

Special Provision to Item 000

Description of Project, Scope of Contract and Sequence of Work



1. DESCRIPTION OF PROJECT

- 1.1. **General.** The work to be performed on this project consists of furnishing, installing, testing, and interconnecting a Computerized Transportation Management System. This project covers IH 69 from Harris County line to Liberty County line. The Components of the system are as follows:
- Dynamic Message Signs
 - CCTV Surveillance
 - Communications System
 - Radar Vehicle Sensing Device
- Control of the systems will be via computers located in the satellite control center and at Houston Transtar. Communications to the equipment will be via fiber optic cable.
- 1.2. **Dynamic Message Sign System.** The Dynamic Message Signs (DMS) will be located along the roadway and will be used to provide motorists with traffic condition information and other pertinent messages from Houston Transtar. DMS to be installed on this project will be provided by the Department. The existing DMS control system at Houston Transtar will be used to control the DMS.
- 1.3. **Closed Circuit Television (CCTV).** The CCTV surveillance system consists of CCTV cameras to be located at strategic locations along the roadway. These cameras will furnish visual surveillance of the roadway and provide visual confirmation of free-flow conditions, incidents, or congestion along the roadway. The CCTV cameras will be mounted on structures dedicated to the CCTV cameras and on existing traffic signal poles. Personnel operating the CCTV system from Houston Transtar will have the following remote-control functions for each CCTV locations: pan, tilt, zoom, focus, iris control, and camera power. Communications and video data between each CCTV location and Houston Transtar will utilize fiber optic cable.
- 1.4. **Communications System.** This project will utilize an Ethernet based communications system. The communications system will be used to interconnect the equipment in the field and to provide control and monitoring of field devices from Houston Transtar. Command data from equipment at Houston Transtar will be transmitted to the communication hub locations via the network for distribution to the various field devices. Data from the field devices will also be collected in the communications hubs for transmission to Houston Transtar. Use fiber optic cable for interconnection of the field equipment to the communications hub locations and for interconnection of the communications hubs to the Satellite Control Center and Houston Transtar.
- 1.5. **Radar Vehicle Sensing Device (RVSD).** Install radar-based vehicle sensing devices on this project to monitor traffic flow conditions on the corridor. Data from this system will be transmitted to Houston Transtar via the fiber optic communication network.

2. SCOPE OF CONTRACT

- 2.1. **Dynamic Message Sign (DMS) System.** Dynamic message signs using Light Emitting Diode (LED) technology will be supplied by the Department for installation on this project by the Contractor. Completely install the DMS, sign support structures, foundations, fiber optic cable, transceivers, and field controllers as shown on the plans, and make them fully operational.

Fully test the DMS installed on this project in accordance with plans and specifications. Provide incidental work, material, and services not expressly called for in the specifications, or not shown on the plans, which may be necessary for a complete and properly functioning system.

- 2.2. **CCTV Surveillance System.** Furnish and install, as shown on the plans, CCTV equipment and associated components and accessories which are fully compliant with the requirements of the plans and specifications.

Completely install the CCTV equipment as shown on the plans and make it fully operational.

Fully test the CCTV equipment installed on this project in accordance with the plans and specifications. Provide incidental work, material, and services not expressly called for in the specifications, or not shown on the plans, which may be necessary for a complete and properly functioning system.

- 2.3. **Communications System.** Furnish, install, splice, and test the fiber optic cable as shown on the plans. Provide incidental work, material, and services not expressly called for in the specifications, or not shown on the plans, which may be necessary for a complete and properly functioning system. Fully test the fiber optic cables installed on this project in full compliance with the requirements of the plans and specifications. Provide the test results to the Engineer.

Perform the necessary splicing on every fiber strand and provide the necessary fiber optic jumper cables and other incidentals necessary for complete and operating systems.

This project will interconnect with portions of the existing fiber optic cable at the Mc Clellan communications hub building. Perform the necessary splicing on the existing cable to provide connectivity for equipment installed on this project.

Ethernet communications equipment for this project will be supplied by the Department, through the Engineer, for installation by the Contractor. This equipment includes: Ethernet switches, video encoders, and terminal servers. Install equipment at locations shown in the plans. The terminal servers will be utilized for transmission of serial data. The encoders will be utilized to encode the video signals and serial data from the CCTV cameras for interconnection with the Ethernet switches. The Department will configure and program the Ethernet equipment.

- 2.4. **Radar Vehicle Sensing Device (RVSD).** The Contractor is responsible for providing continuous communication from the Radar Vehicle Sensing Device to the hub building. This work is subsidiary to the various bid items.

Provide the necessary terminals and make the necessary connections to ensure a completely operational communications circuit between the Radar Vehicle Sensing Device and the cabinet/ hub building to which it is being connected.

Provide the necessary cards and other ancillary items associated with the serial server communication equipment to ensure a completely operational serial data connection from the Radar Vehicle Sensing Device to the Satellite building. This work is subsidiary to the various bid items.

Mount and install the Radar Vehicle Sensing Device according to manufacturer's recommendation to achieve the specified accuracy and reliability.

Completely replace any cable in which any portion fails to pass the tests at no cost to the Department.

- 2.5. **Trade Name Reference.** Reference made to any manufacturer's trade name or catalog number for any item of equipment or material necessary to meet the requirements of this specification and the plans, is intended to be descriptive but not restrictive and indicate the type of acceptable equipment or materials.
- 2.6. **Approval of Equipment, Materials, and Details.** Within 30 days after time charges begin, submit descriptive manuals and brochures for each type of electronic equipment and apparatus proposed for this project. Also submit for approval, detailed equipment submittals and shop drawings for each fabricated item proposed for use on this project. Make submission for these materials electronically in accordance with pertinent portions of Item 5 and the Guide to Electronic Shop Drawing Submittal. Ensure these documents completely identify the equipment manufacturer's name and model number for each submitted item and contain sufficient technical data for complete evaluation. Provide drawings which contain the information required for complete fabrication in accordance with the plans and specifications and which fully describe the quality, function, and capability of each deliverable item in complete detail.
- The specifications for this project contain component lists defining the minimum requirements for submittal contents on various bid items. Review and prepare submittals in accordance with these requirements. Provide submittals which, as a minimum, completely address the stated requirements. Include in the submittal package, information not specifically contained in the lists but required for clarification of submittal information. Provide submittals on items necessary for completion of the project but not specifically identified elsewhere in the project documents to the Engineer, a minimum of 60 days before the time needed for use on the project. Submittal packages, which do not completely address required information or are incomplete in any manner, will be subject to rejection.
- Review the submittals for completeness before submitting them to the Department. At the time of submission, certify in writing that the submittal has been reviewed for completeness, that the submittal completely addresses the requirements of the specification, and that the equipment is appropriate for intended use.
- In addition to the submittals and shop drawings, the Engineer may also require the Contractor to provide equipment samples for evaluation and may also require complete demonstration of the equipment as part of the submittal review process. Additional requirements for equipment demonstrations and testing are located elsewhere in the project documents.
- The Engineer, upon receipt of the complete submittal packages, has a minimum of 60 days to indicate and authorize any correction to the details in the submittals.
- The Engineer, upon approval of the submittals, will indicate and authorize any correction to the details in the submittals.
- No change will be permitted in the list of equipment or shop drawings once approved, unless authorized by the Engineer in writing.
- Equipment will not be accepted for delivery, nor any payment made until the equipment, materials lists, and shop drawings are approved by the Engineer. Approval by the Engineer does not relieve the Contractor of the responsibility to meet the requirements of the specifications and plans.
- 2.7. **Inspection and Tests.** The Department, through its authorized representative, retains the right to rigidly inspect structures, equipment, and materials used in the project before, during, and after installation, also the right to inspect the work during the process of fabrication or manufacture for the purpose of determining if the plans and specifications are being complied with and being satisfied as to quality of the material and workmanship. Such inspection will not release the manufacturer from strict compliance with specifications when the work is completed and offered for acceptance.
- 2.8. **Utilities.** Cooperate with the public utility companies in placing and connecting meters and other required service equipment. The Contractor will not be required to furnish meters for same. The Contractor will not be responsible for payment for utilities during the testing of the systems.

Be aware that while working near power lines, a minimum clearance of 10 ft. from power lines must be maintained between personnel and equipment. Do not install any structure within 10 ft. of a power line.

When the required clearance of 10 ft. cannot be maintained during construction, contact the Power Company to arrange for de-energization of the line. Notify the Power Company at least one week before the time de-energization of the lines will be needed.

- 2.9. **Right-of-Way.** Cooperate in the use of the right-of-way with other contractors, utility companies, and other entities when such parties are engaged in work through the same general area. The Engineer will permit temporary closures subject to the provisions of Item 7 of the Standard Specifications.

No extra compensation will be made for any delays occasioned by work of other contractors; however, time suspension may be granted if justified and authorized by the Engineer in writing.

- 2.10. **Traveling Public.** Regard the safety and convenience of the traveling public passing through and adjacent to this project as an important feature of this project.

Keep any section of roadway now open to traffic or that may be open to traffic during the duration of this project continuously open to traffic except for temporary closure when erecting overhead structures and related appurtenances, or when moving heavy equipment. The traffic lane adjacent to the freeway median may be blocked during the temporary closure period when the space provided by these lanes is needed to pursue construction work in the freeway median.

Furnish one or more, as needed, mobile advance warning signs of a design and size approved by the Engineer. Locate the warning signs in advance of any construction work within the crown width of any roadway when such roadway is under traffic. The use of the warning signs does not relieve the Contractor of the responsibility of furnishing other warning devices or flagging as necessary to accommodate the traveling public.

The Engineer has the authority to suspend the work on this project if the Contractor conducts operations in such a manner as to cause unwarranted hazards that affect the traveling public.

Provide signs, detours, and other traffic control devices in accordance with the Traffic Control Plan shown on the plans and with the current revision of the "Texas Manual on Uniform Traffic Control Devices."

- 2.11. **Documentation.** Provide documentation as specified in the Special Specifications. Submit 3 draft copies of documentation to the Engineer for approval at least 30 days before delivery of the final documentation.

Provide each field cabinet with 3 copies of the final cabinet wiring diagrams. Also deliver to the Engineer, an electronic copy, in PDF format, of the cabinet wiring diagrams showing any field changes incorporated.

- 2.12. **Support.** Provide support during the entire project including any required design reviews, maintenance during construction, and operational support during system integration, manufacturer's normal warranties, and guarantees.

- 2.13. **Design Reviews.** Conduct design reviews as required, at no additional cost to the Department.

- 2.14. **Maintenance during Construction.** Assume responsibility for the new materials and equipment furnished and installed, as well as existing equipment modified as part of this contract, until final acceptance of the systems. Replace, at no cost to the Department, equipment that fails due to any cause including vandalism and knockdowns.

Operational Support. Provide a project manager who is responsible for the project and who will be on-site from the beginning of construction until final system acceptance to serve as the contractor's official contact for communications with the Engineer. Supplement the project manager's support with the services of

qualified engineers and the services of vendor technical representatives for the duration of the project. Include the cost of this operational support in the price bid for the individual equipment.

- 2.15. **Warranties and Guarantees.** Before acceptance of the project, obtain the manufacturer's normal warranties or guarantees on electronic, electrical, and mechanical equipment, materials, technical data, and products purchased for use on the project which are consistent with those provided as customary trade practice. Assign to the Department, the manufacturer's normal warranties or guarantees on such electronic, electrical, and mechanical equipment, materials, technical data, and products furnished for and installed on the project.

Technical data, as used in this section, means recorded information, regardless of form or characteristics, of a scientific or technical nature. Assume full responsibility for the technical data delivered under this contract. If any revisions are required in the technical data due to errors, deficiencies, or omissions, deliver the revisions to the Engineer.

- 2.16. **Training.** Provide training materials and services on the equipment furnished and installed on this project.

Training includes basic theory of the equipment operation, trouble-shooting procedures including the use of test equipment, and scheduled maintenance requirements. Provide hands-on training for each type of equipment.

Provide a minimum of 40 hr. of training for up to 15 persons over a period not less than 10 working days. Submit an outline of the proposed training material to the Engineer for approval at least 60 days before the training is to begin. The Engineer will review this material and approve it or request changes to the outline.

Conduct training in Houston after the completion of the subsystem acceptance tests. Establish the schedule of the training sessions with the approval of the Engineer.

Include the cost of training in the price bid for the individual equipment.

Record on video the training sessions, in DVD format, and deliver the media to the Engineer upon completion of training.

- 2.17. **Testing.** Conduct Design Approval Tests, Factory Demonstration Tests, Stand-Alone Tests, and Subsystem Tests as described in the Special Specification for each type of equipment.

Follow approved test procedures in conducting the tests and provide completed approved data forms for each test. Submit these completed data forms to the Engineer.

- 2.18. **Final System Acceptance Test.**

- 2.19. **Testing Procedures.** Prepare the test procedure and data forms for each of the types of tests required which include a step-by-step sequence for conducting the tests. Provide a data form which is designed to record the results of each step of the tests.

Submit a copy of the proposed test procedures and data forms to the Engineer electronically in PDF format, at least 60 days before initiating each type of test. Obtain the Engineer's approval for the test procedures and data forms before submitting equipment for tests.

Fully complete the inspection and testing requirements before submission for the Engineer's inspection and witness of the tests. Provide a minimum of 25 working days' notice for the tests to permit the Engineer's representative to observe each test.

Failure to satisfy the requirements of any test is counted as a defect and the equipment is subject to rejection by the Engineer. The rejected equipment may be offered again for retest provided the non-compliances have been corrected.

Provide test fixtures and test instruments for the tests.

Furnish completed data forms containing the data taken including quantitative results for the tests. Ensure the data forms for the Design Approval Tests are signed by an authorized representative (company official) of the equipment manufacturer or by an authorized representative of an independent testing facility. Ensure the data forms for the Factory Demonstration Tests are signed by an authorized representative (company official) of the equipment manufacturer. The data forms for the other tests must be signed by an authorized representative (company official) of the Contractor. Submit 3 copies of the completed forms to the Engineer.

2.20. **Installation Summary.** Compile and furnish an installation summary for each field installation. Include in this summary the equipment components and cable lists for each location.

2.21. **As Built Plans.** Upon final system acceptance, furnish a set of "As-Built" plans which show the actual equipment and construction of the various systems. Prepare these plans using the current version of Micro station and deliver the plans to the Engineer in a file format specified by the Engineer. Also deliver to the Engineer one printed paper copy of the as-built plans, 11 in. by 17 in. in size.

Collect data pertaining to as-built documentation for use by the Department for entry into software databases. Collect this data on forms supplied by the Engineer and in a format specified by the Engineer.

2.22. **Standard Specifications.** In addition to the requirements of these specifications, ensure the equipment, materials, and work conform to the requirements of the following standard specifications:

- Federal Communications Regulations Part 68 & 76 as applicable to this project.
- The Standards of the National Electrical Manufacturer's Association (NEMA).
- The National Electrical Code (NEC).
- The American National Standards Institute (ANSI).
- The Specifications of the International Municipal Signal Association, Inc. (IMSA).
- American Association of State Highway and Transportation Officials (AASHTO).
- The American Institute of Steel Construction (AISC).
- Texas Manual of Uniform Traffic Control Devices (Texas MUTCD)
- National Manual of Uniform Traffic Control Devices (National MUTCD)
- The National Fire Protection Association (NFPA).
- The Joint Electronic Device Engineering Council (JEDEC).
- The Institute of Electrical and Electronic Engineers (IEEE).
- The American Society of Testing and Materials (ASTM).
- The American Concrete Institute (ACI).
- The applicable ordinances of the County, City, and State.

Where reference is made in these specifications to the code or standards mentioned above, the reference means the code or standard that is in effect on the date of advertising of these specifications. If there is a conflict between the Special Specifications and the general specification list above, the Special Specifications take precedence.

3. SEQUENCE OF WORK

3.1. **Project Schedule.** Before beginning any construction on the project, provide of a proposed sequence of construction of the entire project and project schedule (CPM, PERT, Primavera, or equivalent) covering every item of work. Clearly indicate the interrelation of individual tasks in the schedule. Divide the schedule into logical stages with scheduling of equipment, design, Design Approval Tests, Factory Demonstration Tests, delivery of equipment, installation dates, and completion dates of work items clearly indicated. Also include in this schedule, the procurement of the materials and equipment for the installation and testing of the fiber optic cable system. Show sufficient detail to permit monitoring of progress in monthly intervals.

4. PAYMENT

Work performed and materials supplied in accordance with this item will be paid under the pertinent bid items in the proposal.