PROPOSAL CONTRACT

FOR THE CONSTRUCTION OF

Contract No.

PIN:	120327.01
County:	Sumner / Davidson
Federal Project No.:	CM-9321(2)
State Project No.:	19LPLM-F3-139
Local Agency Reference No.:	N/A
Description Of Project:	TRAFFIC FLOW IMPROVEMENTS AND TRAFFIC SIGNAL UPGRADES ALONG TWO ARTERIAL CORRIDORS WITHIN CITY LIMITS
Project Length:	2.26 MILES
Completion Time:	On or Before Nine (9) months from Construction NTP
DBE Goal:	8.0%

By: _____

City, St.: _____

Surety: _____

TDOT Version: 3/9/18

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The above Supplemental Specifications, revised as noted, are incorporated by reference for bidding purposes and will be printed with the Contract after awards. These Supplemental Specifications may be obtained from the Department at Suite 700, James K. Polk Bldg., Nashville, Tennessee or viewed on the Department's website at http://www.tn.gov/tdot/section/tdot-construction-division.

ATTENTION

It shall be the bidders' responsibility to confirm that the Proposal Contract contains all the documents indicated on the Table of Contents.

Should any omissions occur, the appropriate documents may be obtained from the Construction Division upon request.

THE CITY OF GOODLETTSVILLE

INSTRUCTIONS TO BIDDERS

BIDS TO BE RECEIVED

[DATE]

Sealed bids for the construction of the following projects will be received by the CITY OF GOODLETTSVILLE**, 105 MAIN STREET, GOODLETTSVILLE, TENNESSEE 37072** until **[TIME] [AM/PM] [DATE]** and opened publicly at 105 MAIN STREET, GOODLETTSVILLE, TENNESSEE 37072**, [TIME] [AM/PM] [DATE]**. The reading of the bids will begin at **[TIME] [AM/PM]**.

The proposed construction shall be performed in accordance with the most current version of the Standard Specifications for Road and Bridge Construction of the Tennessee Department of Transportation , and the Standard Roadway and Structures Drawings of the Tennessee Department of Transportation which are incorporated herein by reference and made a part hereof. In addition, only the Special Provisions contained within the applicable Proposal Contract will be considered binding. Any reference to any Special Provision not contained within the applicable Proposal Contract shall be disregarded. All questions related to the Proposal Contract, Plans, Specifications or Special Provisions shall be directed to the **ENGINEER, TERRANCE HILL, P.E. (VA & GA), KIMLEY-HORN AND ASSOCIATES, INC., 214 OCEANSIDE DRIVE, NASHVILLE, TENNESSEE 37204** (**615-564-2701**). Information received from other offices of the CITY OF GOODLETTSVILLE strictly advisory.

IMPORTANT NOTICE TO BIDDERS:

Prospective bidders should read the following instructions carefully before submitting their bids. Special attention is called to the regulations of the CITY OF GOODLETTSVILLE that total bids, rather than unit prices, will be read. Proposals shall be rejected as being irregular if they fail to contain a unit price for each item listed. Extensions of the various items must be sub-totaled, carried forward, and shown as a grand total following the last proposal item. All entries must be in ink.

After a bidder has deposited a proposal with the CITY OF GOODLETTSVILLE, he can withdraw it only on written request in accordance with Subsection 102.07 of the Tennessee Department of Transportation Standard Specifications.

Totals read at the opening of the bids are not guaranteed to be correct and no final award of the contract will be made until bids and extensions have been checked and re-checked.

On all projects which are financed in whole or in part by funds received through Federal agencies and/or the Tennessee Department of Transportation, the awarding of contracts by the CITY OF GOODLETTSVILLE will be subject to approval by the Tennessee Department of Transportation. The CITY OF GOODLETTSVILLE reserves the right to reject any bid proposal which is not acceptable to the parties as listed, although such bid proposal would otherwise qualify

as the lowest and best bid under the Tennessee Department of Transportation Standard Specifications.

The CITY OF GOODLETTSVILLE reserves the right to reject any or all Proposals, to waive technicalities or to advertise for new Proposals, if in the judgment of the awarding authority and subject to TDOT concurrence, the best interest of the CITY OF GOODLETTSVILLE will be promoted thereby.

The CITY OF GOODLETTSVILLE reserves the right to cancel the award of any Contract, at any time prior to execution of said Contract by all parties without any liability against the CITY OF GOODLETTSVILLE**.**

The awarding of the contract or rejection of all proposals will be made within 60 days after the formal opening of the proposals. Upon award, a detailed letter of instructions will be forwarded along with appropriate documents to the low bidder.

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

The CITY OF GOODLETTSVILLE is an equal opportunity affirmative action employer, drug-free, with policies of nondiscrimination on the basis of race, sex, religion, color, national or ethnic origin, age, disability, or military service.

PREQUALIFICATION OF BIDDERS:

Each prospective bidder and subcontractor will be required to file a document entitled "Prequalification Questionnaire." The foregoing shall be filed on a form provided by the Tennessee Department of Transportation. The form must be filled out completely, and the truth and accuracy of the information provided must be certified by a sworn affidavit signed by an officer, partner, owner or other authorized representative of the applicant who has authority to sign contracts or other legal documents on behalf of the applicant. A prospective bidder must be prequalified by and in good standing with the Tennessee Department of Transportation prior to the issuance of a proposal form. A prospective subcontractor must be prequalified by and in good standing with the Tennessee Department of Transportation prior to being approved as a subcontractor. Each prospective bidder or subcontractor shall notify the Tennessee Department of Transportation if there is any subsequent change in the name, organization or contact information provided.

Prospective bidders' "Prequalification Questionnaire" shall be filed with the Tennessee Department of Transportation at least fourteen (14) days prior to the date of opening bids on any letting in which the applicant intends to submit a bid to the CITY OF GOODLETTSVILLE**,** or at least fourteen (14) days prior to the date on which the applicant requests approval as a subcontractor under a contract awarded by the CITY OF GOODLETTSVILLE. Bidders intending to submit proposals consistently shall complete and submit the prequalification application annually; however, this document may be changed during such period upon submission of additional favorable reports or upon receipt by the Tennessee Department of Transportation of substantiated evidence of unsatisfactory performance. The Tennessee Department of

Transportation reserves the right to request additional information and documentation to clarify and/or verify any information submitted in an applicant's prequalification application.

The prequalification form can be found at the web address
http://www.tn.gov/tdot/section/tdot-construction-division

A proposal to be used for non-bidding purposes may be issued to any interested party regardless of prequalification. This proposal Contract will be marked "Void for Bidding". A contractor that has purchased a proposal contract that was marked "void for bidding" can buy another book once they are fully prequalified before the bid date.

LICENSING REQUIREMENTS

According to the types of funds used, contractor bidding requirements differ. When using any Federal funds, proposals shall be completed as described below:

Proposals shall be submitted by a bidder licensed with the Tennessee Department of Commerce and Insurance (TDCI), Board for Licensing Contractors (BLC) within twenty-one (21) days of the bid opening, in accordance with Subsection 102.11 of the Tennessee Department of Transportation Standard Specifications.

Prior to recommending award of a contract, the Local Government will confirm that the lowest responsible bidder is licensed with the BLC. Because TDOT work classifications and the BLC licensing classifications slightly differ, the Local Government will verify only that the apparent low bidder is licensed in the general classification (e.g., Heavy Construction (HC), Highway, Railroad, Airport Construction (HRA), Specialty (S), Municipal and Utility Construction (MU), or Electrical Contracting (CE)) and not the specific subcategories of these classifications for the type of work involved in the project. This is in recognition that the prime contractor is required to complete 30% of the specific project work and may subcontract the remainder of the work.

Title 48 of Tennessee Code requires all contractors and subcontractors that are domestic or foreign Corporations, Limited Liability Companies, Limited Partnerships, or Limited Liability Partnerships to be in good standing with the Secretary of State (i.e., have a valid Certificate of Existence/Authorization). This includes being duly incorporated, authorized to transact business, and/or in compliance with other requirements as detailed by the Secretary of State.

Bidders that are domestic or foreign corporations, limited liability companies, limited partnerships, or limited liability partnerships, must be in good standing with the Secretary of State (i.e., have a valid Certificate of Existence/Authorization) on or before twenty-one (21) days after proposals are opened.

PROPOSAL BOND

Each proposal must be accompanied by a bidder's bond, or Cashier's Check, or Certified Check made payable to the CITY OF GOODLETTSVILLE in an amount equaling not less than five percent (5%) of the amount bid. In the case of optional items in the proposals, the amount of the bidder's bond or check must be in an amount equaling not less than five percent (5%) of the total amount of the bid based on the high option.

If the bidder's bond is offered as guaranty, the bond must be on the form furnished by the CITY OF GOODLETTSVILLE and made by a surety company, qualified and authorized to transact business in the State of Tennessee and must be acceptable to the CITY OF GOODLETTSVILLE.

If a check is offered as guaranty, the check of the successful bidder will be cashable at the discretion of the CITY OF GOODLETTSVILLE, pending the satisfactory execution and acceptance of the contract and the contract bond.

ISSUANCE OF BIDDING DOCUMENTS

This CITY OF GOODLETTSVILLE and the Tennessee Department of Transportation are on a cash basis for sales of Plans, Proposal Contracts, Standard Specifications, Standard Drawings, Standard Drawing Books and Tabulations of Bids. Requests for documents must be accompanied by cash, check, money order, or they may be mailed to the buyer C.O.D.

A charge of **$50** plus **9.25%** sales tax, for in-state delivery, will be made for each Proposal Contract. This charge is applicable regardless of whether the Proposal is to be used for bidding or non-bidding purposes. Proposals will be obtainable until the time set for opening bids. The charge for Plans and/or Cross-sections will be as specified in the Notice to Contractors and this charge will be applicable before the letting and for three months after the letting. Plans ordered after the three month period will be furnished at **$5.00** per sheet. Individual Plan sheets and individual Standard Drawings will be furnished at **$5.00** per sheet. Tabulations of bids will be furnished at **$5.00** per sheet. Tennessee Department of Transportation Standard Drawing Books will be furnished by the Tennessee Department of Transportation at **$100.00** per book plus **9.25%** sales tax, for in-state delivery. The most recent version of the Tennessee Department of Transportation Standard Specifications for Road and Bridge Construction will be furnished by the Tennessee Department of Transportation at **$12.00** per book plus **9.25%** sales tax, for in-state delivery. There will be a minimum charge of $2.00 on any purchase. All documents will be furnished without refund and transmitted at your risk.

When two or more contractors wish to bid together in a joint venture, each contractor will be required to make a written request for such a proposal to the CITY OF GOODLETTSVILLE. This request shall be signed by an authorized signatory of each firm.

Requests for joint venture proposals may be made in person or by telephone. However, the proposal for said joint venture will not be issued until the request in writing, as set forth above, is received by the CITY OF GOODLETTSVILLE.

REJECTION OF PROPOSALS

Proposals will be rejected as irregular if prior to the formal opening of the Proposal all of the following documents have not been signed: (1) the bidder shall sign by written signature the Proposal form, (2) the bidder shall sign by written signature the Proposal Certification form, (3) the bidder shall sign by written signature the Proposal Bond form or the Proposal Guarantee, whichever is applicable, (4) the Agent or Attorney-in-Fact representing a Surety Company shall sign by written signature the Proposal Bond, if applicable. In addition, Proposals will be rejected if any of the above signatures are a reproduced copy, such as, but not limited to a photostatic copy or a facsimile transmission. An original, dated and valid Power of Attorney for the Attorney-in-Fact must accompany the Proposal and the Contract. The accompanying Power of Attorney

must be dated, and the date must be the exact same date as the date on the Proposal Bond. The Proposal and the Proposal Bond, including the attached Power of Attorney, shall be valid and binding for 60 days subsequent to the date of opening bids.

Proposals shall be completed on the forms as issued. Proposals will be rejected as being irregular if they are not prepared on the prescribed forms; if they show any omissions, alterations of form, additions, or conditions not called for, unauthorized alternate bids, or irregularities of any kind; or if they fail to contain a unit price for each item listed. Proposals may be rejected if any of the unit prices contained therein are mathematically unbalanced, either excessive or below the Engineer's Estimate.

Written alterations to unit prices and extensions of the various items in the bid item sheets of the Proposal or, for computer assisted bids (CAB), in the CAB program generated set of bid item sheets will not be cause for rejection of the Proposal, provided each alteration is made in ink and is initialed by a duly authorized official of the company. In case of conflict between altered unit prices or extensions thereof, the unit price in numerals will govern.

The Plans and Specifications are as much a part of the proposal form as if they were bound therein. All of the documents contained therein are part of the proposal. Proposals shall not be taken apart. Proposals taken apart may be subject to rejection. Photostatic or facsimile copies of Proposal sheets may not be attached to the Proposal. Proposals containing forms not issued by the CITY OF GOODLETTSVILLE may be subject to rejection.

Proposals will be rejected as irregular if the bidder fails to acknowledge all addenda.

Proposals will be rejected as irregular when submitted by a bidder who is not prequalified and in good standing on the date of letting in accordance with Subsection 102.01 of the Tennessee Department of Transportation Standard Specifications and Chapter 1680-5-3, Prequalification of Contractors, of the Rules of the Tennessee Department of Transportation.

Proposals will be rejected as irregular when submitted by a bidder who is not licensed according to the requirements as detailed above.

Reasonable grounds for believing that there has been collusion among the Bidders will cause a rejection of all Proposals in which the Bidders involved are interested.

ADDENDA

Addenda to the Proposal will be acknowledged by all bidders. Failure to acknowledge receipt of Addendum Letters is grounds for rejection.

RETAINAGE

Effective for all contracts, the CITY OF GOODLETTSVILLE will not hold retainage. In addition, the Contractor will not be able to hold retainage from the subcontractor.

SUBCONTRACTS

Your special attention is called to Section 105 - Control of Work, and Section 108 - Prosecution and Progress of the Tennessee Department of Transportation Standard Specifications, concerning duties of the contractor and subletting of contracts.

CHANGED CONDITIONS

Your special attention is called to Section 104.02 of the Tennessee Department of Transportation Standard Specifications, concerning changed conditions on this contract.

The following information applies to Federal-Aid construction projects:

NOTICE TO ALL BIDDERS

To report bid rigging activities call:

1-800-424-9071

The U.S. Department of Transportation (DOT) operates the above 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 use the "hotline" to report such activities.

The "hotline" is part of the DOT's continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

S T A T E **OF** **T E N N E S S E E**
Rev: October 10, 2016 January 1, 2015

SPECIAL PROVISION

REGARDING

EMPLOYING AND CONTRACTING WITH ILLEGAL IMMIGRANTS

The State shall endeavor to do business only with those contractors and subcontractors that are in compliance with the Federal Immigration and Nationality Act. This policy shall apply to all State Contractors including subcontractors. This policy statement is issued to establish implementation guidance to procuring state agencies and contractors reflecting the requirements of *Tennessee Code Annotated* §12-3-309 regarding the employment of illegal immigrants in the performance of state contracts.

1. The Contractor hereby attests, certifies, warrants, and assures that the Contractor shall not knowingly utilize the services of an illegal immigrant in the performance of this Contract and shall not knowingly utilize the services of any subcontractor who will utilize the services of an illegal immigrant in the performance of this Contract. The Contractor shall reaffirm this attestation, in writing, by submitting to the State a completed and signed copy of the "Attestation form" provided by the Department, semi-annually during the period of this Contract.

2. Prior to the use of any subcontractor in the performance of this Contract, and semi-annually thereafter, during the period of this Contract, the Contractor shall obtain and retain a current, written attestation that the subcontractor shall not knowingly utilize the services of an illegal immigrant to perform work relative to this Contract and shall not knowingly utilize the services of any subcontractor who will utilize the services of an illegal immigrant to perform work relative to this Contract.

3. The Contractor shall maintain records for its employees used in the performance of this Contract. Said records shall include a completed federal Department of Homeland Security Form I-9, *Employment Eligibility Verification*, for each employee and shall be subject to review and random inspection at any reasonable time upon reasonable notice by the State.

The Contractor understands and agrees that failure to comply with this section will be subject to the sanctions of *Tennessee Code Annotated* § 12-3-309 for acts or omissions occurring after January 1, 2007. This law requires the Chief Procurement Officer, Department of General Services, to prohibit a contractor from contracting with, or submitting an offer, proposal, or bid to contract with the State of Tennessee to supply goods or services for a period of one year after a

contractor is discovered to have knowingly used the services of illegal immigrants during the performance of this contract.

For the Purposes of this policy, “illegal immigrant” shall be defined as a non-citizen who has entered the United State of America without federal government permission or stayed in this country beyond the period allowed by a federal government-issued visa authorizing the non-citizen to enter the country for specific purposes and a particular time period.

S T A T E **O F** **T E N N E S S E E**

(Rev. 6-19-95) January 1, 2015
(Rev. 6-1-04)
(Rev. 06-20-2011)

SPECIAL PROVISION

REGARDING

BUY AMERICA REQUIREMENTS

All manufacturing processes for iron and steel products, and coatings applied thereon, used in this project shall occur in the United States except that if the proposal has bid items for furnishing domestic and foreign iron and steel, the bidder will have the option of (1) submitting a bid for furnishing domestic iron and steel, or (2) submitting a bid for furnishing domestic iron and steel and a bid for furnishing foreign iron and steel. If option (2) is chosen the bid will be tabulated on the basis of (a) the total bid price using the bid price for furnishing domestic iron and steel and, (b) the total bid price using the bid price for furnishing foreign iron and steel.

For the total bid based on furnishing foreign iron and steel to be considered for award, the lowest total bid based on furnishing domestic iron and steel must exceed the lowest total bid based on furnishing foreign iron and steel by more than 25 percent. The 25 percent differential applies to the total bid for the entire project, not just the bid prices for the steel or iron products.

Iron and steel products are defined as products rolled, formed, shaped, drawn, extruded, forged, cast, fabricated or otherwise similarly processed from iron and steel made in the United States. Iron products are included, however, pig iron and processed, pelletized, and reduced iron ore may be purchased outside the United States.

Manufacturing begins with initial melting and continues through the coating stage. Any process which modifies chemical content, physical size or shape, or the final finish is considered a manufacturing process. Coatings include epoxy, galvanizing, painting or any other surface protection that enhances the value and/or durability of a material.

The contractor shall provide a certification to the Engineer with each shipment of iron and steel products to the project site that the manufacturing processes for the iron and steel products occurred in the United States. No steel shall be placed until the contractor ensures the requirements of this Special Provision are met.

The above requirements do not prevent a minimal use of foreign materials, if the cost of such materials used does not exceed 0.1 percent of the total contract cost or $2,500.00, whichever is greater. If steel

not meeting the requirements of this Special Provision is used, the contractor shall provide a written statement to the Department prior to its use indicating where the steel will be incorporated in the work, the value of the steel, the percentage of the contract amount, and the appropriate invoices shall be submitted as documentation.

The contractor shall be responsible for all cost associated with any steel that is permanently incorporated into the project that does not meet the requirements of this Special Provision without prior written approval from the Department, up to and including removal and replacement.

S T A T E **O F** **T E N N E S S E E**

January 1, 2015

Rev. 12-22-14
Rev. 2-13-17
Rev. 6-26-17

SPECIAL PROVISION

REGARDING

WATER QUALITY AND STORM WATER PERMITS

Scope

The conditions of this Special Provision apply to all construction on this project pursuant to the following:

1. Section 404 of the Federal Clean Water Act (33 U.S.C. §1344), and all implementing regulations, including without limitation regulations of the U.S. Army Corps of Engineers governing permits for discharges of dredged or fill material into waters of the United States in 33 CFR Part 323; and
2. The Tennessee Water Quality Control Act (T.C.A. §69-3-101, et seq.) and all implementing regulations, including without limitation the Rules of the Tennessee Department of Environment and Conservation governing NPDES permits in Chapter 1200-4-10, and Aquatic Resource Alteration permits in Chapter 1200-4-7; and
3. Section 26a of the TVA Act of 1933 as amended (49 Stat. 1079, 16 U. S. C. sec. 831y1.) and all implementing regulations, including without limitation the regulations of the Tennessee Valley Authority governing construction in the Tennessee River System in 18 C.F.R., Part 1304; and
4. The Tennessee Wildlife Resources Agency Reelfoot Lake Watershed Management permit program (T.C.A. section 70-5-1,), and all implementing regulations, including without limitation regulations authorizing any activity, practice, or project which has or is likely to have the effect of diverting surface or subsurface water from the Lake or have the effect of draining or otherwise removing water from Reelfoot Lake; and
5. Coast Guard Bridge Permit (USCG) (Section 9 of the Rivers and Harbors Appropriation Act of 1899) and all implementing regulations, including but not without limitation for projects which impact streams deemed navigable by the U.S. Coast Guard.

Responsibility

It is understood and agreed that the Contractor assumes all responsibilities of the permittee as indicated in the permit that relates to protection of the "waters of the United States" and/or "waters of the State of Tennessee."

It is also understood and agreed that the Contractor shall be responsible for obtaining any additional permits required by the Contractor’s method of construction, including without

limitation haul roads, temporary channels or temporary ditches, or off-site waste and/or borrow areas.

It is also understood that the Contractor shall be responsible for implementing the provisions of the Water Quality (including, but not limited to, TDEC ARAP, USACE 404, TVA Section 26a, Coast Guard, TWRA) and Storm Water [including, but not limited to, National Pollution Discharge Elimination System (NPDES), Statewide Stormwater Management Plan (SSWMP)] Permits and requirements that pertain to construction activities.

The Contractor by signing this contract is indicating that the Contractor has reviewed a copy of the permit provisions, including NPDES Permit provisions at http://www.tdot.state.tn.us/construction/permits/npdes.pdf, the site specific SWPPP, the contract plans, Standard Specifications and contract Special Provisions and finds the permit requirements and erosion prevention and sediment control (EPSC) procedures to be reasonable, workable, and binding.

It is also understood that the Contractor shall not be released from the project site responsibilities under the NPDES permit provisions until the Notice of Termination (NOT) is submitted to TDEC by the TDOT Regional Construction Supervisor. The NOT is a certification that the construction project site is permanently stabilized and that all construction related discharges have ceased. This means that the use of EPSC measures to alleviate concerns of surface erosion and transport of sediment to surface water conveyances or to waters of the state is no longer necessary. Furthermore, it means that permanent controls, hard surfaces and/or vegetation, employed at the site are deemed adequate to prevent erosion and sediment transport and no other potential sources of construction-related pollution are on the project.

It is also understood that the Contractor shall not be released from any warranty provided for EPSC plantings, including sod and trees. If the entire project is complete as outlined in **Subsection 105.15** of the **Standard Specifications,** the Contractor shall be required to supply a performance bond as outlined in **Subsection 802.15** of the **Standard Specifications** to cover any warranty for EPSC plantings.

NPDES Permit Required Action

The Contractor (or their representative) shall accompany the EPSC inspector (TDOT personnel or TDOT hired consultant) on all EPSC inspections of the entire construction project including permitted locations and potentially impacted streams as well as attend all QA/QC Project Assessments.

EPSC Inspections shall be conducted as required in the most current TN Construction General Permit.

EPSC inspections shall be performed on the schedule established in the TN Construction General Permit until the site is permanently stabilized to determine if the permit requirements are being met. Where sites or portion(s) of construction sites have been temporarily stabilized, or runoff is unlikely due to winter conditions (e.g. site covered with snow or ice), such inspection only has to be conducted once per month until thawing or precipitation results in runoff or construction activity resumes. Written notification of the intent to change the inspection frequency and the justification for such request must be submitted to the TDOT Project Supervisor and the TDEC Central Office before proceeding.

An individual representing the Contractor, who holds a current TDEC *"Fundamentals of Erosion Prevention and Sediment Control Level I"* certification shall accompany the EPSC inspector on all required EPSC inspections. The Contractors project supervisor(s) shall also hold

a current TDEC "*Fundamentals of Erosion Prevention and Sediment Control Level I*" certification. Proof of required personnel training for the individual(s) shall be provided to the TDOT Project Supervisor prior to beginning of construction.

The TDOT EPSC inspector shall document all deficiencies on the required TDOT EPSC Inspection Report form (provided in the SWPPP). The Contractor (or their representative) shall sign the TDOT EPSC Inspection Report form and any supporting documentation indicating that he is in agreement with the report, recommendations and repair schedule as stated within the documentation.

Additionally, the Contractor shall make necessary maintenance and repairs relative to deficiencies in these permit conditions or requirements within twenty-four (24) hours after an inspection identifies the maintenance or repair need, and/or when directed to do so by the TDOT Project Supervisor, unless conditions make a particular activity impracticable. Any such conditions that make immediate repairs impracticable shall be documented and provided to the TDOT Project Supervisor, via the inspection report, and be accompanied by an expected repair schedule based on forecasted weather conditions.

The Contractor further agrees that he will execute two (2) copies of the Notice of Intent (NOI) form of the permit (provided by the Department), indicating his acceptance of the stipulations contained therein. The Contractor further agrees, that should he fail to execute said copies and return them to the TDOT Construction Division within ten (10) calendar days after submittal of the contract proposal to him, that the Department may at its discretion cancel the award with the Contractor forfeiting his bid bond.

Further, the Contractor agrees to review the site specific Stormwater Pollution Prevention Plan (SWPPP) that will be made available prior to or at the pre-construction conference, for any additional EPSC requirements. The Contractor shall sign and submit two copies of the SWPPP signature page (provided by the Department within the site specific SWPPP). The Contractor may submit for review and approval changes/revisions to the SWPPP to better prevent erosion and sediment transport at any time after contract execution. Rejection of any submittals does not relieve the contractor of any liability for appropriate Best Management Practices (BMPs).

If at any time during this contract, the requirements for the Water Quality Permits and/or the Storm Water Permits for Construction Related Activities are changed/revised/updated, the Contractor shall be notified in writing by the Department of such requirements. The Contractor shall comply with the new requirements within thirty (30) days of the Department notification.

If at any time the Contractor becomes aware that sedimentation is occurring or has occurred in streams impacted by the specified project, the Contractor shall immediately notify the TDOT Project Supervisor to evaluate the EPSC measures employed. A determination of the cause for sedimentation will be made by the Department. The Contractor shall immediately repair or replace defective EPSC measures, and install, as applicable, additional or other EPSC measures with the goal of eliminating future sedimentation. Once a remediation plan is provided by the Department, the Contractor shall, within twenty-four (24) hours after notification, begin the remediation as required. Based on the cause of sedimentation, the Department will determine if the cost of remediation will be performed at the Contractor's expense.

Failure to Comply

In the event a Notice of Violation (NOV) or Order pursuant to the Tennessee Water Quality Control Act or the Federal Clean Water Act is issued on this project, any and all fines will be the

sole responsibility of the Contractor as outlined in **Subsection 107.01** of the **Standard Specifications for Road and Bridge Construction.**

Failure of the Contractor to comply with this Special Provision or take immediate corrective actions required within twenty-four (24) hours (unless documented conditions make a particular maintenance or repair activity impracticable immediately) shall be reason for the TDOT Project Supervisor to suspend all other work on the Project, except erosion prevention and sediment control (EPSC) and traffic control, applying non-refundable deductions of monies from the Contract per calendar day from monies due to the Contractor for any EPSC work on the Project. This deduction can be made for each location, as determined by the TDOT Project Supervisor, for each calendar day that the deficiency is allowed to remain and charged as item description *"Failure to Comply with Permit Deduction"*. A deduction shall be made from monies due the Contractor, not as a penalty, but as liquidated damages, as indicated in **Subsection 108.09** of the **Standard Specifications for Road and Bridge Construction January 1, 2015**, as amended.

If the Contractor does not make necessary corrections/adjustments in a timely manner as required above, the Department will implement the provisions of **Subsection 209.07 and Subsection 109.08** of the **Standard Specifications for Road and Bridge Construction** that provides for the Department making repairs and recovering the costs thereof from the Contractor.

The Department will not participate in any payment or reimbursement for fines and will not authorize time extensions due to delays in project progress for work stoppage, to remedy the violations stated within the NOV, required by the TDOT Project Supervisor as stated in **Subsection 105.01** of the **Standard Specifications for Road and Bridge Construction**.

Spill Prevention, Control, and Countermeasure

To help prevent the discharge of oil into navigable waters, the U.S. Environmental Protection Agency (EPA) developed the Spill Prevention, Control, and Countermeasure (SPCC) Program.The SPCC Program is under the authority of Section 311 (j)(1)(C) of the Federal Water Pollution Control Act (Clean Water Act) in 1974. The rule may be found at Title 40, Code of Federal Regulations (CFR), Part 112. Additional information regarding the preparation and requirements of a SPCC Plan can be found at: http://www.epa.gov/oem/content/spcc/.

If applicable based upon the total aggregate capacity of aboveground oil storage, the contractor shall develop a site specific SPCC Plan per EPA requirements. This plan shall be provided to the Project Supervisor as part of the required submittals during the project Pre-Construction Meeting or at which time the conditions on the project site meet the applicable criteria. The contractor shall be responsible for obtaining any other necessary local, state, and federal permits as applicable. The SPCC Plan and/or permits shall be kept on-site.

The contractor shall be responsible complying with all aspects of the site specific SPCC Plan including but not limited to: performing any required inspections as directed by the SPCC Plan as well as implementing material and spill management practices per the project's Stormwater Pollution Prevention Plan (SWPPP). In the event, where a release containing a hazardous substance in an amount equal to, or in excess of a reportable quantity established under either 40 CFR 117 or 40 CFR 302 occurs during a 24-hour period, the contractor shall immediately notify the Project Supervisor.

S T A T E **O F** **T E N N E S S E E**

January 1, 2015

SPECIAL PROVISION

REGARDING

EQUAL EMPLOYMENT OPPORTUNITY

Reference:
Federal-Aid Highway Program Manual
Transmittal 147, June 26, 1975
Replaces FHWA Order Interim 7-2(1)

Specific Equal Employment Opportunity Responsibilities

GENERAL

a) Equal employment opportunity requirements not to discriminate and to take affirmative action to assure equal employment opportunity as required by Executive Order 11246 and Executive Order 11375 are set forth in Required Contract Provisions (Form FHWA-1273 or PR-1316, as appropriate) and these Special Provisions which are imposed pursuant to Section 140 of Title 23, U.S.C., as established by Section 22 of the Federal-Aid Highway Act of 1968. The requirements set forth in these Special Provisions shall constitute the specific affirmative action requirements for project activities under this contract and supplement the equal employment opportunity requirements set forth in the Required Contract Provisions.

b) The contractor will work with the Tennessee Department of Transportation and the Federal Government in carrying out equal employment opportunity obligations and in their review of his/her activities under the contract.

c) The contractor and all his/her subcontractors holding subcontracts not including material suppliers, exceeding $10,000, will comply with the following minimum specific requirement activities of equal employment opportunity: (The equal employment opportunity requirements of Executive Order 11246, as set forth in Volume 6, Chapter 4, Section 1, Subsection 1 of the Federal-Aid Highway Program Manual, are applicable to material suppliers as well as contractors and subcontractors). The contractor will include these requirements in every subcontract exceeding $10,000 with such modification of language as is necessary to make them binding on the subcontractor.

Equal Employment Opportunity Policy

The contractor will accept as his operating policy the following statement which is designed to further the provision of equal employment opportunity to all persons without regard to their age, race, color, religion, sex, national origin or disability and to promote the full realization of equal employment opportunity through a positive continuing program:

> It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment opportunity officer (hereinafter referred to as the EEO Officer) who will have the responsibility for and must be capable of effectively administering and promoting an active contractor program of equal employment opportunity and who must be assigned adequate authority and responsibility to do so.

Equal Employment Opportunity Officer

The contractor will designate and make known to the Tennessee Department of Transportation contracting officers an equal employment opportunity officer (hereinafter referred to as the EEO Officer) who will have the responsibility for and must be capable of effectively administering and promoting an active contractor program of equal employment opportunity and who must be assigned adequate authority and responsibility to do so.

Dissemination of Policy

(a) 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 equal employment opportunity policy and contractual responsibilities to provide equal employment opportunity 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:

(1) 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 equal employment opportunity policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.

(2) All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer or other knowledgeable company official covering all major aspects of the contractor's equal employment opportunity obligations within thirty days following their reporting for duty with the contractor.

(3) All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer or appropriate company official in the contractor's procedures for locating and hiring minority group employees.

(b) In order to make the contractor's equal employment opportunity policy known to all employees, prospective employees and potential sources of employees, i.e., schools, employment agencies, labor unions (where appropriate), college placement officers, etc., the contractor will take the following actions:

(1) Notices and posters setting forth the contractor's equal employment opportunity policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

(2) The contractor's equal employment opportunity 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.

Recruitment

(a) When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be published in newspapers or other publications having a large circulation among minority groups in the area from which the project work force would normally be derived.

(b) 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, including, but not limited to, State employment agencies, schools, colleges and minority group organizations. To meet this requirement, the contractor will, through his EEO Officer, 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.

(c) 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 equal employment opportunity contract provisions. (The U.S. Department of Labor 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).

(d) The contractor will encourage his present employees to refer minority group applicants for employment by posting appropriate notices or bulletins in areas accessible to all such employees. In addition, information and procedures with regard to referring minority group applicants will be discussed with employees.

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 age, race, color, religion, sex, national origin 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.

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 the Special Provision Regarding Training Program Requirements is provided under this contract, this subparagraph will be superseded as indicated therein.

(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.

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 equal employment opportunity clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their age, race, color, religion, sex, national origin 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 Tennessee Department of Transportation 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 age, race, color, religion, sex, national origin or disability, making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The U.S. Department of Labor 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 Tennessee Department of Transportation.

Subcontracting

(a) The contractor will use his best efforts to solicit bids from and to utilize minority group subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of minority-owned construction firms from the Tennessee Department of Transportation.

(b) The contractor will use his best efforts to ensure subcontractor compliance with their equal employment opportunity obligations.

Records and Reports

(a) The contractor will keep such records as are necessary to determine compliance with the contractor's equal employment opportunity obligations. The records kept by the contractor will be designed to indicate:

(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 to increase employment opportunities for minorities and women. (Applicable only to contractors who rely in whole or in part on unions as a source for their work force).

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

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

(b) All such records must be retained for a period of 3 years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the of the Tennessee Department of Transportation and the Federal Highway Administration.

(c) Each contractor and subcontractor shall submit to the Tennessee Department of Transportation an annual report for every July during which work is performed indicating the number of minority, women and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form PR 1391 and is to be received by the Department not later than the 20th of the month following the reporting period.

(d) The contractor and/or sub-contractor will be required to complete other reports as instructed by the Engineer.

(e) Current estimates may be withheld by the Project Engineer when reports are not received within the above specified time limits.

S T A T E **O F** **T E N N E S S E E**

January 1, 2015

SPECIAL PROVISION

REGARDING

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 or Portuguese 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 indentifiable tribal affiliations through membership and participation or community identification).

2) Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically 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 arid which is set forth in the solicitations from which this contract resulted.

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 (including goals and time tables) 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 individually required to comply with its obligations under the EEO clause, and to make a 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 Contractors 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 and timetables.

4) The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a though p of these specifications. The goal 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. The Contractor is expected to make substantially uniform progress toward 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 specification, Executive Order 11246, or the regulations promulgated pursuant thereto.

6) In order for the nonworking training hours of apprentices and the 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 shall be based upon its 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 two or more women to each construction project. The Contractor shall specifically 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 organization's 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 may have 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 sent 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 expressly 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 complied 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 its 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 Superintendents, 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 any advertising in the news media, specifically 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 one 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, screenings 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 Part 60-3.

(l) Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriation 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 nonsegregated 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 supervisor's 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 one or more of 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 any one or more of its obligations under 7a through p 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 its individual 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 single goal for minorities and a separate single 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 particular 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 specific minority group of women is underutilized).

10) The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of age, race, color, religion, sex, national origin or disability.

11) The Contractor shall not enter into any 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 violations 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 its obligations under these specifications, shall implement' specific affirmative action steps, at least as extensive as those 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 shall not be required to maintain separate records.

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

S T A T E **O F** **T E N N E S S E E**

Revised 10-19-2012 January 1, 2015

SPECIAL PROVISION

REGARDING

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION

TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246)

1. The 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 are as follows:

County	Goals for Female Participation in each Trade
All Counties	6.9

County	Goals for Minority Participation for each Trade
Lincoln	11.2
Hamilton, Marion, Sequatchie	12.5
Bledsoe, Bradley, Grundy, McMinn, Meigs, Monroe, Polk, Rhea	8.6
Carter, Hawkins, Sullivan, Unicoi, Washington	2.6
Greene, Hancock, Johnson	3.2
Anderson, Blount, Knox, Union	6.6
Campbell, Claiborne, Cocke, Cumberland, Fentress, Grainger, Hamblen, Jefferson, Loudon, Morgan, Roane, Scott, Sevier	4.5

County	Goals for Minority Participation for each Trade
Montgomery	18.2
Davidson, Cheatham, Dickson, Robertson, Sumner, Williamson, Wilson, Rutherford	15.8
Bedford, Cannon, Clay, Coffee, Dekalb, Franklin, Giles, Hickman, Houston, Humphreys, Jackson, Lawrence, Lewis, Macon, Marshall, Maury, Moore, Overton, Perry, Pickett, Putnam, Smith, Stewart, Trousdale, Van Buren, Warren, Wayne, White	12.0
Shelby, Tipton	32.3
Benton, Carroll, Chester, Crockett, Decatur, Dyer, Fayette, Gibson, Hardeman, Hardin, Haywood, Henderson, Henry, Lake, Lauderdale, McNairy, Madison, Obion, Weakley	26.5

These goals are applicable to all the Contractor's construction work whether or not it is Federal or federally assisted.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in CFR Part 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 through- out the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from Project to Project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Office of Federal Contract Compliance Programs at the following address within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation:

U.S. Department of Labor – Regional Office
Office of Federal Contract Compliance Program
61 Forsyth Street, Room 7B75
Atlanta, GA 30303

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 the geographical area in which the contract is to be performed.

S T A T E **O F** **T E N N E S S E E**

(Rev. 08-20-18) January 1, 2015

SPECIAL PROVISION

REGARDING

DISADVANTAGED BUSINESS ENTERPRISE PARTICIPATION – LOCAL PROGRAMS

The disadvantaged business enterprise (DBE) requirements of 49 CFR Part 26 apply to this contract. Accordingly, Disadvantaged Business Enterprises (DBEs) as defined in 49 CFR Part 26 shall have the maximum appropriate opportunity to participate in the performance of this contract or in the performance of subcontracts to this contract. In this latter regard, the Contractor shall take all necessary and reasonable steps in accordance with 49 CFR Part 26 to ensure that DBEs have the opportunity to compete for and perform subcontracts. The Contractor shall not discriminate on the basis of age, race, color, religion, national origin, sex, or disability in the award of subcontracts.

The Contractor shall submit to the Civil Rights Division Small Business Development Program (CRD-SBDP) copies of any subcontract agreements with DBEs upon execution. The Contractor shall identify all DBE subcontractors at the Preconstruction Conference and indicate the approximate date for each DBE subcontractor's appearance on the project. Before terminating and/or substituting a DBE subcontractor, the Contractor must give notice in writing to the DBE subcontractor, with a copy to TDOT's CRD-SBDP, of its intent to terminate and/or substitute including the reason for the request.

The Contractor shall provide notification to the Project Supervisor at least 24 hours prior to each DBE beginning work. The project supervisor or Inspector must complete a "Commercially Useful Function Checklist" to document the first date of work, work items, equipment, and forces of each DBE. The Contractor shall take full responsibility for the performance of a commercially useful function (CUF) by all DBE subcontractors, manufacturers, and materials suppliers who work on or provide materials for the project.

The Contractor shall provide a monthly payment certification to the Department entitled "Prompt Payment Certification Form." The Department shall provide the Contractor with the Prompt Payment Certification Form. An officer of the Contractor shall provide an electronic signature to the Prompt Payment Certification Form and return in Excel format via email to DBE.Runningtally@tn.gov and to the Project Supervisor concurrently. The Prompt Payment Certification Form shall be submitted monthly beginning no later than sixty (60) days after payment of the first estimate. Payments must abide by the conditions set in T.C.A. § 12-4-707.

Prior to receiving final payment, the Contractor shall provide to the project supervisor and CRD-SBDP certification of the dollars paid to each DBE firm, using Form CC3, "Certification of DBE Accomplishment." The certification shall be dated and signed by a responsible officer of the Contractor and by a responsible officer of the DBE. Falsification of this certification may

result in formal enforcement actions, including civil actions for false claims, suspension and debarment proceedings, or other administrative actions affecting bidder qualifications.

The Contractor and all subcontractors shall retain, for a period of not less than three (3) years after final acceptance of a project, copies of canceled checks or other documentation that substantiates payments to DBE firms. These records shall be available at reasonable times and places for inspection by authorized representatives of the Department and various Federal Agencies.

The Contractor is advised that failure to carry out the requirements as set forth above shall constitute a breach of contract, and after notification by the Department, may result in termination of the contract or other remedy deemed appropriate by the Department.

REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS

I. GENERAL

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

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

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

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

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

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

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

II. NONDISCRIMINATION

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

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

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

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

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

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the

provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 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 contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

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

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

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

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or 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 minorities and women.

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

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

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

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

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

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

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, 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 its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

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

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

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

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

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

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

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

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

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

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

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

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

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

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

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

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

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

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

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

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

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. The staffing data should

represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more.

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

IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding $2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

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

1. Minimum wages

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

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

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

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

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

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

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

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for

determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

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

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

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

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

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

b.(1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a “Statement of Compliance,” signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

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

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed,

as specified in the applicable wage determination incorporated into the contract.

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

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

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

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

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

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

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

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

b. Trainees (programs of the USDOL).

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

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

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

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

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity

requirements of Executive Order 11246, as amended, and 29 CFR part 30.

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

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

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

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

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

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

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

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

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

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

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

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

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

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

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

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

VI. SUBLETTING OR ASSIGNING THE CONTRACT

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

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

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

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

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

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

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

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

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

VII. SAFETY: ACCIDENT PREVENTION

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

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

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. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

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

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

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

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

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

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

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

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

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

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

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.
2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

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

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

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

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

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

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

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

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

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

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

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 is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.

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

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

* * * * *

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

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

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

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

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

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

b. Where the prospective 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 Participants:**

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

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," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

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

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

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

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 Participants:

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 participating in covered transactions 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.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000 (49 CFR 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 its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

ATTACHMENT A - EMPLOYMENT AND MATERIALS PREFERENCE FOR APPALACHIAN DEVELOPMENT HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS ROAD CONTRACTS

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

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

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

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

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

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

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

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

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

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

TENNESSEE DEPARTMENT OF TRANSPORTATION

MINIMUM WAGE SCALES FOR FEDERAL AID HIGHWAY CONSTRUCTION

General Decision Number: TN180148 01/05/2018 TN148

Superseded General Decision Number: TN20170148

State: Tennessee

Construction Type: Highway

Counties: Tennessee Statewide.

HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.35 for calendar year 2018 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.35 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2018. The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/05/2018

SUTN2016-001 07/13/2016

	Rates	Fringes
BRICKLAYER	$ 14.26	
CARPENTER	$ 17.52	

CEMENT MASON/CONCRETE FINISHER...$ 15.55

ELECTRICIAN.....$ 24.08

IRONWORKER
- Reinforcing.....$ 16.29
- Structural.....$ 16.89

LABORER
- Common/Unskilled.....$ 13.11
- Skilled
  - Air Tool Operator, Asphalt Raker, Chain Saw Operator, Concrete Mixer (less than 1 yd), Concrete Rubber, Edger, Fence Erector, Form Setter (steel), Guard Rail Erector, Mechanic's Tender (tire changer or oiler), Mortar Mixer, Nozzleman or Gun Operator (gunite), Pipelayer, Sign Erector.....$ 15.27

PAINTER (INCLUDES SANDBLASTER)...$ 26.36

POWER EQUIPMENT OPERATOR:
- GROUP 1
  - Backhoe/Hydraulic Excavator (3/4 yd & over), Crane (less than 20 Tons), End Loader (3 yd & over), Motor Patrol (finish),Piledriver, Dragline.....$ 19.14
- GROUP 1A
  - Drill Operator (Caisson)...$ 25.26
  - Farm Tractor Operator (Power Broom).....$ 13.50
- GROUP 2
  - Backhoe/Hydraulic Excavator (less than 3/4 yd), Bulldozer or Push Dozer, End Loader (less than 3 yd), Motor Patrol (rough), Tractor (crawler/ utility), Truck Driver (Heavy Duty, Off Road) Scraper, Shovel, or Trenching Machine.....$ 17.08

GROUP 3
Asphalt Paver, Concrete Finishing Machine, Concrete Paver, Scale, Spreader (self-propelled), Concrete Grinder, Asphalt Milling Machine, Boring Machine (horizontal).....$ 17.75

GROUP 4
Bobcat, Central Mining Plant, Concrete Pump, Concrete Saw, Curb Machine (automatic or manual), Dozer or Loader (stockpile), Drill (piling), Mulcher or Seeder, Rock Drill (truck mounted), Roller (asphalt), Roller (compaction self-propelled), Soil Stabilization Machine, Tractor (boom and hoist), Bituminous Distributor Machine, pump, Track Drill, Striping Machine....$ 16.48
Heavy Duty Mechanic.....$ 20.33
Light Duty Mechanic.....$ 19.53
Sweeping Machine (Vacuum) Operator.....$ 15.56

GROUP 5
Crane (over 20 Tons).....$ 20.44

TRUCK DRIVER
2 axles.....$ 15.36
3-4 axles.....$ 14.86
5 or more axles.....$ 16.27

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

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours

they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

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

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

Union Rate Identifiers

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

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

Survey Rate Identifiers

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

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

Union Average Rate Identifiers

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

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

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

S T A T E O F T E N N E S S E E

(Orig. 8-20-18) January 1, 2015

SPECIAL PROVISION

REGARDING

DBE CONTRACT GOAL

All contractors shall pursue affirmative action requirements to encourage and increase participation of firms certified as a Disadvantaged Business Enterprise (DBE) as set forth in this special provision and in accordance with 49 CFR Part 26. The bidder shall arrange for the percentage of the work specified on the cover of the Proposal Contract to be performed by Tennessee Uniform Certification Program (TNUCP) Disadvantaged Business Enterprises (DBEs) or otherwise clearly demonstrate adequate good faith efforts as described herein. All payments must follow the conditions set by the most current T.C.A. § 12-4-707.

The Contractor shall take full responsibility for ensuring the performance of a "commercially useful function" (CUF), as defined in 49 CFR Part 26, by all DBE subcontractors, manufacturers, and materials suppliers who work on the project or provide materials for the project.

A. Disadvantaged Business Enterprise Policy

The Contractor shall abide by the following provision and include in all subcontract agreements the following provision, which is designed to promote full participation of DBEs as suppliers and subcontractors through a continuous, positive result-oriented program on contracts let by the Department:

> *The Contractor, sub-recipient 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 U.S. Department of Transportation-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 Department deems appropriate*.

B. Counting DBE Participation toward Meeting Goals

The Contractor shall count DBE participation toward goals in accordance with 49 CFR Part 26. If the DBE performs a CUF on the contract including those functions as a subcontractor, expenditures to a DBE contractor count toward DBE goals. A DBE performs a CUF when it is responsible for execution of some portion of the work of the contract and is carrying out its responsibilities by actually performing, managing, and

supervising the work involved. To perform a CUF, the DBE must also be responsible, with respect to materials and supplies used on the contract, for negotiating price, determining quality and quantity, ordering the material, installing (where applicable), and paying for the material itself. The work performed by the DBE firm shall be necessary and useful to the completion of the contract, and consistent with normal highway construction industry practices in Tennessee. Work performed by a DBE firm in a particular transaction may be counted toward the goal only if the Department determines that it involves a CUF. The determination is verified by the "Commercially Useful Function Checklist" and the requirements of 49 CFR Part 26.

Note: In accordance with 49 CFR 26.55(c), to determine whether a DBE is performing a CUF, the Department must evaluate the amount of work subcontracted, industry practices, whether the amount the firm is to be paid under the contract is commensurate with the work it is actually performing and the DBE credit claimed for its performance of the work, and other relevant factors. A DBE does not perform a commercially useful function if its role is limited to that of an extra participant in a transaction, contract, or project through which funds are passed in order to obtain the appearance of DBE participation. In determining whether a DBE is such an extra participant, the Department must examine similar transactions, particularly those in which DBEs do not participate.

When a DBE is presumed not to be performing a commercially useful function, the DBE may present evidence to rebut this presumption. The Department may determine that the firm is performing a commercially useful function given the type of work involved and normal industry practices.

The bidder may count the following DBE expenditures involving a CUF towards the DBE goal:

1. **Projects where the DBE is the Prime Contractor** – The entire portion(s) of the contract to be completed by certified DBE firm's own forces will be counted toward meeting the goal. This will also include the cost of supplies and materials obtained by the DBE for the work of the contract, including supplies purchased or equipment leased by the DBE. Items of the contract subcontracted to non-DBE firms will not be counted toward the goal.

Note: If a DBE does not perform or exercise responsibility for at least 30 percent of the total cost of its contract with its own work force, or the DBE subcontracts a greater portion of the work of a contract than would be expected on the basis of normal industry practice for the type of work involved, the Department must presume that it is not performing a commercially useful function.

2. **Portions of a Bid from a Joint Venture** – When a DBE performs as a participant in a joint venture, only the total dollar value of the contract equal to the distinct, clearly defined portion of the work of the contract that the DBE performs with its

own forces will count toward DBE goals. A bid from a joint venture between a DBE and a non-DBE Contractor shall include an explanation of DBE commitments on DBE Form 1247A, which must be approved by the Civil Rights Division - Small Business Development Program (CRD-SBDP) prior to the letting. Only the DBE's portion will be counted toward the goal. Joint venture agreements have to be approved separately from the bid documents, prior to the awarding of the contract.

3. **DBE Subcontractors** – The DBE subcontractor shall assume actual and contractual responsibility for provision of materials and supplies, subcontracted work, or other commercially useful functions of the items of work subcontracted to them. When a DBE subcontracts part of the work of its contract to another firm, the value of the subcontracted work may be counted toward the DBE goal only if the DBE's subcontractor is also a DBE. Work that a DBE subcontracts to a non-DBE firm does not count toward the DBE goal. Cost of materials purchased from or the cost of equipment leased from the non-DBE Contractor will not count toward the project DBE commitment. Prior written approval must be obtained from the CRD-SBDP for any DBE use of the Contractor's personnel or equipment.

4. **DBE Manufacturers** – The Contractor may count toward the DBE goal 100% of its expenditures for materials and supplies required under a contract and obtained from a DBE manufacturer only if the DBE operates or maintains a factory or establishment that produces, on the premises, the materials, supplies, articles, or equipment required under the contract and of the general character described by the specifications.

5. **DBE Regular Dealers (Material Suppliers)** – The Contractor may count toward the DBE goal 60% of its expenditures for materials and supplies required under a contract and obtained from a DBE regular dealer. For purposes of this section, a regular dealer is a firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials, supplies, articles or equipment of the general character described by the specifications and required under the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business. To be a regular dealer, the firm must be an established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question. A firm may be a regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating, or maintaining a place of business where such products are bought, kept in stock, and regularly sold to the public if the firm owns and operates the distribution equipment for the products. Any supplementing of the regular dealer's own distribution equipment shall be by a long-term lease and not on an ad hoc or contract-by-contract basis. Any lease containing the terms of the agreement shall be made available to and must be approved in writing by CRD-SBDP

6. **Other DBE Suppliers** − With respect to materials or supplies purchased from a DBE which is neither a manufacturer nor a regular dealer, count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job site, toward DBE goals; provided, the Department finds the fees to be reasonable and not excessive as compared with fees customarily allowed for similar services. The cost of the materials and supplies themselves shall not count toward DBE goals.

7. **Transportation or Hauling of Materials** – The Contractor may count towards the DBE goal hauling in either DBE-owned trucks or in trucks leased to or by DBE firms. The verification of truck drivers employed by DBE firms will continue to be by submission of payrolls independent from any Davis-Bacon regulations. Use the following factors in determining whether a DBE trucking company is performing a CUF:

   a. The DBE must be responsible for the management and supervision of the entire trucking operation for which it is responsible on a particular contract, and there cannot be a contrived arrangement for the purpose of meeting DBE goals.
   b. The DBE must itself own and operate at least one fully licensed, insured, and operational truck used on the contract.
   c. The DBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs.
   d. The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services that the lessee DBE provides on the contract.
   e. The DBE may also lease trucks from a non-DBE firm, including an owner-operator. The DBE that leases trucks equipped with drivers from a non-DBE is entitled to credit for the total value of transportation services provided by non-DBE leased trucks equipped with drivers not to exceed the value of transportation services provided by DBE-owned trucks or leased trucks with DBE employee drivers. Additional participation by non-DBE owned trucks equipped with drivers receives credit only for the fee or commission it receives as a result of the lease arrangement. If the DBE chooses this approach, it must obtain written consent from the Department [CRD-SBDP].
   f. The DBE may lease trucks without drivers from a non-DBE truck leasing company. If the DBE leases trucks from a non-DBE truck leasing company and uses its own employees as drivers, it is entitled to credit for the value of these hauling services.
   g. For purposes of this paragraph, a lease must indicate that the DBE has exclusive use of and control over the truck. Leases cannot be Department contract-specific, must be long term, and must be approved by CRD-SBDP. This does not preclude the leased truck from working for others during the

term of the lease with the consent of the DBE, so long as the lease gives the DBE absolute priority for use of the leased truck. Leased trucks must display the name and identification number of the DBE.

h. Prior to hauling, the Contractor and DBE shall provide the project supervisor a complete list of trucks that will be used on the project for DBE goal participation. The Department will provide a form that shall be used by the Contractor and the DBE to identify the trucks. A revised list will be required any time the trucks used changes. The Contractor and DBE must be able to adequately document the actual amount of hauling eligible for DBE goal participation.

8. **Contracted Labor / Temporary Employment Agencies** – The Department will count the entire amount of fees or commissions charged by a DBE firm for providing a bona fide service, such as professional, technical, consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of the contract; provided, however, the Department must find the fee to be reasonable and not excessive as compared to the fees customarily allowed for similar services.

C. Contract Award Procedures

The established DBE goal will be shown on the proposal as a percent of the total amount bid. If the total proposed DBE work submitted with the bid is less than the percentage participation goal set by the Department, the bidder shall, within three (3) business days from the bid openings, either propose sufficient additional DBE participation to meet the goal or clearly demonstrate by documentation that good faith efforts were made to meet the goal.

1. Bidder's Responsibility

It is the bidder's responsibility to determine the level of professional competence and financial responsibility of any proposed DBE subcontractor. The bidder shall ascertain that the proposed DBE subcontractor has suitable experience and equipment to perform a commercially useful function for work that is common industry practice in the Tennessee highway construction industry.

The Contractor shall develop and maintain records of negotiations with DBEs to reach agreeable prices, quotations and work schedules, including but not limited to a record of dates when the Contractor first contacted each DBE.

2. DBE’s Responsibility

Before bidding and subsequently entering into a contract (as a contractor or subcontractor), the DBE should consider the scope and size of the project, as well as

whether it is certified to receive credit for the type of work performed. As with any contract, this is a legally binding document and should be performed to the best of one's ability. However, should a DBE ever have to withdraw from a contract, it shall provide the CRD-SBDP and Contractor with written documentation. A DBE should only withdraw when there is no other option, as non-completion of its duties may result in temporary disqualification of a prequalified bidder or subcontractor by suspending the privilege of bidding on Department contracts or becoming an approved subcontractor, as outlined in Chapter 1680-05-03 of the Rules of the Department.

3. Proposals with Established Project DBE Goals

For proposals with established project goals, the bidder will be required to complete DBE Form 1247A. The bidder shall list the following information on each DBE Form 1247A that is submitted:

a. The names and addresses of all DBE firms being used or being considered for use under the contract as part of the bidder's DBE commitment;
b. The work classification(s) for each DBE on the contract;
c. The "Amount to DBE" which has been committed to each DBE firm for use on the contract;
d. Written documentation of the bidder's commitment to use a DBE subcontractor whose participation it submits to meet a contract goal; and
e. Written confirmation from each listed DBE firm that it is participating in the contract in the kind and amount of work provided in the Contractor's commitment.

The completed DBE Form 1247A shall be submitted within three (3) business days after the Letting. Failure to provide a completed form or documentation clearly evidencing a good faith effort, as detailed in Section 4 below, within three (3) business days after the Letting may cause the bid to be rejected as irregular. Only certified DBE firms may be used. Contractor may access certification information by viewing the TNUCP DBE Directory website.

When DBE goal projects are involved and the Contractor subcontracts to a non-DBE, and the non-DBE subcontractor in turn subcontracts to a DBE as a second tier subcontractor, the Contractor must affirm in writing his/her knowledge and approval of such an arrangement. Recognition of a second tier arrangement with a DBE subcontractor for goal work must be forwarded to the CRD-SBDP Director for verification, in writing, prior to any work being performed by the DBE which is intended to be counted toward the goal.

4. Bidder Selection and Good Faith Efforts

a. Bidders shall submit proposals that meet the DBE goal or shall submit documentation clearly evidencing that they made a good faith effort to meet the

DBE goal. Contractors who meet or exceed the contract goal will be assumed to have made good faith efforts to utilize DBE firms. DBE firms who bid as Prime Contractors will be considered to have met the goal.

b. In making a fair and reasonable judgment as to whether the bidder has made adequate good faith efforts, the Department shall consider quality, quantity, and intensity of the different kinds of efforts that the bidder has made. The following list of factors is not intended to be a mandatory checklist, nor is it intended to be exclusive or exhaustive. Other factors or types of efforts may be relevant in appropriate cases. In any event, the Department may consider whether the bidder:

    1) Selected portions of the work likely to attract DBE participation. The total dollar value of the portions selected should meet or exceed the contract DBE goal. If it is necessary, the bidder should break down subcontracts into economically feasible units in order to facilitate participation.

    2) Provided notice to a reasonable number of specific DBEs, including those not regularly used by the bidder, that their participation in the contract is being solicited in sufficient time to allow them to participate effectively.

    3) Provided interested DBEs with adequate information about the plans, specifications and requirements of the contract.

    4) Advertised in trade association publications or minority-focused media concerning participation opportunities.

    5) Effectively used the services of available minority community organizations, minority contractors groups, local, state, or federal minority business assistance offices, or other organizations that provide assistance in the recruitment and placement of DBEs.

    6) Negotiated in good faith with interested DBEs, including not rejecting DBEs as unqualified lacking sound reasons based on a thorough investigation of their capabilities.

    7) Made efforts to assist interested DBEs in obtaining bonding or insurance required by the bidder.

    8) Submitted all quotations received from DBEs, and for those quotations not accepted, an explanation of why the DBE was not accepted including price comparisons. Receipt of a lower quotation from a non-DBE will not in itself excuse a bidder’s failure to meet the contract goal.

9) Has adequate records of its contacts and negotiations with DBEs.

c. If the Contractor has not met the DBE goal or submitted documentation clearly evidencing good faith efforts within three (3) business days after the bid opening, the Contractor's bid will be considered non-responsive and may be cause for the forfeiture of the Proposal Guaranty which shall become the property of the Department, not as penalty, but as liquidated damages. The Department then may consider the next lowest responsive bid for award.

As soon as practical after contract award, the Contractor shall submit copies of all binding subcontracts and purchase orders with DBEs to the respective Project Supervisor and to CRD-SBDP.

No progress estimate shall be processed until copies of all binding subcontracts and purchase orders with DBEs have been received.

5. Joint Checking Allowance for DBE

A DBE must receive pre-approval by the Department before using a joint check. Joint check requests shall be submitted by the DBE to CRD-SBDP prior to the subcontract agreement.

The following are some general conditions that must be met regarding joint check use:

a. The second party (typically the Contractor) acts solely as a guarantor.
b. The DBE must release the check to the supplier.
c. The use of joint checks must be a commonly recognized business practice in the industry.
d. The DBE remains responsible for all other elements of 49 CFR Part 26.55(c)(1)
e. The DBE is not required to use a specific supplier nor the Contractor's negotiated unit price.
f. The DBE shall submit receipt/copy of cancelled checks to CRD-SBDP.

D. Construction Requirements

1. Preconstruction Conference

The Contractor shall identify all DBE subcontractors and indicate the approximate dates for their appearance on the project. The Department will review the contract information to verify the actual work to be performed by the DBE contractors and will review any lease agreements allowed as part of the DBE commitment. Information submitted shall match Form 1247A.

2. Process for Removal of a DBE

At no time shall a DBE be terminated or substituted without prior written consent from CRD-SBDP. This includes, but is not limited to, instances in which the Contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm. The Contractor shall utilize the specific DBEs listed to perform the work and supply the materials for which each is listed unless the Contractor obtains the CRD-SBDP's written consent as provided herein. Absent such written consent, the Contractor shall not be entitled to any payment for work or material unless it is by the listed DBE. The CRD-SBDP may provide such written consent only if it agrees that the Contractor has good cause to terminate the DBE firm, as further described below.

Before terminating and/or substituting a DBE subcontractor on a project that includes SP1247 in the Contract Proposal, the Contractor must give notice in writing to the DBE subcontractor, with a copy to the CRD-SBDP, of its intent to request to terminate and/or substitute including the reason for the request.

The Contractor must then give the DBE five (5) days to respond to the Contractor's notice. The DBE shall then advise the CRD-SBDP and the Contractor of the reasons, if any, why it objects to the proposed termination of its subcontract and why the CRD-SBDP should not approve the Contractor's action. If required in a particular case as a matter of public necessity (e.g., safety), the CRO-SBDP may provide a response period shorter than five (5) days.

If approval is granted for removal, CRD-SBDP will submit a letter to the Contractor and the DBE. Good faith efforts shall then be directed at finding another DBE to perform at least the same amount of work under the contract as the DBE that was terminated, to the extent needed to meet the contract goal established. The good faith efforts shall be documented by the Contractor. If requested by the CRD-SBDP, the Contractor shall submit the documentation within seven (7) days, which may be extended for an additional seven (7) days if necessary at the request of the Contractor, and the CRD-SBDP shall provide a written determination to the Contractor stating whether or not good faith efforts have been demonstrated.

The Contractor has the responsibility to comply with 49 CFR Part 26.53(f) and all applicable policies and regulations.

Reasons for termination and/or substitution of a DBE subcontractor must meet the reasons for good cause as outlined in the current 49 CFR Part 26.53(f), which include, but are not limited to, circumstances in which the listed DBE subcontractor:

a. Fails or refuses to execute a written contract;

b. Fails or refuses to perform the work of its subcontract in a way consistent with normal industry standards. Provided, however, that good cause does not exist if the failure or refusal of the DBE subcontractor to perform its work on the subcontract results from the bad faith or discriminatory action of the Contractor;
c. Fails or refuses to meet the Contractor's reasonable, nondiscriminatory bond requirements;
d. Becomes bankrupt, insolvent, or exhibits credit unworthiness;
e. Becomes ineligible to work on public works projects because of suspension and debarment proceedings pursuant 2 CFR Parts 180, 215 and 1,200 or applicable state law;
f. Is not a responsible contractor, as determined by the Department;
g. Voluntarily withdraws from the project and provides written notice to the Contractor of its withdrawal;
h. Is ineligible to receive DBE credit for the type of work required;
i. Is unable to complete its work on the contract as a result of death or disability of an owner; and/or
j. For other documented good cause, the Department may elect to compel the termination of the DBE subcontractor; provided that good cause does not exist if the Contractor seeks to terminate a DBE it relied upon to obtain the contract so that the Contractor can self-perform the work for which the DBE was engaged, or so that the Contractor can substitute another DBE or non-DBE contractor after contract award.

3. Brokering of work by DBEs is not allowed and is a material breach of contract. A DBE firm involved in brokering of work may result in removal or suspension of DBE certification and/or formal enforcement actions, including civil actions for false claims, suspension and debarment proceedings, or other administrative actions affecting bidder qualifications Any firm involved in brokering of work that engages in willful falsification distortion, or misrepresentation with respect to any facts related to the project shall be referred to the U. S. Department of Transportation's Office of the Inspector General for prosecution under Title 18, U. S. Code, Section 641. Contractor shall place this provision in all subcontracts with DBEs.

4. The Contractor shall provide notification to the Project Supervisor at least 24 hours prior to each DBE beginning work. A Department Project Supervisor/Inspector must complete a Commercially Useful Function (CUF) Checklist to document the first date of work, work items, equipment, and forces of each DBE.

The Contractor shall provide a monthly payment certification to the Department entitled "Prompt Payment Certification Form." The Department shall provide the Contractor with a computer generated Prompt Payment Certification Form. An officer of the Contractor shall provide an electronic signature to the Prompt Payment Certification Form and return via email to DBE.Runningtally@tn.gov.

5. The Department will hold estimate payment if previously listed information is not submitted. Reasons for non-payment to a DBE could include the following:

    a) Whether the DBE is performing satisfactorily;
    b) Whether the Contractor has reason to believe the DBE is not performing a commercially useful function, and if so, why and what steps the Contractor is taking to rectify the situation.

In the event the Contractor reports questions in relation to prompt payment regarding whether a DBE is independent and performing a commercially useful function and takes appropriate steps promptly to address the issue, then the Department will take this effort into account when considering Contractor compliance measures as described below. Payments must abide by the conditions set in TCA 12-4-707.

E. Post Construction Requirements

Prior to receiving final payment, the Contractor shall provide to the Project Engineer and CRD-SBDP certification of the dollars paid to each DBE firm, using Form CC3, "Certification of DBE Accomplishment." The certification shall be dated and signed by a responsible officer of the contractor and by a responsible officer of the DBE. Falsification of this certification may result in removal or suspension of DBE certification and/or formal enforcement actions, including civil actions for false claims, suspension and debarment proceedings, or other administrative actions affecting bidder qualifications. The final estimate will not be paid to the Contractor until proper certifications including CC-3 have been made.

F. Required Records

The Contractor and all subcontractors shall retain, for a period of not less than three (3) years after final acceptance of a project, copies of canceled checks or other documentation that substantiates payments to DBE firms. These records shall be available at reasonable times and places for inspection by authorized representatives of the Department and various Federal Agencies. Copies shall be provided to the Department if requested.

G. Contractor Compliance

1. If the Contractor fails to comply with Special Provision 1247 and/or 49 CFR Part 26, resulting in failure to obtain goal where a good faith effort was not accepted, the Department shall take one or a combination of the following steps:

    1) The Department may withhold from the Contractor the monetary value of the unattained goal percentage plus an additional 10% for engineering costs, not as penalty but as liquidated damages.

    2) Suspend the Contractor from participation in Department bid lettings pursuant to rules promulgated by the Department.

3) For repeated failures to comply, debar the Contractor pursuant to rules promulgated by the Department.

4) Invoke other remedies available by law and/or in the contract.

5) Invoke any other lawful remedy agreed upon by the Commissioner and the Contractor in writing.

STATE OF TENNESSEE

July 23, 2001

SPECIAL PROVISION

REGARDING

VIDEO DETECTION FOR TRAFFIC SIGNALS

This specification establishes the minimum requirements for a system that detects vehicles on a roadway by video image processing.

1.0 FUNCTIONAL CAPABILITIES

Generally, the system shall include video cameras, image processing units, and all appurtenances as recommended by the manufacturer for proper operation. A manufacturer may meet the functional aspects of this specification by integrating the optics, image processing hardware, and a general purpose CPU in one sealed enclosure.

1.1 AVAILABLE SYSTEM CONFIGURATION

The proposed video vehicle detection system shall be available in various configurations to allow maximum deployment flexibility. Each configuration shall have identical user interface for system setup and configuration. The communications protocol to each configuration shall be identical and shall be hardware platform independent.

Wired camera systems shall be able to transmit NTSC or PAL video signals, with minimal degradation, up to 1000 feet under ideal conditions.

Wireless camera systems shall be able to transmit NTSC or PAL video signals, with minimal degradation, up to 500 feet under normal conditions, and up to 900 feet under ideal electromagnetic interference conditions.

1.2 SYSTEM INTERFACES

VIDEO INPUT: Each video input shall accept RS170 (NTSC) or CCIR (PAL) signals from an external video source (camera sensor or VCR). The interface connector shall be located on the video processing unit.

VIDEO LOCK LED: A LED indicator shall be provided to indicate the presence of the video signal. The LED shall illuminate upon valid video synchronization and turn off when the presence of a valid video signal is removed

VIDEO OUTPUT: One video output shall be provided. The video output shall be RS170 or CCIR compliant and shall pass through the input video signal.

SERIAL COMMUNICATIONS: A serial communications port shall be provided. The serial port shall be compliant with RS232. The serial communications interface shall allow the user to remotely configure the system and/or to extract calculated vehicle/roadway information. The interface protocol shall be documented and interface software shall be provided. The interface protocol shall support multi-drop or point-to-multipoint communications. Each video vehicle detection system shall have the capability to be addressable.

DETECTION LEDS: LED's shall be provided on the front panel. The LED's shall illuminate when a contact closure output occurs.

1.3 GENERAL SYSTEM FUNCTIONS

Detection zones shall be programmed via an on board menu displayed on a video monitor and a pointing device or via a laptop computer.

The video detection processing unit (VDPU) shall store a minimum of two different detection zone patterns.

The VDPU shall detect vehicles in real time as they travel across each detection zone.

The VDPU shall have an RS232 port for communications with an external computer. The VDPU RS232 port shall be multi-drop capable.

The VDPU shall accept new detection patterns from an external computer through the RS-232 port when the external computer uses the correct communications protocol for downloading detection patterns. A WINDOWS™-based software designed for local or remote connection and providing video capture, real-time detection indication and detection zone modification capability shall be provided with the system.

The VDPU shall send its detection patterns to an external computer through the RS-232 port when requested when the external computer uses the correct communications protocol for uploading detection patterns.

The VDPU shall default to a safe condition, such as a constant call on each active detection channel, in the event of unacceptable interference with the video signal.

The system shall be capable of automatically detecting a low-visibility condition such as fog and respond by placing all defined detection zones in a constant call mode. A user-selected output shall be active during the low-visibility condition that can be used to modify the controller operation if connected to the appropriate controller input modifier(s). The system shall automatically revert to normal detection mode when the low-visibility condition no longer exists.

2.0 VEHICLE DETECTION

2.1 DETECTION ZONES

A minimum of 128 detection zones (a minimum of 24 detection zones per camera) shall be supported and each detection zone can be sized to suit the site and the desired vehicle detection region.

A single detection zone shall be able to replace multiple inductive loops and the detection zones shall be OR'ed as the default or may be AND'ed together to indicate vehicle presence on a single phase of traffic movement.

The VDPU's memory shall be non-volatile to prevent data loss during power outages.

The selection of the detection zone pattern for current use shall be available.

The VDPU shall provide dynamic zone reconfiguration (DZR). DZR enables normal operation of existing detection zones when one zone is being added or modified during the setup process. The vehicle detection equipment shall output a constant call on any detector channel corresponding to a zone being modified.

Detection zones shall be directional to reduce false detections from objects traveling in directions other than the desired direction of travel in the detection area.

The VDPU shall output a constant call for each enabled detector output channel if a loss of video signal occurs. The VDPU shall output a constant call during the background learning period.

Detection zone outputs shall be configurable to allow the selection of presence, pulse, extend, and delay outputs.

A minimum of six detection zones per camera view shall have the capability to count the number of vehicles detected. The count value shall be internally stored for later retrieval through the RS-232 port. The data collection interval shall be user definable in at least the periods of 1, 5, 15, 30 or 60 minutes.

3.0 VEHICLE DETECTION HARDWARE

The VDPU hardware shall be powered by 120 VAC 60 HZ single-phase power. Surge ratings shall be as set forth in NEMA specifications. Power consumption shall not exceed 135 watts.

3.1 DETECTION OUTPUTS

The VDPU shall include ports for transmitting TS1 and TS2 detections to a traffic controller. The TS1 contact closure port shall be a 37-pin "D" connector. The TS2 port shall be a 15-pin "D" connector.

3.2 VIDEO INPUTS

The VDPU shall be able to accept a minimum of four video input connections suitable for RS170 video inputs. Each video input shall include a switch selectable 75-ohm or higher impedance termination to allow camera video to be routed to other devices, as well as input to the VDPU for vehicle detection. The video inputs to the VDPU shall include transient voltage suppression and isolation. Amplification that shall assure the 1-volt peak to peak video signal integrity is maintained despite video cabling losses and externally induced transients shall be provided. The amplifier shall have a minimum common mode rejection at 60 hz or 90 db.

3.3 VIDEO OUTPUTS

The VDPU shall be able to provide a minimum of one video output connection.

3.4 MECHANICAL

The VDPU shall operate satisfactorily in a temperature range from -34 °C TO +60 °C and a humidity range from 0%RH TO 95%RH, non-condensing as set forth in NEMA specifications.

The VDPU enclosure shall include provisions to be bonded to a good earth ground.

The VDPU shall include an RS232 port for serial communications with a remote computer.

This port shall be a 9-pin "D" subminiature connector on the front of the VDPU.

The VDPU shall utilize flash memory technology to enable the loading of modified or enhanced software through the RS232 port and without modifying the VDPU hardware.

4.0 CAMERA

The video cameras used for traffic detection shall be furnished by the VDPU supplier and shall be qualified by the supplier to ensure proper system operation.

The camera shall produce a useable video image of the bodies of vehicles under all roadway lighting conditions, regardless of time of day. The minimum range of scene luminance over which the camera shall produce a useable video image shall be the minimum range from nighttime to daytime, but not less than the range 0.1 lux to 10,000 lux.

The camera shall use a CCD sensing element and shall output monochrome or color video with resolution of not less than 380 lines horizontal.

The camera shall be housed in a weather-tight sealed enclosure. The housing shall be field rotatable to allow proper alignment between the camera and the traveled road surface.

The camera enclosure shall be equipped with a sunshield. The sunshield shall include a provision for water diversion to prevent water from flowing in the camera's field of view.

The camera enclosure shall include a thermostatically controlled heater to assure proper operation of the lens shutter at low temperatures and prevent moisture condensation on the optical faceplate of the enclosure.

The camera shall be powered by 120-240 VAC.

The camera enclosure shall be equipped with separate, weather-tight connections for power and setup video cables at the rear of the enclosure. These connections may also allow diagnostic testing and viewing of video at the camera while the camera is installed on a mast arm or pole using a lens adjustment module (LAM) supplied by the VDPU supplier. Video and power shall not be connected within the same connector.

The video signal output by the camera shall be black and white or color in RS170 or CCIR format.

The video signal shall be fully isolated from the camera enclosure and power cabling.

5.0 INSTALLATION

CAMERAS - The coaxial cable to be used between the camera and the VDPU in the traffic cabinet shall be Belden 8281 or a 75 ohm, precision video cable with 20 gauge solid bare copper conductor (9.9 ohms/m), solid polyethylene insulating dielectric, 98% (min) tinned copper double-braided shield and black polyethylene outer covering.

The signal attenuation shall not exceed 0.78 db per 100 feet at 10 mhz. Nominal outside diameter is 0.304 inches. The coax cable shall be a continuous unbroken run from the camera to the VDPU. This cable shall be suitable for installation in conduit or overhead with appropriate span wire. 75-ohm connectors shall be used at both the camera and cabinet ends. The coaxial cable, connector, and crimping tool shall be approved by the supplier of the video detection system, and the manufacturer's instructions shall be followed to ensure proper connection.

6.0 WARRANTY

The supplier shall provide a two-year warranty on the video detection system.

During the warranty period, technical support shall be available from the supplier via telephone within 4 hours of the time a call is made by a user, and this support shall be available from factory-certified personnel or factory-certified installers.

During the warranty period, updates of all software shall be available from the supplier without charge.

7.0 MAINTENANCE, SUPPORT, AND TRAINING

The supplier shall maintain an adequate inventory of parts to support maintenance and repair of the video detection system. These parts shall be available for delivery within 30 days of placement of an acceptable order at the supplier's then current pricing and terms of sale for said parts.

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

Installation and training support shall be provided by a factory-authorized representative and shall be a minimum IMSA-level II certified signal technician.

8.0 COMPENSATION

Vehicle Detection (Video) shall be measured and paid for per camera furnished and installed, and shall be full compensation for each camera and the associated VDPU, cable, appurtenances, training, warranty, and support as outlined herein.

Payment will be made under item 730-13.02, Vehicle Detection (Video), per each.

PROPOSAL

TO THE CITY OF GOODLETTSVILLE, TENNESSEE

By submitting this Proposal, the undersigned bidder represents that it has carefully examined the site of the work described herein, has become familiar with local conditions and the character and extent of the work; has carefully examined the Plans, the *Standard Specifications for Road and Bridge Construction* (January 1, 2015) adopted by the State of Tennessee, Department of Transportation, with subsequent revisions which are acknowledged to be a part of this Proposal, the Special Provisions, the Proposal Form, the Form of Contract, and the Form of Contract Payment and Performance Bond; and thoroughly understands their stipulations, requirements, and provisions.

The undersigned bidder has determined the quality and quantity of materials required; has investigated the location and determined the sources of supply of the materials required; has investigated labor conditions; and, has arranged for the continuous prosecution of the work herein described.

By submitting this Proposal, the undersigned bidder agrees to provide all necessary equipment, tools, labor, incidentals, and other means of construction, to do all the work, and furnish all the materials of the specified requirements which are necessary to complete the work in accordance with the Plans, and the Specifications, and agrees to accept as payment in full the unit prices for the various items described in the Specifications that are set forth in this Proposal. The bidder understands that the quantities of work specified are approximate only and are subject to increase or decrease and that any such increase or decrease will not affect the unit prices set forth in this Proposal. Compensation for "extra work" which may be required by the CITY OF GOODLETTSVILLE in connection with the construction and completion of the work but which was not reflected in the Plans and Specifications at the time of bidding, will be made in the following manner: work for which there is a unit price set forth in this Proposal will be compensated at that unit price; work for which there is no unit price set forth in this Proposal will be compensated in accordance with the applicable Tennessee Department of Transportation Standard Specifications.

By submitting this Proposal, the parties hereto, in the performance of this Contract, shall not act as employees, partners, joint ventures, or associates of one another. It is expressly acknowledged by the parties hereto that such parties are independent contracting entities and that nothing in this Contract shall be construed to create an employer/employee relationship or to allow either to exercise control or direction over the manner or method by which the other transacts its business affairs or provides its usual services. The employees or agents of one party shall not be deemed or construed to be the employees or agents of the other party for any purpose whatsoever.

By submitting this Proposal, the undersigned bidder, if awarded the contract, agrees that it will be responsible for compliance with the Patient Protection and Affordable Care Act ("PPACA") with respect to itself and its employees, including any obligation to report health insurance coverage, provide health insurance coverage, or pay any financial assessment, tax, or penalty for not providing health insurance. The Contractor shall indemnify the State and hold it harmless for any costs to the State arising from Contractor's failure to fulfill its PPACA responsibilities for itself or its employees.

By submitting this Proposal, the undersigned bidder, if awarded the contract, shall be registered with the Department of Revenue for the collection of Tennessee sales and use tax or provide confirmation from the Department of Revenue that the bidder is not required to register for the Tennessee sales and use tax. This registration requirement is a material requirement of this Contract.

By submitting this Proposal, the undersigned bidder hereby agrees to be bound by the award of the Contract and, if awarded the Contract on this Proposal, to execute the required Contract and the required Contract Payment and Performance Bond within ten (10) days after receipt of notice of the award. The undersigned bidder submits herewith the required Proposal guaranty in an amount of not less than five percent (5%) of the total amount of the Proposal offered and agrees and consents that the Proposal guaranty shall immediately be at the disposal of the CITY OF GOODLETTSVILLE, not as a penalty, but as an agreed liquidated damage if the required Contract and Contract Payment and Performance Bond are not executed within ten days from receipt of the notice of award.

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to § 12-12-106. This list is generated to identify entities ineligible to contract with the State of Tennessee or any political subdivision of the State per the Iran Divestment Act, T.C.A. §§ 12-12-101 – 113, and the current list may be found at the Tennessee Department of General Services, Central Procurement Office, website under the Public Information Library webpage at the following link: http://tn.gov/assets/entities/generalservices/cpo/attachments/List_of_persons_pursuant_to_Tenn._Code_Ann._12-12-106._Iran_Divestment_Act-July.pdf.

THIS PROPOSAL SUBMITTED BY:

Bidder (1)

By:

Printed Name and Title

Address

City/State/Zip

Bidder (1) being a _____ composed of officers, partners, or owners as follows:
(Type of business entity)

Name/Title	Name/Title
Name/Title	Name/Title
Name/Title	Name/Title

Bidder (2)*

By:

Printed Name and Title

Address

City/State/Zip

Bidder (2) being a _____ composed of officers, partners, or owners as follows:
(Type of business entity)

Name/Title	Name/Title
Name/Title	Name/Title
Name/Title	Name/Title

BID FORM

FOOT NOTE	ITEM NUMBER	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT COST	EXTENSION
1	202-03	REMOVAL OF RIGID PAVEMENT, SIDEWALK, ETC.	S.Y.	69		
2	202-03.01	REMOVAL OF ASPHALT PAVEMENT	S.Y.	200		
3	202-08.15	REMOVAL OF CURB AND GUTTER (CONCRETE OR ASPHALT)	L.F.	170		
	203-07	FURNISHING & SPREADING TOPSOIL	C.Y.	50		
4	209-03.20	FILTER SOCK (8 INCH)	L.F.	170		
4	209-05	SEDIMENT REMOVAL	C.Y.	221		
4	209-08.02	TEMPORARY SILT FENCE (WITH BACKING)	L.F.	150		
4	209-08.03	TEMPORARY SILT FENCE (WITHOUT BACKING)	L.F.	1200		
4	209-09.41	CURB INLET PROTECTION (TYPE 2)	EACH	1		
4	209-09.43	CURB INLET PROTECTION (TYPE 4)	EACH	5		
4	209-40.31	CATCH BASIN PROTECTION (TYPE E)	EACH	1		
5	407-02.14	ASPHALT PAVEMENT REPAIR	S.Y.	67		
	407-20.05	SAW CUTTING ASPHALT PAVEMENT	L.F.	860		
	701-01.01	CONCRETE SIDEWALK (4")	S.F.	1550		
6	701-02.01	CONCRETE CURB RAMP (RETROFIT)	S.F.	500		
6	701-02.03	CONCRETE CURB RAMP	S.F.	1915		
	701-03	CONCRETE MEDIAN PAVEMENT	C.Y.	11		
	702-01	CONCRETE CURB	C.Y.	16		
	702-03	CONCRETE COMBINED CURB & GUTTER	C.Y.	10		
7	712-01	TRAFFIC CONTROL	LS	1		
	712-04.01	FLEXIBLE DRUMS (CHANNELIZING)	EACH	150		
	712-05.03	WARNING LIGHTS (TYPE C)	EACH	150		
	712-06	SIGNS (CONSTRUCTION)	S.F.	1200		
	712-08.03	ARROW BOARD (TYPE C)	EACH	4		

FOOT NOTE	ITEM NUMBER	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT COST	EXTENSION
	713-11.01	"U" SECTION STEEL POSTS	LB	462		
	713-15	REMOVAL OF SIGNS, POSTS AND FOOTINGS	LS	1		
	713-15.02	REMOVAL & RELOCATION OF SIGN & SUPPORT	EACH	8		
	713-15.36	REMOVE SIGN, SUPPORT & FOOTING	EACH	5		
	713-16.21	SIGNS (R10-3E)	EACH	50		
	713-16.22	SIGNS (R10-12)	EACH	1		
	713-16.23	SIGNS (TN-69A) FLASHING YELLOW ARROW	EACH	15		
	713-16.24	SIGNS (R10-15R)	EACH	2		
	713-16.25	SIGNS (W11-2)	EACH	8		
	713-16.26	SIGNS (W16-7P)	EACH	7		
	713-16.27	SIGNS (R1-2)	EACH	2		
	713-16.28	SIGNS (R5-1)	EACH	2		
	713-16.29	SIGNS (D3-1)	EACH	1		
	713-16.30	SIGNS (W16-9P)	EACH	1		
8	716-02.04	PLASTIC PAVEMENT MARKING (CHANNELIZATION STRIPING)	S.Y.	140		
8	716-02.05	PLASTIC PAVEMENT MARKING (STOP LINE)	L.F.	270		
8	716-02.06	PLASTIC PAVEMENT MARKING (TURN LANE ARROW)	EACH	9		
8	716-02.09	PLASTIC PAVEMENT MARKING (LONGITUDINAL CROSS-WALK)	L.F.	2000		
8	716-03.01	PLASTIC WORD PAVEMENT MARKING (ONLY)	EACH	10		
8	716-04.01	PLASTIC PAVEMENT MARKING (STRAIGHT-TURN ARROW)	EACH	5		
8	716-04.12	PLASTIC PAVEMENT MARKING (YIELD LINE)	S.F.	30		
	716-08.01	REMOVAL OF PAVEMENT MARKING (LINE)	L.F.	820		
	716-08.03	REMOVAL OF PAVEMENT MARKING (CROSS-WALK)	L.F.	1780		
	716-08.05	REMOVAL OF PAVEMENT MARKING (STOP LINE)	L.F.	180		

FOOT NOTE	ITEM NUMBER	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT COST	EXTENSION
	716-08.06	REMOVAL OF PAVEMENT MARKING (ARROWS)	EACH	5		
	716-13.01	SPRAY THERMO P.M. (60 MIL 4IN)	L.M.	0.44		
	716-13.03	SPRAY THERMO P.M. (60 MIL) (8IN BARRIER LINE)	L.F.	451		
9	717-01	MOBILIZATION	LS	1		
10	725-02.41	FIBER OPTIC TERMINATION SPLICE UNIT	EACH	11		
10	725-02.79	FIBER SPLICE ENCLOSURE	EACH	5		
10	725-23.12	FIBER OPTIC CABLE (48F)	L.F.	6975		
10	725-23.21	FIBER OPTIC DROP CABLE (12F)	L.F.	2925		
10	725-23.28	FIBER OPTIC SPLICE FUSION	EACH	11		
10	725-28.07	ETHERNET SWITCH (FIELD LAYER 2)	EACH	11		
10	725-28.08	ETHERNET SWITCH (LAYER 3)	EACH	1		
12, 13	730-01.02	REMOVAL OF SIGNAL EQUIPMENT	EACH	12		
	730-02.09	SIGNAL HEAD ASSEMBLY (130 WITH BACKPLATE)	EACH	12		
	730-02.17	SIGNAL HEAD ASSEMBLY (150 A2H WITH BACKPLATE)	EACH	5		
	730-02.31	SIGNAL HEAD ASSEMBLY (130 A3 WITH BACKPLATE)	EACH	5		
	730-02.32	SIGNAL HEAD ASSEMBLY (140 A4F WITH BACKPLATE)	EACH	4		
	730-02.41	SIGNAL HEAD MODIFICATION (INSTALL BACKPLATE)	EACH	39		
	730-02.42	SIGNAL HEAD MODIFICATION (REPLACE LENS)	EACH	2		
	730-03.20	INSTALL PULL BOX (TYPE A)	EACH	19		
	730-03.21	INSTALL PULL BOX (TYPE B)	EACH	53		
	730-03.23	INSTALL PULL BOX (FIBER OPTIC-TYPE A)	EACH	7		
	730-03.24	INSTALL PULL BOX (FIBER OPTIC-TYPE B)	EACH	4		
10	730-02.30	SIGNAL HEAD ASSEMBLY (BIMODAL FYA SIGNAL ASSEMBLY WITH BACKPLATE)	EACH	11		
	730-05.02	SERVICE CABLE (2 CONDUCTOR, # 6 AWG)	L.F.	930		

FOOT NOTE	ITEM NUMBER	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT COST	EXTENSION
12, 14	730-05.04	MODIFY EXISTING ELECTRICAL SERVICE CONNECTION	EACH	11		
	730-08.01	SIGNAL CABLE - 3 CONDUCTOR	L.F.	10010		
	730-08.02	SIGNAL CABLE - 5 CONDUCTOR	L.F.	12470		
	730-08.03	SIGNAL CABLE - 7 CONDUCTOR	L.F.	19080		
	730-11.11	RISER ASSEMBLY (FIBER OPTIC)	EACH	1		
15, 16	730-12.07	CONDUIT 1" DIAMETER (RGS)	L.F.	555		
	730-12.13	CONDUIT 2" DIAMETER (JACK AND BORE)	L.F.	2130		
15, 16	730-12.16	CONDUIT (2" DIAMETER HDPE)	L.F.	4580		
10	730-13.02	VEHICLE DETECTOR (VIDEO)	EACH	3		
	730-14.01	SHIELDED DETECTOR CABLE	L.F.	8220		
	730-14.02	SAW SLOT	L.F.	770		
	730-14.03	LOOP WIRE	L.F.	2350		
10	730-15.07	CABINET (ATC, BASE MOUNTED)	EACH	11		
10, 11	730-16.14	CONTROLLER (INSTALL CITY FURNISHED 16 PHASE ATC)	EACH	11		
17	730-23.30	PEDESTAL POLE (PEDESTRIAN)	EACH	30		
17	730-23.72	CANTILEVER SIGNAL SUPPORT (1 ARM @ 35')	EACH	1		
17	730-23.88	CANTILEVER SIGNAL SUPPORT (1 ARM @ 45')	EACH	1		
17	730-23.96	CANTILEVER SIGNAL SUPPORT (1 ARM @ 50')	EACH	2		
17	730-23.97	CANTILEVER SIGNAL SUPPORT (1 ARM @ 55')	EACH	1		
17	730-23.98	CANTILEVER SIGNAL SUPPORT (1 ARM @ 60')	EACH	1		
17	730-23.99	CANTILEVER SIGNAL SUPPORT (1 ARM @ 75')	EACH	1		
	730-26.05	COUNTDOWN PEDESTRIAN SIGNAL	EACH	53		
17	730-26.06	PEDESTRIAN PUSHBUTTON POST	EACH	3		
10, 18	730-26.10	PEDESTRIAN SIGNAL HEAD W/PUSHBUTTON & 15IN SIGN	EACH	50		

FOOT NOTE	ITEM NUMBER	DESCRIPTION	UNIT	TOTAL QUANTITY	UNIT COST	EXTENSION
10	730-35.06	BATTERY BACK-UP AND POWER CONDITIONER	EACH	1		
10	798-06.13	FIBER OPTIC CABLE (48F INDOOR/OUTDOOR CABLE)	L.F.	500		
10	798-06.48	FIBER STORAGE LOOP	EACH	1		
4	801-01	SEEDING (WITH MULCH)	UNIT	10		
4	801-02	SEEDING (WITHOUT MULCH)	UNIT	10		
4	801-03	WATER (SEEDING AND SODDING)	M.G.	10		
10	920-10.04	LCD VIDEO WALL MONITOR	EACH	2		
10	920-10.05	CENTRAL SOFTWARE (TOC)	LS	1		
10	920-11.04	SFP MODULE (TYPE, SPEED, HAUL)	EACH	26		
10	920-11.05	CENTRAL SERVER (TOC)	LS	1		
10	920-12.05	TOC ROOM MODIFICATION	LS	1		

Footnotes:

1 PAY ITEM SHALL BE USED FOR REMOVAL OF NON-VEHICULAR CONCRETE SECTIONS SUCH AS SIDEWALK, CURB RAMPS, AND CONCRETE PLACED WITHIN AN ISLAND / MEDIAN. IT SHALL ALSO INCLUDE THE COST OF SAW CUTTING THE LIMITS OF THESE REMOVAL ITEMS. LIMITS OF SAW CUT SHALL BE DETERMINED AT THE NEAREST SIDEWALK JOINT, WHERE APPLICABLE.

2 DEPENDENT UPON THE DEPTH OF REMOVAL NEEDED, THIS PAY ITEM MAY SOMETIMES INCLUDE REMOVE OF BASE MATERIAL THAT IS BELOW THE RIGID PAVEMENT SECTION.

3 PAY ITEM SHALL BE USED FOR REMOVAL OF ALL CURB AND CURB AND GUTTER (CONCRETE OR ASPHALT).

4 REFER TO EROSION PREVENTION AND SEDIMENT CONTROL NOTES. THIS PAY ITEM SHALL ONLY BE USED WHERE INDICATED BY ENGINEER. SEE SUBSECTION 209.07 OF THE STANDARD SPECIFICATIONS FOR MAINTENANCE REPLACEMENT. ALL QUANTITIES ARE TO BE USED AS DIRECTED BY THE ENGINEER.

5 THIS PAY ITEM INCLUDES ALL NECESSARY BASE MATERIAL AND SITE PREPARATION FOR THE AREA OF REPAIR.

6 THIS ITEM SHALL BE USED FOR THE INSTALLATION OF A CONCRETE CURB RAMP INCLUDING ALL CONCRETE AND THE TRUNCATED DOME TO BE CONSTRUCTED. THIS PAY ITEM ALSO INCLUDES CONCRETE FILL BETWEEN THE SAWCUT LINE AND THE EDGE OF CURB OR CURB / GUTTER. SEE RP-H-SERIES OF THE TDOT STANDARD DRAWINGS AND DETAILS ON SHEET 3C. THIS ITEM SHALL BE PAID ON A SQUARE FOOT BASIS USING THE TOTAL RAMP AREA AS MEASUREMENT FOR PAYMENT.

7 THIS ITEM NUMBER SHALL INCLUDE ALL TRAFFIC CONTROL ACTIVITIES AND DEVICES THAT WILL BE REQUIRED THROUGHOUT THE LIFE OF THE PROJECT AS DESCRIBED ON THE SPECIAL NOTES ON SHEET 2B AND AS DETERMINED BY THE ENGINEER.

8 THE CONTRACTOR MAY ELECT TO SUBSTITUTE PREFORMED PLASTIC FOR THERMOPLASTIC. PREFORMED PLASTIC SHALL BE PAID FOR AT THE SAME UNIT PRICE AS BID FOR THERMOPLASTIC.

9 THE MOBILIZATION ITEM NUMBER IS PROJECT INCLUSIVE AND IS NOT BROKEN DOWN INTO INDIVIDUAL SITES.

10 TECHNICAL SPECIFICATIONS HAVE BEEN DEVELOPED SPECIFICALLY FOR THESE PAY ITEMS. REFER TO THE TECHNICAL SPECIFICATIONS INCLUDED IN THE PROJECT BID BOOK.

11 ITEM INCLUDES INSTALLATION OF MCCAIN OMNI EX2 ATC CONTROLLER INTO PROPOSED CABINET. CONTROLLER WILL BE SUPPLIED BY THE CITIES OF SEVIERVILLE AND PEGION FORGE. SIGNAL SETTINGS WILL BE INPUT INTO THE CONTROLLER PRIOR TO CONSTRUCTION.

12 ITEM SHALL INCLUDE ANY AND ALL COORDINATION WITH UTILITY COMPANIES THAT IS ASSOCIATED WITH THIS TASK.

13 ITEM SHALL INCLUDE THE REMOVAL OF ANY EXISTING SIGNAL EQUIPMENT AS SHOWN ON THE PLANS, INCLUDING BUT NOT LIMITED TO SIGNAL POLES, SIGNAL HEADS, SIGNS ATTACHED TO SIGNAL EQUIPMENT, EXISTING WIRELESS COMMUNICATIONS RADIOS, CONDUCTOR WIRING, TRAFFIC SIGNAL CONTROLLERS, VEHICLE DETECTION EQUIPMENT, AND CONTROLLER CABINETS AND FOUNDATIONS. ALL EQUIPMENT SHALL BE DELIVERED TO THE CITY OF GOODLETTSVILLE.

14 PAY ITEM INCLUDES RELOCATION OF EXISTING ELECTRICAL SERVICE FEED FOR THE NEW TRAFFIC SIGNAL CABINET LOCATIONS. THIS ITEM INCLUDES ANY AND ALL INCIDENTAL ITEMS NECESSARY FOR THE ELECTRICAL SERVICE CONNECTION FOR THE NEW TRAFFIC SIGNAL, INCLUDING RISER ASSEMBLY, ELECTRICAL METER BASE, SERVICE DISCONNECT, AND ANY ADDITIONAL SERVICE CONDUCTORS THAT MAY BE REQUIRED. MODIFICATION OF ELECTRICAL SERVICE CONNECTION SHALL BE COORDINATED WITH THE UTILITY COMPANY.

15 TRENCHING IS NOT BROKEN OUT AS A SEPARATE PAY ITEM; IT SHALL BE INCLUDED IN THE COST OF CONDUIT.

16 THIS PAY ITEM SHALL INCLUDE INSTALLATION OF A SINGLE #6 BCW CABLE IN EVERY TRENCH AND DIRECTIONAL DRILL CONDUIT ROUTE, A 5/8 INCH CW GROUND ROD AT THE BASE OF EACH SIGNAL POLE, AND A SEPARATE #6 BCW CABLE FOR THE CONTROLLER CABINET ALONG WITH A 5/8 INCH CW GROUND ROD. THE SIGNAL POLES SHALL NOT BE BONDED TO THE CONTROLLER CABINET.

17 THIS BID ITEM INCLUDES THE COST OF THE FOUNDATION DESIGN AND IF NECESSARY, THE SOIL EXPLORATION REQUIRED FOR THE DESIGN OF THE SIGNAL POLE FOUNDATION.

18 THIS PAY ITEM IS REFERENCED THROUGHOUT THE PLANS AS "ACCESSIBLE PEDESTRIAN SIGNAL".

_____ and _____/100 Dollars,

$_____.

Note: This project shall be awarded to the lowest responsive and qualified bidder based upon the sum of the base bids for this project (Goodlettsville Traffic Flow Improvements and Traffic Signal Upgrades (PIN: 120327.01)).

END OF BID FORM

PROPOSAL CERTIFICATION

The undersigned, being first duly sworn, certifies on behalf of the bidder that it has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this Proposal or Contract. This is an official document that is required or authorized by law to be made under oath and is presented in an official proceeding. A person who makes a false statement in this certification is subject to the penalties of perjury.

The undersigned further certifies that said bidder is not under the control of any person, firm, partnership, or corporation, which has or exercises any control of any other person, firm, partnership, or corporation, which is submitting a bid on this Contract.

_____ Sworn to and subscribed before me

Bidder (1)

this _____ day of _____, _____

By: _____

_____

Printed Name and Title Notary Public

My commission expires _____

(Seal)

_____ Sworn to and subscribed before me

Bidder (2)

this _____ day of _____, _____

By: _____

_____

Printed Name and Title Notary Public

My commission expires _____

(Seal)

***NOTE: The signature and information for Bidder (2) is to be provided when there is a joint venture.**

CITY OF GOODLETTSVILLE, TENNESSEE

PROPOSAL BOND

CONTRACT NO. 150167

Principal: _____
Print Name of Principal

Surety: _____
Print Name of Surety

KNOW ALL MEN BY THESE PRESENTS, that we, the Principal and Surety above named, are held and firmly bound unto the CITY OF GOODLETTSVILLE in the full and just sum of five percent (5%) of the total amount bid by the Principal for the project stated above, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

NOW, THEREFORE, the condition of this obligation is: the Principal shall not withdraw its bid within sixty (60) days after the opening of the bids, or within such other time period as may be provided in the Proposal, and if the CITY OF GOODLETTSVILLE shall award a Contract to the Principal, the Principal shall, within ten (10) days after written notice of the award is received by him, fully execute a Contract on the basis of the terms, conditions and unit prices set forth in his Proposal or bid and provide bonds with good and sufficient surety, as required for the faithful performance of the Contract and for the protection of all persons supplying labor, material, and equipment for the prosecution of the work. In the event the Principal withdraws its bid after bids are opened, or after award of the Contract has been made fails to execute such the Contract and/or such additional documents as may be required and to provide the required bonds within the time period specified above, then the amount of the Proposal Bond shall be immediately paid to the CITY OF GOODLETTSVILLE, not as a penalty, but as agreed upon liquidated damages.

IN WITNESS WHEREOF, the Principal has caused these presents to be signed by a duly authorized official and the Surety has caused these presents to be duly signed and sealed by an authorized agent or attorney-in-fact.

Principal (1)	Surety (1)
By:	By:
	General Agent or Attorney-in-Fact
Print Name and Title	Date
Date	(Seal)

Principal (2)	Surety (2)
By:	By:
	General Agent or Attorney-in-Fact
Print Name and Title	Date
Date	(Seal)

***NOTE: The signature and information for Principal(2) and Surety(2) is to be provided when there is a joint venture.**

CITY OF GOODLETTSVILLE, TENNESSEE

PROPOSAL GUARANTEE

CONTRACT NO. 150167

Bidder: _____

Print Name of Bidder

KNOW ALL MEN BY THESE PRESENTS, that the above-named Bidder has tendered the attached cashier's or certified check in an amount equal to five percent (5%) of the total amount it bid for the project stated above, payable to the CITY OF GOODLETTSVILLE, to be held pending the fulfillment of the following obligation conditions.

NOW, THEREFORE, the condition of this obligation is: the Bidder shall not withdraw its bid within sixty (60) days after the opening of the bids, or within such other time period as may be provided in the Proposal, and if the CITY OF GOODLETTSVILLE shall award a Contract to the Bidder, the Bidder shall, within ten (10) days after it receives written notice of the award, fully execute a Contract on the basis of the terms, conditions and unit prices set forth in its Proposal or bid and provide bonds with good and sufficient surety, as required for the faithful performance of the Contract and for the protection of all persons supplying labor, material, and equipment for the prosecution of the work. In the event the Bidder withdraws its bid after bids are opened, or after award of the Contract has been made fails to execute such the Contract and/or such additional documents as may be required and to provide the required bonds within the time period specified above, then the CITY OF GOODLETTSVILLE shall cash the attached check and retain the funds, not as a penalty, but as agreed upon liquidated damages.

IN WITNESS WHEREOF, the Bidder has caused these presents to be signed by a duly authorized official.

Bidder (1)	Bidder (2)*
By:	By:
Print Name and Title	Print Name and Title
Date	Date

***NOTE: The signature and information for Bidder(2) is to be provided when there is a joint venture.**

CITY OF GOODLETTSVILLE, TENNESSEE

CONTRACT NO. 150167

This agreement is made and executed in three (3) originals, between the CITY OF GOODLETTSVILLE, and _____ hereinafter referred to as the "Contractor."

WITNESSETH

The CITY OF GOODLETTSVILLE did advertise for, receive and accept a bid from the Contractor for work on the above identified contract.

In consideration of the agreements herein contained, to be performed by the parties hereto and of the payments hereafter agreed to be made, it is mutually agreed by both parties that:

1. The contract between the parties consists of the following "Contract Documents" all of which constitute one instrument:
   (a) the Instructions to Bidders
   (b) the Proposal
   (c) all conditions and terms of this Contract form
   (d) the Contract Payment & Performance Bond and/or Letter of Credit, where applicable
   (e) the most current version of the *Tennessee Department of Transportation Standard Specifications for Road and Bridge* Construction (herein referred to as *TDOT Standard Specifications)*
   (f) Supplemental Specifications
   (g) Revisions and Additions
   (h) Special Provisions
   (i) Addenda
   (j) The most current version of the TDOT Standard Drawings
   (k) The Contract Plans,
   (l) The Work Order
   (m) Construction Changes
   (n) Supplemental Agreements

   All of the provisions contained in the listed Contract Documents are incorporated herein by reference with the same force and effect as though set out in full.

2. The Contract Documents are intended to be complementary and to describe and provide for a complete work. Requirements in one of these are as binding as if occurring in all of them. In case of discrepancy, Supplemental Specifications will govern over the TDOT Standard Specifications; the TDOT Standard Specifications will govern over the local government standard specifications; the Contract Plans will govern over both Supplemental and Standard Specifications, and Special Provisions will govern over both Plans and Specifications. In interpreting Plans, calculated dimensions will govern over scaled dimensions. Contract Plans, typical cross sections and approved working drawings will govern over Standard Drawings.

3. The Contractor agrees to furnish all materials, equipment, machinery, tools and labor and to perform the work required to complete the project in a thorough and

workmanlike manner, to the satisfaction of the appropriate official of the CITY OF GOODLETTSVILLE.

4. The CITY OF GOODLETTSVILLE agrees to pay to the Contractor such unit prices for the work actually done as are set out in the accompanying proposal, in the manner provided for in the TDOT Standard Specifications, Supplemental Specifications and applicable Special Provisions.

5. The Contractor shall, at all times, observe and comply with all applicable federal, state and local laws, ordinances and regulations and shall indemnify and hold harmless the CITY OF GOODLETTSVILLE and all of its officers, agents and servants against any claim of liability or assessment of fines or penalties arising from or based upon the Contractor's and/or its employees' violations of any such law ordinance or regulation. The Contractor shall maintain documentation for all charges against the CITY OF GOODLETTSVILLE under this Contract. The books, records and documents of the Contractor insofar as they relate to the work performed or money received under this contract shall be maintained for a period of seven (7) full years from the date of the final payment and shall be subject to audit at any reasonable time and upon reasonable notice by the CITY OF GOODLETTSVILLE, the State, the Comptroller of the Treasury, the Tennessee Department of Transportation, or their duly appointed representatives.

6. The Contractor shall be responsible for any and all injury or damage to persons or to property arising from the prosecution of the work and due to any act, omission, neglect or misconduct in its manner or method of prosecuting the work or due to its non-execution of the work or due to defective work or materials. The Contractor shall provide proof of adequate and appropriate general liability insurance providing liability coverage in an amount not less that $1 million dollars per occurrence and $300,000 per claimant, naming the CITY OF GOODLETTSVILLE as an additional insured.

7. The Contractor shall indemnify and hold harmless the CITY OF GOODLETTSVILLE and all of its officers, agents and employees from all suits, actions or claims of any character arising from the Contractor's acts or omissions in the prosecution of the work, use of unacceptable materials in constructing the work, infringement of patent, trade mark or copyright, or claims for Workers' Compensation. If any such suit, action or claim is filed, the CITY OF GOODLETTSVILLE may retain from the monies due to the Contractor under this Contract a sum deemed sufficient by the CITY OF GOODLETTSVILLE to protect the CITY OF GOODLETTSVILLE from loss therefrom. Upon resolution of the suit, action or claim, any remaining retained funds will be released.

8. Upon execution of this Contract, the Contractor shall be prepared to begin the work to be performed under the Contract, but will not proceed until it has received official "Notice to Proceed". This official notice will stipulate the date upon which it is expected that the Contractor will begin his work, and from which date the working days tabulated against its time limit will begin. All other requirements in regard to the beginning of construction set forth in the Proposal and Special Provisions will date from the official notice.

IN WITNESS WHEREOF, the parties hereto have cause this Contract to be signed and executed by their respective authorized agents or officials.

Contractor 1	Contractor 2*
By:	By:
Print Name and Title	Print Name and Title
Date	Date

CITY OF GOODLETTSVILLE, TENNESSEE

This Contract is accepted this _____ day of _____, _____

and is effective on the _____ day of _____, _____

_____
[CITY/COUNTY Official]

Approved:

_____
CITY OF GOODLETTSVILLE
Attorney

***NOTE: The signature and information for Contractor 2 is to be provided when there is a joint venture.**

CONTRACT PAYMENT AND PERFORMANCE BOND

Note: to be filled out post-award

CONTRACT NO. 150167

Be it known that _____, as Principal, and_____, as Surety(ies), all authorized to do business in the State of Tennessee, hereby bind themselves to the CITY OF GOODLETTSVILLE, and other potential claimants, for all obligations incurred by the Principal under its contract with CITY OF GOODLETTSVILLE, for the construction of the above identified contract; in the full contract amount of _____

_____ ($_____).

The obligations of the Principal and Surety(ies) under these payment and performance bonds shall continue in full force and effect until all materials, equipment and labor have been provided AND all requirements contained in the contract, plans and specifications have been completed in a timely, thorough and workmanlike manner. The parties agree that these bonds are statutory in nature and are governed by the provisions contained in Title 12, chapter 4 and Title 54, chapter 5 of the Tennessee Code Annotated relating to bonds required of contractors and that those provisions constitute a part of this bond.

By this instrument, the Principal and Surety(ies) specifically bind themselves, their heirs, successors, and assigns, *in solido*, under the following bonds:

Payment Bond. To the CITY OF GOODLETTSVILLE and all "Claimants," as contemplated by T.C.A. Title 54, chapter 5, in the full contract amount of

_____

_____ ($_____), in order to secure the payment in full of all timely claims under the project.

Performance Bond. To the CITY OF GOODLETTSVILLE in the full contract amount of _____

_____ ($_____), in order to secure the full and faithful performance and timely completion of the project according to its plans and specifications, inclusive of overpayments to the contractor and liquidated damages as assessed.

Upon receipt of notice that the Principal is in default under the contract, the Surety(ies) shall undertake to complete performance, without regard to cost. If the Surety(ies) fail or refuse to complete performance of the contract, the CITY OF GOODLETTSVILLE may then proceed with the work in any lawful manner that it may elect until it is finally completed. When the work is thus finally completed, the total cost of the same will be computed. All costs and charges incurred by the CITY OF GOODLETTSVILLE in completing the Work will be deducted from any monies due or which may become due to the Principal. If the total costs of completion exceeds the sum which would have been payable under the Contract, then the Principal and the Surety(ies), *in solido*, shall be liable for and shall pay to the CITY OF GOODLETTSVILLE the amount of such excess.

In witness whereof we have signed this instrument as dated.

Principal/Contractor 1:

By: _____ Date: _____

_____

Printed Name and Title

(For Joint Venture) Principal/Contractor 2:

By: _____ Date: _____

_____

Printed Name and Title

Surety 1:	**Surety 2:**
By:	By:
Attorney-in-Fact	Attorney-in-Fact
Printed Name	Printed Name
Agency Name	Agency Name
Street Address	Street Address
City/State/Zip	City/State/Zip

(Seal) (Seal)

Subsequent correspondence/communication from CITY OF GOODLETTSVILLE with respect to monthly progress reports and/or the contract bonds should be directed to:

For Surety 1:	**For Surety 2:**
Name	Name
Address	Address
City	City
State/Zip	State/Zip
Phone Number	Phone Number
Fax Number	Fax Number

Traffic Flow Improvements and Signal Upgrades – Phase II

FINAL DESIGN

Technical Special Provisions

Prepared For:

City of Goodlettsville, Tennessee

Prepared By:

Kimley-Horn and Associates, Inc.

DECEMBER 2018

Table of Contents

PROJECT OVERVIEW

This project – The City of Goodlettsville's Traffic Improvements and Signal Upgrades – Phase II Construction Project – consists of the construction, installation, and testing of the expansion of a fully functional interconnected traffic signal system. The project will include the interconnection of traffic signals along State Route 174 (Long Hollow Pike) and Conference Drive and will also include signal rebuilds / upgrades, various curb ramp / sidewalk improvements, and associated signing and pavement marking upgrades.

Communication to each of the traffic signals will be provided via an existing and/or proposed fiber optic network. The Contractor will be required to coordinate with City staff to provide a connection to the new Traffic Operations Center (TOC) located within the City of Goodlettsville Public Works building located at 215 Cartwright Street. The project will also consist of the furnishing, installing, testing, and integration of a new signal system software along with field cabinet upgrades at each of the project intersections.

The project further consists of several intersection upgrades. These upgrades include but are not limited to, pedestrian signal additions and modifications, phasing changes, ADA ramps and sidewalk modifications, pavement marking replacement and upgrade, replacement of signal poles and signal heads, and sign replacement and additions. These improvements are specifically detailed on the individual intersection improvement plan sheets.

A. TRAFFIC SIGNAL CONTROLLER

1. Description

Install, configure, and test City of Goodlettsville-provided McCain Omni eX2 Advanced Transportation Controller (ATC) NEMA traffic signal controllers as shown in the plans.

2. Construction Methods

Before any new controller is installed in the field, the Contractor shall program the controller consistent with the phasing and timing plans furnished by the Engineer. The appropriate communications settings (including the IP address) will be programmed by the Contractor. The Contractor shall install the controller in the controller cabinet, making the necessary connections between the controller and the terminal blocks in the controller cabinet.

For local controllers connected to an existing or proposed traffic signal system, the Contractor shall fully integrate the new controller with the existing or proposed communications equipment and network. The Contractor shall setup and configure the local intersection at the TOC and fully test the communications before acceptance testing.

Documentation

The Contractor shall provide to the City a MAC address of the Ethernet network interface for each installed ATC controller.

3. Measurement and Payment

Payment at the contract unit price, per each, shall be made for each City provided controller of the type specified. This shall be payment in full for installing the controller in the controller cabinet, making all connections inside the controller cabinet as required to render the installation operable, and fully integrating the controllers with existing traffic signal system.

Pay Item	Pay Unit
730-16.14, CONTROLLER (INSTALL CITY-FURNISHED 16 PHASE ATC)	EACH

B. TRAFFIC SIGNAL CONTROLLER CABINET

1. Description

At locations shown on the Plans, the Contractor shall furnish and install an Advanced Transportation Controller (ATC) cabinet. Cabinets must be permanently marked with a label including the manufacturer's name or trademark, model / part number, and the year and month of manufacture. The label should be placed on the inside of the main door using a water-resistant method. The label must be visible after installation.

Cabinets shall be provided as a complete unit and have all terminals and facilities necessary for traffic signal control as shown on the plans and shall meet at a minimum, the following requirement:

ATC Controller Cabinet …….…… ITS Cabinet (ATC 5301 v01)

The manufacturer must supply certification of the conformance to the above requirements at the time of the bid.

Cabinets shall also be in accordance with the latest version of the TDOT Traffic Design Manual.

Two (2) paper copies of the cabinet wiring diagram shall be provided with each cabinet. The nomenclature of signal heads, vehicular movements and pedestrian movements on the wiring diagram must be in accordance with the signal operating plan. Documentation must include a list identifying the termination points of cables used for vehicular and pedestrian signal heads, detector loop lead-ins, and pedestrian pushbutton wires. A heavy duty, resealable plastic bag must be mounted on the backside of main cabinet door for storing cabinet documentation.

House the controller in a rigid, weatherproof cabinet, constructed, finished, and equipped as follows, and as shown on the Standard Details:

2. Material

Provide weather-tight cabinets fabricated from aluminum sheet or cast aluminum alloy with a minimum 0.125-inch thickness. All welds on fabricated cabinets shall be internal and continuous; spot welding is not acceptable. Painting of cabinets is only required if the final finish presents an unsightly appearance.

3. Doors

Type III, IV, and V cabinets shall have a hinged front opening door that shall include substantially the full area of the front of the cabinet. Equip the door with a positive hold fast device to secure the door in at least two open positions: one position at approximately 90 degrees and the other at 120 degrees or more. The holdfast device shall be easily secured and released without the use of tools. Equip doors for Type II, III, IV, and V cabinets with a switch compartment, and provide the manual switches, specified in 730.26.7k, with a hinged front opening auxiliary door. Each door shall have a gasket to provide a weatherproof seal when closed.

Provide the main door with a No. 2 pin-tumbler cylinder lock, and the auxiliary door with a standard police sub-treasury lock. Provide four keys for each lock.

Provide a switch which is to be tied to the cabinet light so that cabinet light will be on when the door is open and off when the door is closed.

4. Cabinet Mounting
Mount cabinets on concrete foundation as shown on the Plans or Standard Details.

5. Ventilation
Unless otherwise specified, provide ventilation as follows:

a. On all cabinets housing controllers, mount a screened, rain-tight vent, 1-1/2 inches in diameter or larger, on the cabinet top.
b. Provide screened or filtered inlet ventilation openings, equal to or greater in area than top vents, located in the bottom or lower back side of Type I and II cabinets or around the lower 8 inches portion of Type III cabinets.
c. Construct the vents so as to project within the cabinet no more than necessary to provide for lock nuts and gaskets to retain the vent.
d. Locate vents so as to not interfere with the mounting of controller equipment.

6. Cabinets with Exhaust Fans
Exhaust fans shall consist of an electric fan with ball or roller bearings and a capacity of at least 100 cubic feet per minute. Mount the fan in a rain-tight housing attached to the top of the controller cabinet.
The fan shall be controlled by a thermostat having a temperature differential between turn-on and turn-off of 15 °F (-0, +5 °F), adjustable for turn-on through a minimum calibrated range of from 100 °F to 150 °F.
Whenever a fan is to be installed, provide the air inlet filter and filter holder shown in the Standard Details, or approved equal. Internally seal other air inlets. Provide exhaust fans in all cabinets that house controllers, with the exception of flasher controllers.

7. Auxiliary Equipment
With the exception of cabinets used in special applications (Type I and II), provide all cabinets with the following:

a. Cabinet rack cage to support controller and auxiliary equipment.

b. ATC Cabinet Assemblies:
   1) Service Assembly (SA)
   2) Power Assembly (PA)
      a) DC Power Supply
      b) AC Clean Power Bus
      c) SB1/SB2 and DC Power Bus
      d) Advanced Detection Assembly
      e) Auxiliary I/O Assembly
   3. Input Assembly (IA)
   4. Input Test Panel Assembly
   5. Field Input Termination Assembly (FITA)
   6. Output Assembly (OA)
   7. Field Output Termination Assembly (FOTA)

c. The cabinet shall include an LED light and GFI duplex receptacle which can be used when the main circuit breaker is off.

d. Control panel assembly consisting of:

1. Power supply connections made to a 30-ampere circuit breaker mounted on the cabinet separate from the signal terminal panel. The circuit breaker shall be a magnetic trip type, having an interrupting capacity of at least 2,000 amperes at 125 volts AC. The circuit shall trip between 101% and 125% of rated load, with an inverse time delay characteristic provided. Instantaneous tripping shall occur at ten times the nominal rating. All controllers shall be internally fused.

2. Service line surge protection.

3. Electrical service termination point sized to accept No. 4 AWG copper wire.

4. Ground fault receptacle.

5. Porcelain lamp receptacle to accept a standard traffic signal lamp. If LED lenses are utilized, the shall be dimmable and switchable to reduce glare at night time.

6. Circuit breakers in accordance to the National Electric Code for:

a) Main power input to provide all power associated with normal operation.

b) Flasher power input to provide all power associated with flash operation.

c) Service power to provide power for the lamp and duplex receptacle and\cabinet light.

7. Copper ground bus (minimum of 12 positions).

e. High density switch pack/flasher unit (HDSP). HDSP shall be card based, two-channel and interchangeable with a four-output flasher unit. Output voltage and current shall be measured for each output and reported to cabinet monitor unit.

f. Cabinet monitor unit (CMU). CMU shall be modular unit capable of monitoring 32 channels. Configuration programming of the CMU shall be from a Datakey removable memory device.

g. General purpose relays, where required to perform specified functions. All relays external to the controller or appurtenances shall meet NEMA standards. In addition: Flash transfer relays shall be a hermetically sealed nitrogen enclosure and feature LEDs to indicate contact status. Unless otherwise specified, each cabinet shall include six (6) flash transfer relays. Flash transfer relays shall support Flashing Yellow Arrow for Permissive Left-turn Movements applications.

h. Type II, III, IV, and V cabinets, when specified as housing for traffic actuated controllers, with two or more insulated terminal blocks mounted within the housing, one or more for terminating each field wire.

i. A minimum of 12 available bare ground positions tied to AC Common Return.

j. Earth (driven) ground tie point to terminate a single No. 4 AWG copper ground.

k. A tie point to tie all ground systems within the cabinet to a single reference point. All grounds (AC - return, Chassis, and Logic Ground) must be referenced to a single ground point at the electric service.

l. A panel (police subpanel):

1. A main power switch, which shall be wired to remove all cabinet power when in the Off position.

2. An Automatic Flash switch, which shall be wired as follows:

a) The Flash position shall cause the cabinet to provide Flash Operation. The controller shall continue to operate, and Stop Time shall be applied to the controller.

b) Auto / Manual switch to activate Manual Control Enable.

c) Manual control pushbutton switch with self-coiling cord. Cord shall attach to a 2-position terminal strip via fork type connector (25-feet cable shall be provided).

d) Upon return from Flashing to Automatic, the controller shall initialize in the Start-Up Display condition as programmed in the controller, typically major road phases.

3. A panel mounted inside the main door shall contain the following switches:

a) A technician Stop-Time switch to apply Stop Time to each controller ring.

b) An Interval Advance switch, enabled only by the Stop Time switch, to be momentary pushbutton switch to apply Interval advance to the timer.

c) A Signal On-Off switch, which shall remove the AC power applied to the signal heads for normal operation while the controller continues to operate.

d) Individual phase vehicle and pedestrian detector test switches to be miniature toggle of the On-Off Momentary type to place:

I. No Call - Call provided by detectors

II. Locked detector call

III. Momentary detector call

Insulate or shield switch terminals on back of main cabinet door so that no live parts are exposed.

Leads from the terminal block to the auxiliary door switches shall be no less than No. 18 AWG stranded, with TW plasticized polyvinyl chloride or nylon insulation enclosed in an insulating loom, and shall be of sufficient length to allow full opening of the main cabinet door.

m. The cabinet shall be wired with the appropriate number of inputs and outputs to accommodate vehicular and pedestrian phasing according to plans. At a minimum, cabinets shall include a 16-channel output assembly.

n. All cabinet wiring shall be neatly routed and labeled, laced and permanently secured. All cable shall be secured to the panel, where practical. There shall be no holes drilled through the cabinet walls to mount panels or secure cables.

o. All terminals in the cabinet shall be of the barrier type. The following field connector terminals shall be provided:

1. Four (4) signal output positions (R-Y-G-FL).

2. Ten (10) positions per phase for vehicle loop detector harness.

3. One position per phase for pedestrian detector inputs

p. Cabinets shall have SDLC communication between the controller, CMU, Detector Rack, Radar Detector (if applicable) and Video Detection (if applicable).

q. Cabinets should have an electrical outlet (Non GFI) that has 120 VAC from the OUTPUT side of the Main Power Surge unit.

r. Cabinets shall support Flashing Yellow Arrow for Permissive Left-turn Movements applications.

s. Controller cabinets shall be equipped with a 240V/50A pin-and-sleeve receptacle and manual transfer switch for connection to an external portable generator. The pin-and-sleeve receptacle shall be compatible with CS6369-type generator plugs, or the Contractor shall furnish a mating adapter cable.

8. Measurement and Payment

The Traffic Signal Controller cabinet will be measured in units of each and paid for at the contract price per each. The price bid shall include furnishing, installing, system integration, and testing of a complete Traffic Signal Controller Cabinet including the unit and concrete foundation all the associated harnesses and cabling, all auxiliary cabinet equipment (load switches, flasher relay switches, MMU, etc.), satisfactory

completion of testing and training requirements and all work, equipment, and appurtenances as required to effect the full operation including remote and system control of the local traffic signal complete in place and ready for use. The price bid shall also include all system documentation including: shop drawings, operations and maintenance manuals, wiring diagrams, block diagrams, and other material necessary to document the operation of the Traffic Signal Controller Cabinet. This price shall be full compensation for all labor, tools, materials, equipment, and incidentals necessary to complete the work.

The contract unit price shall be full compensation for all work specified in this section.
Payment will be made under:

Pay Item	**Pay Unit**
730-15.07, CABINET (ATC, BASE MOUNTED)	EACH

Each item will be paid per each as follows:

- 50% of the contract unit price upon approval of Bench Test Component, Bench Test System and Pre-installation test results.
- Additional 20% of the contract unit price upon approval of Stand Alone Site Test results.
- Additional 20% of the contract unit price upon approval of Conditional System Acceptance Test results.
- Final 10% of the contract unit price upon Final System Acceptance.

C. BATTERY BACK-UP SYSTEM

1. Description

This work shall consist of furnishing and installing a true-on-line, power conditioner and DSP processor based uninterruptible power system (UPS) designed for transportation and traffic applications. The inverter shall be in operation at all times capable of supplying clean regulated power (both voltage and frequency) to all loads at all times. This system shall be fully NEMA compliant and meet the full operating temperature range of – 40C to +70C. This system must be fully power factor corrected and fully functional with any type of auxiliary power generator. The UPS system shall be installed in conformance with the Manufacturers recommendations and as specified herein.

2. Materials

Environmental Requirements

The UPS shall meet or exceed NEMA temperature standards from -40° C to +74° C. The UPS shall be certified and field proven to meet or exceed NEMA temperature standards. A certificate of compliance shall be supplied with the Traffic UPS. The UPS internal component boards shall be conformal coated.

Battery Requirements

The battery system shall be certified and field proven to meet or exceed NEMA temperature standards from –40° C to +74° C. Batteries shall be the 51 Ampere-Hour rating type. Batteries shall meet MIL SPEC B-8565J for hydrogen gas emissions. Batteries shall be AGM design with epoxy sealed casing. Batteries shall have power pole connectors with wiring welded to battery posts. Battery posts with welded wires shall be sealed to prevent corrosion. External battery pack shall consist of four or eight 51 Ampere-Hour batteries as specified on the plans.

Reliability Requirements

Calculated MTBF is 100,000 hours based on component ratings. When Bypass and Power Interface Module are included, system MTBF increases to 150,000 hours.

Communications, Controls and Diagnostics Requirements

Alarm function monitoring through the UPS shall be through a standard DB-9F connector with open collectors (40V @ 20mA) indicating:

- Loss of utility power
- Inverter failure
- Low battery

Full interactive remote computer monitoring and control of the UPS functions may be added via an external SNMP/HTTP adaptor with 10/100 auto-sense fast Ethernet. The optional external SNMP/HTTP adaptor shall connect to the UPS via a cable that connects the external adaptor to the USB Type B port located on the front of the UPS.

Front panel controls shall consist of no less than: Power On, Cold (DC) Start, Load 1 and Load 2 switching. The Windows configuration software shall allow the user to monitor and control the following UPS functions through a direct connection to the USB Type B on the UPS:

- Real time input status including frequency, voltage, current and power.
- Real time output status including frequency, voltage, current and power.
- Real time battery status including charge type, on time totals, charge level, voltage, current and temperature.
- Real time nominal output rating, nominal output power, nominal low battery time, audible alarm status and nominal battery life.
- Active alarms – input bad, output bad, overload, bypass bad, output off, UPS shutdown and charger failure.

Serviceability and Maintainability

MTTR (Mean-Time-To-Replace or Repair):

- Electronic: 15 minutes or less
- Battery System: 15 minutes or less

Electrical Requirements

Input Voltage:

▪ Nominal Input Voltage	120 VAC, Single Phase
▪ Input Voltage Range	85 (+/- 5%) VAC to 155 (+/- 5%) VAC
▪ Input Frequency	40 to 70 Hz (+/- 5%)
▪ Input Configuration	IEC, C14 male connector
▪ Input Current (Maximum Draw)	7.2 Amps, Power-Factor Corrected
▪ Input Protection	Input Fuse (15 Amp)

Output Specification:

▪ Nominal Output Voltage	120 VAC, Single Phase
▪ Power Rating	1.25 kVA (1250VA/875W)
▪ Output Voltage Regulation	+/- 4% for 100% step load change and from High battery to Low battery condition
▪ Output Frequency	50 or 60 Hz (+/- .25%, software selectable)
▪ Output Configuration	IEC, C13 female receptacle (X2)
▪ Output Wave Form	True Sinewave
▪ Overload Capacity	110% for 10 seconds 200% for 50 milliseconds
▪ Fault Clearing	Current limit and automatic shutdown
▪ Short Circuit Protection	Current limit and automatic shutdown
▪ Efficiency	92% at full load
▪ Load Power Factor	0.7 lagging through unity to 0.7 leading

3. Functional Requirements

The UPS shall consist of three major components: (1) the electronics module, (2) a detachable power interface module bypass switch, and (3) the external battery system. The **Electronics Module (EM)** shall consist of the following:

- True sine wave, high frequency inverter utilizing IGBT technology. shall consist of the following:
- 3-stage, temperature compensated, battery charger.
- For connection from the Electronics Module to the Power Interface Bypass Switch and Battery System, dedicated harnesses shall be provided and braided nylon sleeve over all conductors.
- Local and remote control of UPS functions.
- Local and remote communications capabilities.
- A detachable Power Interface Bypass Switch for inserting power safety and reliably.
- And be capable of accepting an NTCIP-ready adapter, a Spread Spectrum Radio modem or a Broadband Ethernet Radio.
- DB9F connectors for remote signal alarms, USB type B plug for monitoring and remote communications and USB type A for data retrieval.

The **Power Interface Bypass Switch (PIBS)** shall consist of the following:

- A PIBS shall be required to safely insert utility power into the UPS system.
- The PIBS shall include a manual bypass switch to allow the utility power to pass directly to the signal cabinet without passing through the UPS.
- The PIBS shall include a generator cable for connecting to a portable generator. The PIBS shall automatically control the switching between utility power, generator power and battery power without allowing any power to “back feed” into the power system.

The external **Battery System** shall consist of the following:

- The battery shall be comprised of extreme temperature, deep cycle, AGM/VRLA (Absorbed Glass Mat/Valve Regulated Lead Acid) batteries that have been field proven and tested by the U.S. military.
- The battery system shall consist of either a single string of 4 batteries or a double string of 8 batteries of extreme temperature, deep cycle, AGM/VRLA type (Absorbed Glass Mat/Valve Regulated Lead Acid) batteries. Either battery system shall connect to the UPS without a hardware change to the UPS.
- Batteries shall be certified to operate at extreme temperatures (from -40°C to +74°C) and shall not require aid of any external devices to cool or heat the batteries.
- The batteries shall be provided with appropriate interconnect wiring harness. This harness shall connect the battery pack to the UPS module. The harness shall be a minimum of 5 feet in length.
- The interconnect cable shall be protected with abrasion-resistant nylon sheathing.
- The interconnect cable shall connect to the base module via a Phoenix connector.
- For purposes of safety and proper operation, the Phoenix battery connector shall have two screws to securely attach the battery harness to the UPS to prevent the batteries from becoming disconnected.
- Battery construction shall include heavy-duty, inter-cell connections for low-impedance between cells, and heavy-duty plates to withstand shock and vibration.
- The top cover shall use tongue and groove construction and shall be epoxied to the battery case for maximum strength and durability.

Cabinet

When a separate cabinet is required, the cabinet shall house the batteries, wiring, related equipment, and the UPS, which includes converter/inverter/charger unit, power transfer relay, power management unit, manually operated bypass switch and other control panels and wiring harnesses. The cabinet shall be a nominal 48" High x 24" Wide X 24" Deep. Cabinet shall in conjunction with the traffic signal cabinet foundation in accordance with the plan details. Cabinet for UPS shall be weatherproof and constructed of welded sheet aluminum, 0.125-inch minimum. Cabinet mounting attachments shall be durable, corrosion resistant, chemically compatible so as not to adversely react with the aluminum of the cabinet or isolated from it and of heavy-duty construction. Cabinets shall house the external batteries, wiring, related equipment, and the UPS, which includes converter/inverter/charger unit, power interface bypass switch and other control panels and wiring harnesses. The UPS cabinet door shall be hinged on the right side of the cabinet.

Doors

Cabinet doors shall provide full access to the cabinet interior and shall have durable gaskets to ensure weatherproofing. Two keys for each cabinet shall be provided to the Engineer. Hinges shall be stainless steel and continuous. Doors shall have a doorstop arrangement that will allow it to be firmly positioned at 90 and 135 degrees, ± 10 degrees. The locking system for cabinets shall be a three-point draw roller system. Rollers shall be fabricated from nylon with a diameter of at least 8/10 inch. The door opening shall be double flanged on all four sides.

Cabinet doors shall have a screened and louvered vent design to prevent rain entry, with a standard size furnace vent filter. The filter tray shall be sized to house and secure the filter in place. The screen shall be constructed from at least 0.031-inch aluminum with 1/8-inch diameter openings positioned on 3/16 inch staggered centers. The screen shall be placed on the inlet side of the filter and held in place by the filter or silicone adhesive.

Interior

The interior of cabinet shall be of sufficient size to provide adequate ventilation of the equipment housed therein. Cabinet shall contain at least three adjustable shelves or equivalent supports, with enough space to hold UPS, batteries, battery trays and brackets, wiring and related equipment. Vertical mounting channels for the shelves shall be continuous and shall allow for adjustable shelf placement ranging from 5 inches from the bottom to 5 inches from the top of the cabinet. Shelves and vertical mounting channels shall be heavy duty and have sufficient strength to hold the batteries without deforming, bending or breaking. Wiring panels and terminal blocks shall be neatly finished and clearly and permanently marked with identifications applied by silk screening. Conductors shall be neatly arranged and bundled in groups with cable ties. The bundled conductors shall not obstruct access to other circuits and terminals in the cabinet.
A water-resistant enclosure to store documentation shall be securely attached to the UPS cabinet with studs welded to the cabinet and nuts. The enclosure shall have non-corrosive metal grommets for use with the studs.

A listing, indicating terminal numbers with a description of their use, shall be attached to the UPS cabinet door and overlaid with a clear, plastic covering. Edges of the plastic overlay shall be sealed with a clear, exterior grade waterproofing compound. Unless cable is passing through the cabinet uninterrupted, incoming and outgoing conductors shall have each wire connected to terminal post positions.

A screened air exhaust opening under the top overhang shall be provided. One thermostatically controlled vent fan with a screened guard in the top section of the cabinet with a capacity of exhausting at least 100 CFM shall be provided. The thermostat shall be adjustable from 80 degrees F to 130 degrees F. Degree markings shall be indicated on the thermostat in 10-degree increments. The fan shall be AC operated from the same line output of the Manual Bypass Switch that supplies power to the Traffic Signal Control Cabinet. A two-position terminal block shall be provided on the fan panel. Proper over current protection shall be provided for the fan circuit.

A, fluorescent lamp conforming to the Specification, a fluorescent lamp receptacle and an ON/OFF door switch shall be located in the cabinet so that it provides unobstructed illumination of the interior of the cabinet. A toggle switch and a momentary switch operated by the door shall be connected inline for operation of the lamp. The lamp toggle switch shall be located adjacent to the fluorescent lamp and labeled "LAMP" with "ON", "OFF" indications. The fluorescent lamp and switches shall be AC operated from the same line output of the Manual Bypass Switch that supplies power to the Traffic Signal Control Cabinet. Proper over current protection shall be provided for the fluorescent lamp circuit.

Wiring for the lamp, fan and other auxiliary equipment shall be connected via terminal blocks. Wiring from the UPS to the traffic signal controller cabinet shall be accomplished as follows:

- When mounted to the side of the signal controller cabinet two conduits passing through the UPS cabinet to the signal controller cabinet shall be of sufficient size to allow wiring connections in accordance with the manufacturers recommendations.
- When installed on a dual cabinet foundation, there shall be a gap of no less than two inches between the two cabinets and wiring connections shall be via the conduits located in the concrete foundation.

Operation

The UPS shall be capable of producing, simultaneously, a fully regenerated and regulated, conditioned and true sine wave power with hot standby and continuous AC outputs.

The UPS's inverter shall be on at all times to produce continuous, clean, regulated power to all loads. The inverter shall have a minimum operating efficiency of 92%. The continuous power output shall be provided for signals, controllers and modems; Standby output can be provided for signals in flash mode operation. Up to the maximum load rating, the UPS shall be capable for running any combination of signal heads, whether Incandescent, LED or Neon, by any manufacturer, regardless of power factor, without overdriving the poorer power factor LED heads which may cause early degradation, low luminosity or early signal failure.

Upon loss of utility power, the UPS shall utilize battery power in support of the system via a supplied Power Interface Bypass Switch (PIBS). The switch to battery power shall occur in 100 milliseconds or less after the loss of utility power orF the UPS can be operated in the true on-line mode with the inverter supplying power to all cabinet loads at all times. In the event of UPS failure and/or battery depletion, the Power Interface Module (PIM) will ensure that the UPS will drop out and, upon return of utility power, the traffic control system will default to normal operating mode.

The Power Interface Module shall enable removal and replacement of the UPS without shutting down the traffic control system (i.e. “hot swap” capability).

A DPS based processor shall allow the user to control frequency settings and operation, alarm signals, load switching and fan operations.

Existing Flasher Modules and Flash Transfer Relays shall be utilized. To facilitate emergency crews and police activities, the UPS shall be compatible with police panel functions (i.e. “Signals OFF” switch must kill power to the field wiring even when on UPS/Battery power).

The UPS shall not duplicate or take over flash operation or flash transfer relay functions. The UPS shall be capable of providing continuous, fully conditioned, regulated, sinusoidal (AC) power to selected devices such as signal controllers, modems, communications hubs, NTCIP adapters and video equipment at all times. The UPS shall operate on an Input voltage range between 85 (+- 5%) Vac and 155 (+- 5%) Vac before switching to battery power. The UPS shall be supplied with one external serial ports located on the front panel of the UPS and serial cable with connector. The Signal serial port shall provide the user the option to select certain output functions. These functions shall be open collector type contact closures that the user can assign as signal utility interrupt, low battery and inverter active conditions or utility fail indicate. These signals shall be capable of being interfaced to any controller’s auxiliary alarm inputs. The UPS shall be fully power factor corrected. Each UPS shall be provided with Windows based SP Configuration software.

4. Construction Methods

Mounting Configuration

The mounting method for a NEMA style shall be shelf-mount or wall-mount. The mounting method for a “170” style: mounting shall be 19” rack-mount.

5. Measurement and Payment

Uninterruptible power supply will be measured in units of each and will be paid for at the contract unit price per each. The price shall include furnishing and installing the complete uninterruptible power supply, power interface bypass switch, electronics module, control panels, cables, cabling, software, testing, certifying, complete documentation, and all incidental items necessary for a fully functioning system.

External 4 battery pack will be measured in units of each and will be paid for at the contract unit price per each. The price shall include furnishing and installing one external battery pack (with 4 batteries) and battery cable harness, testing and certifying, complete documentation, and all incidental items necessary for a fully functioning system.

External 8 battery pack will be measured in units of each and will be paid for at the contract unit price per each. The price shall include furnishing and installing one external battery pack (with 8 batteries) and battery cable harness, testing and certifying, complete documentation, and all incidental items necessary for a fully functioning system.

Uninterruptible power supply cabinet will be measured in units of each and will be paid for at the contract unit price per each. This price shall include furnishing and installing cabinet, thermostatically controlled fan

in the cabinet with a vent, thermostat, switches, air filter, fluorescent lamp receptacle, fluorescent lamp, conductor cables, flexible cables, over current protection devices (fuses/circuit breakers), terminal blocks, power panels, surge protection devices, circuit diagrams, grounding systems, gaskets, bolts, weatherproofing, conduits and fittings.

SNMP/HTTP External Adaptor will be measured in units of each and will be paid for at the contract unit price per each. The price shall include furnishing and installing SNMP/HTTP adaptor with power supply, all communication cables required for a fully functional system, windows configuration software and complete documentation shall be included with the adaptor.

Payment will be made under:

Pay Item	**Pay Unit**
730-35.06, BATTERY BACK-UP AND POWER CONDITIONER	EACH

D. CENTRAL CONTROLLER SOFTWARE

1. Description

The central system will provide communication between the TOC and field controllers via a fiber optic network operated and maintained by the City and it will be comprised of a central server located at the proposed TOC (located in the public works building), Transparity Traffic Management System (TMS) central software on the central application server, and operator workstations residing at the TOC. An overview schematic of the system architecture is provided in the plans.

2. Central Software

The Transparity TMS central software shall be used to communicate, coordinate, and monitor up to thirty (30) existing and proposed traffic signal controllers, in real time. The following subsections define the software features and software setup responsibilities under this contract.

The software shall support providing system access with individual password with operations access and device access levels definable by user for up to five (5) concurrent users. The software shall provide user friendly, graphical interface and shall have a modular design, allowing for easy program updates and enhancements. Multiple view modules for map viewing, tabular statistics views, interactive camera views, as well as variable message sign, traffic data, and weather modules. Mapping displays shall utilize either static images or ESRI GIS map data.

The software shall be backward compatible with the City's existing, legacy PEEK 3000 / 3000E controllers. Software shall have complete NTCIP compatibility, demonstrated to work with any traffic equipment that follows the NTCIP standard.

Software shall support for a full range of communications paths to field hardware, including direct serial, dial-up modems, Ethernet, radio modems, fiber optic modems, and PPP dial-up or serial to single devices or arterial masters.
Generate real-time alarms and reports shall include the following:

- Failed intersections
- Intersection status
- System detector status
- Active Alarm status
- Port server status
- Traffic responsive status

Provide real-time monitoring, management, and control of field controllers shall include the following:

- Second by second monitoring
- Second by second signal control
- Controller database upload and download

Generate special features and reports via Microsoft Office™ tools shall include the following:

- History reports (parameter reconstruction)
- Synchro support
- Time space diagrams
- Split monitoring reports
- Map recording and playback

3. Central Server

One (1) server shall be provided to support the central application software and application database. The central server will be supplied with Windows Server 2016 Server x64 operating system and Microsoft SQL Server 2016 R2 Express Edition. It shall adhere to NTCIP 1201, NTCIP 1202, and associated underlying base standards.

The central server shall be a tower configuration and meet or exceed the following requirements:

- 2.4 GHz Quad-core Intel Xeon processor,
- 8 GB of RAM,
- Four (4) 500GB hot-plug hard cards in a RAID 10 configuration,
- Mirrored HDD for the boot disk,
- Dual power supplies,
- VGA or higher resolution monitor,
- CDROM/DVD-ROM, keyboard, and mouse, and
- Dual 10/100/1000 Network adapter.

The server shall be provided with 3-year, 4-hour on-site service support.

4. TOC Integration Support

Integration services shall be required to setup TOC hardware elements, configure the signal system database and establish communication with up to twelve (12) field traffic signal controllers. This subsection defines the integration services requirements.

Prior to commencing work, the Contractor shall develop a Requirements Definition Document (RDD) that will form the basis for the overall network architecture and design. It is expected that the Contractor will work closely with City of Goodlettsville IT to define the network.

The document will contain:

- Complete description of the proposed implementation of the access, distribution and core layers for the Signal System network as described in the Plans and these Project Special Provisions
- Development of an IP Design Scheme with ranges assigned to each node to be integrated by the Contractor using guidance from the City of Goodlettsville (address ranges, geographic distribution, standards for addresses within each cabinet);
- Proposed IP subnet definition and addressing including any and all masks;
- Proposed configuration and guidelines for Virtual LAN assignments including management VLANs, device VLANs and routing VLANs; and
- Proposed configuration and guidelines for specific port assignments on each of the Layer 2 and 3 devices.

The Engineer will provide the Contractor with an IP address range or ranges from which the Contractor will develop the IP address scheme. The RDD shall be prepared by a qualified networking professional (minimum CCNA or a manufacturer-approved equivalent based on the approved hardware vendor) and will be approved by the Engineer. The Qualified network professional shall be present during the installation and testing of the local area network as well as during system testing.

The system integrator shall set up and configure all TOC hardware and software elements and provide the following requirements:

- Build the signal system database to include all 12 intersections included in this project;
- Set-up GUI at an intersection, corridor, and system level constructed from definable map image files (provided by Goodlettsville) and linked to both the central database and real-time status information from individual field controllers;
- Verify communication and establish full system control between the TOC central software and all 12 intersections included in this project; and

The Contractor shall be required to provide a technical training session for the central software. Such training shall be supplied at a facility provided and / or arranged by the vendor and at a time that is convenient to City of Goodlettsville staff. Such training shall be of a technical nature and shall be conducted by a person in the employ of the software manufacturer. The training shall be available for up to four (4) persons to be named by the City of Goodlettsville. The supplier shall provide a complete set of documentation materials for each person in attendance. The training shall involve at least two (2) eight (8) hour classes. Material covered shall include the operation as well as maintenance of all elements provided, instruction on the database structure, and graphical interface additions / modifications guidance. A draft outline of the proposed training topics shall be submitted to the City at least 14 days in advance of scheduled performance for approval. It shall be the responsibility of the Contractor to provide the training to City personnel at no cost to the City of Goodlettsville.

6. Measurement and Payment

No separate measurement and payment shall be provided for TOC integration support; rather the costs associated with this effort shall be included in the cost of the Central Software (TOC)

Payment for the remaining items will be made under:

Pay Item	Pay Unit
920-10.05, CENTRAL SOFTWARE (TOC)	LUMP SUM
920-11.05, CENTRAL SERVER (TOC)	LUMP SUM

E. TRAFFIC OPERATIONS CENTER (TOC) EQUIPMENT

1. Description

Furnish and outfit a Traffic Operations Center (TOC) room equipment in the City of Goodlettsville Public Works building located at 215 Cartwright Street, Goodlettsville, TN 37072. The TOC Room is to include electrical / cabling improvements, two (2) LCD plat panel wall monitors, and the structural / electrical / cabling accommodations for the proposed LCD video wall monitors.

The proposed TOC room is located in the southeastern quadrant of the public works building. It consists of one access to the hallway and contains windows on the eastern and southern walls. A portion of the existing room will be dedicated to operation of the TOC.

The server room is located on opposite end of the hallway from the TOC room (approximately 50 feet). The server room is the entry point for the network connection to the main servers in City Hall. The server room within City Hall is the location that the fiber optic cable proposed with this project will connect with the City's existing network.

2. Materials

This section details furnishing, installing, integrating, and testing digital central video wall monitors for displaying streaming video images from the proposed fish-eye detection camera and the traffic signal system to the proposed LCD flat panel wall monitors in the City's Traffic Operations Center (TOC) room. The Contractor shall furnish and install all necessary mounting equipment to accommodate two (2) LCD monitors each with a screen dimension of 55" measured diagonally. The mounts shall reticulate a minimum 15" away from the wall and protrude from the wall no more than 4" when stored. The Contractor shall install all necessary raceways to conceal all cables. The Contractor shall extend electrical circuits, as part of the respective TOC's modifications, to serve the proposed monitors from the existing electrical panels.

LCD Video Wall Monitors

The following are the minimum requirements and performance criteria for the TOC Video Wall:

- The configuration of the video wall shall be two large-format, slim-profile video monitors mounted to the existing wall. Streaming video will be supplied by one or more TOC workstations or servers.
- Monitors shall be LED backlit LCD technology. No Plasma monitors will be allowed.
- The proposed product shall be a new off-the-shelf product of the current production line. No discontinued products will be allowed.
- Monitor shall have a 55" Class viewable screen, measured diagonally
- 1080p HD with a 120Hz refresh rate (or better), with resolutions up to and including 1920x1080
- Inputs: 2 HDMI, 1 Component Video, 1 USB, 1 Composite, 1 PC RGB video, 1 RF, at a minimum
- Ethernet port
- Monitors shall be rated for control room operation and shall be equipped with one or more image burn-in prevention technique(s)
- Provide monitor with mounting brackets, cabling, and ancillary appurtenances required to properly install and operate the video monitor. Mounting accessories shall accommodate cabling access from the front side of the video monitor.

3. Construction Methods

Coordinate all work at, near, or inside buildings with the City Engineer. Do not work on buildings or enter buildings without prior, written authorization from the City Engineer. Coordinate and obtain approval from the City Engineer regarding allowable working time in buildings. Obtain necessary permits and inspections as required. Work shall not commence until the necessary permits are issued, posted on site, and approved plans are available on site.

LCD Video Wall Monitors

Install / configure supports, electrical, and video cable termination panels to prepare for the LCD Video Wall Monitors to be centered horizontally on the existing wall surface. Provide cable management organization and access / termination panels for the proposed wall mounting location that are compatible with the proposed LCD Video Wall Monitors. Organize all cabling neatly using cable ties and fasten to the wall. Conceal all cabling using cable management raceways. Apply a coat of paint finish to the exposed raceways to match the existing wall color

Install the proposed LCD monitors on the walls shown in the plans, centered horizontally on the existing wall surface. Mount LCD monitors using Engineer-approved and manufacturer-provided mounting hardware at a height no less than 12" from the ceiling, measured from the top of the LCD monitor encasing. Organize all cabling neatly using cable ties and fasten to the wall. Conceal all cabling using cable management raceways. Apply a coat of paint finish to the raceways to match the existing wall color.

The video monitor shall be integrated with the central system computers in coordination with the City's Signal System Provider.

4. Integration and Testing

LCD Video Wall Monitors

The Contractor shall coordinate integrating the video wall monitors with the System Provider's central system software. The Contractor shall submit a test plan prior to commencing System Operational Testing and subsequent Acceptance Testing.

5. Measurement and Payment

TOC Room Modification

The TOC Room Modification will be measured and paid as a lump sum for the complete modification and includes video wall monitors and mounting hardware, cable raceways, electrical receptacles, power distribution strips, network cabling and devices, surface mount faceplates (if needed), and video and network cables. Indoor fiber optic splice enclosures and indoor fiber interconnect centers (both ends of cable) shall be incidental to installation of the TOC room modifications. No separate measurement will be made for fasteners, attachment assemblies, or any other equipment or labor required to complete the room modifications.

All payments for the building modification items will be made in accord with the following conditions: 75% of the payment will be made upon acceptance of the room modifications; 25% of the payment will be made following final acceptance of the integrated system (including completion of the 60-day observation period).

LCD Video Wall Monitors

LCD Video Wall Monitors will be measured in units of each and paid for at the contract price per each. Price shall include all labor, materials, power supplies, power cords, adapters, connectors, cables, remotes, finish-work, installation materials, tools, and configuration software necessary to complete this work, including the integration and testing with the central system computers. Final payment will be made when work is accepted by the Engineer.

Payment will be made under:

Pay Item	**Pay Unit**
920-12.05, TOC ROOM MODIFICATION	LUMP SUM
920-10.04, LCD VIDEO WALL MONITOR	EACH

F. ETHERNET SWITCH (TYPE A)

1. Description

This work shall consist of furnishing and installing Primary Network Switches (PNSW) for intelligent transportation system (ITS) projects. The contractor shall install a Cisco Meraki Layer 3, which is compatible with the city's existing network and Cisco Meraki equipment. The PNSWs shall provide Ethernet connectivity and shall distribute digitally encoded video, network traffic, and ITS device control data at the communications hub and within the TOC. The PNSWs be connected to field devices by way of Managed Field Ethernet Switches (MFES) and shall be connected to PNSWs, respectively. These connections shall be through Ethernet links over fiber optic cable.

2. Equipment

Primary Network Switches shall be compatible with the existing communication devices and those communication devices provided by the Contractor for this project. PNSWs shall be placed in designated centers as shown on the Plans or directed by the Engineer. The Contractor shall provide PNSWs meeting the following specification requirements:

a. Primary Network Switch Equipment (Layer 3 Switch)

1) Mechanical Specifications

Each PNSW chassis shall be of a modular design capable of adding modules to allow for future system expansion. Each PNSW shall have no fewer than 4 interface slots and shall meet the following requirements:

a) Minimum of twenty-four SFP Gig-E ports and twenty-four 10/100/1000 Base-TX copper Ethernet ports; these ports shall be present on two separate interface slots unless otherwise approved by the City.

i. Combination of up to 24 short-haul, medium haul, long-haul, and very long-haul SFP-based ports: LC fiber connectors (single-mode) as needed to meet distance requirements for connection with other PNSW and be compatible with matched Field MFES and Aggregation Switches provided under this project. Furnish attenuators if required to service link without saturating receiving optics.

i. Fiber jumper cables with appropriate connectors for switch and adjacent drop cable connectors

ii. Minimum of 24x 10/100/1000 Base-TX copper RJ-45 connectors

b) Ethernet management port: RJ-45 connectors, 2-pair Cat-5 UTP cabling

c) Management console port: RJ-45-to-DB9 cable for PC connections

d) Dynamic Host Configuration Protocol (DHCP)

e) Autonegotiation on all ports for auto selection of speed and duplexing modes

f) Link Aggregation Control Protocol (LACP)

g) Automatic media-dependent interface crossover (MDIX)

h) Switching Fabric of 1,000 Gbps at a minimum; N+1 switch fabric redundancy, or approved equal

i) Management module redundancy (1:1, or approved equal)

j) Packet routing greater than 500 million packets per second (pps)

k) Support 10 GbE and 100GbE interface modules/ports

l) At least 1000 VLANs

m) At least 4000 VLAN IDs

n) 1000 Switched Virtual Interfaces (SVIs)

o) Support 1000 IGMP groups and multicast routes

p) Support automatic address learning of up to 12,000 MAC addresses

2) Electrical Specifications

Each PNSW shall come with redundant (1+1) auto-switching power supplies rated for operation between 100-220 VAC. A fully loaded chassis shall consume no greater than 2,100 watts, including redundant power supplies when functionally configured per this application.

The power cable shall be designed to meet NEC standards for the Primary Network Switch volt-ampere load.

The PNSW shall contain all power conversion and regulation necessary to support electronics operations in compliance with this Specification.

Over and under voltage conditions shall be considered a power failure and the PNSW shall automatically recover from an over or under voltage condition when prime power has returned to values defined herein.

The PNSW shall not require reprogramming or any manual adjustments upon power. The chassis shall be bonded to the rack in which it is installed.

3) Environmental Specifications

The Primary Network Switch shall perform to specification when operated within an ambient temperature range from 5°C to +40°C with relative humidity from 5 percent to 80 percent and shall be non-condensing.

4) Physical Specifications

A standard back-plane data and address bus shall be provided. The Primary Network Switch shall be of modular construction with interchangeable electronics modules. The PNSW data and address bus shall facilitate "mix and match" of modules, preventing damage from a module not "plugged into" a specific chassis slot.

The chassis shall be constructed from metal, unless otherwise approved by the Engineer. The PNSW shall not be constructed of dissimilar metals to inhibit cathodic action and corrosion. Materials used shall not support fungal growth. Unit construction shall facilitate EIA "19-inch" equipment rack mounting and shall not exceed a 5U panel height. Depth of the Primary Network Switch shall not exceed 25 inches, with connectors. The PNSW shall be supplied with locking chassis slides. Fully loaded, the PNSW shall not exceed 120 pounds (lbs). The chassis shall be provided with handling (carrying/mounting/ dismounting) provisions to support safe handling, installation, and removal.

The chassis shall include any required cooling provisions such as fans. Where fans are used, acoustic noise shall not exceed 50 dBa, as measured 9 feet from the chassis, and shall be provided with redundancy (auto-switchover).

All Primary Network Switch connectors including fiber ports and copper ports shall be provided on the front panel of the unit. Power connectors shall be provided on the rear panel. Front connectors shall not interfere with the front installed cable and associated cabinet door closure. Connector placement shall facilitate ease of equipment cable connection. Modular unit replacement shall be from the front panel. Each module shall contain appropriate status indicators to prompt, facilitate, and support maintenance.

The Primary Network Switch shall contain a permanently attached identification plate on the chassis including:

a) Product Name

b) Product Model Number

c) Serial Number

d) Manufacturer's Name

e) Manufacturer's Address

Each removable module shall, as a minimum, include a permanently attached (e.g., stamped, etched, etc.) part number. Each removable module shall include a permanently attached serial number to assist in maintenance management.

All components identifications shall correctly correspond to schematics, parts lists, and written narratives included in maintenance manuals. The unit shall include a permanently attached plate or markings specifying type and maximum amount of power. Switches, indicators, and jacks shall be uniquely marked. Modules shall include part number. All interconnect cables shall be uniquely marked to identify the cable and the specific jack/connector mates.

All data and drawings supplied with the equipment shall represent the as delivered/as installed hardware and cabling. The Primary Network Switch shall include protective covers over connectors during shipment. Modules not installed in the chassis during shipment shall include electrostatic discharge protection as well as protection against physical damage.

Full management capabilities shall be available via a management module and require no additional software or hardware for management. All required management software shall be included in the Primary Network Switch. Fail-over of the primary management module to the second module shall be automatic. The RJ-45 TX ports in the backup module shall fully function while the backup module is in either backup or primary mode.

5) Networking Standards

Primary Network Switches shall meet the following Layer 2 and Layer 3 specifications:

a) IEEE 802.1q VLAN tagging

b) IEEE 802.1p bit priority tagging

c) Support port mirroring and monitoring

d) IEEE 802.1d spanning tree protocol

e) IEEE 802.1w rapid spanning tree protocol

f) Support 4096 IEEE 802.1q addressable VLANS with 2048 being active

g) Support IGMP snooping both passive and active (ability to perform IGMP queries)

h) Support RIP version 1 and 2 (RFC 1058 and 1723)

i) Support OSPF version 2 (RFC1583 and 2328)

j) Support PIM (SM/DM)

k) Support IGMP version 1 and 2 (RFC 1112 and 2236)

l) Support DVMRP

m) Support VRRP (RFC 2338)

n) Support 802.1p mapping to priority queue

o) IP Forwarding

p) Multicasting

6) Communication Standards

Optical Small Form-Factor Pluggable (SFP) modules shall meet the following minimum requirements:

a) Fully support the 1 Gbps (1GbE) data transmission needs over single mode fiber operating at a nominal wave length of 1310 and/or 1550 nm

b) 100% compatibility with the network equipment and be a standard product of the manufacturer

c) Dual (Tx-Rx) LC fiber connectors with 9-micron cable core diameter

d) SFP slot compatible

e) Hot swappable

f) IEEE 802.3z compliant

Each PNSW shall be provided with optical distribution and backbone SFP modules. Distribution SFPs shall come in the forms of short haul (SH), and medium haul (MH) where specified, shall be compatible with the MFES distribution SFPs. Backbone SFP modules shall come in the forms of short haul (SH), medium haul (MH), long haul (LH), and very long haul (VLH) where specified and shall be compatible with those provided with other PNSWs.

The short haul SFP optical port shall transmit and receive Ethernet data at a distance of 15 to 20 km on 0.3 dB/km signal loss Single Mode (SM) fiber. Short haul ports shall be identical.

The medium haul SFP optical port shall transmit and receive Ethernet data at a distance of 40 to 50 km on 0.3 dB/km signal loss SM fiber. Medium haul ports shall be identical.

The long haul SFP optical port shall transmit and receive Ethernet data at a distance of 70 to 90 km on 0.3 dB/km signal loss SM fiber. Long haul ports shall be identical.

The very long haul SFP optical port shall transmit and receive Ethernet data at a distance of 150 km on 0.3 dB/km signal loss SM fiber. Very long-haul ports shall be identical.

7) Management Capability

The Contractor shall provide a Primary Network Switch that meets the following maintenance interface requirements:

a) The PNSW shall be centrally managed from an interface tool to enable central station software control and configuration updates. The Contractor shall provide all control software and licensing for use of the management software.

b) Command Line Interface (CLI) shall be industry standard configuration interface.

c) Optional Graphical User Interface (GUI) for system configuration from standard web browsers.

d) Wire-speed network monitoring and accounting, without network performance impact, for gathering a variety of sophisticated network statistics and information for real-time network monitoring and capacity planning.

e) SNMP - All versions.

f) Remote monitoring supporting network monitoring and multiple mirror ports for network tracing and troubleshooting.

g) Built-in hardware and firmware testing and diagnostic functions. Built-in test shall detect a fault, prevent its propagation throughout the network, and be capable of reporting the failure to the network user/operator. Built-in test shall isolate a failure to a single module or to any two modules.

h) Indicators on the front edge of each module to support fault isolation, operational verification, and isolating failed modules. Indicators shall be marked for easy identification. Front panel shall include status indicators.

i) User-friendly provisions to support applications software development and maintenance.

j) Each Ethernet port programmed to be active shall have periodic tests to validate communications. Built-in test function shall be automatic and run concurrently with normal operation.

k) Electronics shall be modular in design. Electronics modules shall be replaceable between Primary Network Switch units. Built-in test features shall be provided with

failure reporting via the maintenance communications serial interface. The Primary Network Switch Mean-Time To-Repair (MTTR) at the interchangeable unit level shall not exceed 15 minutes after fault diagnostics by a qualified technician. MTTR of a failed electronic module shall not exceed 60 minutes.

l) Modular, fault tolerant design with built-in test and failure reporting which shall include power supplies, switch management and supervisory engines (i.e., at least two shall be provided).

m) All interfaces shall comply with open architecture standards.

Units shall be immediately serviceable or replaceable when defective or damaged.

3. Procedures

a. PNSW Procedures

The Contractor shall mount the PNSW in a 19" rack at the TOC and communications hub as specified or as directed by the Engineer. The PNSW shall be resistant to all electromagnetic interference (EMI). The PNSW shall be mounted securely in the equipment racks and fully accessible by maintenance staff.

Furnish and install all mounting brackets and hardware necessary to install the PNSW in existing equipment racks in the hub and at the TOC.

Furnish and install all power supplies, cables, etc. required to properly power on the PNSW at each location.

Furnish and install all communications cabling, such as single mode fiber jumpers, Cat6 cables, etc. that are required for communication from the PNSW to the trunk fiber terminations in the hub and at the TOC and from the PNSW to any video decoders, servers, etc. at the TOC.

The Contractor shall provide and install any software that is needed in order to provide a fully functional PNSW. Any associated licenses shall be provided to the City.

b. Documentation

Documentation provided shall be accessible via web browser, and capable of being printed. The documentation shall not be web-based and shall be locally accessible. Documentation shall provide all the information on the PNSW necessary to install, configure, troubleshoot, replace, and verify the proper functioning of the Switch. The documentation shall be in English.

c. Testing

All equipment, materials, and software shall be tested by the manufacturer prior to shipment for conformance with the specifications and to demonstrate operational status of the equipment and software provided by the manufacturer. The manufacturer shall use test procedures that will demonstrate equipment and software performance and operation in conformance with the project requirements.

The switches installed under the Contract shall be subjected to field acceptance tests (FATs), TOC Integration testing, and system acceptance testing (SAT). The Contractor shall meet the requirements of the City's test plan.

Additionally, the manufacturer shall provide support during additional testing phases conducted by the City, including: post-installation testing, conditional acceptance testing, system acceptance testing, and 30-day operational testing. The testing support shall be in the form of toll free telephone support and, if the issue raised during the toll-free telephone support is not resolved within one business day, on-site technical support shall be provided by the manufacturer to resolve the particular issue or condition preventing successful completion of the specific test conducted.

d. Training

Training shall be performed by the equipment manufacturer's qualified personnel endorsed as a trainer and factory support specialist familiar with the equipment and software. Training will be provided for up to 10 people as determined by the City of Goodlettsville.

Training must be sufficient to provide the following as a minimum:

1) Internal operating system of the switch/router to include but not limited to:

   a) Configuration commands necessary to configure each interface in the switch/router and the global parameters

   b) Commands to obtain statistics on the operational status of the switch/router

   c) Commands necessary to troubleshoot the hardware

   d) Commands to upgrade IOS of the router/switch

2) Hardware training to include but not limited to:

   a) Installation of all hardware

   b) Replacement of all hardware

City personnel shall receive training comparable to the equipment manufacturer's factory training for each new type of Switch equipment that has not previously been installed within the jurisdictional Traffic

Operations region. The minimum training shall be one 4-hour session for instruction of device operation and maintenance.

e. Warranty/Guaranty Provisions

The balance of the manufacturer's warranty on the installed equipment and associated software shall be fully transferable from the Contractor to the City. If the manufacturer's warranties noted below are for a longer period, those longer period warranties will apply.

The Contractor shall provide a Switch having a manufacturer's warranty for equipment and parts furnished to be free from defects in fabrication, assembly, and materials for five years from the date of final acceptance by the Engineer of all work performed under the Contract.

Warranty periods shall begin on the date of final acceptance by the City.

The City will return defective units to the manufacturer for repair or replacement under the warranty.

1. Support Agreement

Clearly identify, in writing, the designated contact person and alternate responsible for equipment support and equipment warranty. Provide full support from the Contractor's vendor (for parts and labor) for the duration of the warranty period for hardware and software. The support shall cover maintenance, software upgrades, any upgrades available to the public shall be included and provided at no additional charge during the warranty/support period, and any defects in materials and workmanship for all system components and replacement, during the support period for labor, equipment, system components, and other materials. The vendor support shall encompass all system components notwithstanding any manufacturer's warranties whether written or implied. Software patches and firmware packages shall be included in the warranty period.

4. Measurement and Payment

Primary Network Switch (PNSW) will be measured in units of each and will be paid for at the contract unit price per each. This price shall include furnishing, installing, configuring, integrating, testing all equipment and materials, including but not limited to, the PNSW, SFP Gigabit Optical Module slots, operational software package(s) and firmware(s), training, all tools, labor, hardware, supplies, support, shop drawings, documentation, and incidentals necessary to complete the work. The Contractor will be paid seventy percent of the unit bid price following successful completion of the Field Acceptance Test (FAT). The Contractor will be paid the remaining thirty percent of the unit bid price following the successful completion of the 30-day System Acceptance Test.

SFP module (Type, Speed, Haul) will be measured in units of each and will be paid for at the contract unit price per each. This price shall include, fiber patch cables, attenuators, configuration, testing, and other labor or materials required to install and integrate the SFP module with Ethernet Switch will be considered incidental and not be paid for separately. The Contractor will be paid seventy percent of the unit bid price following successful completion of the Field Acceptance Test. The Contractor will be paid the remaining

thirty percent of the unit bid price following the successful completion of the 30-day System Acceptance Test.

Mounting brackets and necessary hardware, communications cabling, including but not limited to, single mode fiber jumpers and Cat6 cables, power supplies and cables, and manufacturers' equipment and software testing; training; software and licenses shall be considered incidental and shall be included in the contract unit price of the equipment.

Payment will be made under:

Pay Item	**Pay Unit**
725-28.08, ETHERNET SWITCH (LAYER 3)	EACH
920-11.04 SFP MODULE (TYPE, SPEED, HAULI)	EACH

G. ETHERNET SWITCH (FIELD LAYER 2)

1. Description

Furnish equipment for the LAN that complies with IEEE standard 802. Furnish Ethernet LAN switches that are fully compatible and interoperable with the network monitoring software, the Ethernet and the L3 switch at the TOC.

Furnish Ethernet Switches that comply with the following electrical safety requirements: UL60950 or CSA C22.2 No. 60950 (safety requirements for IT equipment) and FCC Part 15 Class A for EMI emissions. Furnish Layer 2 (L2) Field Gigabit Ethernet Switches fabricated for use in traffic signal controller cabinets that meet or exceed NEMA TS-2 requirements for temperature, shock, humidity, and vibration.

2. Materials

Furnish L2 Field Gigabit Ethernet Switches that are din-rail mounted and come equipped with hardware to permit mounting on a din-rail in addition to placement on a cabinet shelf, and shall be optically compatible with the proposed Meraki Layer 3 TOC Switch at City of Goodlettsville.
Furnish Ethernet Switches with internal Power Supply. Furnish field Ethernet and switches meeting the following power supply requirements:

a. 85 to 264 Vac (50/60Hz)/ 88 to 300Vdc.
b. Power supply shall have two stage isolation accomplished via two transformers: first steps down from primary AC/DC to 48VDC; the second steps down from 48VDC to 3.3VDC.
c. A power cord of not less than 5 feet in length shall be supplied
d. The switch shall require no more than 10W of power

Furnish Field Gigabit Ethernet Switches that weigh no more than 3 lbs and are no more than 150 cubic inches in volume.

Furnish ruggedized field Ethernet switches with the following minimum characteristics:

a. Minimum of Eight (8) 10BASE-T/100BASE-TX ports:
b. Minimum of two (2) 1000 BaseX Optical uplink ports that utilize SFP plugs.
c. Furnish SFP modules rated to service the Field Ethernet to Field Ethernet optical uplinks and Field Ethernet to Gig-E Hub Uplink rated for optical attenuation required to service the link. Use SFP modules that are LX or ZX and are matched and compatible with the SFP module it is mated with. Furnish attenuators if required to service link without saturating receiving optics.
d. Furnish SFP modules rated for use with the optical cable furnished under this project.
e. Furnish SFP modules compatible with the Cisco Meraki Layer 3 switches.
f. Furnish SFP modules with LC connector or other connector approved by the Engineer.
g. SFP modules shall be considered incidental to the field Ethernet switch, including the eight SFP modules to complete all four groups at the TOC Layer 3 switches.
h. Management console port.
i. Furnish SMFO fiber patch cables and barrel adapters.

Furnish Field Ethernet switches with the following features:

a. 10/100BaseTX ports:
b. RJ45 connectors
c. Cable type: Category 5e, unshielded twisted pair (CAT 5e UTP)
d. Segment Length: 100m
e. Auto-negotiation support (10/100Mbps)
f. Auto MDIX crossover capability
g. Full Duplex operation (IEEE 802.3x)
h. TVS (transient voltage suppression) between Line +/-, Line +/ground, and Line –ground to protect the circuitry

3. Functional / Networking Requirements

The switch shall support automatic address learning of up to 8192 MAC addresses. The switch shall support the following advanced layer 2 functions:

a. IEEE 802.1Q VLAN, with support for up to 4096 VLANs
b. IEEE 802.1p priority queuing
c. IEEE 802.1w rapid spanning tree
d. IEEE 802.1s multiple spanning tree
e. IEEE802.1AD link aggregation
f. IEEE 802.3x flow control
g. IGMPv2 with 256 IGMP groups
h. Port Rate Limiting
i. Configuration via test file which can be modified through standard text editor
j. Forwarding/filtering rate shall be 14,880 packets per second (PPS) for 10Mps, 148,800 for 100Mps, 1,488,000 for 1000Mps
k. DHCP Option 82

Network Management Functionality Requirements:

a. SNMPv2, SNMPv3
b. RMON
c. GVRP
d. Port Mirroring
e. 802.1x port security
f. Radius Server
g. TACACS+ Server
h. SSL – Secure Socket Layer
i. SSH – Secure Shell
j. TFTP
k. Network Time Protocol (NTPv3)
l. Simple Network Time Protocol (SNTPv3)
m. Management via web or Telnet

4. Construction Methods

Furnish MAC addresses in a spreadsheet for all equipment utilized as part of this project, in addition to the equipment models, serial numbers, and firmware revisions. Equipment shall be registered in the name of the City of Goodlettsville. Affix MAC Address label to each device utilized.

Furnish IP addresses for all equipment utilized as part of this project. Affix final IP address to each device used. Use labels that do not smear or fade.

In field equipment cabinets, fully integrate new Ethernet switches with the fiber optic interconnect centers. Integrate all field equipment as called for on Plans.

Fully integrate switches with computer and central system hardware to form a complete local area network that allows users from the TOC as shown on the communication schematic in the Plans to access applications on servers.

Fully integrate LAN equipment to provide virus protection, user authentication, and security functions to prevent unauthorized users and data from entering the signal system LAN.

5. Measurement and Payment

Payment will be made under:

Pay Item	Pay Unit
725-28.07, ETHERNET SWITCH (FIELD LAYER 2)	EACH

H. FIBER OPTIC INFRASTRUCTURE

1. Description

This Section specifies the minimum requirements for fiber optic infrastructure furnished and installed on this project. This work includes, but is not limited to, cable, splicing, termination, connectors, closures, panels, installation, and testing.

The fiber optic infrastructure will serve as the backbone for the communication systems (wireline) and will be used to transport data and video signals to/from field device locations using an Ethernet protocol.

2. Materials

Furnish fiber optic infrastructure materials that meet applicable industry standards including but not limited to:

- EIA/TIA
- RUS
- IEEE
- ICEA
- Telcordia
- ASTM
- UL
- NEC
- NESC

Upon request of the Engineer, provide certification from an independent testing laboratory that certifies that the cable conforms to industry standards.

Furnish fiber optic infrastructure materials recommended by the manufacturer for outside plant use and the intended application.

Furnish all optical fiber, fiber optic cable, fiber optic drop cable, optical termination and connection materials, and all ancillary and incidental materials that are single-mode and/or compatible. All materials shall meet the following requirements:

- Listed with and conform to RUS 7 CFR 1755.900 and associated fiber optic test procedures (FOTPs), ICEA 640, EIA/TIA-568-B.3, 598B, 758, Fiber Optic Connector Intermateability Standard (FOCIS), and Telcordia GR-20 core requirements.
- Manufacturer is currently ISO 9001 certified. This requirement applies to assemblers of manufactured components, such as patch cords and termination cabinet interconnection cables.
- All cables and termination infrastructure shall be assembled from Corning SMF28e, OFS All Wave or approved equivalent single-mode optical fiber.
- All fibers and buffer tubes shall follow EIA/TIA-598B identification using colors. Do not use printed legends.
- All cables shall have been manufactured and labeled no earlier than in the third calendar month preceding the MPW letting date of the contract.

Fiber optic installation and testing tools shall be maintained and calibrated in accordance with the tool manufacturer's recommendations. Provide tool manufacturer certified calibration documentation upon Engineer's request. Installation and testing tools include but are not limited to:

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

Fiber optic installation and testing tools shall be operated only by Contractor personnel who have been trained and certified by the tool manufacturer. Installation and testing tools requiring certified operators include but are not limited to:

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

Fiber Optic Cable

Provide 48-count fiber optic cable that meets the following requirements:

- All-dielectric outside plant loose tube cable with central strength/anti-buckling member
- Dry water blocking materials and construction
- Reverse oscillating "SZ" stranded buffer tube construction
- High tensile strength yarn
- Medium density polyethylene outer jacket
- 48 fiber cable with four (4) active buffer tubes and 12 individual stranded fibers per buffer tube
- Cable construction design that allows no more than 6 buffer tube positions
- Maximum diameter 0.48 inches
- Maximum weight 0.07 pounds per foot

Designate this cable as a trunk cable.

Provide Corning ALTOS All-Dielectric, Pirelli FlexLink, OFS MiDia, or approved equivalent cables. Ensure that the cable can withstand a maximum pulling tension of 600 lbf during installation and 180 lbf installed long term (at rest). Provide cable with shipping, storage, and operating temperature range of -30°C to +70°C. Provide cable with an installation temperature range of -30°C to +60°C. Provide cable with outer jacket marking using the following template:

Manufacturer's Name – "Optical Cable" – Month/Year of Manufacture - Telephone Handset Symbol – "GOODLETTSVILLE" – "48F SM"

Include in the outer jacket marking the cable sequential length in accordance with the following:

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

Fiber Optic Cable (48 SMFO Indoor / Outdoor Riser Rated)
Provide fiber optic plenum rated cable that meets the following requirements:

- All-dielectric inside plant loose tube central core cable
- high tensile strength yarn surrounding the central tube core
- dry water blocking materials and construction
- 48 fiber cable with four (4) active buffer tubes and 12 individual stranded fibers per buffer tube

Provide Corning Freedm LST All-Dielectric, Pirelli CentraLink, or approved equivalent cables. Designate this cable as building entry.

Ensure that the cable can withstand a maximum pulling tension of 300 lbf during installation.

Provide cable with shipping, storage, and operating temperature range of -30°C to +70°C and an installation temperature range of -10°C to +60°C.

Provide cable with outer jacket marking using the following template:

Manufacturer’s Name – “Optical Cable” – Month/Year of Manufacture - Telephone Handset Symbol – “GOODLETTSVILLE” – “48F SM”

Include in the outer jacket marking the cable sequential length in accordance with the following:

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

Fiber Optic Cable (12 SMFO Drop Cable)
Provide fiber optic drop cable that meets the following requirements:

- All-dielectric outside plant loose tube central core cable
- High tensile strength yarn surrounding the central tube core
- Dry water blocking materials and construction
- 12 individual stranded fibers contained within the central tube core

Provide Corning Freedm LST All-Dielectric, Pirelli CentraLink, or approved equivalent cables. Designate this cable as drop cable. Ensure that the cable can withstand a maximum pulling tension of 300 lbf during installation. Provide cable with shipping, storage, and operating temperature range of -30°C to +70°C and

an installation temperature range of -10°C to +60°C. Provide cable with outer jacket marking using the following template:

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

Include in the outer jacket marking the cable sequential length in accordance with the following:

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

Fiber Optic Splice (Fusion)

Provide fusion splices for splicing of all fibers on the project. Do not provide any other type of fiber splicing. Perform fusion splicing with a fully automatic portable fusion splicer that provides consistent low loss (max 0.10 dB) splices. Splicer shall provide three (3)-axis fiber core alignment using light injection and loss measurement techniques. The fusing process shall be automatically controlled. The splicer shall provide splice loss measurements on an integral display, as well as a magnified image of the fiber alignment. The Contractor shall retain ownership of the fusion splicer.

Fiber Optic Connectors

Provide fiber optic connectors compliant with this technical specification for all fiber optic infrastructure including, but not limited to, fiber optic termination cabinets, fiber optic drop panels, and fiber optic patch cords.

Provide only factory-installed keyed LC compatible connectors for all fiber optic infrastructure. Provide only factory-installed connectors of a type other than LC when required by the Network Switches. Do not use field-installed connectors. Do not use adapter couplers to change connector types.
Use ceramic ferule connectors factory-installed with a thermal-set heat-cured epoxy and machine polished mating face. Install connectors as per Manufacturer application and recommendations, including proper termination to the outer-tubing (900 micron tubing, 3 mm fan out tubing, etc.) required for the application. Use connectors rated for an operating temperature of -40°C to +75°C.

Provide connectors that have an installed insertion loss of less than 0.50 dB, a typical loss of 0.20 dB, and an optical return loss of greater than 45 dB.

Use simplex connectors for all male LC connectors. Provide latching cover for two male connectors being used in a duplex configuration. Female couplers may be duplex but must allow simplex mating connectors. Label each fiber position on panels and termination cabinets containing duplex couplers with the port/position ID as shown in the Plans.

Provide dust caps for all exposed male connectors and female couplers at all times until permanent connector installation.

Fiber Optic Closure

Provide fiber optic closures (splice closures) designed for underground or aerial outside plant use as identified in the plans.

Use fiber optic closures that are impact and corrosion resistant and waterproof when immersed in 10 feet of water of underground installation or GR-771 aerial watertight closure requirements if overhead.

Use fiber optic splice closures that are fully compatible with all components of the fiber optic infrastructure as specified, including, but not limited to, fiber optic trunk cable, fiber optic branch cable, integrated fiber optic termination unit, and fiber optic fusion splices.

Use a cylindrical dome-type splice closure with cable entry at one end only and a sealed single-molded piece dome body of high density polyethylene or equivalent non-metallic material for underground installation.

- The cable entry end shall be manufactured of a similar material as the dome body and shall seal the closure with flexible thermoplastic rubber or polymer gasket seals.
- The cable entry end shall include cable entrance ports that shall seal the cable and port opening with flexible thermoplastic rubber or polymer gasket seals with mechanical compression.
- Closures shall be re-enterable and re-sealed without the need for specialized tools or equipment, or the use of any additional parts.
- Do not use any heat shrink or caulk/encapsulate materials for sealing the assembled closure or terminated cables.

Use an aerial watertight fiber optic splice closure for overhead installations.

Provide a splice closure with a cable entry end with pre-template cable ports and a split-plate design permitting installation of the closure in mid-span cable segments.
The splice closure size shown in the Plans specifies the minimum number of fusion splices to be accommodated by the closure. With the splice closure, provide all materials to accommodate the number of splices specified by the closure size, including splice tray, storage, and organizing materials.

Fiber Optic Storage Bracket (Aerial)

Furnish fiber-optic storage brackets (snowshoes) that are non-conductive and resistant to fading when exposed to UV sources and changes in weather. Ensure snowshoes have a captive design such that fiber-optic cable will be supported when installed in the rack and fiber-optic cable's minimum bending radius will not be violated. Provide stainless steel attachment hardware for securing snowshoes to messenger cable or for securing snowshoes to manhole walls as indicated on the plans. Provide black UV resistant tie-wraps for securing fiber-optic cable to snowshoe. Ensure that snowshoes are stackable so that multiple cable configurations are possible.

Fiber Optic Termination Panel (12 Fiber)

Provide fiber optic drop panels designed for outside plant use for terminating drop cables in equipment cabinets. Use fiber optic drop panels that include the fiber optic drop cable as an integral component. Use fiber optic drop panels that are fully compatible with all components of the fiber optic infrastructure as specified, including, but not limited to, fiber optic trunk cable, fiber optic closures, fiber optic fusion splices, and fiber optic connectors. Use fiber optic drop panels that are factory manufactured assemblies of fiber optic drop cable with factory-installed fiber connectors and integral ruggedized fiber connector enclosures. Use drop panels with six (6) fiber (three (3) duplex LC) connectors. Use ruggedized fiber connector enclosures of thermally stable rigid plastic housings fully potted with a thermally stable epoxy filling that encapsulates the drop cable fan out, fibers and connector bodies.

Use permanent labels on the enclosure with contrasting color to identify each connector body by its associated fiber number.

Fiber connectors shall be arranged in rows of 1 duplex connector couplers. All fiber connectors shall be arranged on one of the long (vertical) faces of the enclosure.

Provide a unique serial number permanently attached on the enclosure body of each drop panel.

Provide an outer non-metallic cable strain-relief boot where the drop cable enters the fiber connector enclosure and that secures the cable and to the enclosure; the strain-relief boot shall fully encircle the cable for a minimum of 2 inches from the enclosure's outer surface.

Use fiber connector enclosures on the drop panel that are no more than 2 inches wide and deep (the maximum dimension of the enclosure plus fiber connector body) and no more than 11 inches long.

Provide a 0.125-inch thick aluminum mounting plate that secures to the fiber connector enclosure. The mounting plate shall have at least four mounting holes near the plate's corners that permit horizontal or vertical mounting flush to a panel, and are spaced appropriately for vertical mounting to an EIA equipment rack rail using two of the mounting holes.

Test all completed and assembled fiber optic drop panels at the point of manufacture and provide two copies of the manufacturer test documentation. Test each connected fiber in the drop panel to demonstrate compliance with all requirements for cables and connectors as detailed in this technical specification. Include in the test documentation the location station number where the drop panel is to be installed, the serial number of the drop panel, the drop cable sequential length markings at each end of the drop cable, and the total drop cable distance.

Cable Labels

Provide cable labels that meet the following requirements:

- Self-coiling wrap-around type
- PVC or equivalent plastic material with UV and fungus inhibitors
- Base materials and graphics/printing inks/materials designed for underground outside plant use including solvent resistance, abrasion resistance and water absorption
- Minimum size of 2.5 inches wide by 2.5 inches long

- Minimum thickness of 0.010 inches
- Orange label body with pre-printed text in bold black block-style font with minimum text height of 0.375 inches.

Pre-print the following text legibly on labels used for all fiber optic trunk cables (FO Cable):

GOODLETTSVILLE
FIBER OPTIC CABLE

Pre-print the following text legibly on labels used for all fiber optic drop cables (FO Drop Cable):

GOODLETTSVILLE
FIBER OPTIC DROP CABLE

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

Fiber Optic Patch Cords

Provide fiber optic patch cords consisting of a length of fiber optic cable terminated on both ends. All patch cords shall be factory pre-connected assemblies adhering to all applicable cable and fiber specifications stated in these Specifications. Provide patch cords of the appropriate length for the necessary connections, maintaining minimum bend radius, and with no residual strain at the connector or anywhere on the patch cord itself beyond self-support. Patch cords shall not have excess length beyond what is necessary for equipment connection and routing.

All patch cords shall be duplex zip-cord fiber cable with simplex LC connectors, except as otherwise allowed.

- The two (2) connectors of each end of the patch cord shall be differentiated by different colors.
- Provide sufficient flexibility at each end to disconnect one connector without disturbing the other, or to allow swapping of the two connectors within the same duplex coupler without disturbing the remainder of the patch cord.
- Provide strain relief and reinforcement at the point where the duplex cable separates for the individual simplex connectors.

Fiber cable shall be 3mm jacketed cable with high tensile strength yarn protecting the inner fiber manufactured into a duplex zip-cord configuration. All Inside Plant (IP) patch cords shall meet NEC jacketing requirements.

Connector strain relief boots shall be fixed to the outer jacket and strength yarn.

Use yellow outer jackets for single mode fiber.

No splices of any type are allowed within a patch cord assembly.

Fully test each patch cord assembly at the source of manufacture and place those test results on a test tag for each mated pair of connectors. Attach the associated tag to one end of each fiber within the duplex assembly.

Fiber Optic Attenuator Patch Cords

Provide fiber optic attenuator patch cords that meet all requirements for fiber optic patch cords. Each fiber in the attenuator patch cord shall contain a passive optical attenuator with the following performance characteristics:

- Dual-wavelength capability (1310 and 1550nm)
- Fixed attenuation value of 6dB +/- 15%.
- Minimum optical return loss 40 dB
- Operating temperature range no less than -30 to +65 C

4. Construction Methods

Install all fiber optic infrastructure according to the Manufacturer's recommended procedures and specifications.

Cable Shipping and Delivery

Package the cable for shipment on reels. Each package shall contain only one continuous length of cable. Construct the packaging so as to prevent damage to the cable during shipping and handling. Seal both ends of the cable to prevent the ingress of moisture. Include with each reel a weatherproof reel tag attached identifying the reel and cable that can be used by the manufacturer to trace the manufacturing history of the cable and the fiber. Include with each cable a cable data sheet containing the following information:

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

Cover the cable with a protective and thermal wrap.

- Securely fasten the outer end of the cable to the reel head so as to prevent the cable from becoming loose in transit.
- Project the inner end of the cable a minimum of 6.5 feet into a slot in the side of the reel or into a housing on the inner slot of the drum, in such a manner to make it available for testing.
- Plainly mark each reel to indicate the direction in which it is to be rolled to prevent loosening of the cable on the reel.

Cable Handling and Installation

Do not exceed the maximum recommended pulling tension during installation as specified by the cable Manufacturer. Continuously monitor pulling tensions with calibrated measuring devices, such as a strain dynamometer. Protect all pulled installations with calibrated breakaway links.

Do not violate the minimum recommended bend radius during installation as specified by the cable Manufacturer. Unless the Manufacturer's recommendations are more stringent, use the following guidelines for maximum bend radius:

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

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

Take all necessary precautions to protect reeled cable from vandals or other sources of possible damage while unattended. Any damage to reeled cable or the reel itself shall necessitate replacement of the entire cable section at Contractor's expense.

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

Keep the cable continuous throughout the pull. Cable breaks and reel end splices are permitted only as shown in the Plans.

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

Cable Storage

Properly store all cable to minimize susceptibility to damage.

- Maintain proper bend radius, both short and long term, during cable storage.
- Storage coils shall be neat in even length coils, with no cross over or tangling.
- Storage coils of different cables shall be kept completely separate except when the cables terminate in the same splice closure.
- Storage coils shall be secured to cable racking hardware with tie wraps, Velcro straps, or non-metallic cable straps with locking/buckling mechanism.
- Do not use adhesive or self-adhering tapes, metal wires and straps, or rope/cord.

Store slack cable as summarized in the Details of the Plans.

Fiber Optic Splice (Fusion)

Perform fusion splicing of all fiber optic splices as shown in the Plans. Perform fusion splicing only in enclosed spaces such as splice trailers or tents specifically intended for this operation. Completed fusion splices shall have no more than 0.10dB optical loss. Adequately protect all fusion splices in splice trays in a splice closure or termination cabinet. Provide the splice with strain relief and protection of the stripped fiber splice in a manner recommended by the fiber and the splice tray manufacturers.

Use fusion splice protectors of a heat shrink tubing that protects the splice and extends over the fiber coating. Splice protectors shall be compatible with and as recommended by the fiber and the splice tray manufacturers. No bare fiber may be exposed.

Fiber Optic Closure

Install fiber optic splice closures where and of the size shown in the Plans. Install splice closures in the center ± 3 feet of the entire length of stored cable coils, or install at the end of cables that terminate in the pull box. Store FO closures and cable coils on the pull box cable rack hooks or along aerial pole routes. Keep all closures and cable coils off of the bottom of the pull box. Secure closures and/or cable coils as needed to hold them in place.

Fiber Optic Storage Bracket (Aerial)

Install fiber optic storage brackets where shown in the Plans.

Fiber Optic Termination Panel (12 Fiber)

Prior to factory manufacture of fiber optic drop panels, verify the final installed location of all portions of each drop cable route from the splice closure to the equipment cabinet (including, but not limited to, the cabinet location, all conduit and pull boxes, and the splice closure location) to determine the required length of drop cable, including all splice closure and storage coils, to be factory manufactured with each drop panel. Do not use the plans quantity for determining the drop cable length to be factory manufactured.

Using the drop panel mounting plate, install drop panels on the side panel or equipment cabinets. Mount the fiber optic drop panel with the connectors horizontal or facing downward, and route the drop cable up or down as necessary. Route and secure the drop cable such that it is fully strain-relieved, does not violate the manufacturer's recommended bending radius, and does not interfere with the operation of or access to any cabinet equipment or electrical components.

Place one copy of the manufacturer test documentation in the equipment cabinet, where the drop panel is installed, and submit the other copy to the Engineer.

Cable Labels

Install cable labels on all trunk and drop fiber optic cables. Clean the installed cable of all dirt and grease before applying any label. Label all cables in or at every location where the cable is exposed outside of a conduit, innerduct or pole, using the cable IDs for trunk cables or the device number for drop cables. As a minimum, install cable labels in the following locations:

- Within 12 inches of every cable entry to a pull box, equipment cabinet, communications hub, or the TMC.
- Within 12 inches of the exterior entry point of every fiber optic splice closure, termination cabinet, and drop panel.
- Every 30 feet for the entire length of cable in any storage coil in pull boxes.
- At every pole attachment on aerial segments.

Fiber Optic Patch Cords

Install fiber optic patch cords to connect all electronic equipment with the fiber optic infrastructure. Follow port assignments as shown in the Plans. Install fiber optic patch cords to connect all active optical paths between fiber optic termination cabinets in communications hubs as shown in the Plans. Neatly route and dress all patch cords to the connected devices and within cable management facilities.

Fiber Optic Attenuator Patch Cords

Provide fiber optic attenuator patch cords.

5. Project Testing

General Requirements

- The Contractor shall conduct a project testing program for all fiber optic infrastructure. The project testing program for fiber optic infrastructure shall include but is not limited to the additional specific requirements in this subsection.
- All test results shall confirm physical and performance compliance with this technical specification including, but not limited to, optical fibers and fusion splices. No event in any given fiber may exceed 0.10 dB. Any event measured above 0.10 dB shall be replaced or repaired at the event point.
- Provide the tentative date, time and location of fiber optic infrastructure testing no less than 7 days in advance of the test. Provide confirmed date, time and location of fiber optic infrastructure testing no less than 48 hours before conducting the test.
- Provide test results documentation in electronic format (1 copy) and printed (3 copies) format. Electronic formats shall be readable in Microsoft Excel or other approved application. Printed copies shall be bound and organized by cable segment.
- Provide all test results in English units of measure of length.
- Submit all test results documentation to the Engineer within 14 days of completion of the tests. The Engineer will review test documentation in accordance with the Submittal Review Process.

Pre-Installation Test (PIT)

Perform a PIT on all FO Cable prior to any cable removal from the shipping reels. Perform a PIT on each cable reel delivered to the job site. The PIT for FO Cable shall include but is not limited to:

- A visual inspection of each cable and reel
- An OTDR Test and documentation as required in the SAT below, for three randomly selected fibers from each buffer tube.
- An Optical Attenuation Test is not required. If the contractor decides to perform one for their own protection, said test should be documented and provided to the Engineer.

Standalone Acceptance Test (SAT)

Perform an SAT on all fiber optic infrastructure on this project after field installation is complete including, but not limited to, all splicing and terminations. An SAT for each fiber in each cable shall include OTDR Tests and Optical Attenuation Tests. All fibers in all FO Cables and FO Drop Cables shall be tested from termination point to termination point, including:

- Fibers from FO Termination Cabinet to FO Termination Cabinet
- Fibers from FO Termination Cabinet to FO Drop Panel

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

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

- Cable & Fiber Identification
    - Cable & Fiber ID and Location – Physical location (device ID and station number of FO Termination Cabinet, FO Drop Panel, or cable end FO closure), fiber number, and trunk or drop cable ID for both the beginning and end point.
    - Operator Name
    - Engineer's Representative
    - Date & Time
- Setup and Test Conditions Parameters
    - Wavelength
    - Pulse width Optical Time Domain Reflectometer (OTDR)
    - Refractory index (OTDR)
    - Range (OTDR)
    - Scale (OTDR)
    - Ambient Temperature
- Test Results for OTDR Test (each direction and averaged)
    - Total Fiber Trace (miles)
    - Splice Loss/Gain (dB)
    - Events > 0.05 dB
    - Measured Length (Cable Marking)
    - Total Length (OTDR Measurement)
- Test Results for Attenuation Test (each direction and averaged)
    - Measured Cable Length (Cable Marking)
    - Total Length (OTDR Measurement from OTDR Test)
    - Number of Splices (Determined from As-Builts)
    - Total Link Attenuation

OTDR Test

- Conduct the OTDR Test using the standard operating procedure and recommended materials as defined by the manufacturer of the test equipment.
- Use a factory patch cord ("launch cable") of a length equal to the "dead zone" of the OTDR to connect the OTDR and the fiber under test.
- Conduct bi-directional OTDR Tests for each fiber. Calculate bi-directional averages.
- Conduct all tests at 1310 and 1550 nm for single mode cable.

Optical Attenuation Test

- Conduct the Optical Attenuation Test using the standard operating procedure and recommended materials as defined by the manufacturer of the test equipment.

- Conduct bi-directional Optical Attenuation Tests for each fiber. Calculate bi-directional averages.
- Conduct all tests at 1310 and 1550 nm for single mode cable.

6. Measurement and Payment

Fiber Optic Cable (48 SMFO Trunk Cable)

Fiber Optic Cable (48 SMFO Trunk Cable) will be measured in units of linear feet and paid for at the contract price per linear foot. The price bid shall include, the length in feet of actual cable installed as measured from the cable sequential length markings, cable labels, patch cords, ancillary and incidental materials, testing, documentation and all labor and equipment necessary to complete the work. No measurement for payment will be made for cable storage amounts in excess of that required in this technical specification or the Plans. This price shall be full compensation for all labor, tools, materials, equipment and incidentals necessary to complete the work.

Fiber Optic Cable (48 SMFO Indoor/Outdoor Cable)

Fiber Optic Cable (48 SMFO Indoor/Outdoor Cable) will be measured in units of linear feet and paid for at the contract price per linear foot. The price bid shall include, the length in feet of actual cable installed as measured from the cable sequential length markings, cable labels, patch cords, ancillary and incidental materials, testing, documentation and all labor and equipment necessary to complete the work. No measurement for payment will be made for cable storage amounts in excess of that required in this technical specification or the Plans. This price shall be full compensation for all labor, tools, materials, equipment and incidentals necessary to complete the work.

Fiber Optic Cable (12 SMFO Drop Cable)

Single Mode Fiber Optic Drop Cable will be measured in units of linear feet and paid for at the contract price per linear foot. The price shall include the length in feet of actual cable installed as measured from the cable sequential length markings, fiber optic connectors, cable labels, patch cords, manufacture with the fiber optic drop panel, ancillary and incidental materials, testing, documentation and all labor and equipment necessary to complete the work. No measurement for payment will be made for cable storage amounts in excess of that required in this technical specification or the Plans. This price shall be full compensation for all labor, tools, materials, equipment and incidentals necessary to complete the work.

Fiber Optic Connectors

Fiber Optic Connectors are included in the quantities of other pay items and will not be measured separately for payment.

Fiber Optic Splice (Fusion)

Fiber Optic Splice (Fusion) will be measured in units of each site and paid for at the contract price per each site. The price bid shall include but not limited to all ancillary and incidental materials, testing, documentation and all labor and equipment necessary to complete the work. This price shall be full compensation for all labor, tools, materials, equipment and incidentals necessary to complete the work.

Fiber Optic Termination Panel (12 Fiber)

Fiber Optic Termination Panel (12 Fiber) will be measured in units of each and paid for at the contract price per each. The price bid shall include but not limited to fiber optic connectors, cable labels, patch cords, manufacture with the fiber optic drop cable, mounting hardware, ancillary and incidental materials, testing,

documentation and all labor and equipment necessary to complete the work. This price shall be full compensation for all labor, tools, materials, equipment and incidentals necessary to complete the work.

Fiber Optic Closure

Fiber Optic Closure will be measured in units of each and paid for at the contract price per each. The price bid shall include but not limited to cable labels, patch cords, mounting hardware, ancillary and incidental materials, testing, documentation and all labor and equipment necessary to complete the work. This price shall be full compensation for all labor, tools, materials, equipment and incidentals necessary to complete the work.

Fiber Optic Storage Bracket (Aerial)

Fiber Optic Storage Bracket (Aerial) will be measured in units of each and paid for at the contract price per each. The price bid shall include but not be limited to all materials, labor, tools, equipment, and incidentals necessary to complete the work.

Cable Labels

Cable Labels are included in the quantities of other pay items and will not be measured separately for payment.

Fiber Optic Patch Cords

Fiber Optic Patch Cords are included in the quantities of other pay items and will not be measured separately for payment.

Fiber Optic Attenuator Patch Cords

Fiber Optic Attenuator Patch Cords are included in the quantities of other pay items and will not be measured separately for payment.

The contract unit price shall be full compensation for all work specified in this Section. Payment will be made under:

Pay Item	**Pay Unit**
725-23.12, FIBER OPTIC CABLE (48 F)	LINEAR FEET
798-06.13, FIBER OPTIC CABLE (48 INDOOR/OUTDOOR CABLE)	LINEAR FEET
725-23.21, FIBER OPTIC DROP CABLE (12 F)	LINEAR FEET
725-23.28, FIBER OPTIC SPLICE FUSION	EACH
725-02.41, FIBER OPTIC TERMINATION SPLICE UNIT	EACH
725-02.79, FIBER OPTIC ENCLOSURE	EACH
798-06.48, FIBER STORAGE LOOP	EACH

Fiber optic infrastructure, except as specified below, will be paid per linear foot or per each, as applicable, as follows:

- 25% of the contract unit price upon delivery and PIT test.
- Additional 35% of the contract unit price for complete installation of cables.

- Additional 30% of the contract unit price for completion of SAT testing and documenting of all fibers in any linear foot and in each splice or termination/connection location, and submission of and acceptance of all test documentation.
- Final 10% of the contract unit price upon Final System Acceptance.

Fiber optic splices, fusion, will be paid per each as follows:

- 60% of the contract unit price upon completion of the splice.
- Additional 30% of the contract unit price for completion of SAT testing and documenting of all fibers in any lineal foot and in each splice or termination/connection location, and submission of and acceptance of all test documentation.
- Final 10% of the contract unit price upon Final System Acceptance.

I. ACCESSIBLE PEDESTRIAN SYSTEM

1. Description

This Section specifies the minimum requirements for Accessible Pedestrian Signal (APS) equipment furnished and installed. The work shall consist of providing all labor, materials, equipment, and incidentals necessary to furnish, install, and test APS equipment. This work consists of furnishing and installing APS equipment complete and ready for service.

Furnish and install push button integrated APS that include pedestrian push button, push button locator tone, raised tactile arrow, audio and vibro-tactile walk indications, automatic volume adjustment, pedestrian information sign, and all necessary hardware. Furnish the R10-3e with appropriate arrow direction for the pedestrian information sign.

2. Materials

Provide the accessible pedestrian signals with a two (2)-inch diameter pedestrian push button that contains a tactile arrow whose direction can be easily adjusted in the field. Ensure each push button actuates a sturdy, momentary, normally-open switch with a minimum rating of 20 million actuations. Include on the button, a raised tactile arrow having a high visual contrast with the remainder of the button face. Ensure the housing is weather-tight and fabricated from aluminum. Ensure the housing is suitable for mounting on wood and metal poles. Paint surfaces of the pedestrian push button housing in highway yellow, unless otherwise specified, with an electrostatically-applied, fused-polyester paint method. Ensure the thickness of the paint is a minimum of 2.5 mils. Provide the pedestrian information sign that is integral to the housing. Ensure the accessible pedestrian signals can provide tones, sounds, and speech messages that are synchronized at an intersection. Provide a means for adjusting the base sound level for the tones, sounds, and speech messages. Ensure the tones, sounds, and speech messages will adjust automatically to the ambient noise level up to a maximum of 100 dBA. Provide the custom speech messages in both English and Spanish languages. Ensure you can program the accessible pedestrian signal by a means not readily accessible by unauthorized persons.

Ensure each push button provides a standard locator tone that is deactivated when the traffic signal is operating in the flash mode. Provide a user-programmable audible beaconing feature that is initiated by an extended push button press of one second or more. Ensure the audible beaconing feature increases the volume of the push button locator tone during the pedestrian change interval of the called pedestrian phase and operates in one of the following ways:

- The louder audible walk indication and louder locator tone comes from the far end of the crosswalk, as pedestrians cross the street,
- The louder locator tone comes from both ends of the crosswalk, or
- The louder locator tone comes from an additional speaker that is aimed at the center of the crosswalk and that is mounted on a pedestrian signal head.

Provide confirmation of the push button activation by an LED pilot light. Ensure the pilot light remains illuminated until the pedestrian's green or WALKING PERSON (symbolizing WALK) signal indication is displayed. Ensure each press of the pushbutton initiates a "wait" speech message during all intervals except the Walk interval.

Ensure you can select a percussive tone and custom speech message to sound during the "Walk" interval. Provide a push button that vibrates during the "Walk" interval. Ensure the "Walk" indications have the same duration as the illuminated pedestrian signals except when the signal is programmed to rest in the walk interval. Ensure the "Walk" indications are deactivated when the traffic control signal is operating in a flashing mode. When audible "Walk" indications are selected as a percussive tone, ensure the tone repeats at eight (8) to 10 ticks per second and consists of multiple frequencies with a dominant component at 880 Hz.

Ensure the accessible pedestrian signals are weatherproof and suitable for operation in wet locations. Ensure proper operation over a temperature range of -30ºF (-34ºC) to 165ºF (+74ºC). Ensure all circuit boards have a moisture resistant coating. Ensure the equipment interfaces and operates properly in the signal cabinet.

3. Construction Methods

Install in accordance with the manufacturer's recommendations. Mount push button integrated accessible pedestrian signals in a tamperproof manner on wood and metal poles, signal pedestals, or pushbutton posts as indicated in the signal plans. Install each pushbutton so that the tactile arrow is pointed in the direction of travel and is aligned parallel to the direction of travel on the associated crosswalk.

Ensure pushbuttons are separated by a distance of at least 10 feet such that they clearly indicate which crosswalk has the WALK indication. Where there are constraints on a particular corner that make it impractical to provide the 10 feet of separation between the two pushbuttons, the pushbuttons may be placed closer together or on the same pole, with approval by the Engineer. If two pushbuttons are placed on the same pole or with less than 10 feet separation, provide a speech walk message for the WALK indication and a speech pushbutton information message.

Adjust the intensity of the pushbutton locator tones so they are audible six (6) feet to 12 feet from the pushbutton, or to the building line, whichever is less. Ensure the pushbutton locator tones are no more than five (5) dBA louder than ambient sound. Configure audible "Walk" indication to be audible at the nearest end of the associated crosswalk.

If speech messages are used, have each recorded custom speech message approved by the Engineer in advance.

4. Measurement and Payment

The APS will be measured in units of each and paid for at the contract price per each. The price bid shall include furnishing, installing warranties, full operation and configuring the APS in accordance with applicable Standards, Specifications, and requirements. The price bid shall also include the mounting hardware, power cable, user manuals, testing, warranties, and any and all other equipment required to complete installation of the unit. This price shall be full compensation for all labor, tools, materials, equipment, and incidentals necessary to complete the work.

The contract unit price shall be full compensation for all work specified in this section. Payment will be made under:

Pay Item	Pay Unit
730-26.10, PEDESTRIAN SIGNAL HEAD W/ PUSHBUTTON & 15IN SIGN	EACH

J. BI-MODAL FLASHING YELLOW ARROW (FYA) SIGNAL ASSEMBLY

1. Description

This Section specifies the minimum requirements for the bi-modal FYA signal assembly furnished and installed. The work shall consist of providing all labor, materials, equipment, and incidentals necessary to furnish, install, and test the signal head assembly equipment. This work consists of furnishing and installing the signal head assembly complete and ready for service.

2. Materials

Provide the three-section signal head assembly consisting of a red arrow, yellow arrow, and a bi-modal green arrow / flashing yellow arrow stacked vertically, each 12 inches in diameter. Each of the three sections shall meet Metro Nashville's TDOT Signal Specifications (730N) – Section 730.27 – Signal Heads. Additionally, the bi-modal green arrow / yellow arrow at the bottom of the three-section signal assembly shall be a clear, convex, glare reducing, and sun reflective lens having the following specifications:

- Operating voltage: 80V AC to 135V AC
- Power consumption: 6W/7W
- Operating Temperature: -40ºC to +74ºC
- Surge protection: 1kV line to line, 2 kV line to ground
- Noise requirements / EMC: FCC Title 47, Subpart B, Section 15, class A device. RF immunity; 10V/m, 80Mhz-1GHz
- Total harmonic distortion (THD) < 20%
- Power factor: > 0.9
- Conforms to MIL-STD-810F for blowing rain
- Turn-on / Turn-off Time equal to 75 msec maximum
- Dominant wavelength: 505 / 590

Each signal indication shall be light-emitting diode (LED) type and meet standard set forth by the Institute of Transportation Engineers (ITE) for light output. All LED lenses shall have a minimum 5-year full performance warranty.

3. Construction Methods

Install in accordance with the manufacturer's recommendations. Mount signal assembly to mast arm poles or span / tether wire in accordance with TDOT Standard Drawings and Standard Specifications.

4. Measurement and Payment

The Bi-Modal FYA Signal Assembly shall will be measured in units of each and paid for at the contract price per each. The price bid shall include furnishing, installing, warranties, full operation, and configuring the bi-modal FYA assembly in accordance with applicable Standards, Specifications, and requirements. The price bid shall also include the mounting hardware, user manuals, testing, warranties, and any and all other equipment required to complete installation of the unit. This price shall be full compensation for all labor, tools, materials, equipment, and incidentals necessary to complete the work.

The contract unit price shall be full compensation for all work specified in this section. Payment will be made under:

Pay Item	Pay Unit
730-02.30, SIGNAL HEAD ASSEMBLY (BIMODAL FYA SIGNAL ASSEMBLY WITH BACKPLATE)	EACH

K. FISHEYE VIDEO DETECTION SYSTEM

1. Description

The 360º camera unit has been designed to be a platform for traffic management applications utilizing video for vehicle detection. The initial release of the product will provide stop bar functionality and provide the base for future features and functions.

The system will support vehicle detection. The system will be easily configured and provide the functionality required to manage intersections efficiently.

Hardware

The system consists of the following components:

- CPU – The CPU consists of the image processing hardware and software. The CPU contains the I/O and communication interfaces for the system.
- Camera – The camera is enclosed in an environmental housing suitable for outdoor applications.
- I/O cables – The cables required to interface the system to the traffic controller are provided.
- Mounting Hardware – cantilevered extension arm for placement of the camera at it recommended mounting height and location over the intersection.

Software

The system software has the ability to detect and track vehicles in real time. The software includes a Windows based application that is utilized to configure the system. The application provides a method that allows the user to easily configure the system.

2. Functional Requirements

The 360º camera system is optimized for real time vehicle detection. The system is designed so that a single camera can be utilized to cover the average sized intersection. The system detects and tracks vehicles from any angle of approach to the intersection.

The camera is controlled via the image processing software and provides images that are properly exposed for use by the image processing algorithms.

CPU

The CPU is designed to capture and process images from the 360º camera at a rate of 5 frames per second. The CPU provides power and communications to the camera through a single cable. The CPU contains 24 parallel inputs and outputs which can be utilized for detector outputs and phase inputs. The CPU provides an SDLC interface for TS2 controllers and implement the NEMA standard protocol.

Detection

The system provides the following forms of detection:

- Presence – The system detects the presence of vehicle(s) and provides indication of the detection via a parallel output or via the SDLC interface. The presence detection may be configured to provide a delay between when a vehicle is detected and when the indication of the delay is indicated. The user

can specify the delay in 1 second increments. If specified, the delay will be applied on detection in zones that do not have a green light.

Detection Zones

The detection zones are user definable. The zones may be of any size and shape. The user defines the zones by selecting points within the image to create a closed area. Once the definition of the zone is complete, the user can specify the phase associated with the zone as well as the parallel output pin or logical output in the SDLC protocol. The direction of normal traffic flow is defined to prevent false calls associated with vehicles moving the wrong direction through a zone.

Presence

The system determines a vehicle to be "present" when the majority of the object falls within a user defined zone. The imaging software will then use the user defined parameters to determine if the indication of presence will be delayed, which output to use and which phase is associated with the zone.

Parallel Inputs and Outputs

The CPU contains 24 inputs and 24 outputs. The I/O is optically isolated to provide protection against transients as well as to prevent ground loops. The I/O characteristics are:

- Inputs
  - Input voltage 12 to 30 VDC
  - Common whetting voltage
  - Active low
  - DB-25 connector
- Outputs
  - Output voltage 12 to 30 VDC
  - Common voltage return
  - Active low
  - DB-25 connector

SDLC Interface

The CPU provides an SDLC interface which communicates with controllers utilizing the protocol defined in the NEMA TS2 specification. The interface conforms to the RS-485 specification and supports multi-drop operation. The CPU can be programmed to answer to up to four BIU addresses (8 to 11) giving the CPU the capability to have 64 outputs.

WAN Interface

The CPU contains an Ethernet interface so that the system can be placed on a wide-area network. The interface can operate at 10 Mbs, 100 Mbs or 1000 Mbs. The interface can operate with a fixed IP address or utilize DHCP to receive the IP address that it will use. The CPU has a female RJ-45 connector for connection to the network.

Input Power

The CPU operates on AC voltage in the range of 90 to 240 volts 50/60 hertz.

Environmental Specifications

The CPU operates in the following environmental conditions:

- Temperature range: -50C to 80C
- Humidity: 0 to 95% non-condensing

Camera

The system contains a high resolution camera that is fitted with a lens that allows a single camera to cover an average sized intersection. The camera is designed and packaged to operate properly in an outdoor environment.

Camera Characteristics

The camera meets the following requirements:

- Resolution – The camera will contain a 5 mega-pixel CMOS sensor
- Color – The camera be able to provide both color and black and white images
- Frame Rate – The camera will support 10 frames per second at full resolution
- Interface – The camera will communicate with the CPU via an Ethernet interface
- Power – The camera will operate on 48 VDC provided from the Ethernet interface
- Field of view – The camera will have a 180-degree field of view

Enclosure

The enclosure will be designed to provide weather-proof housing for the camera electronics. The enclosure will have the following characteristics:

- The enclosure is constructed of aluminum
- The exterior of the enclosure is painted with a powder coat paint
- The air within the enclosure is purged, replaced with an inert gas and sealed

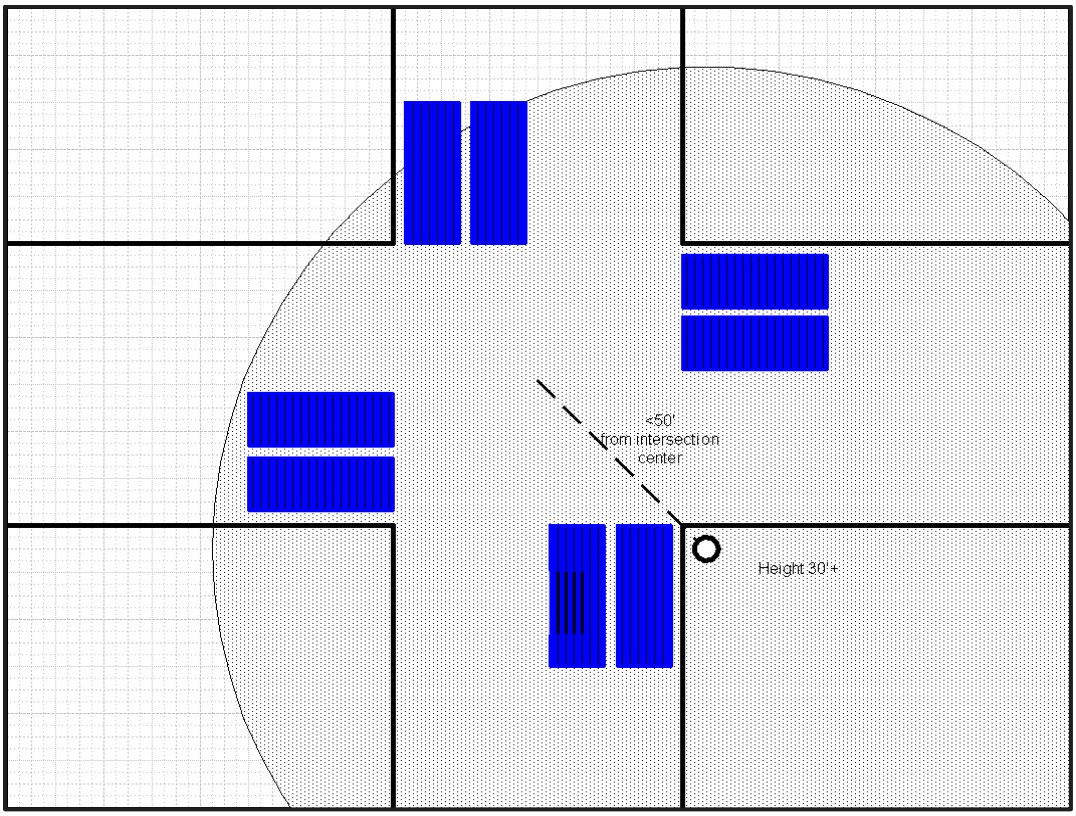
Environmental Specifications

The camera operates properly in the following environmental conditions:

- Temperature range: -34C to 74C
- Humidity: 0 to 95% non-condensing

3. Construction Methods

A maximum distance of 50' from the center of the intersection and 100' from any stop bar is the manufacturer's recommended placement of the fish eye camera. It shall be installed between a 30' and 40' mounting height over the intersection as close to the center of the intersection as possible. Shown below is a typical intersection with the camera mounted from a corner signal pole (mast arm, steel strain, or wooden signal pole). The coverage area for the camera is centered around the mounting point.



System Installation & Training

The supplier of the 360º Camera system may supervise the installation and testing of the system as required by the contracting agency. Training shall be available to personnel of the contracting agency in the operation, set-up, and maintenance of the 360º Camera system. The User's Guide is not an adequate substitute for practical training.

Warranty, Service, and Support

For a minimum of one (1) year, the supplier shall warrant the 360º Camera system. Ongoing software support by the supplier shall include software updates. These updates shall be provided free of charge during the warranty period. The supplier shall maintain a program for technical support and software updates following expiration of the warranty period. This program shall be available to the contracting agency in the form of a separate agreement for continuing support.

4. Measurement and Payment

Payment will be made under the following pay item. It shall include the camera, necessary cabling, mounting bracket, equipment within the cabinet, training, vendor operating software, and users manuals for a complete and fully operational fish-eye camera detection system:

Pay Item	**Pay Unit**
730-13.02, VEHICLE DETECTOR (VIDEO)	EACH