal Water Pollution Control Act and all regulations and guidelines listed thereunder.

3. That the firm shall promptly notify the SHA of the receipt of any communication from the Director, Office of Federal Activities, EPA, indicating that a facility that is or will be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities.

4. That the firm agrees to include or cause to be included the requirements of paragraph 1 through 4 of this Section X in every nonexempt subcontract, and further agrees to take such action as the government may direct as a means of enforcing such requirements.

XI. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

1. **Instructions for Certification - Primary Covered Transactions:** (Applicable to all Federal-aid contracts - 49 CFR 29)

a. By signing and submitting this proposal, the prospective primary 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 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 primary participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

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

d. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is submitted for assistance in obtaining a copy of those regulations.

f. The prospective primary 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.

g. The prospective primary 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 Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

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. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the nonprocurement portion of the "Lists of Parties Excluded From Federal Procurement or Nonprocurement Programs" (Nonprocurement List) which is compiled by the General Services Administration.

i. 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.

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.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Primary Covered Transactions

1. The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

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 3-year period preceding this proposal been convicted of or had a civil judgement 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 paragraph 1b of this certification; and

d. Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

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

* * * * *

2. **Instructions for Certification - Lower Tier Covered Transactions:** (Applicable to all subcontracts, purchase orders and other lower tier transactions of $25,000 or more - 49 CFR 29)

a. By signing and submitting this proposal, the prospective lower tier 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.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "primary covered transaction," "participant," "person," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

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.

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.

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 may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

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.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Covered Transactions:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

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

* * * * *

XII. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

(Applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000 - 49 CFR 20)

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 his or her bid or proposal that he or she 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.

LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

REQUIRED CONTRACT PROVISIONS FOR DBE PARTICIPATION IN FEDERAL AID CONSTRUCTION CONTRACTS (DBE GOAL PROJECT)

A. AUTHORITY AND DIRECTIVE: The Code of Federal Regulations, Title 49, Part 26 (49 CFR Part 26) as amended and the Louisiana Department of Transportation and Development's (DOTD) Disadvantaged Business Enterprise (DBE) Program are hereby made a part of and incorporated by this reference into this contract. Copies of these documents are available, upon request, from DOTD Compliance Programs Office, P. O. Box 94245, Baton Rouge, LA 70804-9245.

B. POLICY: It is the policy of the DOTD that it shall not discriminate on the basis of race, color, national origin, or sex in the award of any United States Department of Transportation (US DOT) financially assisted contracts or in the administration of its DBE program or the requirements of 49 CFR Part 26. The DOTD shall take all necessary and reasonable steps under 49 CFR Part 26 to ensure nondiscrimination in the award and administration of US DOT assisted contracts. The DBE program, as required by 49 CFR Part 26 and as approved by US DOT, is incorporated by reference in this agreement. Implementation of this program is a legal obligation and failure to carry out its terms shall be treated as a violation of this agreement. Upon notification of failure to carry out the approved DBE program, the US DOT may impose sanctions as provided for under 49 CFR Part 26 and may in appropriate cases, refer the matter for enforcement under 18 U.S.C. 1001 and/or the Program Fraud Civil Remedies Act of 1986 (31 U.S.C.3801 et seq.).

C. DBE OBLIGATION: 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 US 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 DOTD deems appropriate.

The preceding policy and DBE obligation shall apply to this contract and shall be included in the requirements of any subcontract. Failure to carry out the requirements set forth therein shall constitute a breach of contract and, after notification by DOTD, may result in termination of the contract, a deduction from the contract funds due or to become due the contractor or other such remedy as DOTD deems appropriate. The contractor is encouraged to use the services offered by banks in the community which are owned and controlled by minorities or women when feasible and beneficial. The term DBE is inclusive of women business enterprises (WBE) and all obligations applicable to DBE shall apply to firms certified and listed as WBE.

D. FAILURE TO COMPLY WITH DBE REQUIREMENTS: All contractors and subcontractors are hereby advised that failure to carry out the requirements set forth above shall constitute a breach of contract and, after notification by DOTD may result in rejection of the bid; termination of the contract; a deduction from the contract funds due or to become due the contractor; or other such remedy as DOTD deems appropriate. Failure to comply with the DBE requirements shall include but not be limited to failure to meet the established goal and/or failure to submit documentation of good faith efforts; failure to exert a reasonable good faith effort (as determined by DOTD) to meet established goals; and failure to realize the DBE participation set forth on approved Form CS-6AAA and attachments. Failure to submit Form CS-6AAA and attachments and/or reasonable good faith efforts' documentation within the specified time requirements will result in the Department taking the actions specified in Heading G(6) below. The utilization of DBE is in addition to all other equal opportunity requirements of the contract. The contractor shall include the provisions in Sections B, C and D of these provisions in subcontracts so that such provisions will be binding upon each subcontractor, regular dealer, manufacturer, consultant, or service agency.

E. ELIGIBILITY OF DBE: The DOTD has included as part of the solicitation of bids a current list containing the names of firms that have been certified as eligible to participate as DBE on US DOT assisted contracts. This list is not an endorsement of the quality of performance of the firm but is simply an acknowledgment of the firm's

eligibility as a DBE. This list indicates the project numbers and letting date for which this list is effective. Only DBE listed on this list may be utilized to meet the established DBE goal for these projects.

F. COUNTING DBE PARTICIPATION TOWARD DBE GOALS: DBE participation toward attainment of the goal will be credited on the basis of total subcontract prices agreed to between the contractor and subcontractors for the contract items or portions of items being sublet as reflected on Form CS-6AAA and attachments, in accordance with the DOTD DBE Program, and the following criteria.

(1) Credit will only be given for use of DBE that are certified by the Louisiana Unified Certification Program. Certification of DBE by other agencies is not recognized.

(2) The total value of subcontracts awarded for construction and services to an eligible DBE is counted toward the DBE goal provided the DBE performs a commercially useful function. The contractor is responsible for ensuring that the goal is met using DBE that perform a commercially useful function.

The contractor shall operate in a manner consistent with the guidelines set forth in the DOTD DBE Program. A commercially useful function is performed when a DBE is responsible for the execution of a distinct element of work by actually managing, supervising, and performing the work in accordance with standard industry practices except when such practices are inconsistent with 49 CFR Part 26 as amended, and the DOTD DBE Program, and when the DBE receives due compensation as agreed upon for the work performed. To determine whether a DBE is performing a commercially useful function, the DOTD shall evaluate the work subcontracted in accordance with the DOTD DBE Program, industry practices and other relevant factors. When an arrangement between the contractor and the DBE represents standard industry practice, if such arrangement erodes the ownership, control or independence of the DBE, or fails to meet the commercially useful function requirement, the contractor will not receive credit toward the goal.

(3) A DBE prime contractor may count only the contract amount toward DBE participation for work he/she actually performs and for which he/she is paid. Any subcontract amounts awarded to certified DBE by a DBE prime will also be credited toward DBE participation provided the DBE subcontractor performs a commercially useful function.

(4) A contractor may count toward the DBE goal 100 percent of verified delivery fees paid to a DBE trucker. The DBE trucker must manage and supervise the trucking operations with its own employees and use equipment owned by the DBE trucker. No credit will be counted for the purchase or sale of material hauled unless the DBE trucker is also a DOTD certified DBE supplier. No credit will be counted unless the DBE trucker is an approved subcontractor.

(5) A contractor may count toward the DBE goal that portion of the dollar value with a joint venture equal to the percentage of the ownership and control of the DBE partner in the joint venture. Such crediting is subject to a favorable DOTD review of the joint venture agreement to be furnished by the apparent low bidder before award of the contract. The joint venture agreement shall include a detailed breakdown of the following:

a. Contract responsibility of the DBE for specific items of work.

b. Capital participation by the DBE.

c. Specific equipment to be provided to the joint venture by the DBE.

d. Specific responsibilities of the DBE in the control of the joint venture.

e. Specific manpower and skills to be provided to the joint venture by the DBE.

f. Percentage distribution to the DBE of the projected profit or loss incurred by the joint venture.

(6) A contractor may count toward the DBE goal only expenditures for materials and supplies obtained from DBE suppliers and manufacturers in accordance with the following:

a. The DBE supplier assumes actual and contractual responsibility for the provision of materials and supplies.

b. The contractor may count 100 percent of expenditures made to a DBE manufacturer provided the DBE manufacturer operates or maintains a factory or establishment that produces on the premises the materials or supplies obtained by the contractor.

c. The contractor may count 60 percent of the expenditures to DBE suppliers who are regular dealers but not manufacturers, provided the DBE supplier performs a commercially useful function in the supply process including buying the materials or supplies, maintaining an inventory, and selling materials regularly to the public. Dealers in bulk items such as steel, cement, aggregates and petroleum products are not required to maintain items in stock, but they must own or operate distribution equipment. The DBE supplier shall be certified as such by DOTD.

d. A DBE may not assign or lease portions of its supply, manufactured product, or service agreement without the written approval of the DOTD.

(7) A contractor may count toward the DBE goal reasonable expenditures to DBE firms including fees and commissions charged for providing a bona fide service; fees charged for hauling materials unless the delivery service is provided by the manufacturer or regular dealer as defined above; and fees and commissions for providing any bonds or insurance specifically required for the performance of the contract.

(8) The contractor will not receive credit if the contractor makes direct payment to the material supplier. However, it may be permissible for a material supplier to invoice the contractor and DBE jointly and be paid by the contractor making remittance to the DBE firm and material supplier jointly. Prior approval by DOTD is required.

(9) The contractor will not receive credit toward the DBE goal for any subcontracting arrangement contrived to artificially inflate the DBE participation.

G. AWARD DOCUMENTATION AND PROCEDURE: This project has specific DBE goal requirements set forth in the Special Provision for DBE Participation in Federal Aid Construction Contracts. The bidder by signing this bid certifies that:

(1) The goal for DBE participation prescribed in the special provisions shall be met or exceeded and arrangements have been made with certified DBE or good faith efforts made to meet the goal will be demonstrated.

(2) Affirmative actions have been taken to seek out and consider DBE as potential subcontractors. Bidders shall contact DBE to solicit their interest, capability, and prices in sufficient time to allow them to respond effectively, and shall retain, on file, proper documentation to substantiate their good faith efforts.

(3) Form CS-6AAA and "Attachment to Form CS-6AAA" and, if necessary, documentation of good faith efforts shall be submitted within 10 business days following the opening of bids to the DOTD Compliance Programs Office. Submittals shall be personally delivered and date and time stamped into the DOTD Compliance Programs Office by the close of business, 10 business days after opening of bids; or mailed to the DOTD Compliance Programs Office by certified mail, return receipt requested and post marked by the 10th business day after the opening of bids. A business day is defined as a normal working day of DOTD.

Should a bidder protest or appeal any matter regarding the bidding or award of a contract in accordance with Subsection 102.13 of the 2006 Standard Specifications (Subsection 102.13 of the 2000 Louisiana Standard Specifications) after the scheduled time of bid opening, the Compliance Programs Section will immediately suspend the ten day requirement for submission of the CS-6AAA and Attachments until further notice and will notify all parties involved of the suspension. Once the protest has been resolved the

Compliance Programs Section will notify the low bidder and issue a date for submission of the CS-6AAA and Attachments.

All attachments to Form CS-6AAA shall include:

a. The names of DBE subcontractors that will actually participate in meeting the contract goal; and

b. A complete description of the work to be performed by the DBE including the specific items or portions of items of work, quantities, and unit price(s) of each item; and

c. The total dollar value of each item that can be credited toward the contract goal; and

d. Any assistance to be provided to the DBE; and

e. The original signature of each DBE and the contractor attesting that negotiations are in progress and that it is the intention of the parties to enter into a subcontract within 60 calendar days from the time the contract is finalized between the contractor and DOTD.

It shall be the bidder's responsibility to ascertain the certification status of designated DBEs. An extension of time for submittal of Form CS-6AAA and Attachments will not be granted beyond the stated time. Questionable technical points will be cleared with the DOTD Compliance Programs Office within the time period allowed. If the documentation required is not provided in the time and manner specified, DOTD will take the actions specified in Heading (6) below.

(4) If the apparent low bidder is not able to meet the DBE goal, the DBE firms that can meet a portion of the goal shall be listed on the form CS-6AAA. Form CS-6AAA and attachments shall be completed and submitted in accordance with Heading (3) above 10 business days after opening of bids. Form CS-6AAA shall indicate the DBE participation which has been secured along with documentation of good faith efforts. The apparent low bidder shall document and submit justification stating why the goal could not be met and demonstrate the good faith efforts as shown in Section J.

The DOTD's evaluation of good faith efforts in the pre-award stage will focus only on efforts made prior to submittal of the bid. For consideration, good faith efforts shall include the requirements listed in these provisions as well as other data the contractor feels is relevant.

(5) Form CS-6AAA and attachments, and documentation of good faith efforts, when appropriate, will be evaluated by DOTD in the selection of the lowest responsible bidder. The information provided shall be accurate and complete. The apparent low bidder's proposed attainment of the DBE goal and/or demonstration of good faith efforts will be considered in the award of the contract.

(6) An apparent low bidder's failure, neglect, or refusal to submit Form CS-6AAA and attachments committing to meet or exceed the DBE goal and/or documentation of good faith efforts, shall constitute just cause for forfeiture of the proposal guarantee and the DOTD rejecting the bid, pursuing award to the next lowest bidder, or re-advertising the project. The original apparent low bidder will not be allowed to bid on the project should readvertisement occur.

The apparent low bidder shall forfeit the proposal guarantee unless the bidder can show that the reason for not meeting the requirements given in these DBE Provisions was beyond the bidder's control. The DOTD DBE Oversight Committee will review the bidder's reasons for not meeting these DBE Provisions and will decide if the reasons are sufficient to allow return of the proposal guarantee.

(7) The bidder has the right to appeal the DOTD's findings and rulings to the DOTD Chief Engineer. The bidder may present information to clarify the previously submitted documentation. The decision rendered by the DOTD Chief Engineer will be administratively final. There shall be no appeal to the US DOT. If the DOTD Chief Engineer does not rule in favor of the original apparent low bidder, the new apparent low bidder shall submit, in detail, its subsequent proposed DBE participation within 14 calendar days after notification.

(8) Agreements between the bidder and the DBE, whereby the DBE agrees not to provide subcontracting quotations to other bidders, are prohibited.

H. POST AWARD COMPLIANCE

(1) If the contract is awarded on less than full DBE goal participation, such award will not relieve the contractor of the responsibility to continue exerting good faith efforts. The contractor shall submit documentation of good faith efforts with requests to sublet prior to approval of subcontracting work being performed on the project.

(2) The contractor shall establish a program which will effectively promote increased participation by DBE in the performance of contracts and subcontracts. The contractor shall also designate and make known to the DOTD a liaison officer who will be responsible for the administration of the contractor's DBE program.

(3) The contractor shall enter into subcontracts or written agreements with the DBE identified on Form CS-6AAA and attachments for the kind and amount of work specified. The subcontracting requirements of the contract will apply. The contractor shall submit copies of subcontracts or agreements with DBE to DOTD upon request.

(4) The contractor shall keep each DBE informed of the construction progress schedule and allow each DBE adequate time to schedule work, stockpile materials, and otherwise prepare for the subcontract work.

(5) At any point during the project when it appears that the scheduled amount of DBE participation may not be achieved, the contractor shall provide evidence demonstrating how the goal will be met.

(6) If the contractor is unable to demonstrate to the DOTD's satisfaction that it failed to achieve the scheduled DBE participation due to reasons other than quantitative underruns or elimination of items contracted to DBE and that good faith efforts have been used to obtain the scheduled contract participation, the DOTD may withhold an amount equal to the difference between the DBE goal and the actual DBE participation achieved as damages.

(7) When the DOTD has reason to believe the contractor, subcontractor, or DBE may not be operating in compliance with the terms of these DBE provisions, to include, but not be limited to the encouragement of fronting, brokering, or not providing a commercially useful function, the DOTD will conduct an investigation of such activities with the cooperation of the parties involved. If the DOTD finds that any person or entity is not in compliance, the DOTD will notify such person or entity in writing as to the specific instances or matters found to be in noncompliance.

At the option of the DOTD, the person or entity may be allowed a specified time to correct the deficiencies noted and to achieve compliance. In the event that the person or entity cannot achieve compliance, or fails or refuses to do so, the DOTD reserves the right to initiate administrative action against the contractor which may include but not be limited to terminating the contract; withholding a percentage of the contractor's next partial payment equal to the shortfall amount until corrective action is taken; or other action the DOTD deems appropriate. The contractor has the right to appeal the DOTD's finding and rulings to the DOTD Chief Engineer.

The contractor may present additional information to clarify that previously submitted. Any new information not included in the original submittal will not be used in the final determination. The decision rendered by the DOTD Chief Engineer will be administratively final.

(8) To ensure that the obligations under subcontracts awarded to subcontractors are met, the DOTD will review the contractor's efforts to promptly pay subcontractors for work performed in accordance with the executed subcontracts. The contractor shall promptly pay subcontractors and suppliers, including DBE, their respective subcontract amount within 14 calendar days after the contractor receives payment from DOTD for the items satisfactorily performed by the subcontractors in accordance with Louisiana Revised Statute 9:2784. The contractor shall provide the DBE with a full accounting to include quantities paid and

deductions made from the DBE's partial payment at the time the check is delivered. Retainage may not be held by the contractor. Delay or postponement of payment to the subcontractor may be imposed by the contractor only when there is evidence that the subcontractor has failed to pay its labor force and suppliers for materials received and used on the project. Delay or postponement of payment must have written approval by the Project Engineer. Failure to promptly pay subcontractors or to release subcontractors' retainage shall constitute a breach of contract and after notification by the DOTD may result in (1) a deduction from the contract funds due or to become due the contractor, (2) disqualification of a contractor as non-responsive, or (3) any other such remedy under the contract as DOTD deems appropriate. All subcontracting agreements made by the contractor shall include the current payment to subcontractors provisions as incorporate in the contract. All disputes between contractors and subcontractors relating to payment of completed work or retainage shall be referred to the DBE Oversight Committee. Members of the DBE Oversight Committee are: the Deputy Chief Engineer,; the DOTD Compliance Programs Director; and a FHWA Division Representative.

(9) The contractor shall meet the requirements of Subsection 108.01 Subletting of Contract, and shall submit DOTD Forms OMF-1A, Request to Sublet and OMF-2A, Subcontractor's EEO Certification. These forms shall be approved by DOTD before any subcontract work is performed.

(10) DOTD reserves the right to withhold any partial payment from the contractor when it is determined that a DBE is not performing a commercially useful function or that achievement of the goal is in jeopardy. Payment may be withheld in the amount of the DBE goal that is in jeopardy until either the contractor submits to DOTD a revised plan for achieving the contract goal and the plan is approved, or the DBE goal amount in question has been met.

(11) The DOTD will monitor the contractor's DBE involvement during the contract, the level of effort by the contractor in meeting or exceeding the goal requirements in the contract, the contractor's attempts to do so, and the efforts in soliciting such involvement. If, at the completion of the project, the contractor has failed to meet the DBE goal and has not demonstrated good faith efforts or obtained a waiver or reduction of the goal, DOTD will withhold an amount equal to the difference between the DBE goal and the actual DBE participation achieved as damages.

I. SUBSTITUTIONS OF DBE FIRMS AFTER AWARD

(1) The contractor shall conform to the scheduled amount of DBE participation.

(2) Contract items designated to be performed by the DBE on Form CS-6AAA and attachments shall be performed by the designated DBE or DOTD approved substitute. Substitutions of named DBE shall be approved in writing by the DOTD Compliance Programs Section. Substituted DBE shall not commence work until the contractor is able to demonstrate that the listed DBE is unable to perform because of default, overextension on other jobs, or other acceptable justification. It is not intended that a contractor's ability to negotiate a more advantageous contract with another subcontractor be considered a valid basis for change. Substitution of DBE will be allowed only when the DBE is unable to perform due to default, overextension on other jobs, or other similar justification. Evidence of good faith efforts exerted by the contractor shall be submitted to DOTD for approval. Pay items of work eliminated from the project will not diminish the contractor's DBE participation.

(3) Under no circumstances will a contractor perform work originally designated to be performed by a DBE without prior written approval from the DOTD Compliance Programs Section.

(4) When a listed DBE is unwilling or unable to perform the items of work specified in the Form CS-6AAA and attachments, the contractor shall immediately notify the DOTD Compliance Programs Section.

When a contractor's request to be relieved of the obligation to use the named DBE results in a DBE Goal shortfall, the contractor shall immediately take steps to obtain another certified DBE to perform an equal amount of allowable credit work or make documented good faith efforts to do so. The new DBE's name and designated work shall be submitted to the DOTD for approval using Form OMF-1A, Request to Sublet, prior to proceeding with the work.

If the contractor is unable to replace a defaulting DBE with another DBE for the applicable item, a good faith effort shall be made to subcontract other items to DBE for the purpose of meeting the goal. The DOTD Compliance Programs Section will determine if the contractor made an acceptable good faith effort in awarding work to DBE firms. Any disputes concerning good faith efforts will be referred to the DBE Oversight Committee. The DOTD Compliance Programs Section may allow a waiver or adjustment of the goal as may be appropriate, depending on individual project circumstances.

J. GOOD FAITH EFFORTS: Good faith efforts are required by the contractor when the DBE goals established for a contract are not met, or at anytime during the contract when achievement of the DBE goal is in jeopardy. It is the contractor's responsibility to provide sufficient evidence for DOTD to ascertain the efforts made. The contractor shall demonstrate good faith efforts to maximize participation by DBE prior to award and during the life of the contract. Good faith efforts include personal contacts, follow-ups and earnest negotiations with DBE. DOTD will consider, at a minimum, the following efforts as relevant, although this listing is not exclusive or exhaustive and other factors and types of efforts may be relevant:

(1) Efforts made to select portions of the work to be performed by DBE in order to increase the likelihood of achieving the stated goal. It is the contractor's responsibility to make a sufficient portion of the work available to subcontractors and suppliers and to select those portions of work or materials consistent with the availability of DBE subcontractors and suppliers to assure meeting the goal for DBE participation. Selection of portions of work are required to at least equal the DBE goal in the contract.

(2) Written notification at least 14 calendar days prior to bid opening which solicits a reasonable number of DBE interested in participation in the contract as a subcontractor, regular dealer, manufacturer, or consultant for specific items of work. The contractor shall provide notice to a reasonable number of DBE that their interest in the contract is being solicited, with sufficient time to allow the DBE to participate effectively. The contractor shall seek DBE in the same geographic area from which it generally seeks subcontractors for a given project. If the contractor cannot meet the goal using DBE from the normal area, the contractor shall expand its search to a wider geographic area.

(3) Demonstrated efforts made to negotiate in good faith with interested DBE for specific items of work include:

a. The names, addresses and telephone numbers of DBE contacted. The dates of initial contact and whether initial solicitations of interest were followed-up personally, by mail, or by phone to determine the DBE interest.

b. A description of the information provided to DBE regarding the nature of the work, the plans and specifications and estimated quantities for portions of the work to be performed.

c. A statement of why additional agreements with DBE were not reached.

d. Documentation of each DBE contacted but rejected and the reasons for rejection. All bids and quotations received from DBE subcontractors whether verbal or written, and the contractor's efforts to negotiate a reasonable price shall be submitted. Rejecting a DBE's bid because it was not the lowest quotation received will not be satisfactory reason without an acceptable explanation of how it was determined to be unreasonable. A statement that the DBE's quotation was more than the contractor's bid price for an item or items will not be acceptable.

e. Copies of all bids and quotations received from DBE subcontractors and an explanation of why they were not used.

f. Scheduling meetings to discuss proposed work or to walk the job-site with DBE.

g. Informing DBE of any pre-bid conferences scheduled by the DOTD.

h. Assisting DBE in obtaining bonding, insurance, or lines of credit required by the contractor.

i. Evidence of DBE contacted but rejected as unqualified, accompanied by reason for rejection based on a thorough investigation of the DBEs capabilities.

j. Any additional information not included above which would aid the DOTD in evaluation of the contractor's good faith efforts.

(4) The following are examples of actions that will not be accepted as justification by the contractor for failure to meet DBE contract goals:

a. Failure to contract with a DBE solely because the DBE was unable to provide performance and/or payment bonds.

b. Rejection of a DBE bid or quotation based on price alone.

c. Failure to contract with a DBE because the DBE will not agree to perform items of work at the unit price bid.

d. Failure to contract with a DBE because the contractor normally would perform all or most of the work in the contract.

e. Rejection of a DBE as unqualified without sound reasons based on a thorough investigation of their capabilities.

f. Failure to make more than mail solicitations.

K. RECORD KEEPING REQUIREMENTS: The contractor shall keep such records as are necessary for the DOTD to determine compliance with the DBE contract obligations. These records shall include the names of subcontractors, including DBE; copies of subcontracts; the type of work being performed; documentation such as canceled checks and paid invoices verifying payment for work, services, and procurement; and documentation of correspondence, verbal contacts, telephone calls, and other efforts to obtain services of DBE. When requested, the contractor shall submit all subcontracts and other financial transactions executed with DBE in such form, manner and content as prescribed by DOTD. The DOTD reserves the right to investigate, monitor and/or review actions, statements, and documents submitted by any contractor, subcontractor, or DBE.

L. REPORTING REQUIREMENTS: The contractor shall submit monthly reports on DBE involvement. At the conclusion of each estimate period the contractor shall submit the Form CP-1A, CONTRACTORS MONTHLY DBE PARTICIPATION, to the project engineer to verify actual payments to DBE for the previous month's reporting period. These reports will be required until all DBE subcontracting activity is complete or the DBE Goal has been achieved. Reports are required regardless of whether or not DBE activity has occurred in the monthly reporting period.

Upon completion of all DBE participation, the contractor shall submit the Form CP-2A, DBE FINAL REPORT, to the DOTD Compliance Programs Section with a copy to the project engineer detailing all DBE subcontract payments. When the actual amount paid to DBE is less than the award amount, a complete explanation of the difference is required. If the DBE goal is not met, documentation supporting good faith efforts shall be submitted. Failure to submit the required reports will result in the withholding of partial payments to the contractor until the reports are submitted. All payments due subcontractors which affect DBE goal attainment, including retainage, shall be paid by the contractor before the DOTD releases the payment/performance/retainage bond.

The DOTD reserves the right to conduct an audit of DBE participation prior to processing the final estimate and at any time during the work.

M. APPLICABILITY OF PROVISIONS TO DBE BIDDERS: These provisions are applicable to all bidders including DBE bidders. The DBE bidder is required to perform at least 50 percent of the work of the contract with its own work force in accordance with the terms of the contract, normal industry practices, and the DOTD DBE Program. If the DBE bidder sublets any portion of the contract, the DBE bidder shall comply with provisions regarding contractor and subcontractor relationships. A DBE prime contractor may count only the contract amount toward DBE participation for work that he/she actually performs and any amounts awarded to other certified DBE subcontractors that perform a commercially useful function.

FORM CS-6AAA
BIDDERS ASSURANCE OF DBE PARTICIPATION

S.P.#	**Contract Amount: $**
F.A.P.#	**DBE Goal Percentage**
Letting Date:	**DBE Goal Dollar Value: $**

By its signature affixed hereto, the contractor assures the DOTD that one of the following situations exists (check only one box):

☐ The project goal will be met or exceeded.
☐ A portion of the project goal can be met, as indicated below. Good faith effort documentation is attached. DBE Goal Participation Amount_____ % $_____.

The contractor certifies that each firm listed is currently on the DBE list as maintained by DOTD and is certified for the items of work shown on the attachment(s). The contractor having assured that the goal for DBE participation prescribed in the special provisions will be met or exceeded, or that the portion of the DBE goal will be met or exceeded, attests that negotiations are in progress or complete and that a subcontract(s) will be executed with the firm(s) listed below within 60 calendar days after award of contract.

NAME OF DBE FIRM(S)	INTENDED SUBCONTRACT PRICE[1]

[1]For supplier list only the value of the subcontract that can be credited toward the DBE goal. This amount shall be equal to the amount shown for the supplier on the Attachment to Form CS-6AAA. Details are listed on the attachment(s) to Form CS-6AAA.

The contractor assessed the capability and availability of named firm(s) and sees no impediment to prevent award of subcontract(s) as described on the attachments.

The contractor shall evaluate the subcontract work or services actually performed by the DBE to ensure that a commercially useful function is being served in accordance with the Required Contract Provisions for DBE Participation in Federal Aid Construction Contracts. The contractor understands that no credit toward the DBE goal will be allowed for DBE that do not perform a commercially useful function. The contractor has a current copy of the DOTD DBE Program Implementation Guide which details the methods of operation that are acceptable on projects containing DBE goals. Copies of this guide may be obtained by calling the DOTD Compliance Programs Section at (225) 379-1382.

NAME OF CONTRACTOR	
AUTHORIZED SIGNATURE	
TYPED OR PRINTED NAME	
TITLE	
CONTRACTOR'S DBE LIAISON OFFICER (typed or printed name)	
PHONE NUMBER	
DATE	TAX ID#

ATTACHMENT TO FORM CS-6AAA

Contractor shall submit a separate attachment for each DBE listed on Form CS-6AAA.

S.P.#	F.A.P.#
NAME OF DBE	
PHONE #	CONTACT PERSON:

Fully describe the work to be performed (furnish materials and install, labor only, supply only, manufacture, hauling, etc.), quantity, unit price, and dollar value for each item to be subcontracted to the DBE listed below.

ITEM NO.	QUANTITY/UNIT PRICE/DESCRIPTION OF WORK TO BE PERFORMED	$ VALUE

Describe the types of assistance, if any, the contractor will provide to any DBE on this project.

The contractor and DBE subcontractor attest that a subcontract will be executed for the items of work listed above. The contractor acknowledges that it will only receive credit toward the DB goal if the subcontractor performs a commercially useful function. The DBE understands that it is responsible for performing a commercially useful function.

DBE CONTRACTOR'S SIGNATURE	
TYPED OR PRINTED NAME	
TITLE	
DATE	TAX ID#
PRIME CONTRACTOR'S SIGNATURE	
TYPED OR PRINTED NAME	
TITLE	
DATE	

06/08

FORM CP-1A
LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
CONTRACTOR'S MONTHLY DBE PARTICIPATION

STATE PROJECT NO.	CONTRACTOR:
FEDERAL AID PROJECT NO.	
ESTIMATE NO.	REPORT PERIOD: _____ TO _____

DOTD CERTIFIED DBE SUBCONTRACTOR OR SUPPLIER	ITEMS PERFORMED AND PAID THIS ESTIMATE PERIOD	AMOUNT PAID THIS MONTH[1]	TOTAL PAID TO DATE[1]

[1]For suppliers, list total amount paid and the 60 percent value counted toward the goal.

This report covers the previous estimate period and shall be submitted to the Project Engineer with the current month's pay estimate. Estimates will be withheld until required form is submitted. Questions should be directed to the DOTD Compliance Programs Section at (225) 379-1382.

The Contractor certifies that the above amounts <u>were paid</u> to the listed DBEs and that documentation of these payments is available for inspection.

Project Engineer has reviewed this form. _____ (Signature of Project Engineer).

Authorized Signature	
Typed or Printed Name	
Title	
Phone No.	
Date	

06/08

FORM CP-2A
LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT
DBE FINAL REPORT

STATE PROJECT NO.	DBE GOAL AMOUNT: $	CONTRACTOR:
FEDERAL PROJECT NO.	CONTRACT AMOUNT: $	
PARISH(ES)	LETTING DATE:	

DOTD CERTIFIED DBE SUBCONTRACTOR OR SUPPLIER	ITEMS PERFORMED AND PAID	TOTAL DOLLAR AMOUNT PAID TO SUB OR SUPPLIER (60%)

This is to certify that $_____ has been paid to Disadvantaged Business Enterprise Subcontractors/Suppliers listed above.

Authorized Signature	
Typed or Printed Name	
Title	
Date	

Parish or County _____ State of _____

Subscribed and sworn to, before me, this _____ day of _____, A.D. 20_____

Notary Public _____

My commission expires: _____

06/08

General Decision Number: LA080007 02/08/2008 LA7

Superseded General Decision Number: LA20070011

State: Louisiana

Construction Types: Highway

Counties: Acadia, Ascension, Calcasieu, East Baton Rouge, Lafayette, Lafourche, Livingston, St Landry, St Martin, Terrebonne and West Baton Rouge Counties in Louisiana.

HIGHWAY CONSTRUCTION PROJECTS (does not include building structures in rest area projects)

Modification Number	Publication Date
0	02/08/2008

* SULA2004-015 08/03/2004

	Rates	Fringes
Carpenter (including formbuilding/formsetting)	$ 11.88	
Cement Mason/Concrete Finisher	$ 12.58	
Electrician (including traffic signal wiring and installation)	$ 12.36	
Ironworker, Reinforcing	$ 12.33	
Laborers		
Asphalt Raker	$ 8.95	
General including landscape/erosion	$ 8.48	
Guardrail	$ 8.21	1.80
Jack Hammer/Vibrator	$ 8.92	
Mason Tender	$ 8.63	
Pipelayer	$ 9.71	1.12
Striping/Pavement Marker including paint striping and attachment of reflector buttons	$ 7.93	
Traffic Control including flagger, sign placement, barricades, and cones	$ 8.15	
Painter, Brush, Spray and Roller	$ 13.40	2.55
Piledriverman	$ 13.97	
Power Equipment Operators		
Air Compressor	$ 9.04	
Asphalt Distributor	$ 9.11	
Asphalt Paving Machine	$ 13.30	0.18
Asphalt Screed	$ 11.86	
Asphalt/Aggregate Spreader	$ 10.49	
Backhoe/Excavator	$ 11.31	
Bobcat/Skid Loader	$ 10.00	

Broom/Sweeper.....$ 9.30
Bulldozer.....$ 12.00
Concrete Saw.....$ 9.00
Crane.....$ 14.82
Front End Loader.....$ 9.60
Mechanic.....$ 11.97
Milling/Cold Planing Machine$ 13.08
Motor Grade/Blade.....$ 11.68
MTV/Shuttlebuggy.....$ 10.43
Post Drive including
guardrails.....$ 10.96
Roller.....$ 9.97
Stabilizer.....$ 9.44
Trackhoe.....$ 12.59
Tractor.....$ 11.90
Trenching/Boring Machine....$ 8.50
Truck drivers
Dump (all types).....$ 10.19
Flatbed.....$ 9.46
Lowboy.....$ 12.48
Pickup including paint truck$ 9.90
Tack.....$ 9.28
Water.....$ 10.60

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

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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)).

In the listing above, the "SU" designation means that rates listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

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

Regional Office for the area in which the survey was conducted because those Regional Offices have 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 DECISION

STATE OF LOUISIANA

DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

TECHNICAL SPECIFICATIONS

FEDERAL AID PROJECT

STATE PROJECT NO. 737-55-0003

HOUMA INTELLIGENT TRANSPORTATION SYSTEM (ITS) DEPLOYMENT – PHASE 3

TERREBONNE PARISH

STATE OF LOUISIANA
JONATHAN N. FOX
License No. 33277
PROFESSIONAL ENGINEER
IN
CIVIL ENGINEERING

8-12-09

Fiber Optic Marker (08/09)

Description

This item shall consist of the contractor furnishing and installing warning signs along fiber routes as shown on the plans.

Materials

- Fiber optic marker

Construction Requirements

The sign shall read, "CAUTION, BURIED FIBER OPTIC CABLE, BEFORE DIGGING OR IN AN EMERGENCY CALL 1-800-732-7372 EXT. 131 DOTD, 225-379-1195 DOTD ITS SECTION," as shown on the plans.

Above ground fiber-optic delineation markers shall be installed at a maximum spacing of every quarter mile (1320 feet) or in line of sight from the previous marker along the length of the trench or directional bore section and at points of intersection or corners. Markers shall be nominally 3 inches wide and 72 inches in height prior to installation. Installation and depth of marker shall be approved by the PE. Markers shall be constructed of fiberglass reinforced composite that is UV resistant, will not warp, fade, or sag. Markers shall be able to withstand repeated impacts with vehicles and return to an upright position after impact. Markers shall have a reinforcing member on the backside for strength, shall be bright orange in color, and shall have a thermal transfer message in black block text letters (see plans for illustration). Decals shall not be used. Post and message shall have a 1 year warranty. Above ground delineation marker shall be 3 inches EZ Drive Marker or approved equal. Where conduit crosses or passes through railroad right-of-way, the delineation markers shall be in accordance with the railroad specifications.

Shop drawings detailing the warning sign shall be submitted to the engineer for approval.

Measurement

Fiber optic marker shall be measured in units of each and be paid for at the contract unit price per each. The price shall be full compensation for furnishing and installing; and for all labor, equipment, tools and incidentals necessary to complete the work.

Payment

Payment for fiber optic marker work shall be made at the contract unit price under:

Item #	Pay Item	Pay Unit
NS-ITS-04000	Fiber Optic Marker	Each

Pulling Fiber Optic Cable Through Existing Conduit (08/09)

Description

This item consists of installing fiber optic cable into existing underground conduit.

Materials

- Installation of fiber optic cable (backbone or drop)

Construction Requirements

Cable shall be pulled through existing conduit. Before any underground cable installation is performed the contractor shall provide the engineer with the cable manufacturer's recommended and maximum pulling tensions for each cable reel. These pulling tensions shall be specified for both pulling from the cables and for pulling from the cable's outer jacket. Included with these pulling tensions shall be a list of the cable manufacturer's approved pulling lubricants. Only those lubricants will be permitted.

Cable shall be installed by hand-pulling methods or approved acceptable mechanical methods that do not exceed pulling tensions specified by the cable manufacturer. Approved cable guides, feeders, sleeves (e.g., MaxCell fabric innerduct or approved equal), shoes and/or bushings shall be used to prevent damage to the cable during installation. Cable shall not be pulled over edges or corners, over or around obstructions or through unnecessary curves or bends. Cable shall enter the pullbox or hole directly from the reel or storage stack and shall be pulled directly out of the immediate next downstream pullbox, hole, or cabinet.

When installing the cable using a pulling eye, the maximum allowable pulling tension for the cable installation shall be the cable manufacturer's recommended pulling tension for pulling from the pulling eye, or eighty (80%) percent of the manufacturer's maximum pulling tension for pulling by the outer jacket, whichever is smaller. A dynamometer approved by the engineer shall be used to ensure that the maximum allowable pulling tension is not exceeded at any time during installation. Cables shall be looped in and out of cabinets and pullboxes to provide adequate slack and the least amount of stress on conductors and connectors as possible.

The contractor must comply with the requirement that a maximum of forty (40) percent of the cross-sectional area of the conduit shall be utilized for pulling conductors. If number of conductors exceeds this maximum capacity requirement, the contractor shall immediately notify the engineer of the situation. The contractor shall bare all liability for installing cable resulting in violation of this percent full requirement.

Existing cable that is to be abandoned in conduit shall be taped and capped at the cable's termination points and shall be labeled as abandoned.

Measurement

Pulling fiber optic cable through existing conduit will be measured per linear foot and will include providing all labor, equipment, materials, and incidentals required for the furnishing and installation of pulling conductors through existing conduit as detailed in the plans and as described

in the specifications. Included in this item is labor, all lubricants, and all work, equipment, and appurtenances as required to effect the full operation and control of the fiber optic cable complete in place and ready for use.

Payment

Payment for pulling fiber optic cable work shall be made at the contract unit price under:

Item #	Pay Item	Pay Unit
NS-ITS-04010	Pulling Fiber Optic Cable Through Existing Conduit	Linear Ft.

Fiber Optic Cable (08/09)

Description

This item consists of furnishing and installing fiber optic cable and all appurtenances required for the ITS in accordance with plan details, specifications, and as directed by the engineer.

Materials

All equipment shall be new and constructed using the highest quality, commercially available components and techniques to assure high reliability and minimum maintenance. The contractor shall submit, prior to installation, a complete set of shop drawings of all the equipment and components listed below and included as part of the installation.

The component of the fiber optic communications system described by this specification shall consist of the following:

- Fiber optic backbone cable

Construction Requirements

The contractor shall be required to assemble and install all necessary material and equipment and to furnish a working fiber optic cable in accordance with these plans and specifications and compatible with the requirements of the ITS. All items that are required to complete the installation shall be supplied by the contractor whether listed above or not. All items not specifically shown but required for an operational ITS shall be supplied by the contractor. All components supplied by the contractor are the responsibility of the contractor.

The contractor shall field verify final equipment locations with the engineer. Plans are diagrammatic and indicate the general arrangement of devices and work included in these documents. Final placement and arrangement are the responsibility of the contractor.

During the installation of the underground systems, removal of brush, trees, fencing, and other obstructions within the right-of-way shall comply with Section 202 of the Louisiana Standard Specifications for Roads and Bridges and shall be paid for under Item 202-01-00100 – Removal of Structures and Obstructions. Landscaping shall be restored to original or better condition if disturbed.

The manufacturer upon request by the Department shall grant access to the manufacturing facility for all products specified herein.

A. Strand Single Mode Cable

1. General Requirements

Contractor shall provide strand optical fiber cable with the fiber count as indicated on the plans and with characteristics as specified herein. All fiber strands shall conform to the requirements detailed herein.

- The maximum attenuation for each single mode fiber shall be 0.36 dB/km at 1310 nm and 0.22 dB/km at 1550nm. The attenuation at the water peak (1383 nm) shall not exceed 0.36 dB/km. The maximum dispersion shall be less than 3.5 ps/(nm•km) from 1285nm to 1330nm and less than 18 ps/(nm•km) at 1550 nm.

All optical fibers shall be proof tested by the fiber manufacturer to a minimum load of .07 GN/m2 (100 kpsi).

Each fiber shall be distinguishable by means of color coding in accordance with TIA/EIA-598-A, "Optical Fiber Cable Color Coding."

The cabled fiber shall support Gigabit Ethernet (GbE) operation according to the 1000Base-LX (1310 nm region) specifications up to 5000 meters in accordance with the GbE standard. The cable fiber shall support laser-based 10 Gigabit Ethernet (10 GbE) operation according to the 10GBase-LX (1300 nm region), 10GBase-L (1310 nm) and 10GBase-E (1550 nm) specifications for distances of 10 km, 10 km, and 40 km respectively.

1. **Cable Construction**

Fiber optic cable provided under this specification shall be of a totally dielectric construction. Optical fibers shall be arranged in a loose tube configuration. Fibers must be matched clad.

The fiber strands shall not be colored with solvent-based inks.

All cables shall have either a central strength member. The strength members shall consist of a dielectric, glass reinforced plastic rod. All cables shall also contain either one or two ripcords.

Buffer tubes shall be stranded around a dielectric central member. Water blocking yarn(s) shall be applied longitudinally along the central member during stranding.

All cables shall be sheathed with a circular extrusion of medium density polyethylene (MDPE) and shall be suitable for direct burial. The minimum nominal jacket thickness shall be approximately 1.4 mm. Jacketing material shall be applied directly over the tensile strength members and water blocking tape. The fiber cable shall have a tensile rating of 600-lb. (2670 N).

MDPE shall contain carbon black to provide ultraviolet light protection and shall not promote the growth of fungus. The polyethylene jacket material shall be as defined by ASTM D1248.

All materials used in the fiber cable shall be non-reclaimed, free from foreign matter consistent with good manufacturing practices, and shall not degrade cable components or approved connectors, closures, tapes and other materials used with the fiber cable. All fibers, coatings, plastic tubes and jackets shall be continuous and free from roughness, porosity, bubbles, splits, blisters, voids and inclusions, consistent with good manufacturing practices.

Cable jackets shall be marked with manufacturer's name, sequential meter or foot markings, month and year, or quarter and year of manufacture, and a telecommunication handset symbol, as required by Section 350G of the National Electrical Safety Code (NESC). The actual length of the cable shall be within -0/+1% of the length markings. The print color shall be white; with the exception that cable jackets containing one or more coextruded white stripes shall be printed in light blue. The height of the marking shall be approximately 2.5 mm.

If the initial marking fails to meet the specified requirements (i.e., improper text statement, color, legibility, or print interval), the cable may be remarked using a contrasting alternate color. The numbering sequence shall differ from the previous numbering sequence, and a tag shall be attached to both the outside end of the cable and to the reel to indicate the sequence of remarking. The preferred remarking color will be yellow, with the secondary choice being blue.

The cable shall be of gel-free, loose tube construction with up to 12 buffer tubes wrapped around a dielectric central strength member. All fiber(s) shall be contained within buffer tubes, and each buffer tube shall have an insider diameter much greater than the total diameter(s) of the fiber(s) it supports.

Each fiber or group of fibers shall be free-floating within the tubes such that all mechanically or environmentally induced stress placed upon the cable is de-coupled from the fibers. The buffer tubes shall contain a water-swellable yarn for water blocking protection. The water-swellable yarn shall be non-nutritive to fungus, electrical non-conductive, and homogeneous. The buffer tube shall be gel-free. The optical fiber shall not require cleaning before placement into a splice tray or fan out kit.

The maximum pulling tension shall be 2700 N (608 lbf) during installation (short term) and 890 N (200 lbf) long term installed.

All cables must be able to withstand a minimum bending radius of 10 times cable diameter under no load and 20 times cable diameter under load, without affecting performance characteristics of the cable.

The shipping, storage, and operating temperature range of the cable shall be 40°C to +75°C. The installation temperature range of the cable shall be 30°C to +60°C.

The fiber installer shall be certified in fiber installation by Corning Cable Systems or approved equal.

2. **Quality Control Provision**

All cabled optical fibers shall be 100% attenuation tested. The attenuation of each fiber shall be provided with each cable reel and shall meet the requirements of the fiber specification parameters as specified herein.

All cable once on the reel shall have Optical Time Domain Reflector (OTDR) reports generated at the factory prior to shipment, at the delivery location prior to installation, and

on-site after installation. Cable provided under this Specification must produce equivalent OTDR reports at each test point.

3. References, Standards, Listing, and Codes

Cable characteristics are single mode, overall MDPE jacket, rated for installation in conduit, shall be suitable for direct burial, and shall be an accepted product of the United States Department of Agriculture Rural Utilities Service (RUS) 7 CFR 1755.900 and meet the requirements of ANSI/ICEA Standard for Fiber Optic Outside Plant Communications Cable, ANSI/ICEA S-87-640-1992.

For the equipment specified herein, the manufacturer shall be ISO 9000, 9001 or 9002 certified.

The cable manufacturer shall support industry standards such as Bell Communications Research (Bellcore), Electronic Industries Association (EIA), Telecommunications Industry Association (TIA), International Telecommunications Union (ITU), International Electromechanical Commission (IEC), Rural Utilities Service (RSU, formerly-REA), American Society for Testing and Material (ASTM) and the Building Industry Consultant Services (BICSI) Telecommunications Distribution Methods Manual. In addition, product supplied by the cable manufacturer shall meet all applicable standards of the above organizations and well as the attached reference standards.

Materials provided under this Specification must be new and must be provided by manufacturers regularly engaged in the production of such products.

It is required that the cable manufacturer shall provide installation procedures and technical support concerning the items contained in this specification.

All work and equipment shall be designed, manufactured, and tested in accordance with the latest applicable standards for the equipment specified. In some instances, these Specifications go beyond the requirements of the stated standards. Where these Specifications differ from the requirements of the stated standards, these Specifications shall take precedence.

In addition to the requirements of these Specifications, material and work shall meet and/or exceed all requirements of the applicable portions of the latest editions of the standards and codes listed below. The fiber optic cable shall further meet and/or exceed those applicable standards not stated herein but referenced by the below standards and/or their applicable sections. The standards list includes, but is not limited to, the following:

Industry Standard / Code	Description
ASTM D 1248	Standard Specification for Polyethylene Plastics Molding and Extrusion Materials
ASTM D 1603	Standard Test Method for Carbon Black in Olefin Plastics

Industry Standard / Code	Description
ASTM D 1765	Standard Classification System for Carbon Blacks Used in Rubber Products
ASTM D 3349	Standard Test Method for Absorption Coefficient of Carbon Black Pigmented Ethylene Plastic
ASTM E 29	Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications
BELLCORE GR-20-CORE	Issue 1, September 1994 Generic Requirements for Optical Fiber and Fiber Optic Cable
EIA/TIA-455-3	Procedure to Measure Temperature Cycling Effects on as Optical Fiber, Optical Cable, and Other Passive Fiber Optic Components
EIA/TIA-455-24	Water Peak Attenuation Measurement of Single Mode Fibers
EIA/TIA-455-25	Impact Testing of Fiber Optic Cables and Cable Assemblies
EIA/TIA-455-28	Method for Measuring Dynamic Tensile Strength of Optical Fibers
EIA/TIA-455-29	Refractive Index Profile Transverse Interference Method
EIA/TIA-455-31	Fiber Tensile Proof Test Method
EIA/TIA-455-33	Fiber Optic Cable Tensile Loading and Bending Test
EIA/TIA-455-37	Low or High Temperature Bend Test for Fiber Optic Cable
EIA/TIA-455-41	Compressive Loading Resistance of Fiber Optic Cable
EIA/TIA-455-46	Spectral Attenuation Measurement for Long-Length, Graded-Index Optical Fibers
EIA/TIA-455-47	Output Far-Field Radiation Pattern Measurement
EIA/TIA-455-51	Pulse Distortion Measurement of Multimode Glass Optical Fibers Information Transmission Capacity
EIA/TIA-455-58	Core Diameter Measurement of Graded-index Optical Fibers Information Transmission Capacity
EIA/TIA-455-59	Measurement of Fiber Point Discontinuities Using an OTDR
EIA/TIA-455-61	Measurement of Fiber or Cable Attenuation Using an OTDR

Industry Standard / Code	Description
EIA/TIA-455-62	Measurement of Optical Fiber Macrobend Attenuation
EIA/TIA-455-76	Method for Measuring Dynamic Fatigue or Optical Fibers by Tension
EIA/TIA-455-78	Spectral Attenuation Cutback Measurement for Single-Mode Optical Fibers
EIA/TIA-455-80	Measuring Cutoff Wavelength of Uncabled Single-Mode Fiber by Transmitted Power
EIA/TIA-455-82	Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable
EIA/TIA-455-85	Fiber Optic Cable Twist Test
EIA/TIA-455-86	Fiber Optic Cable Jacket Shrinkage
EIA/TIA-455-89	Fiber Optic Cable Jacket Elongation and Tensile Strength
EIA/TIA-455-97	Procedure for Measuring Static Fatigue of Optical Fibers in Two-Point Bending
EIA/TIA-455-98	Fiber Optic Cable External Freezing Test
EIA/TIA-455-104	Fiber Optic Cable Cyclic Flexing Test
EIA/TIA-455-111	Procedure for the Measurement of Optical Fiber Curl
EIA/TIA-455-113	Polarization-Mode Dispersion Measurement for Single-Mode Optical Fibers by Wavelength Scanning
EIA/TIA-455-164	Single-Mode Fiber, Measurement of Mode Field Diameter by Far-Field Scanning
EIA/TIA-455-167	Mode Field Diameter Measurement-Variable Aperture Method in the Far-Field
EIA/TIA-455-168	Chromatic Dispersion Measurement of Multimode Graded-Index and Single-Mode Optical Fibers by Spectral Group Delay Measurement in the Time Domain
EIA/TIA-455-170	Cable Cutoff Wavelength of Single-Mode Fiber by Transmitted Power
EIA/TIA-455-173	Coating Geometry Measurements, Side View
EIA/TIA-455-175	Chromatic Dispersion Measurement of Single-mode Optical Fibers

Industry Standard / Code	Description
	by the Differential Phase Shift Method
EIA/TIA-455-176	Method for Measuring Optical Fiber Cross-Sectional Geometry by Automated Grey-Scale Analysis
EIA/TIA-455-177	Numerical Aperture Measurement of Graded-Index Optical Fibers
EIA/TIA-455-178	Measurement of Strip Force Required for Mechanically Removing Coatings from Optical Fibers
EIA/TIA-455-181	Lightning Damage Susceptibility Test for Fiber Optic Cables with Metallic Components
IEC 793-1	International Standard (Optical Fibers) – Part1: Generic Specification
-A1A	Refractive Index Profile
-A2	Near Field Light Distribution
-B1	Optical Fiber Proof Test
-C1A	Cut-back Technique
-C1C	Insertion Loss Technique
-C2A	Impulse Response
-C5C	Cromatic Dispersion Measurement of Optical Fibers by the Differential Phase Shift Method
-C7B	Cable Cut-off Wavelength Measurement of Single Mode Fiber
-C9A	Mode Field Diameter Measurement Direct Far-Field Scanning Method
-C9B	Mode Field Diameter Measurement – Variable Aperture Method in the Far-Field
-C11	Macrobending Sensitivity
IEC 794-1	International Standard (Fiber Optic Cables) – Part1: Generic Specification

B. Production Tests and Technical Requirements

2. General Requirements

DOTD shall have accessibility to manufacturing plant to witness manufacture and testing of fiber optic cable.

The manufacturer shall provide a representative to witness field-testing of installed fiber optic cable.

Final inspection and acceptance of the multiple fiber optic cable installations shall be at the discretion of the DOTD. DOTD shall require the contractor to have completed testing as described below, and to have provided DOTD with documentation related to such testing. Testing shall be in accordance with the standards and regulations previously referenced by these Specifications.

The contractor shall prepare a statement of methodology for all testing procedures that shall be used for this installation. This statement shall be provided in advance to the DOTD for approval by the engineer. In addition to approving procedures, the engineer must also pre-approve all data forms that shall be used to record results of pre and post installation testing. Once testing is complete, all test results recorded on approved data forms, and signed by the contractor, shall be provided to the engineer for approval.

In addition to the guidance provided above, all testing shall be performed in accordance with industry standards bodies and generally accepted methods that were previously documented. Testing shall also comply with the specific industry standards provided by the fiber optic cable Specification.

3. Tests Performed at Manufacturing Facility

Certified test reports shall be supplied for each shipping reel of cable. Manufacturer shall document and certify the results of all factory tests and compliance with the performance requirements. Certified test reports shall include but not limited to the test reports for maximum attenuation for each fiber, bandwidth, maximum billable length, actual shipped length, and ordered length. Certificates of compliance are not acceptable. A written quality assurance manual shall be implemented and maintained to insure full compliance with all requirements of this Specification.

Testing shall be performed in accordance with the procedures outlined in the previously mentioned standards. These tests shall be performed at the factory and certified test results shall be provided to the DOTD in accordance with those standards.

4. Tests Performed Immediately Upon Delivery

At the time of delivery, fiber optic cable tests as outlined in this section shall be performed in the presence of the contractor, a DOTD representative, and the manufacturer's representative. Once the tests are complete, are satisfactorily passed, and the results agreed upon by all representatives present, the equipment and materials shall then become the responsibility of the contractor and are suitable for installation.

Once off-loaded from the delivery vehicle, each reel of fiber optic cable shall be subjected to an optical time domain reflectometer (OTDR) test. Every fiber strand in each cable shall be tested end to end with an OTDR which is compatible with wavelength and fiber type. Testing shall measure attenuation and length, verify continuity, and discover anomalies. Should an accurate measurement not be obtained from one end of a cable strand, the test shall be run from the opposite end. Tested loss per kilometer shall not exceed the loss provided in the manufacturer's certification data and as required by these specifications. In the event that loss per kilometer does exceed that of the manufacturer's certification data and these specifications, the cable reel shall be rejected and returned to the manufacturer.

Test reports shall be submitted to the engineer within 48 hours of test completion.

5. Tests Performed Subsequent to Installation

Following installation and prior to splicing, each strand of the fiber cables at each location, shall be tested for loss characteristics. Tests shall be performed for both directions of operation.

These tests shall be repeated once all splices and connectors have been installed, for the full length of the installation and spliced connections to field build-outs.

C. Storage, Packaging, and Shipping

The contractor shall provide a secure indoor storage facility for the duration of the storage period.

Cables shall be shipped on heavy-duty reels. The distance between the cable and the outer edge of the reel flange shall not be less than 2 inches.

Cable ends shall be sealed with heat shrink end caps and both ends of the cable shall be exposed to facilitate testing on the reel.

Reels must be shipped in upright position on edges of flanges. Any reels laid on flanges shall be returned. Reels must not be stored on sides of flanges (laying flat) or stored stacked on each other.

All reels must be wrapped with a protective paper or cardboard wrap to expose any damage that may have occurred during transportation.

Standard industry practices for storage, handling, and shipping shall be adhered to when not covered in these Specifications.

Due to long fiber pulls, it may be necessary for the contractor to supply multiple fiber reels to complete a run. When connecting multiple reels to complete a run, reel-to-reel butt splices shall be provided at locations already identified in the plans as requiring a splice closure.

The reel tag shall include the following information:

- Cable number
- Gross weight

- Shipped cable length in feet
- Project name and number
- Manufacturers product number
- Date cable was tested
- Manufacturers order number
- Cable length markings - Top (inside end of cable) and Bottom (outside end of cable)
- Item number
- Loss budget for each fiber strand w/in each fiber optic cable

The reel (one flange) marking shall include:

- "Manufacturer"
- An arrow indicating proper direction of roll when handling
- Ship to address
- Manufacturer cable number
- Cable length in feet
- Gross package weight inclusive of cable, reel and protective covering
- Project name and number
- Fork lift handling illustration
- The text "DO NOT SHIP REEL ON SIDE"

Each cable shall be accompanied by a cable data sheet. The cable data sheet shall include the following information:

- Manufacturer Cable Number
- Manufacturer Product Number
- Manufacturer Factory Order Number
- Customer Name
- Customer Cable Number
- Mark for Information
- Ordered Length
- Actual Shipped Length
- Loss budget for each fiber strand within each fiber optic cable segment
- Bandwidth Specification

D. Warranty

The manufacturer of the specified fiber optic cable shall provide a written and documented ten 10 year warranty on materials and workmanship to the DOTD effective from the date of commission of said fiber optic cable.

In the event that the fiber optic cable, or any portion thereof, should fail due to workmanship or materials within the said ten -10 year warranty period, the warranty shall provide that the manufacturer shall supply the DOTD with new replacement fiber optic cable of equal or greater kind and quality and meeting all of the applicable Specifications herein, at no charge to the DOTD.

Cable manufacturer must provide recommended Splicing and Termination Instructions and procedures as part of the warranty.

E. Installation Guidelines and Requirements

1. General Requirements

The purpose of this section is to provide guidelines for installing the fiber optic cable. This document provides generic guidance according to generally accepted installation procedures. This document relies on manufacturer provided specific instructions for installation of fiber optic fusion splices, fiber terminations, selective splicing, and other items for which manufacturer specific instructions exist. These procedures are dependent upon the manufacturer of the fiber cable and the cable splicing and termination equipment.

Shop drawings showing the details for each component shall be submitted for approval prior to construction.

Before beginning any excavation, the contractor shall determine the location of any electrical lines, drainage, utility, and other underground facilities in the vicinity and shall conduct his work in such a manner as to avoid damage to it. Precautions shall be taken to insure that the conduit is located to avoid conflict with proposed guard rail, sign posts, or any other miscellaneous structures.

Contractor shall be responsible for repairing any broken or damaged underground facilities.

Backfilling of trenches shall be with usable soil, placed and compacted to at least the density of the surrounding ground at no direct pay.

All publications or standards referenced herein, along with all manufacturers' specifications, directions, and testing procedures, are hereby incorporated into the installation guidelines. In addition to the standards, publications, directions and other specifications appearing here, specifications and standards provided in the cable manufacturer specification are also incorporated. The sum of the previously mentioned sources comprises the complete installation guidelines.

It is the intent of the design to hold to an absolute minimum the number of total fiber optic cable fusion splices. Locations of allowed fusion splices are as detailed herein. It shall be

the responsibility of the contractor to ensure that a sufficient amount of fiber optic cable is included per run in order to avoid unnecessary splices.

Contractor shall install detectable Muletape in every spare conduit installed as part of this project.

2. Installation Description and Locations

See plan sheets and general notes for site or project specific information regarding installation of this item.

3. Fiber Optic Cable Installation

Generally accepted practices and standards for installing fiber optic cable and electrical conductors shall be followed during the installation. All appropriate precautions to prevent cable kinks and breaks shall be followed. Once the cable manufacturer has been selected, their specifications regarding tensile strength, pulling capacity, and bending radius, etc. shall not be violated. Plan details provide a diagram illustrating the route that each cable will take from origin to destination.

All specifications provided by the cable manufacturer along with all procedures and standards provided in this document must be followed. Appropriate standards for buried installation of cable shall be followed in laying-in and routing the fiber cable. Documents such as Lucent Technologies, Outside Plant Systems, Outside Plant Engineering Handbook provide guidance on proper installation procedures. Plan details provide a typical illustration of how the fiber is routed. During installation of the fiber optic cable, care must be taken so that the cables do not kink, or bend excessively, in a manner that diminishes the cable transmission capability. Note that the cable is to be terminated and/or spliced at specific locations. Maximum pulling tensions of all cables and conductors shall not exceed manufacturer's recommendations.

During installation of the optical fiber cable, a minimum of 50'-0" of slack shall be coiled within each underground pullbox. Drop locations for future connectivity shall have a minimum of 200'-0" of slack coiled within each underground pullbox as noted in the plans.

At each underground pullbox the contractor shall label every cable entering and leaving. Labels shall be permanent, plastic, wrap-around crimp-type that contains a minimum of 20 characters. Specific label content shall be determined with the engineer using designations as detailed on the plans.

Measurement

Fiber optic cable, SM, 13-48 fibers will be measured per linear foot and shall include providing all labor, equipment, materials, and incidentals required for the furnishing and installation of the fiber optic cable as detailed in the plans and as described in the specifications. Included in this item is the fiber optic cable (13-48 count) within the aggregation sites, 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 fiber optic cable complete in place and ready for use.

Payment

Payment for fiber optic cable work shall be made at the contract unit price under:

Item #	Pay Item	Pay Unit
NS-ITS-04020	Fiber Optic Cable, SM, Furnish & Install, 13-48 Fibers	Linear Ft.

Optical Fiber Fan Out Kit (08/09)

Description

This Item consists of furnishing and installing fiber optic fan out kits and all appurtenances required for the ITS in accordance with plan details, specifications, and as directed by the engineer.

Materials

All equipment shall be new and constructed using the highest quality, commercially available components and techniques to assure high reliability and minimum maintenance. The contractor shall submit, prior to installation, Fiber Optic Splicing and Termination Diagrams for the Backbone and Drops and a complete set of shop drawings of all the equipment and components listed below and included as part of the installation.

The component of the fiber optic communications system described by this specification shall consist of the following:

- Fiber optic fan out kits
- Fiber optic splicing diagram
- Fiber optic termination diagram

Construction Requirements

The contractor shall be required to assemble and install all necessary material and equipment and to furnish working fiber optic fan out kits in accordance with these plans and specifications and compatible with the requirements of the ITS. All items that are required to complete the installation shall be supplied by the contractor whether listed above or not. All items not specifically shown but required for an operational ITS shall be supplied by the contractor. All components supplied by the contractor are the responsibility of the contractor.

The manufacturer upon request by the Department shall grant access to the manufacturing facility for all products specified herein.

A. Fan Out Kit

1. General Requirements

Buffer tube fan outs shall be used when fiber optic drop cable is required to be connectorized as indicated on the plans. Spider fan outs, or approved equal, for loose tube cable shall be provided in either a six or twelve fiber configuration. The fibers shall be threaded into modular 6 or 12 fiber fan out inserts. These inserts shall consist of six or twelve 1-meter lengths of fan out tubing secured in a composite assembly. The fan out insert shall snaps into the main spider body.

The fan out assembly shall be yellow and have a nominal inner diameter of 0.4 mm and a nominal outer diameter of 2.9 mm. Overall length of the fan out shall be 26.75 inches.

No epoxy, heat shrink tubing, glue, or field sub-assembly shall be necessary to install the fan out. Buffer tube fan outs shall be used only in cases where fiber is terminated inside a fiber distribution panel. Spider fan outs shall be manufactured by Corning Cable Systems (SFK-P-06-250-S or SFK-P-12-250-S) or approved equal. Fan out kits shall be from the same manufacturer as the fiber cable. The fan out tubing shall provide three layers of protection consisting of an inner tube (into which the fiber is inserted), an aramid yarn strength member, and an outer protective polyvinylidene fluoride (PVDF) jacket.

2. Installation Description and Locations

See plan sheets and general notes for site or project specific information regarding installation of this item.

Measurement

Fiber optic fan out kits, SM, 12 strand will be measured per each and will include providing all labor, equipment, materials, and incidentals required for the furnishing and installation of a fiber optic fan out kit as detailed in the plans and as described in the specifications. Work included in this item the fan out kit, and installation of the kit on the drop cable, 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 fiber optic fan out kit complete in place and ready for use.

Payment

Payment for Optical Fiber System work shall be made at the contract unit price under:

Item #	Pay Item	Pay Unit
NS-ITS-04035	Fiber Optic Fan Out Kits, SM, 12 Strand, Furnish & Install	Each

Fiber Optic Splice (08/09)

Description

This Item consists of furnishing and installing an fiber optic splice and all appurtenances required for the ITS in accordance with plan details, specifications, and as directed by the engineer.

Materials

All equipment shall be new and constructed using the highest quality, commercially available components and techniques to assure high reliability and minimum maintenance. The contractor shall submit, prior to installation, fiber optic splicing diagrams for the backbone and drops and a complete set of shop drawings of all the equipment and components listed below and included as part of the installation.

The component of the fiber optic communications system described by this specification shall consist of the following:

- Fiber optic terminations
- Fiber optic patch panel
- Fiber optic splicing diagrams

Construction Requirements

The contractor shall be required to assemble and install all necessary material and equipment and to furnish a working fiber optic splice in accordance with these plans and specifications and compatible with the requirements of the ITS. All items that are required to complete the installation shall be supplied by the contractor whether listed above or not. All items not specifically shown but required for an operational ITS shall be supplied by the contractor. All components supplied by the contractor are the responsibility of the contractor.

The contractor shall field verify final equipment locations with the engineer. Plans are diagrammatic and indicate the general arrangement of devices and work included in these documents. Final placement and arrangement are the responsibility of the contractor.

The manufacturer upon request by the Department shall grant access to the manufacturing facility for all products specified herein.

A. Fiber Optic Cable Fusion Splice and Selective Splice Points

1. General Requirements

Prior to any fiber splicing, the fiber optic splicing and termination diagrams for the Backbone, Subtending and Drops shall be submitted and approved.

Refer to plan details for specific fibers being spliced and those being expressed.

The loss through any one fusion splice shall be 0.07 dB or less.

The complete fusion splice points for the fiber optic cable shall occur only within pullboxes as designated by the engineer. At each of these points, a submersible splice enclosure suitable for a minimum of 72 fusion splices shall be utilized. This enclosure shall allow for installation of a fiber optic drop cable that shall be routed to termination point. Industry accepted standards and manufacturer's specifications shall be followed for installation of splice enclosures and fusion splices.

Fusion splicing shall be utilized for all splices and manufacturer's specifications for equipment and fiber cable shall be followed.

2. Total Cable Fusion Splice Points

All fiber optic cables shall be continuous with no total cable splices. Full butt splices are allowed only due to the physical limitations of the length of fiber that can be placed on the reel. Payment for butt splices due to the physical imitation of the reel, are included as part of the backbone fiber.

The electrically conductive path used for continuity and grounding of the splice closure metallic components shall be capable of withstanding an AC current of 1000 Amperes for 20 seconds.

The closure shall show no evidence of water intrusion into the compartment containing fiber splices after it is immersed in water and subjected to 10 freeze/thaw cycles. The splice closure shall show no evidence of water penetration following exposure to a 20-foot water head for a period of 7 days. The splice closure shall show no evidence of corrosion following exposure to acidified saltwater for a period of 90 days.

Measurement

Fiber optic connection splice will be measured per each and be paid for at the contract unit price per each. The price shall be full compensation for installing; and for all labor, equipment, tools and incidentals necessary to complete the work.

Payment

Payment for fiber optic connection splice work shall be made at the contract unit price under:

Item #	Pay Item	Pay Unit
NS-ITS-04180	Fiber Optic Connection, Install, Splice	Each

Fiber Optic Termination (08/09)

Description

This Item consists of terminating fiber optic drop cable and all appurtenances required for the ITS in accordance with plan details, specifications, and as directed by the engineer.

Materials

All equipment shall be new and constructed using the highest quality, commercially available components and techniques to assure high reliability and minimum maintenance. The contractor shall submit, prior to installation, fiber optic splicing and termination diagrams and a complete set of shop drawings of all the equipment and components listed below and included as part of the installation.

The component of the fiber optic communications system described by this specification shall consist of the following:

- Fiber optic terminations
- Fiber optic splicing diagrams
- Fiber optic termination diagrams

Construction Requirements

The contractor shall be required to assemble and install all necessary material and equipment and to furnish a working terminated fiber optic cable in accordance with these plans and specifications and compatible with the requirements of the ITS. All items that are required to complete the installation shall be supplied by the contractor whether listed above or not. All items not specifically shown but required for an operational ITS shall be supplied by the contractor. All components supplied by the contractor are the responsibility of the contractor.

The contractor shall field verify final equipment locations with the engineer. Plans are diagrammatic and indicate the general arrangement of devices and work included in these documents. Final placement and arrangement are the responsibility of the contractor.

The manufacturer upon request by the Department shall grant access to the manufacturing facility for all products specified herein.

A. Fiber Optic Cable Termination Points

1. General Requirements

Prior to any fiber terminations, the fiber optic splicing and termination diagrams for the backbone fiber optic cable and drop cables shall be submitted and approved.

The loss through any one terminus connector shall be 0.25 dB or less.

Acceptable fiber optic connectors shall be SC or LC and are referenced in this specification as connectors. The contractor shall verify that connector type is compatible with hardware

fiber ports. Industry standards related to fiber termination shall be followed. Connectors shall have pre-radiused zirconia ceramic ferrule, metal connector body, blue shroud, crimp ring, black or blue 3.0 mm and a 900° boots. Connectors shall be compatible with both two part heat cure epoxy and anaerobic adhesive assembly methods.

Connectors shall be used throughout the fiber optic system installation for terminating fibers and for jumping between termination points, unless otherwise required by a network device. Fusion splicing shall be utilized for all splices and manufacturer's specifications for equipment and fiber cable shall be followed.

Manufacturer's specifications for terminating the fiber cable and for utilization of the termination device shall be followed. In addition, industry standard practices for fiber termination shall also be followed. Plan details provide termination diagrams for each termination point and a numbering scheme for the fiber cables that will be followed throughout the layout of the network.

Each strand of each cable being terminated shall be appropriately labeled with origination and destination information, when defined.

2. Installation Description and Locations

See plan sheets and general notes for site or project specific information regarding installation of this item.

Measurement

Fiber optic connection, termination will be measured in units of each and be paid for at the contract unit price per each. The price shall be full compensation for furnishing and installing; and for all labor, equipment, tools and incidentals necessary to complete the work.

Payment

Payment for fiber optic connection, termination work shall be made at the contract unit price under:

Item #	Pay Item	Pay Unit
NS-ITS-04200	Fiber Optic Connection, Termination, Furnish & Install	Each

Fiber Optic Drop Cable (08/09)

Description

This Item consists of furnishing and installing fiber optic drop cable and all appurtenances required for the ITS in accordance with plan details, this specification, and as directed by the engineer.

Materials

All equipment shall be new and constructed using the highest quality, commercially available components and techniques to assure high reliability and minimum maintenance. The contractor shall submit, prior to installation, shop drawings of all the equipment and components listed below and included as part of the installation.

The component of the fiber optic communications system described by this specification shall consist of the following:

- Fiber optic drop cable

Construction Requirements

The contractor shall be required to assemble and install all necessary material and equipment and to furnish a working fiber optic drop cable in accordance with these plans and specifications and compatible with the requirements of the ITS. All items that are required to complete the installation shall be supplied by the contractor whether listed above or not. All items not specifically shown but required for an operational ITS shall be supplied by the contractor. All components supplied by the contractor are the responsibility of the contractor.

The contractor shall field verify final equipment locations with the engineer. Plans are diagrammatic and indicate the general arrangement of devices and work included in these documents. Final placement and arrangement are the responsibility of the contractor.

During the installation of the underground systems, removal of brush, trees, fencing, and other obstructions within the right-of-way shall comply with Section 202 of the Louisiana Standard Specifications for Roads and Bridges and shall be paid for under Item 202-01-00100 – Removal of Structures and Obstructions. Landscaping shall be restored to original or better condition if disturbed.

The manufacturer upon request by the Department shall grant access to the manufacturing facility for all products specified herein.

A. Strand Single Mode Cable – Drop (4, 8, 12, and 24 Count)

1. General Requirements

Contractor shall provide strand optical fiber cable with the fiber count as indicated on the plans (either 4, 8, or 12) and with characteristics as specified herein. All fiber strands shall conform to the requirements detailed herein.

- The maximum attenuation for each single mode fiber shall be 0.36 dB/km at 1310nm and 0.22 dB/km at 1550nm. The attenuation at the water peak (1383 nm) shall not exceed 0.36 dB/km. The maximum dispersion shall be less than 3.5 ps/(nm•km) from 1285nm to 1330nm and less than 18 ps/(nm•km) at 1550nm.

All optical fibers shall be proof tested by the fiber manufacturer to a minimum load of 0.07GN/m2 (100 kpsi).

Each fiber shall be distinguishable by means of color coding in accordance with TIA/EIA-598-A, "Optical Fiber Cable Color Coding."

The cabled fiber shall support Gigabit Ethernet (GbE) operation according to the 1000Base-LX (1310 nm region) specifications up to 5000 meters in accordance with the GbE standard. The cable fiber shall support laser-based 10 Gigabit Ethernet (10 GbE) operation according to the 10GBase-LX (1300 nm region), 10GBase-L (1310 nm) and 10GBase-E (1550 nm) specifications for distances of 10 km, 10 km, and 40 km respectively.

2. Cable Construction

The Fiber Optic Cable Drop Cable shall be installed from the main trunk to a termination point within the controller cabinet associated with the particular field device.

Optical fibers shall be placed in a single filled loose buffer tube.

All cables shall have either a central strength member or two groups of strength members that are longitudinally applied diametrically opposite each other over the cable core. Strength members shall consist of a dielectric, glass reinforced plastic rod. All cables shall also contain either one or two ripcords.

The dielectric strength members shall be non-nutritive to fungus, electrically nonconductive, and free from dirt and foreign matter. Water blocking yarn(s) shall be applied longitudinally along the central member during stranding.

Cables shall be sheathed with flame retardant polyvinyl chloride (PVC) and shall be an all dielectric construction. The nominal jacket thickness shall be 1.4mm and shall be applied directly over the tensile strength members. The PVC jacket shall contain carbon black to provide UV protection and shall not promote the growth of fungus. The cable shall meet the requirements of the National Electrical Code Section 770 for Non-Plenum Applications – Applicable Flame Tests: ANSI/UL 1666 and shall be rated OFNR.

Cable jackets shall be marked with manufacturer's name, sequential meter or foot markings, month and year, or quarter and year of manufacture, and a telecommunication handset symbol, as required by Section 350G of the National Electrical Safety Code (NESC). The actual length of the cable shall be within -0/+1% of the length markings. The print color shall be white; with the exception that cable jackets containing one or more coextruded white stripes shall be printed in light blue. The height of the marking shall be approximately 2.5 mm.

If the initial marking fails to meet the specified requirements (i.e., improper text statement, color, legibility, or print interval), the cable may be remarked using a contrasting alternate

color. The numbering sequence shall differ from the previous numbering sequence, and a tag shall be attached to both the outside end of the cable and to the reel to indicate the sequence of remarking. The preferred remarking color will be yellow, with the secondary choice being blue.

The cable shall be of gel-free, Fibers shall be contained within a buffer tube(s), and each buffer tube shall have an insider diameter much greater than the total diameter(s) of the fiber(s) it supports.

Each fiber or group of fibers shall be free-floating within the tubes such that all mechanically or environmentally induced stress placed upon the cable is de-coupled from the fibers. The buffer tubes shall contain a water-swellable yarn for water blocking protection. The water-swellable yarn shall be non-nutritive to fungus, electrical non-conductive, and homogeneous. The buffer tube shall be gel-free. The optical fiber shall not require cleaning before placement into a splice tray or fan out kit.

The maximum pulling tension shall be 2700 N (608 lbf) during installation (short term) and 890 N (200 lbf) long term installed.

All cables must be able to withstand a minimum bending radius of 10 times cable diameter under no load and 20 times cable diameter under load, without affecting performance characteristics of the cable.

The shipping, storage, and operating temperature range of the cable shall be 40°C to +75°C. The installation temperature range of the cable shall be 30°C to +60°C.

3. Quality Control Provision

All cabled optical fibers shall be 100% attenuation tested. The attenuation of each fiber shall be provided with each cable reel and shall meet the requirements of the fiber specification parameters as specified herein.

All cable once on the reel shall have Optical Time Domain Reflector (OTDR) reports generated at the factory prior to shipment, at the delivery location prior to installation, and on-site after installation. Cable provided under this Specification must produce equivalent OTDR reports at each test point.

4. References, Standards, Listing, and Codes

For the Equipment specified herein, the manufacturer shall be ISO 9000, 9001 or 9002 certified.

The cable manufacturer shall support industry standards such as Bell Communications Research (Bellcore), Electronic Industries Association (EIA), Telecommunications Industry Association (TIA), International Telecommunications Union (ITU), International Electromechanical Commission (IEC), Rural Utilities Service (RSU, formerly-REA), American Society for Testing and Material (ASTM) and the Building Industry Consultant Services (BICSI) Telecommunications Distribution Methods Manual. In addition, product

supplied by the cable manufacturer shall meet all applicable standards of the above organizations and well as the attached reference standards.

Materials provided under this Specification must be new and must be provided by manufacturers regularly engaged in the production of such products.

It is required that the cable manufacturer shall provide installation procedures and technical support concerning the items contained in this specification.

All Work and Equipment shall be designed, manufactured, and tested in accordance with the latest applicable standards for the Equipment specified. In some instances, these Specifications go beyond the requirements of the stated standards. Where these Specifications differ from the requirements of the stated standards, these Specifications shall take precedence.

In addition to the requirements of these Specifications, Material and Work shall meet and/or exceed all requirements of the applicable portions of the latest editions of the standards and codes listed below. The fiber optic cable shall further meet and/or exceed those applicable standards not stated herein but referenced by the below standards and/or their applicable sections. The standards list includes, but is not limited to, the following:

Industry Standard / Code	Description
ASTM D 1248	Standard Specification for Polyethylene Plastics Molding and Extrusion Materials
ASTM D 1603	Standard Test Method for Carbon Black in Olefin Plastics
ASTM D 1765	Standard Classification System for Carbon Blacks Used in Rubber Products
ASTM D 3349	Standard Test Method for Absorption Coefficient of Carbon Black Pigmented Ethylene Plastic
ASTM E 29	Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications
BELLCORE GR-20-CORE	Issue 1, September 1994 Generic Requirements for Optical Fiber and Fiber Optic Cable
EIA/TIA-455-3	Procedure to Measure Temperature Cycling Effects on as Optical Fiber, Optical Cable, and Other Passive Fiber Optic Components
EIA/TIA-455-24	Water Peak Attenuation Measurement of Single Mode Fibers
EIA/TIA-455-25	Impact Testing of Fiber Optic Cables and Cable Assemblies
EIA/TIA-455-28	Method for Measuring Dynamic Tensile Strength of Optical Fibers

Industry Standard / Code	Description
EIA/TIA-455-29	Refractive Index Profile Transverse Interference Method
EIA/TIA-455-31	Fiber Tensile Proof Test Method
EIA/TIA-455-33	Fiber Optic Cable Tensile Loading and Bending Test
EIA/TIA-455-37	Low or High Temperature Bend Test for Fiber Optic Cable
EIA/TIA-455-41	Compressive Loading Resistance of Fiber Optic Cable
EIA/TIA-455-46	Spectral Attenuation Measurement for Long-Length, Graded-Index Optical Fibers
EIA/TIA-455-47	Output Far-Field Radiation Pattern Measurement
EIA/TIA-455-51	Pulse Distortion Measurement of Multimode Glass Optical Fibers Information Transmission Capacity
EIA/TIA-455-58	Core Diameter Measurement of Graded-index Optical Fibers Information Transmission Capacity
EIA/TIA-455-59	Measurement of Fiber Point Discontinuities Using an OTDR
EIA/TIA-455-61	Measurement of Fiber or Cable Attenuation Using an OTDR
EIA/TIA-455-62	Measurement of Optical Fiber Macrobend Attenuation
EIA/TIA-455-76	Method for Measuring Dynamic Fatigue or Optical Fibers by Tension
EIA/TIA-455-78	Spectral Attenuation Cutback Measurement for Single-Mode Optical Fibers
EIA/TIA-455-80	Measuring Cutoff Wavelength of Uncabled Single-Mode Fiber by Transmitted Power
EIA/TIA-455-82	Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable
EIA/TIA-455-85	Fiber Optic Cable Twist Test
EIA/TIA-455-86	Fiber Optic Cable Jacket Shrinkage
EIA/TIA-455-89	Fiber Optic Cable Jacket Elongation and Tensile Strength
EIA/TIA-455-97	Procedure for Measuring Static Fatigue of Optical Fibers in Two-Point Bending

Industry Standard / Code	Description
EIA/TIA-455-98	Fiber Optic Cable External Freezing Test
EIA/TIA-455-104	Fiber Optic Cable Cyclic Flexing Test
EIA/TIA-455-111	Procedure for the Measurement of Optical Fiber Curl
EIA/TIA-455-113	Polarization-Mode Dispersion Measurement for Single-Mode Optical Fibers by Wavelength Scanning
EIA/TIA-455-164	Single-Mode Fiber, Measurement of Mode Field Diameter by Far-Field Scanning
EIA/TIA-455-167	Mode Field Diameter Measurement-Variable Aperture Method in the Far-Field
EIA/TIA-455-168	Chromatic Dispersion Measurement of Multimode Graded-Index and Single-Mode Optical Fibers by Spectral Group Delay Measurement in the Time Domain
EIA/TIA-455-170	Cable Cutoff Wavelength of Single-Mode Fiber by Transmitted Power
EIA/TIA-455-173	Coating Geometry Measurements, Side View
EIA/TIA-455-175	Chromatic Dispersion Measurement of Single-mode Optical Fibers by the Differential Phase Shift Method
EIA/TIA-455-176	Method for Measuring Optical Fiber Cross-Sectional Geometry by Automated Grey-Scale Analysis
EIA/TIA-455-177	Numerical Aperture Measurement of Graded-Index Optical Fibers
EIA/TIA-455-178	Measurement of Strip Force Required for Mechanically Removing Coatings from Optical Fibers
EIA/TIA-455-181	Lightning Damage Susceptibility Test for Fiber Optic Cables with Metallic Components
IEC 793-1	International Standard (Optical Fibers) – Part1: Generic Specification
-A1A	Refractive Index Profile
-A2	Near Field Light Distribution
-B1	Optical Fiber Proof Test

Industry Standard / Code	Description
-C1A	Cut-back Technique
-C1C	Insertion Loss Technique
-C2A	Impulse Response
-C5C	Cromatic Dispersion Measurement of Optical Fibers by the Differential Phase Shift Method
-C7B	Cable Cut-off Wavelength Measurement of Single Mode Fiber
-C9A	Mode Field Diameter Measurement Direct Far-Field Scanning Method
-C9B	Mode Field Diameter Measurement – Variable Aperture Method in the Far-Field
-C11	Macrobending Sensitivity
IEC 794-1	International Standard (Fiber Optic Cables) – Part1: Generic Specification

B. Production Tests and Technical Requirements

1. General Requirements

DOTD shall have accessibility to manufacturing plant to witness manufacture and testing of fiber optic cable.

The manufacturer shall provide a representative to witness field-testing of installed fiber optic cable.

Final inspection and acceptance of the multiple fiber optic cable installations shall be at the discretion of the DOTD. DOTD shall require the contractor to have completed testing as described below, and to have provided DOTD with documentation related to such testing. Testing shall be in accordance with the standards and regulations previously referenced by these Specifications.

The contractor shall prepare a statement of methodology for all testing procedures that shall be used for this installation. This statement shall be provided in advance to the DOTD for approval by the engineer. In addition to approving procedures, the engineer must also pre-approve all data forms that shall be used to record results of pre and post installation testing. Once testing is complete, all test results recorded on approved data forms, and signed by the contractor, shall be provided to the engineer for approval.

In addition to the guidance provided above, all testing shall be performed in accordance with industry standards bodies and generally accepted methods that were previously documented. Testing shall also comply with the specific industry standards provided by the fiber optic cable Specification.

2. Tests Performed at Manufacturing Facility

Certified test reports shall be supplied for each shipping reel of cable. Manufacturer shall document and certify the results of all factory tests and compliance with the performance requirements. Certified test reports shall include but not limited to the test reports for maximum attenuation for each fiber, bandwidth, maximum billable length, actual shipped length, and ordered length. Certificates of compliance are not acceptable. A written quality assurance manual shall be implemented and maintained to insure full compliance with all requirements of this Specification.

Testing shall be performed in accordance with the procedures outlined in the previously mentioned standards. These tests shall be performed at the factory and certified test results shall be provided to the DOTD in accordance with those standards.

3. Tests Performed Immediately Upon Delivery

At the time of delivery, fiber optic cable tests as outlined in this section shall be performed in the presence of the contractor, a DOTD representative, and the manufacturer's representative. Once the tests are complete, are satisfactorily passed, and the results agreed upon by all representatives present, the equipment and materials shall then become the responsibility of the contractor and are suitable for installation.

Once off-loaded from the delivery vehicle, each reel of fiber optic cable shall be subjected to an optical time domain reflectometer (OTDR) test. Every fiber strand in each cable shall be tested end to end with an OTDR which is compatible with wavelength and fiber type. Testing shall measure attenuation and length, verify continuity, and discover anomalies. Should an accurate measurement not be obtained from one end of a cable strand, the test shall be run from the opposite end. Tested loss per kilometer shall not exceed the loss provided in the manufacturer's certification data and as required by these specifications. In the event that loss per kilometer does exceed that of the manufacturer's certification data and these specifications, the cable reel shall be rejected and returned to the manufacturer.

Test reports shall be submitted to the engineer within 48 hours of test completion.

4. Tests Performed Subsequent to Installation

Following installation and prior to splicing, each strand of the fiber cables at each location, shall be tested for loss characteristics. Tests shall be performed for both directions of operation.

These tests shall be repeated once all splices and connectors have been installed, for the full length of the installation and spliced connections to field build-outs.

C. Storage, Packaging, and Shipping

The contractor shall provide a secure indoor storage facility for the duration of the storage period.

Cables shall be shipped on heavy-duty reels. The distance between the cable and the outer edge of the reel flange shall not be less than 2 inches.

Cable ends shall be sealed with heat shrink end caps and both ends of the cable shall be exposed to facilitate testing on the reel.

Reels must be shipped in upright position on edges of flanges. Any reels laid on flanges shall be returned. Reels must not be stored on sides of flanges (laying flat) or stored stacked on each other.

All reels must be wrapped with a protective paper or cardboard wrap to expose any damage that may have occurred during transportation.

Standard industry practices for storage, handling, and shipping shall be adhered to when not covered in these specifications.

Due to long fiber pulls, it may be necessary for the contractor to supply multiple fiber reels to complete a run. When connecting multiple reels to complete a run, reel-to-reel butt splices shall be provided at locations already identified in the plans as requiring a splice closure.

The reel tag shall include the following information:

- Cable number
- Gross weight
- Shipped cable length in feet
- Project name and number
- Manufacturers product number
- Date cable was tested
- Manufacturers order number
- Cable length markings - Top (inside end of cable) and Bottom (outside end of cable)
- Item number
- Loss budget for each fiber strand w/in each fiber optic cable
- The reel (one flange) marking shall include:
- "Manufacturer"
- An arrow indicating proper direction of roll when handling
- Ship to address
- Manufacturer cable number
- Cable length in feet

- Gross package weight inclusive of cable, reel and protective covering
- Project name and number
- Fork lift handling illustration
- The text "DO NOT SHIP REEL ON SIDE"
- Each cable shall be accompanied by a cable data sheet. The cable data sheet shall include the following information:
- Manufacturer Cable Number
- Manufacturer Product Number
- Manufacturer Factory Order Number
- Customer Name
- Customer Cable Number
- Mark for Information
- Ordered Length
- Actual Shipped Length
- Loss budget for each fiber strand within each fiber optic cable segment
- Bandwidth Specification

D. Warranty

The manufacturer of the specified fiber optic cable shall provide a written and documented ten (10) year warranty on materials and workmanship to the DOTD effective from the date of commission of said fiber optic cable.

In the event that the fiber optic drop cable, or any portion thereof, should fail due to workmanship or materials within the said ten (10) year warranty period, the warranty shall provide that the manufacturer shall supply the DOTD with new replacement fiber optic drop cable of equal or greater kind and quality and meeting all of the applicable Specifications herein, at no charge to the DOTD.

Cable manufacturer must provide recommended Splicing and Termination Instructions and procedures as part of the warranty.

E. Installation Guidelines and Requirements

1. General Requirements

The purpose of this section is to provide guidelines for installing the fiber optic cable. This document provides generic guidance according to generally accepted installation procedures. This document relies on manufacturer provided specific instructions for installation of fiber optic fusion splices, fiber terminations, selective splicing, and other items for which manufacturer specific instructions exist. These procedures are dependent upon the manufacturer of the fiber cable and the cable splicing and termination equipment.

Shop drawings showing the details for each component shall be submitted for approval prior to construction.

Before beginning any excavation, the contractor shall determine the location of any electrical lines, drainage, utility, and other underground facilities in the vicinity and shall conduct his work in such a manner as to avoid damage to it. Precautions shall be taken to insure that the conduit is located to avoid conflict with proposed guard rail, sign posts, or any other miscellaneous structures.

Contractor shall be responsible for repairing any broken or damaged underground facilities.

Backfilling of trenches shall be with usable soil, placed and compacted to at least the density of the surrounding ground at no direct pay.

All publications or standards referenced herein, along with all manufacturers' specifications, directions, and testing procedures, are hereby incorporated into the installation guidelines. In addition to the standards, publications, directions and other specifications appearing here, specifications and standards provided in the cable manufacturer specification are also incorporated. The sum of the previously mentioned sources comprises the complete installation guidelines.

It is the intent of the design to hold to an absolute minimum the number of total fiber optic cable fusion splices. Locations of allowed fusion splices are as detailed herein. It shall be the responsibility of the contractor to ensure that a sufficient amount of fiber optic cable is included per run in order to avoid unnecessary splices.

Contractor shall install detectable Muletape in every spare conduit installed as part of this project.

2. Installation Description and Locations

See plan sheets and general notes for site or project specific information regarding installation of this item.

3. Fiber Optic Cable Installation

Generally accepted practices and standards for installing fiber optic cable and electrical conductors shall be followed during the installation. All appropriate precautions to prevent cable kinks and breaks shall be followed. Once the cable manufacturer has been selected, their specifications regarding tensile strength, pulling capacity, and bending radius, etc. shall not be violated. Plan details provide a diagram illustrating the route that each cable will take from origin to destination.

All specifications provided by the cable manufacturer along with all procedures and standards provided in this document must be followed. Appropriate standards for buried installation of cable shall be followed in laying-in and routing the fiber cable. Documents such as Lucent Technologies, Outside Plant Systems, Outside Plant Engineering Handbook provide guidance on proper installation procedures. Plan details provide a typical illustration of how the fiber is routed. During installation of the fiber optic cable, care must be taken so

that the cables do not kink, or bend excessively, in a manner that diminishes the cable transmission capability. Note that the cable is to be terminated and/or spliced at specific locations. Maximum pulling tensions of all cables and conductors shall not exceed manufacturer's recommendations.

During installation of the optical fiber cable, a minimum of 50 feet-0 inches of slack shall be coiled within each underground pullbox. Drop locations for future connectivity shall have a minimum of 200 feet-0 inches of slack coiled within each underground pullbox as noted in the plans.

At each underground pullbox the contractor shall label every cable entering and leaving. Labels shall be permanent, plastic, wrap-around crimp-type that contains a minimum of 20 characters. Specific label content shall be determined with the engineer using designations as detailed on the plans.

Measurement

Fiber optic drop cable, SM, 12 strand shall be measured in units of linear feet and be paid for at the contract unit price per linear feet. The price shall be full compensation for furnishing and installing; and for all labor, equipment, tools and incidentals necessary to complete the work.

Payment

Payment for fiber optic drop cable work shall be made at the contract unit price under:

Item #	Pay Item	Pay Unit
NS-ITS-04250	Fiber Optic Drop Cable, SM, 12 Strand, Furnish & Install	Linear Ft.

Fiber Optic Drop Cable (Plenum Rated) (08/09)

Description

This Item consists of furnishing and installing a fiber optic drop cable, plenum rated, and all appurtenances required for the ITS in accordance with plan details, the 2006 Louisiana Standard Specifications for Roads and Bridges, this specification, and as directed by the engineer.

Materials

All equipment shall be new and constructed using the highest quality, commercially available components and techniques to assure high reliability and minimum maintenance. The contractor shall submit, prior to installation a complete set of shop drawings of all the equipment and components listed below and included as part of the installation.

The component of the fiber optic communications system described by this specification shall consist of the following:

- Fiber optic drop cable

Construction Requirements

The contractor shall assemble and install all necessary material and equipment and furnish a working fiber optic drop cable in accordance with these plans and specifications and compatible with the requirements of the ITS. All items that are required to complete the installation, and ensure an operational ITS, shall be supplied by the contractor whether listed above or not. All components supplied by the contractor are the responsibility of the contractor.

The contractor shall field verify final equipment locations with the engineer. Plans are diagrammatic and indicate the general arrangement of devices and work included in these documents. Final placement and arrangement are the responsibility of the contractor.

During the installation of the underground systems, removal of brush, trees, fencing, and other obstructions within the right-of-way shall comply with Section 202 of the standard specifications and will be paid for separately. Landscaping shall be restored to original or better condition if disturbed.

Upon request by the Department, the contractor shall arrange for the manufacturer to grant access to the manufacturing facility for all products specified herein.

A. Strand Single Mode Cable – Drop (6, 12, 18, and 24 Count) Plenum Rated

1. General Requirements

Contractor shall provide strand optical fiber cable with the fiber count as indicated on the plans (6, 12, 18 or, 24) and with characteristics as specified herein. All fiber strands shall conform to the requirements detailed herein.

- The maximum attenuation for each single mode fiber shall be 0.36 dB/km at 1310nm and 0.22 dB/km at 1550nm. The attenuation at the water peak (1383 nm) shall not exceed 0.36 dB/km. The maximum dispersion shall be less than 3.5 ps/(nm•km) from 1285nm to 1330nm and less than 18 ps/(nm•km) at 1550nm.

All optical fibers shall be proof tested by the fiber manufacturer to a minimum load of 0.07GN/m^2 (100 kpsi).

Each fiber shall be distinguishable by means of color coding in accordance with TIA/EIA-598-A, "Optical Fiber Cable Color Coding."

The cabled fiber shall support Gigabit Ethernet (GbE) operation according to the 1000Base-LX (1310 nm region) specifications up to 5000 meters in accordance with the GbE standard. The cable fiber shall support laser-based 10 Gigabit Ethernet (10 GbE) operation according to the 10GBase-LX (1300 nm region), 10GBase-L (1310 nm) and 10GBase-E (1550 nm) specifications for distances of 10 km, 10 km, and 40 km respectively.

2. Cable Construction

The fiber optic drop cable, plenum rated, provided under this specification shall be of a totally dielectric construction. Optical fibers shall be arranged in a loose buffer tube configuration.

The fiber strands shall not be colored with solvent-based inks.

All cables shall have either a central strength member or two groups of strength members that are longitudinally applied diametrically opposite each other over the cable core. Strength members shall consist of a dielectric, glass reinforced plastic rod. All cables shall also contain either one or two ripcords.

The dielectric strength members shall be non-nutritive to fungus, electrically nonconductive, and free from dirt and foreign matter. Water blocking yarn(s) shall be applied longitudinally along the central member during stranding.

Cables shall be sheathed with flame retardant polyvinyl chloride (PVC) and shall be an all dielectric construction. The nominal jacket thickness shall be 1.4mm and shall be applied directly over the tensile strength members. The PVC jacket shall contain carbon black to provide UV protection and shall not promote the growth of fungus. The cable shall OFNP and FT-6 listed for plenum, riser, and general purpose use.

Cable jackets shall be marked with manufacturer's name, sequential meter or foot markings, month and year, or quarter and year of manufacture, and a telecommunication handset symbol, as required by Section 350G of the National Electrical Safety Code (NESC). The actual length of the cable shall be within -0/+1% of the length markings. The print color shall be white; with the exception that cable jackets containing one or more coextruded white stripes shall be printed in light blue. The height of the marking shall be approximately 2.5 mm.

If the initial marking fails to meet the specified requirements (i.e., improper text statement, color, legibility, or print interval), the cable may be remarked using a contrasting alternate color. The numbering sequence shall differ from the previous numbering sequence, and a tag shall be attached to both the outside end of the cable and to the reel to indicate the sequence of remarking. The preferred remarking color will be yellow, with the secondary choice being blue.

The cable shall be of gel-free, loose tube construction with up to 12 buffer tubes wrapped around a dielectric central strength member. All fiber(s) shall be contained within buffer tubes, and each buffer tube shall have an inside diameter much greater than the total diameter(s) of the fiber(s) it supports.

Each fiber or group of fibers shall be free-floating within the tubes such that all mechanically or environmentally induced stress placed upon the cable is de-coupled from the fibers. The buffer tubes shall contain a water-swellable yarn for water blocking protection. The water-swellable yarn shall be non-nutritive to fungus, electrical non-conductive, and homogeneous. The buffer tube shall be gel-free. The optical fiber shall not require cleaning before placement into a splice tray or fan out kit.

The maximum pulling tension shall be 2700 N (608 lbf) during installation (short term) and 890 N (200 lbf) long term installed.

All cables must be able to withstand a minimum bending radius of 10 times cable diameter under no load and 20 times cable diameter under load, without affecting performance characteristics of the cable.

The shipping, storage, and operating temperature range of the cable shall be 40°C to +75°C. The installation temperature range of the cable shall be 30°C to +60°C.

The fiber installer shall be certified in fiber installation by Corning Cable Systems or approved equal.

3. Quality Control Provision

All cabled optical fibers shall be 100 percent attenuation tested. The attenuation of each fiber shall be provided with each cable reel and shall meet the requirements of the fiber specification parameters as specified herein.

All cable once on the reel shall have Optical Time Domain Reflector (OTDR) reports generated at the factory prior to shipment, at the delivery location prior to installation, and on-site after installation. Cable provided under this specification must produce equivalent OTDR reports at each test point.

4. References, Standards, Listing, and Codes

For the equipment specified herein, the manufacturer shall be ISO 9000, 9001 or 9002 certified.

The cable manufacturer shall support industry standards such as Bell Communications Research (Bellcore), Electronic Industries Association (EIA), Telecommunications Industry Association (TIA), International Telecommunications Union (ITU), International Electromechanical Commission (IEC), Rural Utilities Service (RSU, formerly-REA), American Society for Testing and Material (ASTM) and the Building Industry Consultant Services (BICSI) Telecommunications Distribution Methods Manual. In addition, product supplied by the cable manufacturer shall meet all applicable standards of the above organizations and well as the attached reference standards.

Materials provided under this specification must be new and must be provided by manufacturers regularly engaged in the production of such products.

It is required that the cable manufacturer shall provide installation procedures and technical support concerning the items contained in this specification.

All equipment shall be designed, manufactured, and tested in accordance with the latest applicable standards for the equipment specified. In some instances, these specifications go beyond the requirements of the stated standards. Where these specifications differ from the requirements of the stated standards, these specifications shall govern.

In addition to the requirements of these specifications, material and workmanship shall meet or exceed all requirements of the applicable portions of the latest editions of the standards and codes listed below. The fiber optic cable shall further meet or exceed those applicable standards not stated herein but referenced by the below standards or their applicable sections. The standards list includes, but is not limited to, the following:

Industry Standard / Code	Description
ASTM D 1248	Standard Specification for Polyethylene Plastics Molding and Extrusion Materials
ASTM D 1603	Standard Test Method for Carbon Black in Olefin Plastics
ASTM D 1765	Standard Classification System for Carbon Blacks Used in Rubber Products
ASTM D 3349	Standard Test Method for Absorption Coefficient of Carbon Black Pigmented Ethylene Plastic
ASTM E 29	Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications
BELLCORE GR-20-CORE	Issue 1, September 1994 Generic Requirements for Optical Fiber and Fiber Optic Cable

Industry Standard / Code	Description
EIA/TIA-455-3	Procedure to Measure Temperature Cycling Effects on as Optical Fiber, Optical Cable, and Other Passive Fiber Optic Components
EIA/TIA-455-24	Water Peak Attenuation Measurement of Single Mode Fibers
EIA/TIA-455-25	Impact Testing of Fiber Optic Cables and Cable Assemblies
EIA/TIA-455-28	Method for Measuring Dynamic Tensile Strength of Optical Fibers
EIA/TIA-455-29	Refractive Index Profile Transverse Interference Method
EIA/TIA-455-31	Fiber Tensile Proof Test Method
EIA/TIA-455-33	Fiber Optic Cable Tensile Loading and Bending Test
EIA/TIA-455-37	Low or High Temperature Bend Test for Fiber Optic Cable
EIA/TIA-455-41	Compressive Loading Resistance of Fiber Optic Cable
EIA/TIA-455-46	Spectral Attenuation Measurement for Long-Length, Graded-Index Optical Fibers
EIA/TIA-455-47	Output Far-Field Radiation Pattern Measurement
EIA/TIA-455-51	Pulse Distortion Measurement of Multimode Glass Optical Fibers Information Transmission Capacity
EIA/TIA-455-58	Core Diameter Measurement of Graded-index Optical Fibers Information Transmission Capacity
EIA/TIA-455-59	Measurement of Fiber Point Discontinuities Using an OTDR
EIA/TIA-455-61	Measurement of Fiber or Cable Attenuation Using an OTDR
EIA/TIA-455-62	Measurement of Optical Fiber Macrobend Attenuation
EIA/TIA-455-76	Method for Measuring Dynamic Fatigue or Optical Fibers by Tension
EIA/TIA-455-78	Spectral Attenuation Cutback Measurement for Single-Mode Optical Fibers
EIA/TIA-455-80	Measuring Cutoff Wavelength of Uncabled Single-Mode Fiber by Transmitted Power
EIA/TIA-455-82	Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable

Industry Standard / Code	Description
EIA/TIA-455-85	Fiber Optic Cable Twist Test
EIA/TIA-455-86	Fiber Optic Cable Jacket Shrinkage
EIA/TIA-455-89	Fiber Optic Cable Jacket Elongation and Tensile Strength
EIA/TIA-455-97	Procedure for Measuring Static Fatigue of Optical Fibers in Two-Point Bending
EIA/TIA-455-98	Fiber Optic Cable External Freezing Test
EIA/TIA-455-104	Fiber Optic Cable Cyclic Flexing Test
EIA/TIA-455-111	Procedure for the Measurement of Optical Fiber Curl
EIA/TIA-455-113	Polarization-Mode Dispersion Measurement for Single-Mode Optical Fibers by Wavelength Scanning
EIA/TIA-455-164	Single-Mode Fiber, Measurement of Mode Field Diameter by Far-Field Scanning
EIA/TIA-455-167	Mode Field Diameter Measurement-Variable Aperture Method in the Far-Field
EIA/TIA-455-168	Chromatic Dispersion Measurement of Multimode Graded-Index and Single-Mode Optical Fibers by Spectral Group Delay Measurement in the Time Domain
EIA/TIA-455-170	Cable Cutoff Wavelength of Single-Mode Fiber by Transmitted Power
EIA/TIA-455-173	Coating Geometry Measurements, Side View
EIA/TIA-455-175	Chromatic Dispersion Measurement of Single-mode Optical Fibers by the Differential Phase Shift Method
EIA/TIA-455-176	Method for Measuring Optical Fiber Cross-Sectional Geometry by Automated Grey-Scale Analysis
EIA/TIA-455-177	Numerical Aperture Measurement of Graded-Index Optical Fibers
EIA/TIA-455-178	Measurement of Strip Force Required for Mechanically Removing Coatings from Optical Fibers
EIA/TIA-455-181	Lightning Damage Susceptibility Test for Fiber Optic Cables with Metallic Components

Industry Standard / Code	Description
IEC 793-1	International Standard (Optical Fibers) – Part1: Generic Specification
-A1A	Refractive Index Profile
-A2	Near Field Light Distribution
-B1	Optical Fiber Proof Test
-C1A	Cut-back Technique
-C1C	Insertion Loss Technique
-C2A	Impulse Response
-C5C	Cromatic Dispersion Measurement of Optical Fibers by the Differential Phase Shift Method
-C7B	Cable Cut-off Wavelength Measurement of Single Mode Fiber
-C9A	Mode Field Diameter Measurement Direct Far-Field Scanning Method
-C9B	Mode Field Diameter Measurement – Variable Aperture Method in the Far-Field
-C11	Macrobending Sensitivity
IEC 794-1	International Standard (Fiber Optic Cables) – Part1: Generic Specification

B. Production Tests and Technical Requirements

1. General Requirements

DOTD shall have accessibility to the manufacturing plant to witness manufacture and testing of fiber optic cable.

The manufacturer shall provide a representative to witness field-testing of installed fiber optic cable.

Final inspection and acceptance of the multiple fiber optic cable installations shall be at the discretion of the DOTD. The contractor shall complete testing as described below, and provide DOTD with documentation related to such testing. Testing shall be in accordance with the standards and regulations previously referenced by these specifications.

The contractor shall prepare a statement of methodology for all testing procedures that shall be used for this installation. This statement shall be provided in advance to the DOTD for approval by the engineer. In addition to approving procedures, the engineer must also pre-approve all data forms that shall be used to record results of pre and post installation testing. Once testing is complete, all test results recorded on approved data forms, and signed by the contractor, shall be provided to the engineer for approval.

In addition to the guidance provided above, all testing shall be performed in accordance with industry standards bodies and generally accepted methods that were previously documented. Testing shall also comply with the specific industry standards provided by the fiber optic cable specification.

2. Tests Performed at Manufacturing Facility

Certified test reports shall be provided for each shipping reel of cable. The manufacturer shall document and certify the results of all factory tests and compliance with the performance requirements. Certified test reports shall include but not be limited to the test reports for maximum attenuation for each fiber, bandwidth, maximum billable length, actual shipped length, and ordered length. Certificates of compliance are not acceptable. A written quality assurance/quality control manual shall be implemented and maintained to insure full compliance with all requirements of this specification.

Testing shall be performed in accordance with the procedures outlined in the previously mentioned standards. These tests shall be performed at the factory and certified test results shall be provided to the DOTD in accordance with those standards.

3. Tests Performed Immediately Upon Delivery

At the time of delivery, fiber optic cable tests as outlined in this section shall be performed in the presence of the contractor, a DOTD representative, and the manufacturer's representative. Once the tests are complete, and the results are satisfactory to all representatives present, the equipment and materials shall then become the responsibility of the contractor for installation.

Once off-loaded from the delivery vehicle, each reel of fiber optic cable shall be subjected to an optical time domain reflectometer (OTDR) test. Every fiber strand in each cable shall be tested end to end with an OTDR which is compatible with wavelength and fiber type. Testing shall measure attenuation and length, verify continuity, and discover anomalies. Should an accurate measurement not be obtained from one end of a cable strand, the test shall be run from the opposite end. Tested loss per kilometer shall not exceed the loss provided in the manufacturer's certification data and as required by these specifications. In the event that loss per kilometer does exceed that of the manufacturer's certification data and these specifications, the cable reel shall be rejected and returned to the manufacturer.

Test reports shall be submitted to the engineer within 48 hours after test completion.

4. Tests Performed Subsequent to Installation

Following installation and prior to splicing, each strand of the fiber cables at each location, shall be tested for loss characteristics. Tests shall be performed for both directions of operation.

When all splices and connectors have been installed, these teats shall be repeated for the full length of the installation and for spliced connections to field build-outs.

C. Storage, Packaging, and Shipping

The contractor shall provide a secure indoor storage facility for the duration of the storage period.

Cables shall be shipped on heavy-duty reels. The distance between the cable and the outer edge of the reel flange shall not be less than 2 inches.

Cable ends shall be sealed with heat shrink end caps and both ends of the cable shall be exposed to facilitate testing on the reel.

Reels shall be shipped in upright position on edges of flanges. Any reels laid on flanges shall be returned. Reels shall not be stored on sides of flanges (laying flat) or stored stacked on each other.

All reels shall be wrapped with a protective paper or cardboard wrap to expose any damage that may have occurred during transportation.

Standard industry practices for storage, handling, and shipping shall be adhered to when not covered in these specifications.

Due to long fiber pulls, it may be necessary for the contractor to supply multiple fiber reels to complete a run. When connecting multiple reels to complete a run, reel-to-reel butt splices shall be provided at locations already identified in the plans as requiring a splice closure.

The reel tag shall include the following information:

- Cable number
- Gross weight
- Shipped cable length in feet
- Project name and number
- Manufacturers product number
- Date cable was tested
- Manufacturers order number
- Cable length markings - Top (inside end of cable) and Bottom (outside end of cable)

- Item number
- Loss budget for each fiber strand w/in each fiber optic cable

The reel (one flange) marking shall include:

- "Manufacturer"
- An arrow indicating proper direction of roll when handling
- Ship to address
- Manufacturer cable number
- Cable length in feet
- Gross package weight inclusive of cable, reel and protective covering
- Project name and number
- Fork lift handling illustration
- The text "DO NOT SHIP REEL ON SIDE"

Each cable shall be accompanied by a cable data sheet. The cable data sheet shall include the following information:

- Manufacturer Cable Number
- Manufacturer Product Number
- Manufacturer Factory Order Number
- Customer Name
- Customer Cable Number
- Mark for Information
- Ordered Length
- Actual Shipped Length
- Loss budget for each fiber strand within each fiber optic cable segment
- Bandwidth Specification

D. Warranty

The manufacturer of the specified fiber optic cable shall provide a written and documented ten (10) year warranty on materials and workmanship to the DOTD effective from the date of commission of said fiber optic cable.

In the event that the fiber optic drop cable, or any portion thereof, should fail due to workmanship or materials within the ten (10) year warranty period, the warranty shall provide that the manufacturer shall supply the DOTD with new replacement fiber optic drop cable of equal or greater kind and quality and meeting all of the applicable specifications herein, at no charge to the DOTD.

Cable manufacturer must provide recommended Splicing and Termination Instructions and procedures as part of the warranty.

E. Installation Guidelines and Requirements

1. General Requirements

The purpose of this section is to provide guidelines for installing the fiber optic cable. This document provides generic guidance according to generally accepted installation procedures. This document relies on manufacturer provided specific instructions for installation of fiber optic fusion splices, fiber terminations, selective splicing, and other items for which manufacturer specific instructions exist. These procedures are dependent upon the manufacturer of the fiber cable and the cable splicing and termination equipment.

Shop drawings showing the details for each component shall be submitted for approval prior to construction.

Before beginning any excavation, the contractor shall determine the location of any electrical lines, drainage, utility, and other underground facilities in the vicinity and shall conduct his work in such a manner as to avoid damage to it. Precautions shall be taken to insure that the conduit is located to avoid conflict with proposed guard rail, sign posts, or any other miscellaneous structures.

Contractor shall repair any broken or damaged underground facilities.

Backfilling of trenches shall be with usable soil in accordance with Subsection 736.17 of the standard specifications, placed and compacted to at least the density of the surrounding ground at no direct pay.

All publications or standards referenced herein, along with all manufacturers' specifications, directions, and testing procedures, are hereby incorporated into the installation guidelines. In addition to the standards, publications, directions and other specifications appearing here, specifications and standards provided in the cable manufacturer specification are also incorporated. The sum of the previously mentioned sources comprises the complete installation guidelines.

It is the intent of the design to hold to an absolute minimum the number of total fiber optic cable fusion splices. Locations of allowed fusion splices are as detailed herein. The contractor shall ensure that a sufficient amount of fiber optic cable is included per run in order to avoid unnecessary splices.

The contractor shall install detectable Muletape in every spare conduit installed as part of this project.

2. Installation Description and Locations

See plan sheets and general notes for site or project specific information regarding installation of this item.

3. Fiber Optic Cable Installation

Generally accepted practices and standards for installing fiber optic cable and electrical conductors shall be followed during the installation. All appropriate precautions to prevent cable kinks and breaks shall be followed. The cable manufacturer's, specifications regarding tensile strength, pulling capacity, and bending radius, etc. shall not be violated. Plan details provide a diagram illustrating the route that each cable will take from origin to destination.

Appropriate standards for buried installation of cable shall be followed in laying-in and routing the fiber cable. Documents such as *Lucent Technologies, Outside Plant Systems, Outside Plant Engineering Handbook* provide guidance on proper installation procedures. Plan details provide a typical illustration of how the fiber is routed. During installation of the fiber optic cable, care must be taken so that the cables do not kink, or bend excessively, in a manner that diminishes the cable transmission capability. Note that the cable is to be terminated, spliced, or both at specific locations. Maximum pulling tensions of all cables and conductors shall not exceed manufacturer's recommendations.

During installation of the optical fiber cable, a minimum of 50 feet-0 inches of slack shall be coiled within each underground pullbox. Drop locations for future connectivity shall have a minimum of 200 feet-0 inches of slack coiled within each underground pullbox or as noted in the plans.

At each underground pullbox the contractor shall label every cable entering and leaving. Labels shall be permanent, plastic, wrap-around crimp-type that contains a minimum of 20 characters. Specific label content shall be determined with the engineer using designations as detailed on the plans.

Measurement

Fiber optic drop cable, SM, 12 strand (plenum rated) and fiber optic drop cable, SM, 24 strand, (plenum rated) shall be measured in units of linear feet and be paid for at the contract unit price per linear feet. The price shall be full compensation for furnishing and installing; and for all labor, equipment, tools and incidentals necessary to complete the work.

Payment

Payment for fiber optic drop cable (plenum rated) will be made at the contract unit price per linear foot. Payment will be made under:

Item No.	Pay Item	Pay Unit
NS-ITS-04255	Fiber Optic Drop Cable, SM, 12 Strand (Plenum Rated), (Furnish and Install)	Linear Ft.
NS-ITS-04270	Fiber Optic Drop Cable, SM, 24 Strand (Plenum Rated), (Furnish and Install)	Linear Ft.

Fiber Optic Patch Cord (08/09)

Description

This Item consists of furnishing and installing fiber optic patch cords and all appurtenances required for the ITS in accordance with plan details, the 2006 Louisiana Standard Specifications for Roads and Bridges, these specifications, and as directed by the engineer.

Materials

All equipment shall be new and constructed using the highest quality, commercially available components and techniques to assure high reliability and minimum maintenance. The contractor shall submit, prior to installation, fiber optic splicing and termination diagrams for the backbone and drops and a complete set of shop drawings of all the equipment and components listed below and included as part of the installation

The component of the fiber optic communications system described by this specification shall consist of the following:

- Fiber optic patch cord
- Fiber optic splicing diagrams
- Fiber optic termination diagrams

Construction Requirements

The contractor shall assemble and install all necessary material and equipment and to furnish a working fiber optic patch cord in accordance with these plans and specifications and compatible with the requirements of the ITS. All items that are required to complete the installation and ensure an operational ITS , shall be supplied by the contractor whether listed above or not. All components supplied by the contractor are the responsibility of the contractor.

The contractor shall field verify final equipment locations with the engineer. Plans are diagrammatic and indicate the general arrangement of devices and work included in these documents. Final placement and arrangement are the responsibility of the contractor.

Upon request by the Department, the contractor shall arrange for the manufacturer to grant access to the manufacturing facility for all products specified herein.

A. Strand Single Mode Cable – Patch Cord (2, 4, or 8 Count)

1. General Requirements

Contractor shall provide strand optical fiber cables with the fiber count as indicated on the plans (either 2, 4, or 8) and with characteristics as specified herein. All fiber strands shall conform to the requirements detailed herein.

- The maximum attenuation for each single mode fiber shall be 0.65 dB/km at 1310 nm and 0.50 dB/km at 1550 nm. The attenuation at the water peak (1383

nm) shall not exceed 0.65 dB/km. The maximum dispersion shall be less than 3.5 ps/(nm•km) from 1285nm to 1330nm and less than 18 ps/(nm•km) at 1550nm.

All optical fibers shall be proof tested by the fiber manufacturer to a minimum load of 0.07 GN/m2 (100 kpsi).

2. Cable Construction

Standard single mode patch cord shall be installed from the termination point patch panel to the edge device (e.g., Ethernet switch, video encoder, contact closure transceiver, etc).

All patch cords used for system configuration shall be compatible with fiber types and connectors specified herein. Patch cords shall be yellow in color (single mode) and shall incorporate buffered fiber, aramid yarn strength members, and an outer jacket. Part number, manufacturer, and lot number shall be imprinted on the jacket.

All fiber optic patch cords provided under this contract shall be of a totally dielectric construction. Patch cords shall be arranged in a tight-buffer configuration.

The fiber strands shall not be colored with solvent-based inks.

Patch cords in a duplex configuration, 2 fibers, shall be have an outer polyvinylidene fluoride (PVDF) jacket and manufactured together with a heat-shrink prior to the fan out. Patch cords configurations containing more than 2 fibers may be sheathed with a flame retardant polyvinyl chloride (PVC) jacket.

3. Quality Control Provision

All cabled optical fibers shall be 100 percent attenuation tested. The attenuation of each fiber shall be provided with each cable reel and shall meet the requirements of the fiber specification parameters as specified herein.

All cable once on the reel shall have Optical Time Domain Reflector (OTDR) reports generated at the factory prior to shipment, at the delivery location prior to installation, and on-site after installation. Cable provided under this specification must produce equivalent OTDR reports at each test point.

4. Installation Description and Locations

See plan sheets and general notes for site or project specific information regarding installation of this item.

5. References, Standards, Listing, and Codes

For the equipment specified herein, the manufacturer shall be ISO 9000, 9001 or 9002 certified.

The cable manufacturer shall support industry standards such as Bell Communications Research (Bellcore), Electronic Industries Association (EIA),

Telecommunications Industry Association (TIA), International Telecommunications Union (ITU), International Electromechanical Commission (IEC), Rural Utilities Service (RSU, formerly-REA), American Society for Testing and Material (ASTM) and the Building Industry Consultant Services (BICSI) Telecommunications Distribution Methods Manual. Materials provided under this Specification must be new and must be provided by manufacturers regularly engaged in the production of such products.

It is required that the cable manufacturer shall provide installation procedures and technical support concerning the items contained in this specification.

All equipment shall be designed, manufactured, and tested in accordance with the latest applicable standards for the equipment specified. In some instances, these specifications go beyond the requirements of the stated standards. Where these specifications differ from the requirements of the stated standards, these specifications shall govern.

In addition to the requirements of these specifications, material and workmanship shall meet or exceed all requirements of the applicable portions of the latest editions of the standards and codes listed below. The fiber optic cable shall further meet and/or exceed those applicable standards not stated herein but referenced by the below standards and/or their applicable sections. The standards list includes, but is not limited to, the following:

Industry Standard / Code	Description
ASTM D 1248	Standard Specification for Polyethylene Plastics Molding and Extrusion Materials
ASTM D 1603	Standard Test Method for Carbon Black in Olefin Plastics
ASTM D 1765	Standard Classification System for Carbon Blacks Used in Rubber Products
ASTM D 3349	Standard Test Method for Absorption Coefficient of Carbon Black Pigmented Ethylene Plastic
ASTM E 29	Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications
BELLCORE GR-20-CORE	Issue 1, September 1994 Generic Requirements for Optical Fiber and Fiber Optic Cable
EIA/TIA-455-3	Procedure to Measure Temperature Cycling Effects on as Optical Fiber, Optical Cable, and Other Passive Fiber Optic Components
EIA/TIA-455-24	Water Peak Attenuation Measurement of Single Mode Fibers

Industry Standard / Code	Description
EIA/TIA-455-25	Impact Testing of Fiber Optic Cables and Cable Assemblies
EIA/TIA-455-28	Method for Measuring Dynamic Tensile Strength of Optical Fibers
EIA/TIA-455-29	Refractive Index Profile Transverse Interference Method
EIA/TIA-455-31	Fiber Tensile Proof Test Method
EIA/TIA-455-33	Fiber Optic Cable Tensile Loading and Bending Test
EIA/TIA-455-37	Low or High Temperature Bend Test for Fiber Optic Cable
EIA/TIA-455-41	Compressive Loading Resistance of Fiber Optic Cable
EIA/TIA-455-46	Spectral Attenuation Measurement for Long-Length, Graded-Index Optical Fibers
EIA/TIA-455-47	Output Far-Field Radiation Pattern Measurement
EIA/TIA-455-51	Pulse Distortion Measurement of Multimode Glass Optical Fibers Information Transmission Capacity
EIA/TIA-455-58	Core Diameter Measurement of Graded-index Optical Fibers Information Transmission Capacity
EIA/TIA-455-59	Measurement of Fiber Point Discontinuities Using an OTDR
EIA/TIA-455-61	Measurement of Fiber or Cable Attenuation Using an OTDR
EIA/TIA-455-62	Measurement of Optical Fiber Macrobend Attenuation
EIA/TIA-455-76	Method for Measuring Dynamic Fatigue or Optical Fibers by Tension
EIA/TIA-455-78	Spectral Attenuation Cutback Measurement for Single-Mode Optical Fibers
EIA/TIA-455-80	Measuring Cutoff Wavelength of Uncabled Single-Mode Fiber by Transmitted Power
EIA/TIA-455-82	Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable
EIA/TIA-455-85	Fiber Optic Cable Twist Test
EIA/TIA-455-86	Fiber Optic Cable Jacket Shrinkage
EIA/TIA-455-89	Fiber Optic Cable Jacket Elongation and Tensile Strength

Industry Standard / Code	Description
EIA/TIA-455-97	Procedure for Measuring Static Fatigue of Optical Fibers in Two-Point Bending
EIA/TIA-455-98	Fiber Optic Cable External Freezing Test
EIA/TIA-455-104	Fiber Optic Cable Cyclic Flexing Test
EIA/TIA-455-111	Procedure for the Measurement of Optical Fiber Curl
EIA/TIA-455-113	Polarization-Mode Dispersion Measurement for Single-Mode Optical Fibers by Wavelength Scanning
EIA/TIA-455-164	Single-Mode Fiber, Measurement of Mode Field Diameter by Far-Field Scanning
EIA/TIA-455-167	Mode Field Diameter Measurement-Variable Aperture Method in the Far-Field
EIA/TIA-455-168	Chromatic Dispersion Measurement of Multimode Graded-Index and Single-Mode Optical Fibers by Spectral Group Delay Measurement in the Time Domain
EIA/TIA-455-170	Cable Cutoff Wavelength of Single-Mode Fiber by Transmitted Power
EIA/TIA-455-173	Coating Geometry Measurements, Side View
EIA/TIA-455-175	Chromatic Dispersion Measurement of Single-mode Optical Fibers by the Differential Phase Shift Method
EIA/TIA-455-176	Method for Measuring Optical Fiber Cross-Sectional Geometry by Automated Grey-Scale Analysis
EIA/TIA-455-177	Numerical Aperture Measurement of Graded-Index Optical Fibers
EIA/TIA-455-178	Measurement of Strip Force Required for Mechanically Removing Coatings from Optical Fibers
EIA/TIA-455-181	Lightning Damage Susceptibility Test for Fiber Optic Cables with Metallic Components
IEC 793-1	International Standard (Optical Fibers) – Part1: Generic Specification
-A1A	Refractive Index Profile
-A2	Near Field Light Distribution

Industry Standard / Code	Description
-B1	Optical Fiber Proof Test
-C1A	Cut-back Technique
-C1C	Insertion Loss Technique
-C2A	Impulse Response
-C5C	Cromatic Dispersion Measurement of Optical Fibers by the Differential Phase Shift Method
-C7B	Cable Cut-off Wavelength Measurement of Single Mode Fiber
-C9A	Mode Field Diameter Measurement Direct Far-Field Scanning Method
-C9B	Mode Field Diameter Measurement – Variable Aperture Method in the Far-Field
-C11	Macrobending Sensitivity
IEC 794-1	International Standard (Fiber Optic Cables) – Part1: Generic Specification

Measurement

Fiber optic patch cord, SM, 2 Strand, 4 Strand, and 8 Strand shall be measured in units of each and be paid for at the contract price per each. The price shall be full compensation for furnishing and installing; and for all labor, equipment, tools and incidentals necessary to complete the work.

Payment

Payment for fiber optic patch cords will be made at the contract unit price per each. Payment will be made under:

Item No.	Pay Item	Pay Unit
NS-ITS-04290	Fiber Optic Patch Cord, SM, 2 Strand, Furnish and Install	Each
NS-ITS-04295	Fiber Optic Patch Cord, SM, 2 Strand, Furnish	Each

Splice Tray (08/09)

Description

This Item consists of furnishing and installing a splice tray and all appurtenances required for the ITS in accordance with plan details, specifications, and as directed by the engineer.

Materials

All equipment shall be new and constructed using the highest quality, commercially available components and techniques to assure high reliability and minimum maintenance. The contractor shall submit, prior to installation, Fiber Optic Splicing and Termination Diagrams for the Backbone and Drops and a complete set of shop drawings of all the equipment and components listed below and included as part of the installation.

The component of the fiber optic communications system described by this specification shall consist of the following:

- Fiber optic splice tray

Construction Requirements

The contractor shall be required to assemble and install all necessary material and equipment and to furnish a working fiber optic splice tray in accordance with these plans and specifications and compatible with the requirements of the ITS. All items that are required to complete the installation shall be supplied by the contractor whether listed above or not. All items not specifically shown but required for an operational ITS shall be supplied by the contractor. All components supplied by the contractor are the responsibility of the contractor.

The contractor shall field verify final equipment locations with the engineer. Plans are diagrammatic and indicate the general arrangement of devices and work included in these documents. Final placement and arrangement are the responsibility of the contractor.

The manufacturer upon request by the Department shall grant access to the manufacturing facility for all products specified herein.

A. Splice Trays

Splice trays shall be provided by same manufacturer as splice closure for new splice closure installations. New splice trays for existing splice closures shall be of same manufacturer of the splice closure when feasible. When identified in the plans new splice trays required for an existing splice closure, the contractor shall provide splice trays that shall work within the existing splice closure using the same methodology, connections, firmness, and supports as existing splice trays.

Splice trays shall contain strain relief for the buffer tube and adequate area for bare fiber slack storage and management. Splice trays shall accommodate the use of single fiber heat shrink, mechanical, or ribbon heat shrink splices.

Spliced fibers shall not be subjected to a bend radius smaller than 30 mm (1.2 inches). Buffer tubes shall not be subjected to a bend radius smaller than 38 mm (1.5 inches).

Measurement

Fiber optic connection splice tray shall be measured in units of each and be paid for at the contract unit price per each. The price shall be full compensation for furnishing and installing; and for all labor, equipment, tools and incidentals necessary to complete the work.

Payment

Payment for fiber optic connection splice tray work shall be made at the contract unit price under:

Item #	Pay Item	Pay Unit
NS-ITS-04360	Fiber Optic Connection Splice Tray, Furnish & Install	Each

Splice Closure, Indoor (08/09)

Description

This Item consists of furnishing and installing a splice closure, indoor, and all appurtenances required for the ITS in accordance with plan details, specifications, and as directed by the engineer.

Materials

All equipment shall be new and constructed using the highest quality, commercially available components and techniques to assure high reliability and minimum maintenance. The contractor shall submit, prior to installation, fiber optic splicing and termination diagrams for the backbone and drops and a complete set of shop drawings of all the equipment and components listed below and included as part of the installation.

The component of the fiber optic communications system described by this specification shall consist of the following:

- Fiber optic splice closure

Construction Requirements

The contractor shall be required to assemble and install all necessary material and equipment and to furnish a working fiber optic splice closure in accordance with these plans and specifications and compatible with the requirements of the ITS. All items that are required to complete the installation shall be supplied by the contractor whether listed above or not. All items not specifically shown but required for an operational ITS shall be supplied by the contractor. All components supplied by the contractor are the responsibility of the contractor.

The contractor shall field verify final equipment locations with the engineer. Plans are diagrammatic and indicate the general arrangement of devices and work included in these documents. Final placement and arrangement are the responsibility of the contractor.

The manufacturer upon request by the Department shall grant access to the manufacturing facility for all products specified herein.

A. Splice Closure (Indoor)

The splice closure housing shall be wall mountable. The optical fiber closure shall be capable of accepting any optical fiber cable used in interoffice, outside plant, and building entrance facilities.

The closure shall accommodate up to 12 splices, single fiber heat shrink, mechanical, or ribbon heat shrink splices.

The wall mountable splice closure shall be single hinged design. Cable entry shall be grommeted to prevent dust from entering the housing. Cable entry shall be available from either side of the housing. Strain relief or tie down points shall be provided. Also, slack fiber shall be able to be coiled and stored within the housing.

The installation of the splice closure shall not require specialized tools or equipment, other than those normally carried by installation crews.

Measurement

Splice closure, indoor shall be measured in units of each and be paid for at the contract unit price per each. The price shall be full compensation for furnishing and installing; and for all labor, equipment, tools and incidentals necessary to complete the work.

Payment

Payment for splice closure, indoor work shall be made at the contract unit price under:

Item #	Pay Item	Pay Unit
NS-ITS-05020	Splice Closure, Indoor, Furnish & Install	Each

Splice Closure, Outdoor (08/09)

Description

This Item consists of furnishing and installing a splice closure, outdoor and all appurtenances required for the ITS in accordance with plan details, specifications, and as directed by the engineer.

Materials

All equipment shall be new and constructed using the highest quality, commercially available components and techniques to assure high reliability and minimum maintenance. The contractor shall submit, prior to installation, fiber optic splicing and termination diagrams for the backbone and drops and a complete set of shop drawings of all the equipment and components listed below and included as part of the installation.

The component of the fiber optic communications system described by this specification shall consist of the following:

- Fiber optic splice closure

Construction Requirements

The contractor shall be required to assemble and install all necessary material and equipment and to furnish a working fiber optic splice closure and fiber optic splice trays in accordance with these plans and specifications and compatible with the requirements of the ITS. All items that are required to complete the installation shall be supplied by the contractor whether listed above or not. All items not specifically shown but required for an operational ITS shall be supplied by the contractor. All components supplied by the contractor are the responsibility of the contractor.

The contractor shall field verify final equipment locations with the engineer. Plans are diagrammatic and indicate the general arrangement of devices and work included in these documents. Final placement and arrangement are the responsibility of the contractor.

The manufacturer upon request by the department shall grant access to the manufacturing facility for all products specified herein.

A. Splice Closure (Outdoor)

The splice closure housing shall be non-metallic. It shall be resistant to solvents, stress cracking, and creep. The housing materials shall also be compatible with chemicals and other materials to which they might be exposed in normal applications.

The optical fiber closure shall be capable of accepting any optical fiber cable used in interoffice, outside plant, and building entrance facilities.

The optical fiber closure shall be available in distinct sizes to accommodate a variety of cable entries as specified in the table below:

Cable Capacity	Canister (Butt) Configuration		Branch (In-Line) Configuration	
	Express Entries/ Max. Cable Diameter (mm)	Drop Port Entries/ Max. Cable Diameter (mm)	Express Entries/ Max. Cable Diameter (mm)	Drop Port Entries/ Max. Cable Diameter (mm)
Large	2/32	6/25	4/32	12/25
Medium	2/25	4/18	4/25	8/18
Small	2/20	3/15	4/20	6/15

The splice closure shall be re-enterable. The closure end cap shall be capable of accepting additional cables without removal of the sheath retention or strength member clamping hardware on previously installed cables or disturbing existing splices. The optical fiber splice closure shall provide a single clamping mechanism to prevent pistoning of the central member or strength members and to prevent cable sheath slip or pullout.

The splice closure shall have appropriate hardware and installation procedures to facilitate the bonding and grounding of metal components in the closure and the armored cable sheath. The cable bonding hardware shall be able to accommodate a copper conductor equal to or larger than a #6 AWG.

The closure shall accommodate splice trays suitable for single fiber, single fiber heat shrink, mechanical, or ribbon heat shrink splices.

The small splice closure shall accommodate up to 72 single fiber splices or 144 ribbon fiber splices using 12-fiber ribbons. The medium sized closure shall accommodate up to 288 single fiber splices or 432 ribbon fiber splices. The large closure shall accommodate up to 480 single fiber splices or 864 ribbon fiber splices.

The installation of the splice closure shall not require specialized tools or equipment, other than those normally carried by installation crews.

A bond clamp shall remain firmly attached to the cable armor sheath while under a tensile load of 9-kg (20 lbf). Following removal of the load, there shall be no evidence of clamp loosening or damage to the cable sheath, armor, or clamp that would reduce its current carrying capacity as required by the AC fault test.

Measurement

Splice closure, outdoor shall be measured in units of each and be paid for at the contract unit price per each. The price shall be full compensation for furnishing and installing; and for all labor, equipment, tools and incidentals necessary to complete the work.

Payment

Payment for splice closure, outdoor work shall be made at the contract unit price under:

Item #	Pay Item	Pay Unit
NS-ITS-05025	Splice Closure, Outdoor, Furnish & Install	Each

Pullbox, In-ground (08/09)

Description

Pullbox, in-ground shall be manufactured and constructed in accordance with the plans and these specifications.

Shop drawings detailing the pullbox and appurtenances shall be submitted to the engineer for approval.

At every pullbox the contractor shall label every cable entering and leaving the pullbox. Labels shall be permanent, plastic, wrap-around type that contains a minimum of 20 characters. Specific label content shall be determined with the engineer using designations as detailed on the plans.

Materials

- Pull Box
- Ground Rod
- Ground Clamp
- Pea Gravel
- Cathodic Test Station
- Concrete Pad

Construction Requirements

Pullbox, in-ground shall be Composolite as manufactured by Quazite or approved equal.

Pullbox, in-ground shall have the following characteristics:

- Box fabricated from fiberglass reinforced polymer concrete. Quazite "PG" style service box, bottomless, divider in center, dimensions of 3 inches (width) x 5 inches (length) x 2 inches (depth), and concrete gray in color. Catalog number: PG3660BA24. Box shall be stackable for extra depth.
- Heavy duty two piece cover fabricated from fiberglass reinforced polymer concrete. Quazite catalog number: PG3660HC00. Logo over the communications side as shown below and logo 17 over the electrical side
- Box and cover shall comply to all test provisions of ANSI/SCTE 77 (Specification for Underground Enclosure Integrity) for Tier 15 applications.
- Cover and box design load rating of at least 15,000 lbs. (Tier 15)
- Box and cover shall be manufactured using matched surface tooling.
- Cover shall be manufactured using DOTD logo as shown in these specifications.
- Cover is required to have a minimum coefficient of friction of 0.50 inches accordance with ASTM C 1028.

- As above except penta head bolts shall be stainless steel. Penta head tool shall be provided to the Department in the quantity of ten (10).

Independent test reports, stamped by a registered Professional Engineer shall be provided that certifies that all test provisions of this specification have been met.

Pullbox, in-ground shall be installed as located and detailed on the plans.

A ¾ inch x 10 foot stainless steel ground rod shall be installed within the power section of the pullbox, in-ground enclosure according to plan details. Contractor shall connect the exposed ends of the Muletape to the ground rod utilizing a suitable grounding clamp.

Contractor shall install at each pullbox, in-ground a Cathodic protection test station as manufactured by C.P. Test Services - Valvco, Inc. or approved equal. Test station and installation shall have the following characteristics: Locking, 4 point block, 3 inch internal diameter, 18 inch in length, heavy duty cast iron cover and collar, ABS plastic shaft, PVC terminal board, stainless steel terminals and hardware, and concrete mounting pad.

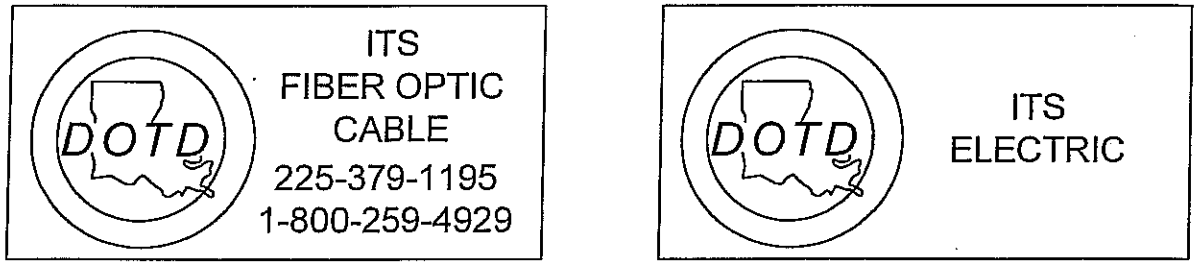

Figure 1: Pullbox Labels

Measurement

Pullbox, in-ground shall be measured in units of each and be paid for at the contract price per each. The price shall be full compensation for furnishing and installing; and for all labor, equipment, tools and incidentals necessary to complete the work.

Payment

Payment for pullbox, in-ground work shall be made at the contract unit price under:

Item #	Pay Item	Pay Unit
NS-ITS-06020	Pullbox, In-Ground, Furnish & Install—New	Each

Environmentally Sealed Enclosure (08/09)

Description

This specification details the requirements for providing an enclosure to house terminated fiber that meets the National Electrical Manufactures Association (NEMA) Type 3 standards. The work shall be in accordance with the plans, the 2006 Louisiana Standard Specifications for Roads and Bridges, and as directed by the engineer. Shop drawings detailing the enclosure shall be submitted to the engineer for approval.

Materials

The enclosure shall be made of gray polyvinyl chloride (PVC) of cell classification 12454-B, ASTM F-512. Nominal dimensions are:

- Height: 12 inches
- Length: 12 inches
- Depth: 6 inches

Construction Requirements

Cover shall be secured to the enclosure by eight self-tapping screws as shown on the plans and sealed with a water tight gasket. Conduits and cables entering the enclosure shall be sealed water tight by using grommets. The enclosure shall have hanging brackets manufactured as part of the molded PVC.

Enclosure shall be mounted as indicated on the plans. When mounting the enclosure to a fence, a ¼ inch thick aluminum bar (approximately 1 inch wide x 16 inches long) shall be used as a backing to secure the enclosure to the fence.

Measurement

The environmentally sealed enclosure shall be measured in units of each and be paid for at the contract unit price per each. The price shall be full compensation for furnishing and installing; and for all labor, equipment, tools and incidentals necessary to complete the work.

Payment

Payment for environmentally sealed enclosure will be made at the contract unit price under:

Item No.	Pay Item	Pay Unit
NS-ITS-06300	Environmentally Sealed Enclosure	Each

ITS Controller Cabinet (08/09)

Description

These items consist of furnishing all necessary equipment, labor and material to install a pole mounted cabinet for ITS operations as described in these specifications. This cabinet may also be referred to herein and on the plans as an ITS cabinet.

Materials

- Cabinet
- Mounting Brackets
- Wiring
- Surge Protection
- Hardware

Construction Requirements

Shop drawings detailing the ITS cabinet, electrical panel, surge protection, electric receptacles, wire, rigid galvanized steel conduits, condulet, elbows, connection, and appurtenances shall be submitted to the engineer for approval.

Mechanical Construction of Enclosures

The cabinet shall be constructed of sheet or cast aluminum alloy. The sheet aluminum alloy shall be ASTM No. 5052-H32 or equivalent, and shall have a minimum sheet material thickness of approximately 1/8 inch.

The cast aluminum alloy shall be ASTM No. 356-75 or equivalent. Flat cast surfaces exceeding 12 inches in both directions shall be a minimum of 1/4 inch (0.25 inches) in thickness. Flat cast surfaces not exceeding 12 inches in both dimensions shall be a minimum 3/16 inch (0.1875 inches) in thickness.

Unpainted aluminum cabinets shall be fabricated from mill finished material and shall be cleaned with appropriate methods that will remove oil film, weld black, mill ink marks and render the surface clean, bright, smooth and non-sticky to the touch.

Dimensions

Outline dimensions shall be as shown in the table below. All dimensions are outside of cabinet and in inches exclusive of hinges, handles, overhang(s), vent housing and adapters. Cabinet heights are measured to the lowest point of the top surface of the cabinet. The combined overhangs of the top of the cabinet shall not exceed 4 inches.

WIDTH	HEIGHT	DEPTH
22 (-0 + 15%)	45 (-0 + 10%)	15 (-0 + 15%)

Shelves

Cabinets shall be provided with a minimum of two shelves to support control equipment. Cabinets shall have provisions for positioning the shelf between 10 inches from the bottom and within 8 inches from the top. The adjustment of the shelves shall be accomplished by using small hand tools. Rivets are not acceptable. All shelves shall have a raised back edge to stop equipment from passing the back edge of the shelf. This edge shall be a minimum of 1/2 inch from the rear wall of the cabinet and be constructed from one continuous piece of metal.

All cabinets shall have a 1-1/2 inch drawer, mounted directly beneath the lowest shelf. This drawer shall have a hinged top cover and shall be capable of storing documents and miscellaneous equipment. The drawer shall open and close smoothly. Drawer dimensions shall make maximum use of the available depth offered by the cabinet and controller shelf, and shall have approximately the same width as the corresponding back panel. The bottom of the drawer shall have drain holes sufficient to drain any amount of accumulated water in the drawer.

Top Surface Construction

Cabinets shall be manufactured to prevent the accumulation of water on its top surface and slope in a manner to drain water to the back side of the cabinet. The highest point of the top surface shall be limited to a maximum of six (6) inches added to the overall height of the cabinet.

Doors

Cabinets shall have a single hinged main door which permits access to all equipment within the cabinet and visual inspection of all indicators and controls. Unless otherwise specified, the door shall be hinged on the right side of the cabinet as viewed from the outside facing the cabinet door opening. Type 4 cabinets shall have two main doors equally dividing the height of the cabinet front with clearances at top, middle, and bottom.

Hinges

All cabinet doors shall incorporate suitable hinges utilizing stainless steel hinge pins. Hinges shall be protected to prevent being removed or dismantled when cabinet door is closed. Attachment to the cabinet shall produce a smooth finish, protruding fasteners are not acceptable.

Door Stop

Each cabinet shall be provided with a door stop which holds the door open at positions of 90° ± 10° and 170° ± 10°. A means shall be provided to minimize accidental release of the door stop. Type 7 cabinets shall have the door stop located at the bottom of the door and all other cabinets shall have the stop located at the top of the door.

Locking Mechanism

All cabinets shall incorporate a main door lock constructed of nonferrous or stainless steel materials, which shall operate with a traffic industry conventional #2 key. A minimum of one key shall be included with each main cabinet door lock.

A three - point lock on the strike edge of the door shall be provided with all types of cabinets except when specified to be different on the order or plans. The three (3) points of the lock shall be located at the top, bottom, and middle of the strike edge of the door.

The lock shall prevent operation of the mechanism when in the locked position.

The door handle shall rotate inward from the locked position so that the handle does not extend beyond the perimeter of the door at any time. The operation of the handle shall not interfere with the key, police door or any other cabinet mechanism or projection. The handle shall have the mechanical strength to operate the mechanism and shall be made from non-corrosive material.

Cabinets with three-point lock shall be provided with a means of externally padlocking the mechanism. A minimum 3/8 inch diameter lock shackle shall be accommodated. The lock shaft shall be 5/8 inches in diameter.

Door Opening

The main door opening of all cabinets shall open on and be centered within the front side having the width dimensions listed in the previous table and shall be at least 69% of the area of the side. Necessary clearances shall be provided allowing unrestricted movement of the door from closed position to open position. The door shall seal against a minimum of one inch wide neoprene sponge gasket with tight seams. The top gasket shall be the width of the door, the side gaskets shall begin below the top gasket and the bottom gasket shall be within the side gaskets. A gasket retaining ring shall be installed on the inside of the gasket.

Pole Mount

The cabinets shall be provided with provisions to attach a pole bracket to a reinforcement plate permanently mounted to the back, top, and center of the cabinet. The reinforcement to the cabinet shall be designed to support the weight of the cabinet and the equipment intended to be contained within and the structural loads referred to in this specification. The minimum width of the adapter shall be six (6) inches wide and three (3) inches high, tolerance of both -0 inch, +6 inches. Two 3/8 inch holes shall be drilled through the cabinet, within the reinforced area, 2 inches from center line of the width of the cabinet. Countersink each hole on the outside of the cabinet for flat head screws. Install two 5/16 inch flathead screws in the mounting holes with the top of the screw heads to be flush with the surface of the cabinet wall.

The cabinet shall be pre-drilled for two (2), 3 inch wire entrance holes, one in the top and one in the bottom, both at the back edge and centered on the width of the cabinet and one (1) 2 inch entrance hole adjacent to the 3-inch hole on the bottom as shown in the attached drawing. Three hubs shall be provided. The hubs shall centered on the entrance holes and attached to the cabinet using four (4) 5/16 inch-18-tpi by 1-1/2 inch long hex head bolts, with lock washers and hex nuts. The hubs and cabinet shall be pre-drilled for mounting the hubs to the cabinet with the above mentioned bolts using a bolt pattern of 2-1/8 inches centered on a line perpendicular to the back of the cabinet, by 3-3/4 inches parallel to the back of the cabinet. The centers of the bolt pattern on the hub and the wire entrance hole shall coincide. The location of the hubs shall allow minimum clearance for box end wrenches to fit onto the nuts within the cabinet.

A pole clamp shall be provided with the cabinet for mounting the cabinet to the pole. The clamp shall be cast aluminum meeting the requirements for the cabinets and designed to hold the weight of the mentioned cabinets and the equipment contained within. The design shall provide four contact points with the pole and shall be adjustable for pole diameters from 10 inches to 12 inches. The clamp shall be divided into two parts, one half to be attached to the cabinet and the other half to be installed on the "back" side of the pole. The clamp shall have a slotted opening for coupling the clamp together using 5/8 inch galvanized all thread bolts and nuts. The clamp shall have a flat surface area, 4-1/2 inches x 2 inches minimum that attaches to the cabinet. Two (2) 5/16 inch - 18 tpi, drilled and tapped holes spaced 4 inch center to center shall be centered within the flat area. The flat area shall space the back of the cabinet a minimum of 2 inches from the pole.

Equipment Protection

Cabinets are intended to provide protection for the housed equipment. Prying open or dismantling the doors, walls, or tops, shall be prevented with the cabinet securely closed.

When completely and properly installed, cabinets shall have provision for rain water drainage. The cabinet shall not permit water to enter the equipment cavity above any live part, insulation, or wiring.

Cabinets shall have proper grounding bus bar connected to the grounding rod installed as part of the pole foundation.

Cabinet shall include a dual pole 300 mA Ground Fault Circuit Interrupt (GFCI)/Earth Leakage circuit breaker and surge arrestor to handle transient over-voltage and provide lightning protection. Also, at least two 16A rated power outlet sockets on a 16A circuit for powering maintenance laptops shall be provided.

The cabinet shall be equipped with appropriate surge protection for equipment (2500 Joule).

Rain Test

All cabinets shall be designed to meet the requirements of the following tests. To insure realistic testing, the enclosure and enclosed equipment shall be mounted as intended for use.

A continuous water spray, using as many nozzles as required, shall be applied against the entire top and all exposed sides of the enclosure for 10 minutes at a minimum rate of 18 inches per hour of equivalent rain at an operating pressure of 4 to 5 pounds per square inch. The distance of the nozzles to the cabinet shall be a minimum of 36 inches and a maximum of 48 inches and located above the top edge of the cabinet.

The enclosure is considered to have met the requirement of this test if there is no significant accumulation of water within the enclosure and no water is visible on the live parts, insulation materials, or mechanism parts.

A rain test which is performed in accordance with Underwriters Laboratories, Inc., "Rain Tests of Electrical Equipment, Bulletin of Research #23, September, 1941", is considered to be equivalent to this test.

Cabinet Lighting

All cabinets shall be provided with Light Emitting Diode (LED) lighting source that automatically switches on when the cabinet door is opened

Measurement

ITS controller cabinet, pole mount shall be measured in units of each and be paid for at the contract unit price per each. The price shall be full compensation for furnishing and installing; and for all labor, equipment, tools and incidentals necessary to complete the work.

Payment

Payment for ITS cabinet work shall be made at the contract unit price under:

Item #	Pay Item	Pay Unit
NS-ITS-07020	ITS Controller Cabinet, Pole Mount, Furnish & Install	Each

95' Pole & Foundation, Furnish & Install (08/09)

Description

This Item consists of furnishing and installing a 95 ft. pole & foundation, and all appurtenances required in accordance with plan details, specifications, and as directed by the engineer.

Materials

All equipment shall be new and constructed using the highest quality, commercially available components and techniques to assure high reliability and minimum maintenance. The contractor shall submit, prior to installation, a complete set of shop drawings of all the equipment and components listed below and included as part of the installation.

The system shall consist of the following major components:

- Pole
- Foundation
- Ground ring
- Ground rods

Construction Requirements

The contractor shall be required to assemble and install all necessary material and equipment and to furnish complete poles and foundations in accordance with these plans and specifications and compatible with the requirements of the ITS. All items that are required to complete the installation shall be supplied by the contractor whether listed above or not. All items not specifically shown but required for an operational pole shall be supplied by the contractor. All components supplied by the contractor are the responsibility of the contractor.

The contractor shall field verify final equipment locations with the engineer. Plans are diagrammatic and indicate the general arrangement of components and work included in these documents. Final placement and arrangement are the responsibility of the contractor.

The manufacturer, upon request by the Department, shall grant access to the manufacturing facility for all products specified herein.

Shop drawings showing the fabrication and erection details for each support shall be submitted to the engineer for approval. Information on the foundations required to support the pole shall be included in shop drawings.

The contractor may submit a driven foundation pile alternate to drilled shaft foundations included in the specifications and plans at the contractor's cost. The alternative shall be in accordance with *Louisiana Standard Specification for Roads and Bridges*, 2006 Edition Section 804. Copies of soil borings may be available from the General Files Section of LADOTD located in the LADOTD Headquarters Building in Baton Rouge, Louisiana. A detail and design of each alternative foundation shall be stamped by a licensed Louisiana Professional Engineer.

Poles and fittings shall be in accordance with the plans and these specifications and shall be galvanized in accordance with ASTM A123 and A153.

95 ft. Pole Shaft

The pole shaft may have a round or octagonal cross section and shall be tapered. A removable cap shall be provided to cover the shaft top when no device is mounted atop the pole. The pole shall be fabricated to deflect a maximum of 3 cm at a wind speed of 13 meters/second (or 1.5 inch at 30 MPH). The pole shall be fabricated to deflect a maximum of 30 cm at a wind speed of 40 meters/second (1 foot at 90 MPH). Wind loads shall be applied in accordance with Section 3.8 of Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (latest adopted edition by DOTD), including all Interim releases published by AASHTO. The application of the wind load shall be modified to reflect the device(s) to be mounted atop the pole. The overall design of the pole shall conform to the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (latest adopted edition by DOTD), including all Interim releases published by AASHTO. The pole shaft shall be suitable for wireways throughout its length. The length of the pole shall be measured from the top of the base plate to the top of the pole.

Handholes

Each pole shall be provided with a handhole located approximately 18 inches above the base with approximate dimensions of 4 inches x 6-1/2 inches. The handhole shall be provided with a cover that is restrained to the pole with a 15 inch- #35 stainless steel chain fastened to both the cover and to the inside of the handhole in a fashion such that the chain shall be inside the pole. The manufacturer's name and pole height shall be stenciled on the cover and be legible on the outside of the pole after galvanizing. The handhole strain bar shall be formed to provide a mechanical lock against the handhole in order to prevent turning. No obstructions shall be in the handhole with the cover removed. A grounding nut (1/2 inch – 13NC) shall be welded to the inside of the shaft 90° left and horizontal from the handhole. A grounding lug shall be provided with each pole (Fargo GC202 or approved equal).

Bosses

Poles shall have a 1 inch and a 3 inch boss centered on a horizontal line 18 inches from the base. When facing the bosses, the 1 inch boss shall be a maximum of 35° to the right of the 3 inch boss. A wireway shall be provided through one (1) 3 inch and one (1) 1 inch boss provided in the shaft 18 inches below the top of the shaft. The 3 inch bosses shall be located 180° from the handhole. The poles shall be shipped with all bosses plugged by using galvanized steel conduit plugs installed to full thread depth. The handhole and the 3 inch boss mentioned above shall be centered on one (1) edge of the base plate.

Hardware

All pole hardware, including leveling and capnuts, shall be packaged together on a per pole basis. Pole base plates, anchor bolts, hex nuts, and washers shall have design and dimensions as shown in the plans. Both hex and cap nuts shall be 2-5/8 inches across the flats. Cap nuts shall have a maximum dome height of 1-3/4 inches with an inside clearance of ½ inch between the threads and the top of the dome. All anchor bolts, with hex nuts and washers, shall be banded in bundles of four (4) and supplied with each pole. The handhole cover shall be securely fastened to the pole for shipment. One (1) additional anchor bolt shall be supplied with each order.

Welding

Welding and fabrication shall be in accordance with Section 815 – Welding, of *Louisiana Standard Specifications for Roads and Bridges*, 2006 Edition as amended. All welded joints shall develop the full-required strength of the member. Circumferential welds, other than at the ends of the shafts, are not permitted. The exterior of longitudinal seam welds shall be ground or otherwise smoothed to the same appearance as other shaft surfaces. Longitudinal seam welds for pole sections shall have 60 percent minimum penetration except longitudinal seam welds shall be complete penetration when within six (6) inches of circumferential base welds. If necessary, a maximum of two longitudinal seam welds may be made in pole sections. Low hydrogen electrodes or the equivalent in wire and flux for automatic welding, shall be required for all welds. Preheat shall be required for welding pole to base plate in accordance with ANSI/AWS D1.1 structural welding code.

Finish

All sheared or cut edges and all other exposed edges to be painted or galvanized shall be rounded or chamfered to approximately one-sixteenth (1/16) inch. Galvanizing shall be done in accordance with Section 811.12 – Galvanizing, of *Louisiana Standard Specifications for Roads and Bridges*, 2006 Edition as amended.

Drilled Shaft Foundation

A. General Requirements

A drilled shaft foundation shall be provided for 95 ft. poles in accordance with Louisiana Standard Specification for Roads and Bridges, 2006 Edition Section 814 and the details provided in the plans. Copies of soil borings may be available from the General Files Section of LADOTD located in the LADOTD Headquarters Building in Baton Rouge, Louisiana. A detail and design of each drilled shaft foundation is included in the plans.

B. Drilled Shaft Testing

Each drilled shaft foundation shall have 5@2 inch diameter preformed test holes in the pole foundation as shown in the plans. Sonic Logging and tests shall be conducted as required by LADOTD Standard Specification Section 814 and paid for as part of the 95 ft. pole.

Pole Location and Base Plate Orientation Plan Submittal

All of the 95 ft. pole sites shall be in constricted areas, bounded by roadways, structures, or other obstacles. Prior to constructing the foundations, the contractor shall survey the site and determine the exact location of the installation in relation to the surrounding structures and roadways. A plan showing all location information shall be prepared and submitted to the engineer for approval prior to construction.

Grounding

Support cable, metallic cable sheaths, conduit, transformer cases, metal poles, pedestals, and other devices and appurtenance as directed by the engineer shall be made mechanically and electrically secure and grounded. Bonding and grounding jumpers shall be properly sized as per

the NEC and in no case shall they be smaller than #6 AWG copper wire. Equipment on wood poles shall be grounded. A grounding ring shall be installed beneath each 95 ft pole & foundation.

The only grounding methods and techniques that are allowed on this project are exothermic welds, with proper molds and metals, and compression crimp connections.

The grounding conductor shall be continuous and of the type and size shown on the plans. The grounding conductor shall be connected to the ground system at all supporting structures, power meter racks, transformer, sign support assembly, and to each grounding conductor in a multi-conductor cable assembly as applicable for the site. All connections shall be made in accordance with the manufacturer's specifications and as specified in splicing. Grounding splices shall not be insulated.

Single 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.

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

Restoration of Site

The contractor shall repair concrete slab, reshape, reseed, and apply vegetative mulch to areas disturbed during the performance of work. The costs incurred in concrete repair, reseeding, resodding, and otherwise restoring areas to their original condition or better shall be at no direct pay.

Cutting and Patching

Should any cutting of walls, floors, ceilings, partitions, paving, sidewalks, driveways, curb and gutters, paved shoulders, etc. be required for proper installation of electrical work, such cutting and restoring of the work to its original condition or better shall be done by the contractor in a manner acceptable to the engineer. The costs incurred for cutting and restoring shall be at no direct pay.

Site Clean Up

During the progress of the work, contractor shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the work. At the completion of the work contractor shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery and surplus materials. contractor shall leave the site clean and ready for occupancy by the department at partial acceptance of the work. Contractor shall restore to original condition all property not designated for alteration by the contract documents.

Measurement

95 ft. pole & foundation shall be measured in units of each and be paid for at the contract unit price per each. The price shall be full compensation for furnishing and installing; and for all labor, equipment, tools and incidentals necessary to complete the work.

Payment

Payment for 95 ft. pole & foundation work shall be made at the contract unit price under:

Item #	Pay Item	Pay Unit
NS-ITS-08010	95' Pole & Foundation, Furnish & Install	Each

Backbone Wireless (08/09)

Description

This Item consists of furnishing and installing an un-licensed wireless communications broadband system and all appurtenances required for the ITS System in accordance with plan details, specifications, and as directed by the engineer.

This type of network is an ethernet architecture with dedicated point-to-point or point-to-multipoint communications. This is done by employing 802.11n (draft) or 802.16 type radios (high bandwidth wireless ethernet network) as high speed wireless ethernet bridges or approved equal.

Materials

All equipment shall be new and constructed using the highest quality, commercially available components and techniques to assure high reliability and minimum maintenance. The contractor shall submit, prior to installation, a complete set of shop drawings of all the equipment and components listed below and included as part of the installation.

Each Section shall consist of the following major components.

- Wireless transceivers
- Wireless antennas
- Cabling
- Mounts and connections

Construction Requirements

The contractor shall be required to assemble and install all necessary material and equipment and to furnish a working wireless communication backbone system in accordance with these plans and specifications and compatible with the requirements of the ITS System. All items that are required to complete the installation shall be secured by the contractor whether listed above or not. It shall be the responsibility of the contractor to properly configure and deliver a working wireless, broadband communications system. It shall be the responsibility of the contractor to determine the final configuration of all electrical connections. Electrical connections may vary slightly than those shown within the plans, as field conditions dictate as being necessary.

A. Radio Requirements

This specification section details the backbone wireless transceiver assembly that will be furnished to the contractor by the Department. If there is a component within this specification that is not included with the material delivered by the Department, it shall be the responsibility of the contractor to provide.

Wireless transceiver assembly manufacturer is Encom and the model is COMMPAK Broadband Series or approved equal.

Wireless transceiver assembly and components shall be installed within a pole mounted cabinet or as approved by the project engineer when a pole mounted cabinet is not identified in the plans.

This equipment shall be supplied by the contractor and shall have a transferable warranty.

The wireless transceiver assembly shall be an unlicensed FCC approved GHz broadband communication package to be used for the backbone communications as detailed in the plan set. The equipment shall be installed within the pole mounted controller cabinet and have pole-mounted antennas rated according to the results of the terrain analysis. Building top transceiver installation diagrams shall be submitted for approval to the project engineer prior to ordering equipment. It shall be the responsibility of the contractor to determine the final cable routing within existing infrastructure, subject to the approval of the engineer. The contractor shall provide an un-interrupted length of cable with connectors on both ends for connecting the antenna with the base equipment.

The wireless transceiver assembly and all appurtenances shall be FCC approved under Article 15 and shall have an equipment authorization as part of Article 15, Subclass C. The wireless transceiver assembly shall be unlicensed and shall not require a FCC site license unless a formal submittal has been made to utilize licensed frequencies in which case shall be approved by the DOTD. If use of a licensed frequency is approved by DOTD, the contractor shall be responsible for obtaining the license in DOTD's name and bare all cost associated with the license as part of payment for the backbone wireless transceiver.

The wireless transceiver assembly, with the proper antenna selection, shall have the capability to transmit up to 20 miles "line-of-sight" without the use of repeaters.

The wireless transceiver assembly shall be able to be configured through network management software.

Each wireless transceiver assembly shall be configurable to operate as point-to-point or point-to-multipoint as shown in the plan set.

The equipment used shall be designed to protect personnel from exposure to high voltage during equipment operation, adjustments, and maintenance.

B. Power and Connectors

The wireless transceiver assembly shall operate via power over ethernet (POE) at an input voltage between 100 to 240 VAC (9W maximum). POE output voltage rated at 1A with a 3-pin quick disconnect connector or 12-24 volts DC. The RS-232 connector shall be DB9 female.

Antenna connector shall be type "N" female on extended range package.

C. I/O Interface

Industrial Weatherproof 10/100 Base-T Ethernet (RJ45)

D. Indicators

The following indicators shall be provided:

Radio Status: LEDs for power, transmit, and receive link status.
I/O Status: LEDs for each output channel / zone activity.
RSSI: Software driven for antenna alignment.

E. Radio

The radio shall have the following specifications:

Frequency Range: 3.65 GHz, 5.4 GHz, 5.8 GHz, 11 GHz, or 18 GHz
Receiver Sensitivity: <74Dbm to maintain sync.
Technology: WiMax (802.16) or E-OFDM (draft-n)
Transmit Power: 400mW (typical)
Data throughput performance: 18 Mbps or greater true usable throughput as tested by bandwidth speed test.

F. Wireless Interface

Wireless shall have the following characteristics:

Protocol: 802.16 or 802.11 a/b/g/(draft-n)
Characteristics: Dynamic Frequency Selection
Channels: 5 MHz, 10MHz and 20MHz channel selectivity
Set-up: Antenna alignment software utility
Modulation: SOFDMA, OFDM and/or DSSS

G. Environmental Ratings

Environmental ratings of the wireless transceiver assembly shall be -40°C to +80°C.

Humidity ratings for the wireless transceiver shall be 0% to 95%, relative, non-condensing.

H. Network Management

- STP (Spanning Tree Protocol)
- DHCP Server or Client
- NTP (Network Time Protocol)
- Firewall and NAT
- Routing
- QOS
- VPN
- VLAN
- SNMP
- IP discovery tool with remote management
- Bandwidth test tool

Wireless Transceiver Antenna and Cabling

This specification section details the wireless transceiver antenna and appurtenances that are required to be purchased and installed by the contractor.

Contractor shall provide a flat panel antenna assembly, complete with all necessary cabling, hardware, and connectors, that is compatible with the above specified wireless transceiver assembly and that conforms to these specifications and the plans. Transceiver site antennas shall be directional. Inline lightning protection shall be included as part of the cabling for the antenna. The contractor shall provide an additional three inline protection devices (fuses) as spare parts.

Terrain Analysis

The contractor shall complete a terrain analysis in accordance with FCC rules and regulations, for verification that the wireless system will perform as intended. These specifications and the plans specify the input and output device locations and the fixed communications sites. The choice of the specific frequencies, relay points (locations and heights), and antenna types (including locations and heights) are the contractor's responsibility. The contractor is responsible for all inter-nodal points necessary for a fully functioning system, based on the contract document requirements and the system choices proposed by the contractor. If required, additional equipment and materials will be provided to the contractor, but will be limited to those items identified herein as being supplied by the DOTD. All other equipment and materials necessary shall be provided by the contractor. Payment for work within this section shall be included within each wireless site pay item.

The terrain analysis shall take into account specific localized obstructions and conditions (i.e. shadowing, multi-path interference, etc.) and include at a minimum, the following:

- Mapping module to include distance and bearing at each site
- RF module to include adequacy of received signal levels
- Shadowing module to include terrain or obstruction
- Path module to include elevations of paths
- Frequency modules to include:
  - Link reliability analysis
  - Signal levels
  - Fade margins

Antenna module shall include suitable antenna elevation.

The contractor shall complete a Frequency Analysis in accordance with FCC rules and regulations, any other applicable rules and regulations governing the use of the system, for verification that the wireless system will perform as intended. The Frequency Analysis shall take into account the frequencies proposed by the contractor and those frequencies outside of this system which may impact the performance of this wireless network system.

The contractor shall provide as part of the submittals, link budget calculations and microwave path profile analysis results. The completed terrain analysis shall be presented as a submittal, after it has been executed and prior to purchase of equipment and start of related work.

Measurement

Backbone wireless transceiver, unlicensed shall be measured in units of each and be paid for at the contract price per each. The price shall be full compensation for furnishing and installing; and for all labor, equipment, tools and incidentals necessary to complete the work.

Payment

Payment for backbone wireless transceiver, unlicensed work shall be made at the contract price under:

Item #	Pay Item	Pay Unit
NS-ITS-09280	Backbone Wireless Transceiver, Unlicensed, Furnish & Install	Each

Local Wireless Transceiver (08/09)

Description

This Item consists of furnishing and installing a low bandwidth wireless communications system and all appurtenances required for the ITS System in accordance with plan details, specifications, and as directed by the engineer.

This type of network is a contact closure only architecture with dedicated Point-to-Multipoint communications. This is done by employing 900 MHz Spread Spectrum type radios as low bandwidth wireless contact closure messages.

Materials

All equipment shall be new and constructed using the highest quality, commercially available components and techniques to assure high reliability and minimum maintenance. The contractor shall submit, prior to installation, a complete set of shop drawings of all the equipment and components listed below and included as part of the installation.

Each Section shall consist of the following major components:

- Wireless transceivers
- Wireless antennas
- Cabling
- Mounts and connections

Construction Requirements

The contractor shall be required to assemble and install all necessary material and equipment and to furnish a working local wireless transceiver system in accordance with these plans and specifications and compatible with the requirements of the ITS System. All items that are required to complete the installation shall be secured by the contractor whether listed above or not. It shall be the responsibility of the contractor to properly configure and deliver a working contact closure system. It shall be the responsibility of the contractor to determine the final configuration of all electrical connections. Electrical connections may vary slightly than those shown within the plans, as field conditions dictate as being necessary.

A. Radio Requirements

This specification section details the wireless transceiver assembly that will be furnished to the contractor by the department. If there is a component within this specification that is not included with the material delivered by the department, it shall be the responsibility of the contractor to provide.

Wireless transceiver assembly manufacturer is Encom and the model is COMMPAK I/O 8 Series or approved equal.

Wireless transceiver assembly and components shall be installed within the cabinet for flasher controller activation and deactivation of the drawbridge status signs flashing beacon at locations as shown in the plans.

Final installation location of the wireless transceivers located within the drawbridge/swing bridge control facilities is subject to approval by project engineer.

This equipment shall be supplied by the contractor and shall have a transferable warranty.

The wireless transceiver assembly shall be an unlicensed FCC approved contact closure communication package to be used as shown in the plans. The equipment shall be installed within ITS cabinets and have pole-mounted antennas rated according to the results of the Terrain Analysis. Fifty (50) feet of cable with connectors on both ends shall be provided to connect the antenna with the base equipment.

The wireless transceiver assembly and all appurtenances shall be FCC approved under Article 15 and shall have an equipment authorization as part of Article 15, Subclass C. The wireless transceiver assembly shall be unlicensed and shall not require an FCC site license.

The wireless transceiver assembly, with the proper antenna selection, shall have the capability to transmit up to 20 miles "line-of-sight" without the use of repeaters.

The wireless transceiver assembly shall be able to be configured through network management software.

Each wireless transceiver assembly shall be configurable to operate as point-to-multipoint.

The equipment used shall be designed to protect personnel from exposure to high voltage during equipment operation, adjustments, and maintenance.

B. Power and Connectors

The wireless transceiver assembly shall operate on 120 volts AC (40W maximum) with a 2-pin quick disconnect connector or 12-24 volts DC. The programming port shall be RJ12 female.

Discrete I/O shall contain quick release I/O terminals (one per I/O point).

Antenna connector shall be type RP TNC-F (female) on extended range package.

C. I/O Interface

Open collector inputs shall be 0-24 VDC (Ground Activated) and 500 mA max load per digital open collector (for 8 outputs).

Number of inputs/outputs shall be 16.

D. Indicators

The following indicators shall be provided:

Radio Status:	LEDs for power, input, output and link status.
I/O Status:	LEDs for each output channel / zone activity.
RSSI:	Software driven for antenna alignment.

E. Radio

The radio shall have the following specifications:

Frequency Range:	902-928 MHz
Receiver Sensitivity:	<74Dbm to maintain sync.
Technology:	FHSS
Transmit Power:	1 mW – 1000mW

F. Serial Ports

The following data ports shall be provided:

Interface:	RS232 (2 or 4 wire half duplex)
Data Rates:	contact closure
Data Format:	contact closure
Flow Control:	transmission confirmation

G. Environmental Ratings

Environmental ratings of the wireless transceiver assembly shall be -40°C to +80°C.

Humidity ratings for the wireless transceiver shall be 0% to 95%, relative, non-condensing.

H. Software Management

Software management shall include Configuration Utility, Remote Maintenance capabilities and Wireless Link Diagnostic features. A software spectrum analyzer shall also be included to determine exact noise levels and ideal operating frequencies.

Wireless Transceiver Antenna and Cabling

This specification section details the wireless transceiver antenna and appurtenances that are required to be purchased and installed by the contractor.

Contractor shall provide antenna assemblies as shown in the plans and in compliance with the wireless terrain analysis, complete with all necessary cabling, hardware, and connectors, that is

compatible with the above specified wireless transceiver assembly and that conforms to these specifications and the plans. Transceiver site antennas shall be directional, with the exception of the master site which shall be omni-directional. In line lightning protection shall be included as part of the cabling for the antenna. The contractor shall provide an additional three inline protection devices (fuses) as spares parts.

Terrain Analysis

The contractor shall complete a terrain analysis in accordance with FCC rules and regulations, for verification that the wireless system will perform as intended. These specifications and the plans specify the input and output device locations and the fixed communications sites. The choice of the specific frequencies, relay points (locations and heights), and antenna types (including locations and heights) are the contractor's responsibility. The contractor is responsible for all inter-nodal points necessary for a fully functioning system, based on the contract document requirements and the system choices proposed by the contractor. If required, additional equipment and materials will be provided to the contractor, but will be limited to those items identified herein as being supplied by the DOTD. All other equipment and materials necessary shall be provided by the contractor. Payment for work within this section shall be included within each wireless site pay item.

The terrain analysis shall take into account specific localized obstructions and conditions (i.e. shadowing, multi-path interference, etc.) and include at a minimum, the following:

- Mapping module to include distance and bearing at each site
- RF module to include adequacy of received signal levels
- Shadowing module to include terrain or obstruction
- Path module to include elevations of paths
- Frequency modules to include:
  - Link reliability analysis
  - Signal levels
  - Fade margins

Antenna module shall include suitable antenna elevation.

The contractor shall complete a frequency analysis in accordance with FCC rules and regulations, any other applicable rules and regulations governing the use of the system, for verification that the wireless system will perform as intended. The frequency analysis shall take into account the frequencies proposed by the contractor and those frequencies outside of this system which may impact the performance of this wireless network system.

The contractor shall provide as part of the submittals, link budget calculations and microwave path profile analysis results. The completed terrain analysis shall be presented as a submittal, after it has been executed and prior to purchase of equipment and start of related work.

Measurement

Local wireless transceiver shall be measured in units of each and be paid for at the contract unit price per each. The price shall be full compensation for furnishing and installing; and for all labor, equipment, tools and incidentals necessary to complete the work.

Payment

Payment for local wireless transceiver work shall be made at the contract price under:

Item #	Pay Item	Pay Unit
NS-ITS-09340	Local Wireless Transceiver, Furnish & Install	Each

Contact Closure Over Optical Fiber Communication System (08/09)

Description

This Item consists of furnishing and installing a contact closure over optical fiber communication system and all appurtenances required for the ITS in accordance with plan details, specifications, and as directed by the engineer.

Materials

All equipment shall be new and constructed using the highest quality, commercially available components and techniques to assure high reliability and minimum maintenance. The contractor shall submit, prior to installation a complete set of shop drawings of all the equipment and components listed below and included as part of the installation.

The system shall consist of the following major components:

- 8 Channel Contact Closure to Optical Fiber Transceiver

Construction Requirements

The contractor shall be required to assemble and install all necessary material and equipment and to furnish a working contact closure over optical fiber communication system in accordance with these plans and specifications and compatible with the requirements of the ITS System. All items that are required to complete the installation shall be secured by the contractor whether listed above or not. It shall be the responsibility of the contractor to properly configure and deliver a working contact closure system. It shall be the responsibility of the contractor to determine the final configuration of all electrical connections. Electrical connections may vary slightly than those shown within the plans, as field conditions dictate as being necessary. Optical fiber shall be provided and installed in accordance with optical fiber system specifications.

A. Transceiver Requirements

This specification section details the contact closure transceiver assembly that shall be furnished by the contractor for use on this project. If there is a component not mentioned in this specification that is required for the functionality of the system, it shall be the responsibility of the contractor to provide. Transceiver shall be understood as: 1) a single device that is capable of transmitting and receiving; 2) a transmitter and receiver pair. If a transmitter and receiver pair are provided, the contractor shall provide a transmitter a the site of transmission (origination of contact closure) and a receiver at the site of reception (destination of contact closure).

Contact closure transceiver assembly manufacturer is International Fiber Systems and the model is (DT3025/DR3030) or approved equal.

Contact closure transceiver assembly and components shall be installed within a pole mounted cabinet, communications rack, or location as approved by the project engineer.

This equipment shall be supplied by the contractor and shall have a transferable limited lifetime warranty.

The contact closure transceiver (transmitter and receiver pair) shall be 8-channel contact mapping system modules. The modules shall require no in-field electrical or optical adjustments to ease installation. The modules shall provide automatic re-settable solid-state current limiters and independent voltage regulators on each module to reduce the chance of a single point failure of the system. The modules shall be hot swappable in an optional rack mount system to reduce complete system shut down during maintenance or repair. The module shall have an MTBF of >100,000 hours and operate in an environment of -40° C to +74° C and relative humidity between 0% to 95% (non-condensing). The module shall be UL listed. The circuit board shall be UL 94 flame rated and meet all PCI standards. All PC boards shall be designated with part number, PC board number and show appropriate revision number. Housing shall be identified with silk-screened labels. The module shall have a lifetime warranty to reduce system life cycle cost in an event of a module failure.

B. Contact Requirements

- Contact Ratings: 100 VDC, 0.5amps, 10 watts
- Normally Open

C. Optical

- Optical Fiber: 9/125 micron single mode
- Number of fibers required: 1
- Optical Wavelength: 1300 nm
- Optical Emitter Type: 1300 nm LED
- Transmitter Output Power: 25μw (-16 dB)
- Optical Detector Type: 1300nm PIN DIODE
- Receiver Sensitivity: 1μw (-30 dB)
- Optical Power Budget: 14 dB

D. Indicators

- Power: On/Red – Off/Off
- Contact Closed (Transmit): Contact Closed/Green – Contact Open/Off
- Contact Closed (Receive): Contact Closed/Yellow – Contact Open/Off

E. Connectors

- Optical: ST
- Power and Contacts: Terminal Block with Screw Clamps

F. Electrical

- Power: 12 VDC
- Current Protection: Automatic re-settable solid-state current limiters
- Voltage Regulation: Solid-state, Independent on each board

- Circuit Board: UL 94 flame rated and meets all PCI standards
- Rack mount Card (Optional): Shall be hot-swappable

G. Mechanical

- Surface Mount Dimensions: 7.1 in x 4.9 in x 2.0 in (18.00 cm x 12.45 cm x 5.08 cm)
- Rack Mount Dimensions (Optional): 7.7 in x 5.0 in x 2.0 in (19.55 cm x 12.70 cm x 5.08 cm)
- Number of Rack Slots: 2
- Finish: Module shall be constructed of a metal enclosure with a powder coat finish with all connections and indicators silk-screened directly on unit. Rack mount units (optional) shall be constructed of anodized aluminum.

H. Environmental

- MTBF: >100,000 Hours
- Operating Temp: -40° C to +74° C
- Storage Temp: 40° C to +85° C
- Relative Humidity: 0% to 95% (non-condensing). If product is installed under condensation conditions, unit shall have conformal coating applied to the printed circuit board. (Add –C to model number for conformal coated printed circuit board.)

I. Regulatory Agency/Approval

- Underwriters Laboratory (UL) Listed
- UL 94-flame rated PCD board: 94VO

Materials provided under this Specification must be new and must be provided by manufacturers regularly engaged in the production of such products.

It is required that the manufacturer shall provide installation procedures and technical support concerning the items contained in this specification.

Delivery, Storage and Handling

Materials must be delivered in unopened factory packaging with manufacturer's bar coding to the job site. Product shall be inspected upon delivery to assure that specified products have been received complete and undamaged. Products are to be stored until time of installation in an environment with the ambient temperature range of -40° C to +74° C without the assistance of fan-forced cooling.

Installation Guidelines and Requirements

A. General Requirements

The contractor shall prepare configuration diagrams that detail the installation of the transceiver assembly, that show final placement of devices inside the cabinets at field locations. Installation diagram approval shall be at the discretion of the DOTD.

B. Standalone Module (Surface Mount)

Shall be mounted on a properly prepared surface adequate for the size and weight of module. The placement of the unit shall allow provision for cable installation and maintenance and in compliance with any manufacturer template and installation manual.

C. Rack Mount Module (19" Rack) (Optional)

Shall be installed in manufacturer recommended card cage. Contractor shall ensure that the card cage is installed in a standard EIA 19 inch (482.6 mm) rack or wall standoff bracket adequate for the size and weight of the card cage. The placement of the unit shall allow provision for cable installation and maintenance as indicated on the any approved diagrams, submitted by the contractor, and in compliance with manufacturer's installation manual.

D. Optical Link

The optical link shall be tested with an OTDR to ensure the link budget (overall path loss) plus an added 3 dB of optical safety margin does not exceed the optical power budget previously specified herein. All optical connectors on cable shall be cleaned in compliance to optical connector manufacturer's specifications and covered with dust caps until connection to the fiber optic module.

Testing

Testing the Fiber Optic Contact Mapping Link shall be conducted as follows

- Verify that the contact leads and optical fibers are properly connected.
- Make sure that power is applied to all fiber optic modules, controllers, and receiver drivers or other equipment used in the system.
- Successful contact mapping operation should be confirmed at this point by using the switches to toggle the contacts open and closed.
- Connect contact closure radios, and configure as recommended by manufacturer, and verify that contact closure states are being transmitted, and received successfully.
- It shall be the responsibility of the contractor to configure final software and hardware configurations, as it may vary amongst vendors. It shall also be the responsibility of the contractor to install and deliver a working contact closure over fiber optic system including proper integration with associated hardware.

Production Tests and Technical Requirements

A. General Requirements

Final inspection and acceptance of the contact closure over optical fiber transceiver system installation shall be at the discretion of the DOTD. DOTD shall require the contractor to have completed testing as described herein, and to have provided DOTD with documentation related to such testing. Testing shall be in accordance with the standards and regulations previously referenced by these Specifications.

The contractor shall prepare a statement for all testing procedures that shall be used for this installation. This statement shall be provided in advance to the DOTD for approval by the engineer. The engineer must pre-approve all data forms that shall be used to record results of pre and post installation testing. Once testing is complete, all test results recorded on approved data forms, and signed by the contractor, shall be provided to the Engineer for approval.

In addition to the guidance provided above, all testing shall be performed in accordance with industry standards bodies and generally accepted methods that were previously documented. Testing shall also comply with the specific industry standards provided by the fiber optic cable Specification.

Measurement

Contact closure fiber transceiver shall be measured in units of each and be paid for at the contract unit price per each. The price shall be full compensation for furnishing and installing; and for all labor, equipment, tools and incidentals necessary to complete the work.

Payment

Payment for contact closure fiber transceiver work shall be made at the contract unit price under:

Item #	Pay Item	Pay Unit
NS-ITS-09600	Contact Closure Fiber Transceiver, Furnish & Install	Each

Electrical Service (08/09)

Description

This item consists of providing electrical service for ITS field equipment sites to accommodate a fully functional ITS System in accordance with the plan details, specifications and as directed by the engineer.

Materials

This work consists of all coordination with local electric service provider, obtaining temporary and permanent metered service, rigid metallic conduit, hardware, cable, connection and installation.

All equipment shall be new and meet the latest adopted National Electric Code (NEC).

Shop drawings detailing the electrical equipment, meter socket, rigid galvanized steel conduit, conduit fittings, disconnects, electrical panel, grounding, wire, weather heads, connection, and appurtenances shall be submitted to the engineer for approval.

Construction Requirements

Conduit

Conduit of the type and size specified shall be installed at the locations shown on the plans or as directed by the PE. For electrical service, "Conduit" shall mean either metallic or nonmetallic pipe, tube, or duct unless specified otherwise on the plans. "RGS" shall mean rigid galvanized steel conduit and "RA" shall mean rigid aluminum conduit.

Rigid galvanized steel conduit shall conform to ANSI C80.1 specifications. Rigid aluminum conduit shall conform to ANSI C80.5 specifications.

Ends of metallic conduit shall be reamed after threads are cut. All ends shall be cut square and shall butt solidly in the joints to form a smooth raceway for cables.

Conduit joints shall be made in such a manner as to form a watertight seal. Conduit connections for RGS or RA shall use threaded couplers and shall be sealed with a waterproof sealant. Coupling of new conduit to existing conduit shall be with a three-piece coupling. All conduit runs shall contain an equipment grounding conductor. Conduit for equipment installed over water shall be aluminum with all aluminum components. Conduits for communications and power over water shall be fiber reinforced conduit (FRE).

Threads shall be clean cut, straight and true and of sufficient length to permit full-depth coupling. Excessive threads will not be permitted. Ends of RA or RGS conduit installed for future connections shall be threaded, reamed and capped. Couplings for RA or RGS shall be tightened until the conduit ends are together. Damaged coatings in exposed threads shall be repaired in accordance with Subsection 811.12 of the Standard Specifications. Exposed threaded ends of conduit shall be terminated with an insulated-throat, ground-type bushing.

Bushings shall be installed in conduit where necessary for protection of the conductors. When the conduit is installed and wiring is to be done at a later date, the contractor installing the

conduit shall perform the mandrel test, ream duct opening to remove burrs or foreign matter, thoroughly clean, and provide and install a weatherproof cap at each open end. This work is to be inspected and approved by the engineer.

The contractor may install larger size conduit at no direct pay. No reducing couplings will be permitted in a conduit run.

Underground conduits shall be buried at a depth as shown on the plans. Conduit shall be directionally bored under existing pavements and within the drip line of trees in accordance with these specifications and Section 728 of the Standard Specifications. Minimum finished cover shall be as shown on the plans.

Power service conduit that is installed in a directionally bore or trench shall be Schedule 80 HDPE.

Conductors

Electrical power conductor characteristics are 600 V rated cross-linked polyethylene insulation, high heat, and moisture resistance conforming to ICEA S66-524. Conductors shall be UL Listed Type XHHW-2 rated for conduit, direct burial, and sunlight resistance. Other characteristics shall include suitability for operation at 600 volts or less in wet or dry locations and at temperatures not to exceed 90°C (194 °F). Conductors shall be annealed copper and shall be stranded. Phase and neutral conductors shall be sized according to the plans and color coded according to NEC requirements. Ground conductors shall be sized according to the plans and colored green.

All conductors used in the work shall be of soft drawn annealed copper having a conductivity of not less than 98% of that of pure copper. Conductors shall be standard code gauge in size, insulated and shall have insulation rated for use at 600 volts.

Unless noted otherwise or specified, insulation shall be type XHHW. Lighting fixture wire shall be heat resistant type TF, 150°C (302°F) with 300-volt insulation minimum. Wires shall be of the single conductor type. Sizes No. 8 AWG and larger shall be stranded. Sizes No. 12 thru No. 14 shall be single strand solid copper.

Throughout the system, all conductors shall be identified as to the phase and voltage of the system by color-coding in accordance with NEC 210.5. Color-coding shall be continuous the full length of the wire with surface printing at regular intervals on all conductors and for neutral conductors.

Wires in cabinets shall be neatly laced into cables with nylon lacing or plastic straps.

Conductors shall be installed in conduit except where the run is inside poles or suspended from support.cable. When wire and cable is brought up into the base of a foundation, sufficient slack shall be left to enable the connections to be made outside the foundation.

Cables in conduits shall be carefully pulled into place using approved methods so that the cable will be installed free from electrical or mechanical injury. Powdered soapstone, talc, or other approved inert cable lubricant shall be used in placing conductors in conduit. Conductors shall

be handled and installed in such a manner as to prevent kinks, bends, or other distortion, which could cause damage to the conductor or outer covering. All wires and cables within a single conduit shall be pulled at the same time. When cables are pulled through hand holes, in pole shafts, etc., a pad of firm rubber or other suitable material shall be placed between the cable and the edges of the opening to prevent cable damage. Cable entrances into panels, and conduit outlets shall be sealed from moisture, insects, rodents, and foreign material with a sealing compound manufactured for this application.

Splices and taps for circuits rated below 600 volts shall be performed in accordance with the National Electrical Code and materials shall be used that will be compatible with the sheath and insulation of the cable and suitable for direct burial. Straight splices shall be made with compression crimp connectors according to plan details. Compression connectors shall be crimped with the connector manufacturer's recommended compression tool and die. The compression tool shall be of the type, which will prevent removal of the tool until the crimp has been completely closed.

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 in the plans and as required by these specifications.

All non-current carrying metal parts of the site shall be grounded per 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 as per the NEC and in no case shall they be smaller than a # 6 AWG copper wire. Equipment on wood poles shall be grounded. A grounding ring shall be installed beneath each antenna pole site.

The only grounding methods and techniques that are allowed on this project are exothermic welds, with proper molds and metals, and compression crimp connections.

The grounding conductor shall be continuous and of the type and size shown on the plans. The grounding conductor shall be connected to the ground system, to each sign support assembly, and to each grounding conductor in a multi-conductor cable assembly. All connections shall be made in accordance with the manufacturer's specifications and as specified in splicing. Grounding splices shall not be insulated.

Single 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.

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

Metered Service

The contractor shall arrange with the local Power Company for temporary and permanent electrical service and shall verify the exact location and points of attachment and metering before installation.

Temporary Service: The contractor shall provide temporary electrical service as part of payment for electrical service. Temporary electrical service includes installing temporary power poles, meters etc. required for temporary power service.

Power Usage: The contractor shall be responsible for and pay for all power usage during construction and testing as part of payment for electrical service.

The contractor shall coordinate with the local power company to obtain all required electrical standard details for all the service connections for the entire project.

Contractor shall install metered service points as shown on the plans. Power service point conductor wires will be 120/240 v single phase. The contractor shall provide the meter socket for the 240/480v.

Each metered point shall have a municipal address assigned by the Parish 911 offices. The contractor shall coordinate with LADOTD and the Parish 911 office to obtain the municipal address. If the meter is adjacent to a cross street, then an address on that street would be best. The contractor shall provide a list of all electrical meter addresses associated with ITS equipment(s) to LADOTD. The municipal number shall be posted and clearly visible on the meter can (box). It may assist in reporting future electric service outages-problems if the address in indicated inside the ITS cabinet. The contractor shall use these addresses to apply for service approx. 8 to 10 weeks before he is ready for electric service.

Measurement

Electrical service shall be measured in units of each and be paid for at the contract unit price per each. The price shall be full compensation for furnishing and installing; and for all labor, equipment, tools and incidentals necessary to complete the work.

1/2 inch RGS conduit shall be measured in units of linear ft. and be paid for at the contract unit price per linear ft. The price shall be full compensation for furnishing and installing; and for all labor, equipment, tools and incidentals necessary to complete the work.

Payment

Payment for electrical service and ½ inch RGS conduit work shall be made at the contract unit price under:

Item #	Pay Item	Pay Unit
NS-ITS-10060	Electrical Service	Each
NS-ITS-10065	½" RGS Conduit	Linear Ft.

Riser Assembly (08/09)

Description

The riser assembly shall provide for aerial access to the conduit in the ground, conduit entering a building and/or conduit entering a pole mounted cabinet.

Shop drawings detailing the riser assembly shall be submitted to the engineer for approval.

Materials

The assembly shall include weather head, rigid galvanized conduit riser, galvanized steel stand-offs, 2-hole conduit banding straps at 5 foot intervals, ¼ inch x 2 ½ inch hot dipped galvanized lag screws, condulet, hardware, and shall adhere to the Louisiana Standard Specifications for Roads and Bridges, current edition. See Traffic Signal and Installation Detail (TS-04) for additional details.

Construction Requirements

Conduit

Size of rigid galvanized conduit shall be as specified on the plans layout and/or facility connection details. When size is not specified on the plans contractor shall provide appropriated sized conduit. All conduits shall meet the National Electric Code (NEC) size requirements based on percent fill.

Rigid galvanized steel conduit (RGS) shall conform to ANSI C80.1 specifications.

Ends of RGS conduit shall be reamed after threads are cut. All ends shall be cut square and shall butt solidly in the joints to form a smooth raceway for cables.

Conduit joints shall be made in such a manner as to form a watertight seal. Conduit connections for RGS shall use threaded couplers and shall be sealed with a waterproof sealant. Coupling of new conduit to existing conduit shall be with a three-piece coupling. All conduit runs shall contain an equipment grounding conductor.

Threads shall be clean cut, straight and true and of sufficient length to permit full-depth coupling. Excessive threads will not be permitted. Ends of RGS conduit installed for future connections shall be threaded, reamed and capped. Couplings for RGS shall be tightened until the conduit ends are together. Damaged coatings in exposed threads shall be repaired in accordance with Subsection 811.12 of the Standard Specifications. Exposed threaded ends of conduit shall be terminated with an insulated-throat, ground-type bushing.

Bushings shall be installed in conduit where necessary for protection of the conductors. When the conduit is installed and wiring is to be done at a later date, the contractor installing the conduit shall perform the mandrel test, ream duct opening to remove burrs or foreign matter, thoroughly clean, and provide and install a weatherproof cap at each open end. This work is to be inspected and approved by the engineer.

The contractor may install larger size conduit at no direct pay. No reducing couplings will be permitted in a conduit run.

Core/Hole Wall Penetration

The core/hole wall penetration shall provide an entry point to install conduit into a building, facility, and/or cabinet.

Prior to installation, the contractor shall submit working plans for approval detailing the exact location of the wall penetration. The engineer and the designated representative from the facility are required to approve the exact location and method of creating the wall penetration prior to performing any work on the building, facility, or cabinet.

The contractor shall use commercial rated equipment rated to provide a hole through an exterior wall of the building, facility, or cabinet. Hole shall be clean, cylindrical, and free from debris. Hammer drills, jack hammers, and other crude methods of penetrating mason walls are not acceptable for this work.

The penetration shall be no greater than ¼ inch larger than the outside diameter of the rigid conduit to enter unless approved otherwise by the project engineer.

Upon installation of the rigid conduit through the exterior wall, the exterior hole shall be sealed around the conduit using NP1 sealant or approved equal. The use of a manufactured gasket shall be allowed only when both sides of the core/hole wall penetration are can be secured using pipe nuts to ensure the seal with the wall.

Measurement

The pole riser assembly shall be paid for at the contract unit price per each, completed and accepted. Measurement shall include furnishing and installing the riser assembly to an existing pole, weather head, rigid conduit, type "C" condulet, mounting hardware, supplementary hardware and all equipment, tools, labor and incidentals necessary to complete the work.

The building riser assembly shall be paid for at the contract unit price per each, completed and accepted. Measurement shall include furnishing and installing the riser assembly to an existing pole, rigid conduit, condulet, mounting hardware, supplementary hardware and all equipment, tools, labor and incidentals necessary to complete the work.

The core/hole wall penetration shall be paid for at the contract unit price per each, completed and accepted. Measurement shall include sealant, all equipment, tools, labor and incidentals necessary to complete the work.

Payment

Payment will be made at the contract unit price under:

Item #	Pay Item	Pay Unit
NS-ITS-10380	Pole Riser Assembly	Each
NS-ITS-10400	Building Riser Assembly	Each
NS-ITS-10420	Core/Hole Wall Penetration	Each

J hooks and Wire Raceway (08/09)

Description

This specification provides for furnishing and installing open-top cable supports and wire raceways. The work shall be in accordance with the plans, the 2006 Louisiana Standard Specifications for Roads and Bridges, these specifications, and as directed by the engineer.

Shop drawings detailing the open-top cable supports and wire raceways shall be submitted to the engineer for approval.

Materials

Herein, J hooks shall be understood to mean an open-top cable support whether of the hook type or tray type. J hooks shall provide proper support for Category 5 and Category 6, fiber optic drop cables, innerduct, and/or any communications cables or low voltage cable. J hooks shall be UL and C-UL listed and meet NEC and EIA/TIA requirements for structured cabling systems. Materials for construction shall be galvanized steel or approved equal corrosion resistant finish capable of providing smooth cable pull.

Construction Requirements

Where building codes permit telecommunications cables to be placed in suspended ceiling spaces without conduit, ceiling zone distribution pathways may consist of:

- Cable trays
  - Cable tray shall provide continuous support for cables throughout the wire run.
- J hooks
  - J hooks should be located 1.52 m (5 ft) apart at the maximum to adequately support and distribute the cable's weight. The manufacturer's specifications for cable loading shall be followed unless approved otherwise in writing by the engineer.
- Wire raceway
  - Wire raceways shall be extruded one-piece single hinged, flame resistant PVC of adequate size to contain the required cable. Wire raceway shall be of similar color to surrounding surface. Method of mounting shall be approved by the engineer as well as the representative of the agency owning the local facility.

Cable support devices that have a small surface area to support the cable lying horizontally inside or on top may have a detrimental effect on the transmission performance of higher performance cabling systems.

If possible, a wider surface area should be chosen to support the cable as a precaution against potential problems. Another precaution would be to reduce the distance between the support devices.

Suspended cables must be installed with at least 76 mm (3 in) of clear vertical space above the ceiling tiles and support channels (T-bars).

Communications System Integration (08/09)

Description

This specification section details the requirement of communication system integration. The contractor is required to assemble and install all necessary material and equipment and to furnish a complete and operational ITS in accordance with these plans, specifications, and as directed by the engineer. All items that are required to complete the installation shall be secured by the contractor.

Also included in this item are the software and any required hardware for the control and programming of field devices and all appurtenances required for the system in accordance with plan details, specifications, and as directed by the engineer.

Materials

The component of the Intelligent Transportation System described by this specification shall consist of the following:

- Communications system integration

Construction Requirements

The contractor shall obtain the necessary technical and engineering assistance from the manufacturer of the individual field devices to insure that all components of the ITS operate and function as specified and intended.

The integration of each of the aforementioned systems is one of the most critical aspects of this project. As part of this contract, the contractor shall be required to attend a pre-construction meeting as well as developmental meetings throughout the course of this project. An approval meeting shall be held upon completion. Close coordination by the contractor, with the Department, during the system integration phase is required. The contractor is herein required to fully integrate the previously mentioned systems into a fully functional and operational ITS as called for in these plans and specifications and as directed by the engineer.

The contractor shall obtain the necessary technical and engineering assistance from the manufacturer of the individual field devices to ensure that all components of the system operate and function as specified and intended. At a minimum, the contractor shall provide the following:

- Establish fully functional and tested wireless Ethernet links between facilities
- Establish a fiber optic cable infrastructure tested and ready for future connection between centers
- An advance drawbridge status system.
    - The flashing beacon assembly on the drawbridge status sign sites shall be activated when the either and/or both drawbridge operators activates the bridge controls to raise/swing-open the drawbridge.

- The flashing beacon assembly on the drawbridge status sign sites shall be deactivated when the either and/or both drawbridge operators activates the bridge controls to lower/swing-close the drawbridge.
- The flashing beacons assemblies shall remain flashing as long as one of the two bridges is in the raised/swung-open position.
- The flashing beacons assemblies shall remain off when neither of the two bridges is in the raised/swung-open position.
- The activation of the flashing beacon shall produce the same contact closure connection in the DOTD Subdistrict 02 Maintenance office/TMC as produced at the drawbridge status signs.

System Integration Test (SIT)

The following criteria define the System Integration Testing:

Purpose

The System Integration Test (SIT) is performed in order to demonstrate that the energized ITSystem is fully operational in accordance with the plan detail, specifications, and as directed by the engineer. The test will verify that the sites are integrated so that the ITSystem is operable. The primary purpose is to ensure that ITSystem components are installed, integrated, and functionally operational meeting all requirements and specifications.

The SIT is a validation that all installed equipment and material operate as per their defined functionality in the field and in the networking environment, i.e., the ITSystem is fully operational.

Test Approach

The contractor shall develop a System Integration Test plan following a step-by-step test script that will demonstrate the functionality of the ITSystem. Specification sections and manufacturers specific features shall be referenced by the test script. The test script shall contain written procedures so as to demonstrate each feature of the ITSystem. The test script shall be optimized to accomplish the maximum level of testing with the fewest steps (tasks). The script shall contain step numbers, space for a date, time, pass/fail designation, and comment along with the task. The test script shall be delivered to the engineer for review and approval at least ten (10) working days' prior to the start of the test.

The engineer and other designated principals will witness the testing. The results of each test step in the script shall be assessed using pass/fail designators. The SIT is successful when the criteria have been met successfully. Once all sites are commissioned as detailed above and the test reports are approved by the engineer, the ITSystem will be deemed commissioned.

The contractor shall have on site during the SIT testing all applicable documentation concerning the devices being tested.

The following criteria shall be met before test entry and upon successful completion of the SIT:

Entry Criteria

- The Commissioning Test has been approved.
- The contractor has inspected and tested ITSystem for operational anomalies.
- The SIT plans have been approved by the engineer.
- The contractor shall provide all material, software, and hardware to conduct the test.
- The contractor shall provide all material, vendor and/or proprietary software and hardware for the test.
- The contractor shall include all vendor documents for the test.

Exit Criteria

- Each SIT script procedure activity has been evaluated via a pass/fail designator.
- The contractor has provided the engineer the results of the SIT and a course of action for resolving any anomalies.
- All discrepancies, inconsistencies, shortages, and failures to meet the ITSystem requirements and specifications have been identified, documented, and have a resolution, and/or agreed-upon schedule of resolution.
- In the event of a requirement deficiency, discrepancies, inconsistencies, shortages, and/or failures requiring repair or replacement of an ITSystem component, the engineer may require a repeat test by revisiting the applicable script.

Upon successful completion of all criteria, the engineer may grant SIT acceptance and, hence, Partial Acceptance of the ITSystem. Six (6) copies of the SIT Report shall be submitted to the engineer within 15 calendar days of the SIT acceptance for approval. The report shall contain the results of the SIT and a problem-tracking list for all deficiencies identified in the test along with a resolution schedule.

Inspection Testing

The contractor shall furnish the instruments, wiring, labor, and incidentals necessary to perform the required tests and adjustments for electrical/electronic systems and equipment. Upon completion of the SIT test, systems and equipment shall be in satisfactory working order. Adjustments or replacements necessary to accomplish this shall conform to the requirements specified herein. All tests shall be performed in the presence of the engineer. The engineer shall be notified in writing two weeks in advance of any scheduled test. Test results shall be submitted to the engineer prior to energization of equipment. Six (6) copies of each test report shall be provided to the engineer within fifteen (15) calendar days after the performance of each test. Tests shall be signed by the contractor and shall include the date and time of testing.

The following installation tests shall be performed after the contractor's equipment has been installed to ensure that the equipment has not been damaged or has failed in shipment or storage and that it has been properly installed and is operating as designed. The installation tests shall be performed by the contractor. The installation tests shall include but not be limited to the following:

- Receptacle Tests: After completion of the electrical system, the contractor shall test each receptacle for proper polarity and continuity of the ground.
- Special Tests: The contractor shall conduct special tests when equipment or systems are suspected of improper operation, or when additional data is necessary to determine proper operation.
- Insulation Tests: The contractor shall conduct megohm tests on all AWG #10 and larger conductors. Tests shall be made after the conductors are installed and before connecting equipment that may be damaged by the tests. Readings below 50 megohms, when measured with a 1000 volt DC insulation tester will be considered defective.
- Fiber Optic and Power Tests: as required elsewhere in these specifications.

ITSystem Burn-In (Demonstration Period)

The ITSystem shall be warranted against any and all defects in materials and workmanship.

Upon Partial Acceptance, the contractor shall maintain the ITSystem for a minimum ninety (90) continuous calendar day Demonstration Period. The contractor shall be responsible for all maintenance and repairs of the ITSystem during the Demonstration Period in accordance with the following requirements:

- On or before the Partial Acceptance of the Work, contractor shall submit a maintenance plan, as detailed in the Extended Maintenance Agreement, and schedule of maintenance events to the Department for approval that delineates the strategy that the contractor shall use to perform preventive, general, and emergency maintenance and monthly reporting. Monthly reports shall document status during demonstration period(s) and note all replacements and repairs. The Department will use this plan to conduct quality assessment reviews of the contractor's compliance with these Specifications.
- Contractor shall maintain a formal procedure to document the configuration of the as-built ITSystem, which shall include maintaining as-built drawings and other documentation of the actual location and arrangement of all hardware installed on the ITSystem, records, and copies of software (compiled and source code) used for programming the ITSystem field devices. Provisions shall be made to accommodate changes to the ITSystem both during (monthly) and after construction.
- Contractor shall routinely inspect each component of the ITSystem and perform all preventive maintenance on all ITSystem equipment at monthly intervals. However, if the manufacturer's instructions applicable to any such piece of equipment requires a specific schedule of preventative or required maintenance either as a method of maintaining the manufacturer's warranty for such equipment, or as a suggested maintenance schedule, preventive maintenance required hereunder shall be performed as frequently as required or suggested by the maintenance instructions provided by the manufacturers of the various pieces of equipment installed on the ITSystem.
- Preventive maintenance shall be performed during normal business hours, not during the traffic peak hours. The peak hours are defined as 6:00 A.M. to 8:30 A.M. and 3:30 P.M. to 6:00 P.M., Monday through Friday.

- The contractor shall be responsible for providing all spares needed to maintain the ITSystem during the Demonstration Period.
- Contractor shall perform all repairs and emergency maintenance to the ITSystem as breakdowns or malfunctions occur. Contractor shall be available on a twenty-four (24) hour per day, seven (7) day per week basis to respond to, and shall respond on-site to, requests for emergency repairs and/or restoration of service that adversely affects the operation of the ITSystem within twenty four (24) hours after notification by Department or identification by the contractor that repairs or service are necessary. Repairs and/or restorations of service shall be completed as soon as possible, but in no event later than forty eight (48) hours after notification or identification by the contractor that repairs or service are necessary.
- Any ITSystem Site that cannot be repaired within the required time period shall be reported to Department's dispatcher and the on-duty police supervisor as soon as possible. The verbal reports shall be followed within twenty-four (24) hours by a written report to the Department indicating the reason for the outage and the estimated date the affected site will return to service.
- Contractor agrees to pay stipulated damagers, which shall be deducted from amounts to the Contractor under the contract for each separate instance of its failure to provide emergency maintenance or repairs within the time requirements listed above according the following:
    - Six hundred twenty-five ($625.00) dollars for contractor's failure to respond on-site to requests for emergency repairs and/or restoration of service that adversely affects the operation of the ITSystem within twenty four (24) hours after notification by Department or identification by the contractor that repairs or service are necessary, plus an additional six hundred twenty-five ($625.00) dollars for each two (2) hour period (or any portion thereof) after the initial two (2) hour period until the contractor so responds, and,
    - Six hundred twenty-five ($625.00) dollars for contractor's failure to complete repairs and/or restoration of service within forty eight (48) hours after notification or identification by the contractor that repairs or service are necessary, plus an additional six hundred twenty-five ($625.00) dollars for each four (4) hour period (or any portion thereof) after the initial four (4) hour period until the contractor so completes.

Successful completion of the Demonstration Period will occur at the end of ninety (90) continuous calendar days of operation without ITSystem failure attributable to software or hardware. That is, should the ITSystem operate successfully for any period less than the complete, continuous ninety (90) calendar days and then crash, it would then have to operate successfully for a new demonstration period of ninety (90) consecutive calendar days to complete a successful Demonstration Period.

ITSystem failure is defined as a condition under which the ITSystem is unable to function as a whole or in significant part to assist the traveling public as designed. While a single component failure may not constitute an ITSystem failure, chronic failure of that component or component type or subsystem may be sufficient to be considered an ITSystem failure. General communication failure due to hardware or software is considered an ITSystem failure in any case. Communication failure due to a minor component may not be an ITSystem failure. Faults affecting all of an area or type of component are ITSystem failures.

Specifically exempted are failures caused by acts of God or external forces beyond the control of the contractor.

The Department will advise the contractor in writing when it considers that an ITSystem failure has occurred or chronic failure exists.

The warranty for the ITSystem shall provide that in the event of a malfunction during the Demonstration Period, the defective component, card, module, subassembly or auxiliary device shall be replaced with a working component within the time limits stated above.

Any component of the ITSystem which, in the opinion of the Department fails three or more times prior to the expiration of the demonstration, shall be judged as unsuitable and with the Department approval, shall be replaced by the contractor at his expense with a new component of the same type. The unsuitable component shall be permanently removed from the ITSystem.

All diagnosis and repair during the Demonstration Period shall be performed by a qualified, authorized representative of the manufacturer of the respective equipment. The contractor shall furnish a letter to the Department signed by the equipment manufacturer designating the authorized representatives of the equipment manufacturer whom will be used by the contractor to perform warranty and maintenance work.

Contractor shall warrant:

- That all services performed hereunder shall conform to the requirements of this contract and shall be performed by qualified personnel in accordance with the highest professional standards;
- That all items furnished hereunder shall conform to the requirements of the contract documents and shall be free from defects in design materials and workmanship; and
- That he has ownership and/or marketing rights for all items provided pursuant to the contract documents.

There shall be no maintenance charges during the Demonstration Period. The contractor shall agree that he shall at his own expense, provide all labor and parts required to remove, repair or replace, and reinstall any such defective workmanship and/or materials which becomes or is found to be defective during the Demonstration Period.

Upon successful completion of the Demonstration Period as defined herein, the engineer may issue a final acceptance of the ITSystem.

Manufacturer's Warranties

All ITS equipment including but not limited to wireless communication radios, antennas, contact closure fiber transceivers and flashing beacon assemblies shall have a minimum manufacturer or vendor's standard warranty of one (1) year or as specified in each specific ITS equipment section of this document. This manufacturer or vendor's standard warranty shall cover all components, cards, modules, subassemblies or auxiliary devices of each particular ITS device in full. The manufacturer's standard warranty shall begin upon partial acceptance of the ITSystem.

The contractor shall transfer and assign to the Department all of its rights under any and all warranties, guaranties, and any similar provisions from the manufacturer's or vendor of the ITSystem or any component part or equipment thereof and shall take all steps necessary to ensure that said manufacturer or vendor recognizes the Department as a beneficiary of any such warranty, guaranty, etc.

Warranties are required in a number of locations herein and the contractor shall provide documentation to the Department to that effect.

Measurement

Communications system integration will be measured per lump sum and will include providing all labor, equipment, materials, and incidentals required for the furnishing and installation of communications system integration as detailed in the plans and as described in the specifications. Included in this item is the establishment of a complete and operational ITS as described and all work, equipment, and appurtenances as required to effect the full operation and control of communications system integration complete in place and ready for use.

Payment

Payment for communications system integration work shall be made at the contract unit price under:

Item #	Pay Item	Pay Unit
NS-ITS-12000	Communications System Integration	Lump Sum

Documentation (08/09)

Description

Documentation shall be supplied for all equipment and components of the ITSystem. The manuals supplied for hardware, peripherals, and modems shall be from the original source. The manuals shall be comprehensive, easy to use and understand, and completely descriptive of the product.

The contractor shall furnish the Department ten (10), bound, loose-leaf copies of a booklet, 8-1/2 inches x 11 inches in size, containing descriptive leaflets and drawings as described in this section. These booklets shall also be furnished on Department approved electronic media in an approved format. This booklet shall include catalog numbers indicated, printed or typewritten statements prepared by the equipment manufacturer covering the proper method of adjusting and otherwise maintaining each item, a concise statement of the necessary operating functions in proper sequence, a detailed description of the functions of each item in connection with the various operating steps and reduced copies of conduit and wiring diagrams. The booklet shall designate each wire and item of equipment by the numbers and symbols used on the drawings.

Materials

The component of the documentation required for the intelligent transportation system described by this specification shall consist of the following:

A manual containing a general description and detailed operating and installation instructions shall be provided for each different type or model of equipment. This manual shall also contain instructions for possible modification to the equipment within the capability of the equipment. Ten (10) copies of the manual shall be provided for each model of equipment.

Manuals for the following shall be provided in hard copy format and on Department approved electronic media:

- Programming
- Integration of the systems
- Interfaces
- Operations manual

Manuals for all equipment shall contain the following:

- Technical descriptions
- Operating instructions
- Theory of operation
- Detailed schematic diagrams
- Assembly drawings
- Wiring diagrams

- Troubleshooting procedures to assist the maintenance staff in the identification and isolation of malfunctions
- Parts list

Construction Requirements

The contractor shall be required to provide all necessary manuals, drawings, diagrams and other documentation as detailed in this specification system.

Maintenance Procedures Manuals

A manual containing detailed preventive and corrective maintenance procedures shall be provided for each different type or model of equipment. Systematic field and bench trouble shooting procedures shall be included, as shall normative waveforms and test voltages as applicable. A detailed parts list shall be included. For each part, its circuit or pictorial identifications shall be shown, as shall all necessary rating information and a manufacturer and associated model or part number. The list shall also include cross-references to parts numbers of other manufacturers who make the same replacement part. Ten (10) manuals shall be provided for each model of equipment.

Equipment Assembly Drawings

A pictorial drawing showing the physical location and identification of each component shall be provided for each different electronic assembly and each different subassembly of each assembly. These drawings shall be included in the maintenance procedure manuals.

Cabinet and Rack Wiring Diagrams

A wiring diagram shall be provided for each different cabinet, equipment rack, junction box containing wire terminals, and twisted wire pair cable termination box identified by location. If the diagrams are in manual form, ten (10) manuals shall be provided for each distinct cabinet and equipment rack. Drawings shall be in the form of mylars, with two such mylars provided for each distinct type of cabinet, rack, junction box, and twisted wire pair cable termination box. If the same diagram serves more than one location, it shall be labeled with all appropriate locations. If a set of drawings is provided, each serving more than one location, a separate mylar shall be included that shows a cross index by location and drawing.

Electrical Schematic, Wiring, and Logic Diagrams

An electrical schematic, wiring diagram and a logic diagram shall be provided for each different type or model of equipment supplied by the contractor. A stage-by-stage explanation of the circuit theory shall be provided with the circuit wiring diagrams. If the diagrams are in manual form, ten (10) manuals shall be provided for each distinct model of equipment. Drawings shall be in the form of mylars, with two such mylars provided for each distinct model of equipment. If the same diagram serves more than one location, it shall be labeled with all appropriate locations. If a set of similar drawings is provided, each showing more than one location, a separate mylar shall be included that shows a cross-index by location and drawing.

Schematic wiring diagrams of all electrical components and electronic circuit board schematic diagrams of all electronic components shall also be provided to the Department.

ITSystem Connection Diagrams

Connection diagrams for the entire ITSystem, including block diagrams, terminal numbers, and conductor and fiber color codes for the work performed by the contractor, shall be cross referenced to correlate with existing wiring diagrams and shall be addenda thereto. Two mylars of each drawing shall be furnished.

Wiring Diagrams

Each ITS field equipment site shall be furnished with a complete set of reproducible wiring diagrams. An instruction card laminated in plastic shall be included in each ITS cabinet.

As-Builts

As-Built plan sheets shall be accepted by the engineer. The As-Built plans shall include the fully inclusive plan set as provided by DOTD with markups clearly identifying the "as installed" condition. As-builts shall be submitted in full size (36 inch x 22 inch) on bond and in electronic format, scanned to PDF or approved equal. Color scans may be required if reproductions from the electronic file are illegible. In addition to the plan layouts, As-Builts shall also include the following:

- Communication equipment configuration settings/diagrams
- Network diagrams
- Fiber allocation diagrams
- Specifications catalog
- Final approved ITS field equipment shop drawings

The specifications catalog shall use 3-ring binders with all the manufacture specifications and/or shop drawings for the specific make/model of the ITS field equipment site components, ITS System Components, vendor software, communications plant, power components, and general electrical components installed and/or integrated with as part of this Project. Sheet sizes are limited to 8.5 inch x 11 inch or 11 inch x 17 inch (tri-folded with title block to the top). The specifications catalog shall refer back to the As-Built Plans for each applicable location of installation.

The contractor shall prepare an electronic file, whether Microsoft Excel 2002 or later spreadsheet, ESRI ArcView GIS shape file or approved equal, containing all ITS field equipment poles, cabinets, power sources, and pullbox location latitude and longitude coordinates in NAD 83. Required latitude and longitude coordinates shall be obtained closest to center of the element as possible with handheld device accuracy (within 10 feet of actual). The electronic file shall be provided with the As-Built Plans.

Measurement

Wiring diagrams will be measured per lump sum and will include providing all wiring diagrams as described in the specifications. Included in this item is the documentation in hard copy(ies) and electronic format.

Equipment assembly drawings will be measured per lump sum and will include providing all equipment assembly drawings as described in the specifications. Included in this item is the documentation in hard copy(ies) and electronic format.

Cabinet & rack wiring diagrams will be measured per lump sum and will include providing all cabinet and rack wiring diagrams as described in the specifications. Included in this item is the documentation in hard copy(ies) and electronic format.

Electrical schematic, wiring, & logic diagrams will be measured per lump sum and will include providing all electrical schematic, wiring, and logical diagrams as described in the specifications. Included in this item is the documentation in hard copy(ies) and electronic format.

ITS connection diagrams will be measured per lump sum and will include providing all ITS connection diagrams as described in the specifications. Included in this item is the documentation in hard copy(ies) and electronic format.

As-Builts will be measured per lump sum and will include providing all As-Build plans and supporting documentation as described in the specifications. Included in this item is the documentation in hard copy(ies) and electronic format.

Basis of Payment

Payment for documentation shall be made at the contract unit price under:

Item #	Pay Item	Pay Unit
NS-ITS-13100	Wiring Diagrams	Lump Sum
NS-ITS-13120	Equipment Assembly Drawings	Lump Sum
NS-ITS-13140	Cabinet & Rack Wiring Diagrams	Lump Sum
NS-ITS-13160	Electrical Schematic, Wiring, & Logic Diagrams	Lump Sum
NS-ITS-13180	ITS Connection Diagrams	Lump Sum
NS-ITS-13200	As-Builts	Lump Sum

Flasher Assembly (08/09)

Description

This Item consists of furnishing and installing a flasher assembly and all appurtenances required for the ITS in accordance with plan details, the Louisiana Standard Specifications for Roads and Bridges, these specifications, and as directed by the engineer.

For the purposes of this specification, the terms: flashing beacon controller, flashing beacon assembly, flasher assembly, flash controller, flashing switch assembly, flashing beacon controller apparatus and flash controller apparatus shall mean one in the same.

Materials

All equipment shall be new and constructed using the highest quality, commercially available components and techniques to assure high reliability and minimum maintenance. The contractor shall submit, prior to installation hardware installation diagrams and a complete set of shop drawings of all the equipment and components listed below and included as part of the installation.

The system shall consist of the following major components:

- Flashing Beacon Controller Apparatus

Construction Requirements

The contractor shall assemble and install all necessary material and equipment and furnish a working flashing beacon assembly activated by contact closure input in accordance with these plans and specifications and compatible with the requirements of the ITS System. All items that are required to complete the installation shall be secured by the contractor whether listed above or not. The contractor shall properly configure and deliver a working contact closure system. The contractor shall determine the final configuration of all electrical connections. Electrical connections may vary slightly from those shown on the plans, as field conditions dictate as being necessary.

This specification details the flasher assembly that shall be furnished by the contractor for use on this project. Any component not mentioned in this specification that is required for the functionality of the system shall be provided the contractor.

Flash Controller

The flashing switch assembly specified herein shall operate on 110-130 volt, 60 cycle, alternating current, and shall be delivered completely wired and enclosed in a weatherproof cabinet. The flasher shall meet NEMA standards for a two-circuit flasher rated at 15 amps per circuit (Type 3).

These specifications define solid-state flashers that are used to periodically interrupt a source of alternating-current line power for the purpose of providing flashing traffic signals and flashing beacons. For the purpose of these specifications, the term "solid state" shall be defined as the main current to the signal load is not switched by electro-mechanically operated contacts.

The flasher shall be certified by an independent laboratory as conforming to NEMA TS-1, Section 8, and Section 2.2.3.2. This certificate shall be included with the drawing and literature for this equipment.

Flasher Characteristics

Flashers shall have the following physical characteristics:

A. The overall dimensions of the flasher shall not exceed 8.25 inches from the mating connector, including any handle or gripping device. The flasher shall be no more than 4.2 inches high.

B. Intermate with a Cinch-Jones socket type S-406-SB or approved equal.

C. Be so constructed that its lower surface will be no more than 2.1 inches below the centerline of connector configuration.

D. Be so constructed that no part of it will extend more than 0.9 inches to the left and 1.1 inches to the right of the centerline of connector pin configuration as viewed from the front.

E. Be so constructed that personnel inserting or removing the module will not be exposed to live parts nor be required to insert either their hands or fingers into a load rack.

F. All printed circuit (PC) boards shall be made from NEMA (FR-4) glass-epoxy, or equivalent (See NEMA Standards Publication No. LI 1-1971). Circuit boards exceeding 2 inches in any dimension shall have a nominal thickness of at least 1/32 inches.

All PC boards shall be coated with an epoxy or approved equal type material to prevent erratic performance due to high humidity, condensation, and growth of fungus and mildew. This coating will not cover the components on the board, but once the components are in place, the soldered joints shall be covered with moisture and fungus proof, clear type of acrylic lacquer. This coating shall not be injurious to the board or components and shall not interfere with the repair of the circuitry or replacement of components. The walls of all plated through holes shall have a minimum copper plating thickness of 0.001 inches. All circuit tracks shall have conductivity equivalent to at least 2 ounces per square foot of copper (2 oz/ft^2 Cu).

All electrical mating surfaces shall be made of non-corrosive material. The unit shall be designed so that each component is identified by a circuit reference symbol. This identification may be affixed to the printed circuit boards, the cover of the unit or in an assembly drawing provided with the unit.

Back Panel Characteristics

The manufacturer shall mount a back panel in the cabinet and shall have mounted on it cartridge type fuse, connector for NEMA Type 3 flasher, flasher support bracket, and permanently identified field terminals. The back panel size shall be 9 inches wide and 12 inches high. The manufacturer shall have the back panel constructed of ¼ inch electrical grade masonite. The panel shall have four (4) mounting holes approximately 11/32 inch in diameter. The holes shall be centered on an 8 inch x 9 inch bolt pattern. The bolt pattern shall be centered on the back panel. The back panel shall support the NEMA flasher from the panel along its longest dimension. The support shall not restrict removal or installation of the flasher unit on the back

panel while the panel is in the cabinet. All wiring shall be on the front of the panel. The field terminals shall have wired to it only the circuits from the field.

Electrical Characteristics

Flashers shall have the following electrical characteristics:

A. Flash controller apparatus must accept contact closure input to activate and deactivate the flashing beacons.

B. The rating of the output circuit shall be the minimum rating for a tungsten lamp or gas-tuning transformer load over a voltage range of 60 to 135 volts at 60 hertz. The output circuit shall not be de-rated for the operation over the ambient range of -30 degrees to +165 degrees F.

C. Input to the solid-state flashers shall consist solely of the 60-hertz alternating-current power source. This input shall supply the power for the output circuit and also provide power to the flasher logic. The flasher shall turn on within 5 degrees of the zero voltage point of the alternating current line sinusoid and shall turn off within 5 degrees of the zero current point of the alternating-current line sinusoid. The flasher need not turn on within 5 degrees of the zero point of the alternating-current sinusoid for the first flash cycle (on-off cycle) after the initial application of alternating-current power to the flasher.

D. The "flashing" voltage output shall provide not less than 50, nor more than 60, flashes per minute with an on period of 50 $\pm$ 5%.

E. The flasher output shall have a dv/dt rating of 100 volts per microsecond at 70 degrees F.

F. The flasher output shall have a peak standoff voltage of 480 volts or greater at 70 degrees F.

G. The output current from the flasher through the load, when the flasher is in the off state, shall not exceed a maximum of 15 milliamperes rms.

H. The flashing output shall consist of two (2) outputs each rated at 15 amperes.

I. Flashers shall be so designed that circuit #1 will be essentially ON when circuit #2 is OFF, and vice-versa. The principal purpose served by this arrangement is to smooth out the loading on the power source. The maximum OFF period when both circuit #1 and circuit #2 are OFF, or the maximum ON period when both circuit #1 and circuit #2 are ON, shall not exceed 17 milliseconds during the transition from OFF to ON to OFF.

J. The line power shall be fused with NON 0-30 amp fuse. This fuse shall be sized properly for the load limit of the flasher. The wiring shall be properly sized for the design current of each circuit. Separate terminals for the line and field neutral shall be provided.

K. Lightning protection shall be provided for line input and each signal circuit. A gas filled fuse shall be across the line input on the load side of the fuse. It shall be capable of clamping input voltage at 350 volts. A MOV shall be on each signal circuit and provide a minimum clamping voltage of 395 volts and dissipate 30 joules of energy (GE - V150LA10A or approved equal).

L. All electrical connectors shall be insulated from the back panel at a 600 VAC rating.

Literature

One complete set of literature shall be furnished with the unit. The literature shall include, as a minimum, the following information: parts list, operating instructions, wiring diagrams complete with (when appropriate) waveform data, peak voltage data, and schematic diagrams.

Submittal

Contractor shall provide product submittal to the engineer for approval prior to ordering equipment. Contractor shall also submit mounting methods to mast arms as required for the project to the engineer for approval.

Required Testing

The following criteria define Commissioning Testing:

1. Purpose

   Commissioning testing is performed for each site using a flasher assembly. The primary purpose is to ensure that the installed site components operate in a local environment and meet all requirements' definitions and specifications.

   The Commissioning testing is a validation that all site installed equipment and material function as according to the manufacturer's specification and the technical requirements and specifications contained herein.

2. Test Approach

   The contractor shall develop a Commissioning Test plan following a step-by-step test script that shall demonstrate that all the site components and features are installed and operate correctly. The test script shall reference specification sections and manufacturers specific features. The test script shall be optimized to accomplish the maximum level of testing with the fewest steps (tasks). The script shall contain step numbers, space for a date, time, pass/fail designation, and comment along with the task. The test script shall be delivered to the engineer for review and approval at least fourteen calendar days prior to the start of the test.

   The contractor shall provide to the engineer for approval prior to Commission Testing, an overall test plan demonstrating quality control procedures.

   The engineer and other designated principals will witness the testing to provide quality assurance. The results of each test step in the script shall be assessed using pass/fail designators. At the successful completion of each commissioning test for a particular site, the site will be deemed commissioned.

   The contractor shall have on site during the commissioning testing, all applicable documentation concerning the devices being tested and used.

Commission Test Entry and Exit Criteria

The following criteria shall be met before test entry of each site and completion of the Commission Test:

1. Entry Criteria
   - The contractor has installed all required site components.
   - The Quality Control plan has been approved by the engineer.
   - The contractor has inspected and tested sites for operational anomalies.
   - The Commissioning Test Plan has been approved by the engineer.
   - The contractor shall have all vendor documentation and all vendor and/or proprietary software and hardware ready for validating the site installed components.
   - Preliminary as-built plans have been submitted and approved.
2. Exit Criteria
   - Each commission test activity has been evaluated via a pass/fail designator.
   - The contractor has provided the engineer data showing the results of the commissioning test and a course of action for resolving any anomalies.
   - All equipment and material discrepancies, inconsistencies, shortages, and failures to meet the project requirements and specifications have been identified, documented, and have a resolution, and/or agreed-upon schedule of resolution.
   - In the event of a requirement deficiency requiring repair or replacement of an component, the engineer may require a repeat test by revisiting the applicable script.

Six (6) copies of the commissioning test results shall be submitted to the engineer within 15 calendar days of test completion for approval. The contractor can commence with energizing the site using the flasher assembly only after written approval notification is received from the engineer.

Measurement

Flasher assembly shall be measured in units of each and be paid for at the contract unit price per each. The price shall be full compensation for furnishing and installing; and for all labor, equipment, tools and incidentals necessary to complete the work.

Payment

Payment for flasher assembly will be made at the contract unit price per each under:

Item No.	Pay Item	Pay Unit
NS-ITS-14000	Flasher Assembly	Each

STATE OF LOUISIANA
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

CONSTRUCTION PROPOSAL INFORMATION FOR

FEDERAL AID PROJECT

STATE PROJECT NO. 737-55-0003
HOUMA ITS DEPLOYMENT – PHASE 3
TERREBONNE PARISH

BID BOND

A Bid Bond is required when the bidder's total bid amount as calculated by the Department in accordance with Subsection 103.01 is greater than $50,000. *(See Section 102 of the Project Specifications.)*

_____, as Principal (Bidder) and _____, as Surety, are bound unto the State of Louisiana, Department of Transportation and Development, (hereinafter called the Department) in the sum of five percent (5%) of the bidder's total bid amount as calculated by the Department for payment, of which the Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, as solidary obligors.

Signed and sealed this _____ day of _____, 20_____.

The condition of this obligation is such that, whereas the Principal has submitted a bid to the Department on a contract for the construction of **STATE PROJECT NO. 737-55-0003, FEDERAL AID PROJECT NO. 5505(503), HOUMA ITS DEPLOYMENT – PHASE 3, located in TERREBONNE PARISH,** if the bid is accepted and the Principal, within the specified time, enters into the contract in writing and gives bond with Surety acceptable to the Department for payment and performance of said contract, this obligation shall be void; otherwise to remain in effect.

_____	_____
Principal (Bidder or First Partner to Joint Venture)	If a Joint Venture, Second Partner
By _____	By _____
Authorized Officer-Owner-Partner	Authorized Officer-Owner-Partner
_____	_____
Typed or Printed Name	Typed or Printed Name

_____
Surety

By _____ (Seal)
Agent or Attorney-in-Fact

_____
Typed or Printed Name

To receive a copy of the contract and subsequent correspondence / communication from LA DOTD, with respect to the bid bonds, the following information must be provided:

_____	_____
Bonding Agency or Company Name	Address
_____	_____
Agent or Representative	Phone Number / Fax Number

07/07
Form CS-2A

Louisiana Department of Transportation and Development

Proposal Schedule of Items **Page: 1**

Contract ID: 737-55-0003 **Project(s):** 737-55-0003

SECTION: 1 General Items

Proposal Line Number	Item ID	Description Unit Price (In Words, Ink or Typed)	Approximate Quantity	Unit of Measure
0001	202-01-00100	Removal of Structures and Obstructions		LUMP SUM
		_____		Dollars
		_____		Cents
0002	706-03-00100	Incidental Concrete Paving (4" Thick)	15.000	SQYD
		_____		Dollars
		_____		Cents
0003	713-01-00100	Temporary Signs and Barricades		LUMP SUM
		_____		Dollars
		_____		Cents
0004	727-01-00100	Mobilization		LUMP SUM
		_____		Dollars
		_____		Cents
0005	729-01-00100	Sign (Type A)	56.000	SQFT
		_____		Dollars
		_____		Cents
0006	730-04-00200	Jacked or Bored Casing (6" Diameter) (PVC/HDPE)	4,310.000	LNFT
		_____		Dollars
		_____		Cents
0007	736-01-00100	Trenching and Backfilling	9,950.000	LNFT
		_____		Dollars
		_____		Cents
0008	736-03-00200	Jacked or Bored Conduit (2" HPDE, Sch 80)	5,730.000	LNFT
		_____		Dollars
		_____		Cents

Contract ID: 737-55-0003 **Project(s):** 737-55-0003

SECTION: 1 General Items

Proposal Line Number	Item ID	Description Unit Price (In Words, Ink or Typed)	Approximate Quantity	Unit of Measure
0009	736-04-02000	Signal Support (Pedestal Pole)	1.000	EACH
				Dollars
				Cents
0010	736-04-03080	Signal Support (30' Steel Strain Pole)	3.000	EACH
				Dollars
				Cents
0011	736-05-01020	Signal Heads (1 Section, 12" Led Lens, Y)	8.000	EACH
				Dollars
				Cents
0012	736-10-00500	Underground Junction Box (Type H)	13.000	EACH
				Dollars
				Cents
0013	736-11-00300	Conduit (2" HDPE, Schedule 80)	16,365.000	LNFT
				Dollars
				Cents
0014	740-01-00100	Construction Layout		LUMP SUM
				Dollars
				Cents
0015	NS-ITS-04000	Fiber Optic Marker	53.000	EACH
				Dollars
				Cents
0016	NS-ITS-04010	Pulling Fiber Optic Cable Through Existing Conduit	2,810.000	LNFT
				Dollars
				Cents

Contract ID: 737-55-0003 **Project(s):** 737-55-0003

SECTION: 1 General Items

Proposal Line Number	Item ID	Description Unit Price (In Words, Ink or Typed)	Approximate Quantity	Unit of Measure
0017	NS-ITS-04020	Fiber Optic Cable, SM, Furnish & Install, 13-48 Fibers	11,650.000	LNFT
		_____		Dollars
		_____		Cents
0018	NS-ITS-04035	Fiber Optic Fan Out Kits, SM, 12 Strand, Furnish & Install	24.000	EACH
		_____		Dollars
		_____		Cents
0019	NS-ITS-04180	Fiber Optic Connection, Install, Splice	107.000	EACH
		_____		Dollars
		_____		Cents
0020	NS-ITS-04200	Fiber Optic Connection, Termination, Furnish & Install	99.000	EACH
		_____		Dollars
		_____		Cents
0021	NS-ITS-04250	Fiber Optic Drop Cable, SM, 12 Strand, Furnish & Install	2,150.000	LNFT
		_____		Dollars
		_____		Cents
0022	NS-ITS-04255	Fiber Op Drop Cable, SM, 12 Strand (Plen), Furnish & Install	10,695.000	LNFT
		_____		Dollars
		_____		Cents
0023	NS-ITS-04270	Fiber Op Drop Cable, SM, 24 Strand (Plen), Furnish & Install	175.000	LNFT
		_____		Dollars
		_____		Cents
0024	NS-ITS-04290	Fiber Optic Patch Cord, SM, 2 Strand, Furnish & Install	12.000	EACH
		_____		Dollars
		_____		Cents

Contract ID: 737-55-0003 **Project(s):** 737-55-0003

SECTION: 1 General Items

Proposal Line Number	Item ID	Description Unit Price (In Words, Ink or Typed)	Approximate Quantity	Unit of Measure
0025	NS-ITS-04295	Fiber Optic Patch Cord, SM, 2 Strand, Furnish	3.000	EACH
		_____		Dollars
		_____		Cents
0026	NS-ITS-04360	Fiber Optic Connection Splice Tray, Furnish & Install	126.000	EACH
		_____		Dollars
		_____		Cents
0027	NS-ITS-05020	Splice Closure, Indoor, Furnish & Install	1.000	EACH
		_____		Dollars
		_____		Cents
0028	NS-ITS-05025	Splice Closure, Outdoor, Furnish & Install	20.000	EACH
		_____		Dollars
		_____		Cents
0029	NS-ITS-06020	Pullbox, In-ground, Furnish & Install - New	45.000	EACH
		_____		Dollars
		_____		Cents
0030	NS-ITS-06300	Environmentally Sealed Enclosure	2.000	EACH
		_____		Dollars
		_____		Cents
0031	NS-ITS-07020	ITS Controller Cabinet, Pole Mount, Furnish & Install	6.000	EACH
		_____		Dollars
		_____		Cents
0032	NS-ITS-08010	95' Pole & Foundation, Furnish & Install	4.000	EACH
		_____		Dollars
		_____		Cents

Contract ID: 737-55-0003 **Project(s):** 737-55-0003

SECTION: 1 General Items

Proposal Line Number	Item ID	Description Unit Price (In Words, Ink or Typed)	Approximate Quantity	Unit of Measure
0033	NS-ITS-09280	Backbone Wireless Transceiver, Unlicensed, Furnish & Install	13.000	EACH
		_____		Dollars
		_____		Cents
0034	NS-ITS-09340	Local Wireless Transceiver, Furnish & Install	5.000	EACH
		_____		Dollars
		_____		Cents
0035	NS-ITS-09600	Contact Closure Fiber Transceiver, Furnish & Install	4.000	EACH
		_____		Dollars
		_____		Cents
0036	NS-ITS-10060	Electrical Service	4.000	EACH
		_____		Dollars
		_____		Cents
0037	NS-ITS-10065	½" RGS CONDUIT	75.000	LNFT
		_____		Dollars
		_____		Cents
0038	NS-ITS-10380	Pole Riser Assembly	4.000	EACH
		_____		Dollars
		_____		Cents
0039	NS-ITS-10400	Building Riser Assembly	18.000	EACH
		_____		Dollars
		_____		Cents
0040	NS-ITS-10420	Core/Hole Wall Penetration	24.000	EACH
		_____		Dollars
		_____		Cents

Contract ID: 737-55-0003 **Project(s):** 737-55-0003

SECTION: 1 General Items

Proposal Line Number	Item ID	Description Unit Price (In Words, Ink or Typed)	Approximate Quantity	Unit of Measure
0041	NS-ITS-10440	J-Hooks and Wire Raceway	425.000	LNFT
		_____ Dollars		
		_____ Cents		
0042	NS-ITS-12000	Communications System Integration		LUMP SUM
		_____ Dollars		
		_____ Cents		
0043	NS-ITS-13100	Wiring Diagrams		LUMP SUM
		_____ Dollars		
		_____ Cents		
0044	NS-ITS-13120	Equipment Assembly Drawings		LUMP SUM
		_____ Dollars		
		_____ Cents		
0045	NS-ITS-13140	Cabinet & Rack Wiring Diagrams		LUMP SUM
		_____ Dollars		
		_____ Cents		
0046	NS-ITS-13160	Electrical Schematic, Wiring, & Logic Diagrams		LUMP SUM
		_____ Dollars		
		_____ Cents		
0047	NS-ITS-13180	ITS Connection Diagrams		LUMP SUM
		_____ Dollars		
		_____ Cents		
0048	NS-ITS-13200	As-Builts As Built Plan Sheets. Hard Copy and Electronic Format.		LUMP SUM
		_____ Dollars		
		_____ Cents		

Contract ID: 737-55-0003 **Project(s):** 737-55-0003

SECTION: 1 General Items

Proposal Line Number	Item ID	Description Unit Price (In Words, Ink or Typed)	Approximate Quantity	Unit of Measure
0049	NS-ITS-14000	Flasher Assembly	4.000	EACH

_____ Dollars

_____ Cents

Section: 1 **Total:** _____.___

Total Bid: _____.___

CONSTRUCTION PROPOSAL SIGNATURE AND EXECUTION FORM

THIS FORM, THE SCHEDULE OF ITEMS, AND THE PROPOSAL GUARANTY MUST BE COMPLETED AS INDICATED AND SUBMITTED TO THE LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT (DOTD) TO CONSTITUTE A VALID BID

STATE PROJECT NO. **737-55-0003**

FEDERAL AID PROJECT NO. **5505(503)**

NAME OF PROJECT **HOUMA ITS DEPLOYMENT – PHASE 3**

I (WE) HEREBY CERTIFY THAT I (WE) HAVE CAREFULLY EXAMINED THE PROPOSAL, PLANS AND SPECIFICATIONS, INCLUDING ANY AND ALL ADDENDA, AND THE SITE OF THE ABOVE PROJECT AND AM (ARE) FULLY COGNIZANT OF ALL PROPOSAL DOCUMENTS, THE MASTER COPY OF WHICH IS ON FILE AT DOTD HEADQUARTERS IN BATON ROUGE, LA., AND ALL WORK, MATERIALS AND LABOR REQUIRED THEREIN, AND AGREE TO PERFORM ALL WORK, AND SUPPLY ALL NECESSARY MATERIALS AND LABOR REQUIRED FOR SUCCESSFUL AND TIMELY COMPLETION OF THE ABOVE PROJECT AND TO ACCEPT THE SUMMATION OF THE PRODUCTS OF THE UNIT PRICES BID ON THE SCHEDULE OF ITEMS ATTACHED HERETO AND MADE A PART HEREOF MULTIPLIED BY THE ACTUAL QUANTITY OF UNIT OF MEASURE PERFORMED FOR EACH ITEM, AS AUDITED BY DOTD, AS FULL AND FINAL PAYMENT FOR ALL WORK, LABOR AND MATERIALS NECESSARY TO COMPLETE THE ABOVE PROJECT, SUBJECT TO INCREASE ONLY FOR PLAN CHANGES (CHANGE ORDERS) APPROVED BY THE DOTD CHIEF ENGINEER OR HIS DESIGNEE. THIS BID IS SUBMITTED IN ACCORDANCE WITH THE GENERAL BIDDING REQUIREMENTS IN THE CONSTRUCTION PROPOSAL AND ALL SPECIAL PROVISIONS, PLANS, SUPPLEMENTAL SPECIFICATIONS, AND THE LOUISIANA STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES (2006 EDITION). I (WE) UNDERSTAND THAT THE SUMMATION OF THE PRODUCTS OF THE UNIT PRICES BID ON THE SCHEDULE OF ITEMS MULTIPLIED BY THE ESTIMATED QUANTITY OF UNIT OF MEASURE FOR EACH ITEM, ALONG WITH ANY OTHER FACTORS SPECIFIED TO BE APPLICABLE SUCH AS CONSTRUCTION TIME AND/OR LANE RENTAL, SHALL BE THE BASIS FOR THE COMPARISON OF BIDS. I (WE) UNDERSTAND THAT THE SCHEDULE OF ITEMS MUST CONTAIN UNIT PRICES WRITTEN OUT IN WORDS AND THAT THE SCHEDULE OF ITEMS SUBMITTED AS PART OF THIS BID IS ON THE FORM SUPPLIED BY DOTD IN THE BID PROPOSAL. MY (OUR) PROPOSAL GUARANTY IN THE AMOUNT SPECIFIED FOR THE PROJECT IS ATTACHED HERETO AS EVIDENCE OF MY (OUR) GOOD FAITH TO BE FORFEITED IF THIS BID IS ACCEPTED BY DOTD AND I (WE) FAIL TO COMPLY WITH ANY REQUIREMENT NECESSARY FOR AWARD AND EXECUTION OF THE CONTRACT, AS WELL AS, SIGN AND DELIVER THE CONTRACT AND PAYMENT/PERFORMANCE/RETAINAGE BOND AS REQUIRED IN THE SPECIFICATIONS.

NONCOLLUSION DECLARATION (APPLICABLE TO FEDERAL-AID PROJECTS)

I (WE) DECLARE UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE UNITED STATES AND THE STATE OF LOUISIANA THAT I (WE) HAVE NOT 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 THE CONTRACT FOR THIS PROJECT NOR VIOLATED LA. R.S. 48:254.

BIDDER'S DBE GOAL STATEMENT (APPLICABLE TO DBE GOAL PROJECTS)

IF THIS PROJECT IS DESIGNATED BY SPECIAL PROVISION AS A DISADVANTAGED BUSINESS ENTERPRISE (DBE) GOAL PROJECT IN ACCORDANCE WITH THE DBE PROVISIONS OF THIS CONTRACT, THE BIDDER ASSURES DOTD THAT HE/SHE WILL MEET OR EXCEED THE DBE CONTRACT GOAL, OR IF THE BIDDER CANNOT MEET THE REQUIRED DBE GOAL, THE BIDDER ASSURES DOTD THAT HE/SHE HAS MADE AND CAN DOCUMENT GOOD FAITH EFFORTS MADE TOWARDS MEETING THE GOAL REQUIREMENT IN ACCORDANCE WITH THE CONTRACT AND DBE PROGRAM MANUAL INCORPORATED HEREIN BY REFERENCE.

THE APPARENT LOW BIDDER SHALL COMPLETE AND SUBMIT TO THE DOTD COMPLIANCE PROGRAMS OFFICE, FORM CS-6AAA AND ATTACHMENT(S) AND, IF NECESSARY, DOCUMENTATION OF GOOD FAITH EFFORTS MADE BY THE BIDDER TOWARD MEETING THE GOAL, WITHIN TEN BUSINESS DAYS AFTER THE OPENING OF BIDS FOR THIS PROJECT. RESPONSIVENESS OF INFORMATION SUPPLIED IN THIS SECTION OF THIS CONSTRUCTION PROPOSAL SIGNATURE AND EXECUTION FORM IS GOVERNED BY THE DBE REQUIREMENTS INCLUDED WITHIN THE SPECIFICATIONS AND DBE PROGRAM MANUAL.

CERTIFICATION OF EMPLOYMENT OF LOUISIANA RESIDENTS TRANSPORTATION INFRASTRUCTURE MODEL FOR ECONOMIC DEVELOPMENT (TIME) PROJECTS (APPLICABLE TO TIME PROJECTS)

IF THIS PROJECT IS DESIGNATED BY SPECIAL PROVISION AS A TRANSPORTATION INFRASTRUCTURE MODEL FOR ECONOMIC DEVELOPMENT (TIME) PROJECT AS DEFINED IN ACT NO. 16 OF THE 1989 FIRST EXTRAORDINARY SESSION OF THE LEGISLATURE WHICH ENACTED PART V OF CHAPTER 7 OF SUBTITLE II OF TITLE 47 OF THE LOUISIANA REVISED STATUTES OF 1950, COMPRISED OF R.S. 47:820.1 THROUGH 820.6.

THE BIDDER CERTIFIES THAT AT LEAST 80 PERCENT OF THE EMPLOYEES EMPLOYED ON THIS TIME PROJECT WILL BE LOUISIANA RESIDENTS IN ACCORDANCE WITH LOUISIANA R.S. 47:820.3.

NON PARTICIPATION IN PAYMENT ADJUSTMENT (ASPHALT CEMENT AND FUELS) STATEMENT

IF THIS PROJECT IS DESIGNATED BY SPECIAL PROVISION AS BEING SUBJECT TO PAYMENT ADJUSTMENT FOR ASPHALT CEMENT AND/OR FUELS, THE BIDDER HAS THE OPTION OF REQUESTING EXCLUSION FROM SAID PAYMENT ADJUSTMENT PROVISIONS THAT ARE ESTABLISHED BY SPECIAL PROVISION ELSEWHERE HEREIN.

IF THE BIDDER DESIRES TO BE EXCLUDED FROM THESE PAYMENT ADJUSTMENT PROVISIONS,

THE BIDDER IS REQUIRED TO MARK HERE ☐

FAILURE TO MARK THIS BOX PRIOR TO BID OPENING WILL CONSTITUTE FORFEITURE OF THE BIDDER'S OPTION TO REQUEST EXCLUSION.

STATE PROJECT NO. 737-55-0003

BIDDER SIGNATURE REQUIREMENTS (APPLICABLE TO ALL PROJECTS)

THIS BID FOR THE CAPTIONED PROJECT IS SUBMITTED BY:

Name of Principal (Individual, Firm, Corporation, or Joint Venture)

If Joint Venture, Name of First Partner

(Louisiana Contractor's License Number of Bidder or First Partner to Joint Venture)

(Business Street Address)

(Business Mailing Address, if different)

(Area Code and Telephone Number of Business)

(Telephone Number and Name of Contact Person)

(Telecopier Number, if any)

If Joint Venture, Name of Second Partner

(Louisiana Contractor's License Number of Second Partner to Joint Venture)

(Business Street Address)

(Business Mailing Address, if different)

(Area Code and Telephone Number of Business)

(Telephone Number and Name of Contact Person)

(Telecopier Number, if any)

ACTING ON BEHALF OF THE BIDDER, THIS IS TO ATTEST THAT THE UNDERSIGNED DULY AUTHORIZED REPRESENTATIVE OF THE ABOVE CAPTIONED FIRM, CORPORATION OR BUSINESS, BY SUBMISSION OF THIS BID, AGREES AND CERTIFIES THE TRUTH AND ACCURACY OF ALL PROVISIONS OF THIS PROPOSAL, INCLUSIVE OF THE REQUIREMENTS, STATEMENTS, DECLARATIONS AND CERTIFICATIONS ABOVE AND IN THE SCHEDULE OF ITEMS AND PROPOSAL GUARANTY. EXECUTION AND SIGNATURE OF THIS FORM AND SUBMISSION OF THE SCHEDULE OF ITEMS AND PROPOSAL GUARANTY SHALL CONSTITUTE AN IRREVOCABLE AND LEGALLY BINDING OFFER BY THE BIDDER.

(Signature)

(Printed Name)

(Title)

(Date of Signature)

(Signature)

(Printed Name)

(Title)

(Date of Signature)

CONTRACTOR'S TOTAL BASE BID $ _____

IT IS AGREED THAT THIS TOTAL, DETERMINED BY THE BIDDER, IS FOR PURPOSES OF OPENING AND READING BIDS ONLY, AND THAT THE LOW BID FOR THIS PROJECT WILL BE DETERMINED FROM THE EXTENSION AND TOTAL OF THE BID ITEMS BY DOTD.

CS-14AA
08/06