STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	87 N-0673-01	2017	79	99

9.0 CONCRETE FOUNDATIONS

9.1 DESCRIPTION
Construct and install all foundations for ITS Field Equipment provided for in this contract per Division 400 and 700 of the KDOT Standard Specifications, as modified below, and as detailed in the plans.

9.2 MATERIALS

9.2.1 REINFORCING STEEL
Use reinforcing steel that meets the requirements of the KDOT Standard Specifications. Use reinforcing steel that is free of rust and dirt. Provide reinforcing steel of the size, number, shape and dimensions as shown in the Plans.

9.2.2 ANCHOR RODS
Provide anchor rods of the size, number and materials as shown in the Plans and meet the requirements of Division 1600 of the KDOT Standard Specifications, as described below, and as detailed in the plans.

9.3 CONSTRUCTION REQUIREMENTS

9.3.1 CONCRETE FOUNDATIONS
Before placement of the concrete for the foundation, ensure that the appropriate anchor rods are placed in the proper orientation, in both the horizontal and vertical direction. This will be accomplished by using preformed rod templates as detailed in the plans. Protect all anchor rod threads from concrete fouling when the foundation is poured.

9.3.2 ANCHOR ROD INSTALLATION
Install anchor rods per the Plans and according to KDOT standard specification 738.3.e.

10.0 ITS FIELD ELEMENTS

10.1 DESCRIPTION
This work consists of furnishing equipment and material for, and installing ITS field elements in conformity with the locations and details shown on the Plans or established by the Engineer. ITS field elements include the controller assemblies, cabinets, communication equipment, closed circuit television (CCTV) systems, vehicle detection systems (VDS), and dynamic message sign (DMS) systems.

10.2 MATERIALS
Furnish all tools, labor, equipment, materials, supplies, and manufactured articles and perform all operations necessary to construct the ITS field element installations as shown on the Plans and as specified herein. The hardware, construction services, and support services specified are intended to describe the minimum configuration that would be acceptable for these installations.

10.2.1 LABELING EQUIPMENT
Apply permanent external labeling on all communication equipment; including any required cross connects to communications equipment, according to these contract documents and information provided by the Engineer. Use self-laminating vinyl labels at least 1-inch wide and long enough that the translucent portion of the label completely covers the white area bearing the legend. Use vinyl with a layer of pressure sensitive acrylic adhesive. Use labels that resist oil, water, and solvents and are self-extinguishing. Use a machine to print the legend in letters at least 1/8 inch high.

10.2.2 INCIDENTALS
Furnish and install all incidental accessories necessary to make the system complete in all respects and ready for operation, even if not particularly specified; furnish, deliver, and install all incidentals without additional expense. Include in the work and in the bid all minor details not usually shown or specified, but necessary for the proper installation and operation.

10.2.3 CABLES AND CONDUCTORS
Incidental items include all cables and conductors including but not limited to, serial cables, alarm ribbon cables, Cisco equipment power cables, DC power cables, AC power cables, power service conductors, fiber optic jumpers, signal cables, interface cables, and other cables and connectors located at the field element sites. No separate payment shall be made for incidental items.

10.2.4 MEDIA CONVERTER
Furnish and install a GE Security IFS Ethernet Optical Transceiver DE7200 or approved equal if specified in the plans with the following minimum requirements:
1. 10/100 Mbps Ethernet, auto-negotiating, full duplex or half duplex data. IEEE 802.3 compliant.
2. Auto network detection.
3. NTCIP Compatible
4. Optical: 1310/1550 nm, Single-mode fiber optic cabling support. LC optical connectors.
5. Minimum optical range of 10 miles.
6. Data: RJ-45 connector
7. Power: 12VDC @ 200mA
8. Power, Transmit, and Received LED indicators.
9. Physical Properties: 4.0 in x 3.0 in x 1.0 in, 2.0 lbs maximum

10.3 CONSTRUCTION REQUIREMENTS

10.3.1 LABELING EQUIPMENT AND CABLES
Label all communication equipment and every cable immediately upon installation. Label all communication equipment and all cables at every point of access, including pull boxes, and termination points. Consult with the Engineer concerning the desired method of identifying each cable.

10.3.1.1 FIBER OPTIC CABLES OUTER JACKETS
1. Label each cable with permanent cable tags, with two integrated holes on each end for connecting tag to cable with cable ties.
2. Label each cable where it enters a cabinet, pull box, splice vault, splice closure, and termination points.
3. All cables shall be labeled within 12 inches of the conduit or other entry point. Label both ends as it comes in and out of a pull box or vault.
4. Label FO trunk cables with the following information:
    a. The number of fiber strands in the cable by mode
    b. Cable type (single mode "SM", Multi-mode "MM" or hybrid "SM/MM")
    c. Owner
    d. The item to which the cable travels (e.g. "TO PB 18-2", "To P.O.P.", etc.)
    e. Example: "96 SM FIBER KDOT" "TO PB 18-2"
5. Label branch cables with same plus what device it is connecting to. Example: "12 SM FIBER KDOT" "TO CCTV10/DET 12"

10.3.1.2 SPLICE ENCLOSURE
1. Label splice closures indicating what fibers inside are spliced
2. Label splice trays within closures with cable and fiber strand numbers.
3. Example: "KDOT 96 SMFO FIBERS 23-24 TO KDOT 12 SMFO BRANCH FIBERS 3-4" or "CENTURYLINK-KDOT 12 SMFO FIBERS 11-12 TO KDOT 12 SMFO BRANCH FIBERS 3-4".

10.3.1.3 POWER CABLES AND LOAD CENTER
1. Label each cable within 12 inches of where it enters a cabinet, pull box, meter pedestal, transformer or other termination point.
2. Label it "POWER XXX VOLTS" with a RED label
3. Label where it is coming from/going to (e.g. "POWER 120 VOLTS" "TO CA CCTV I-135/Central")
4. Label taps inside meter pedestals or transformers with "ITS POWER" tag.
5. Label each circuit.

10.3.1.4 ITS CABINETS
1. Inside cabinets, place a patch panel key/diagram of patch panel with port numbers.
2. On each diagram/key include the following:
    a. Cable number for mainline fiber
    b. What cabinet/shelter and device to which the fiber connects.
    c. The port on the IE 3000 to which a jumper/patch cable connects.
3. Label each port on the fiber optic patch panel with the designated port number.
4. Jumper cables need not be labeled in ITS cabinets as long as they are less than three meters in length.
5. Label each network device (CCTV encoders, DMS controllers, Vehicle Detectors, Media Converters, Power Distribution Devices and Uninterruptable Power Supplies) with IP addresses.
6. Label Cellular Modems with IP addresses and assigned phone numbers.
7. Label Cisco switches with IP address and site number. Label switch ports with Tx1, Rx1, Tx2, Rx2 and what port they connect to on the fiber optic patch panel. Label each port with its corresponding VLAN address.
8. Wireless network devices shall be labeled with the following items:
    a. IP address
    b. Programmed radio frequency/channel
    c. Other wireless devices that link to the unit
    d. e.g.: "AU, 10.8.32.25, 4.97 GHz, TO SU@CCTV 03, TO SU@DET 01, TO SU@DET 02" or "SU, 10.8.34.24, 4.95 GHz, TO AU@SG CO COURTHOUSE"

10.3.1.5 POP BUILDINGS
1. Label patch panels ports to indicate the origin of the fiber optic cable terminated.
2. Label jumper cables at each end with a tag that includes the destination patch panel and port number(s) (e.g. "TO Panel 1 Ports 11-12" and "TO Panel 2 Ports 3-4").
3. Label outer jackets of fiber cables entering patch panels/distribution frames as in section 1-d.
4. Label individual fibers entering back of patch panel with the corresponding strand number and origin.

10.3.1.6 TMC COMMUNICATION ROOM (IF UTILIZED)
1. Label patch panels to indicate the origin of the fiber optic cable terminated.
2. Label individual fibers entering back of patch panel with the corresponding strand number and origin.
3. Label jumper cables at each end with a tag that includes the destination patch panel and port number(s) (e.g. "TO: Panel 1 Ports 11-12" and "TO Panel 2 Ports 3-4").
4. Label jumpers from patch panel to Cisco SFPs with the fiber strand numbers, and origin to which they connect (e.g. Fiber #3, P.O.P. Building)
5. Provide Cisco switch port diagram denoting what fiber and ring they are connected to.

10.3.1.7 CONDUITS
1. Label empty conduits noting to where they connect (e.g. "TO PB2-2 TO PB2-3").
2. If a conduit color is not per plans (Red for Power, Green for Communications), label it so it is clear what it is being used for, even if there are cables inside conduit.

10.3.2 MEDIA CONVERTER
Install in accordance with the manufacturer's recommended procedure.

11.0 DYNAMIC MESSAGE SIGN SYSTEM

11.1 DESCRIPTION
The purpose of this section is to provide general information for the installation of KDOT furnished dynamic message sign (DMS) systems as shown on the Plans and specified herein.

11.2 MATERIALS

11.2.1 GENERAL
KDOT will supply the dynamic message sign systems. The equipment supplied by KDOT consists of a DMS case including contents, sign controller unit (SCU) and communication unit; cabling for between the DMS case and the sign controller unit, display modules, equipment cabinet; and DMS software and power supplies. Do not attach the DMS to the support posts until the supporting systems of conduits, pull boxes, controller assemblies, power supply assemblies and all other items necessary are in place to provide a fully functioning DMS system.

11.2.2 DELIVERY
Contractor is responsible for all loading, unloading, and relocation of DMS prior to installation, including unloading from manufacturer delivery.

Be responsible for any damage to the DMS system upon delivery from the manufacturer. Prior to unloading from the manufacturer, document, in writing and detailed photographs, any visible damage or non-functioning portion of the KDOT-provided DMS system prior to accepting the DMS and leaving the KDOT storage facility. Schedule 72 hours in advanced with KDOT for date and time to pick-up the DMS from the KDOT facility. Do not store the DMS at the field site for more than 24 hours prior to installation.

11.2.3 LIGHTNING PROTECTION
Use system materials that are copper and high copper-content bronze castings. For all fittings, except cable holders, use heavy-duty type made from bronze castings. For all terminal rods, bolts, screws, and related type hardware use copper clad steel, bronze, or brass to prevent galvanic corrosion. The system consists of all necessary equipment as required to provide a complete and coordinated system. Ensure that all cables and all air terminals bear the UL label. Do not mix materials unless using a UL approved transition. All components of the lightning protection system shall conform to the current edition requirements of UL 96A and NFPA 780. Submit 150 foot radius rolling sphere zone of protection drawing with air terminal equipment.

11.3 CONSTRUCTION REQUIREMENTS

11.3.1 GENERAL
Furnish any and all additional tools, equipment, mounting hardware, beam clips, cabling, materials, supplies, manufactured articles and perform all operations necessary to install the DMS as shown on the Plans and as specified herein. The hardware, construction services, and support services specified are intended to describe the minimum configuration that would be acceptable for this DMS system. Furnish and install the DMS support structure as detailed on the Plans.

11.3.2 ERECTION
This is a category A structure. Contractor shall submit detailed erection plans to the field engineer per KDOT specifications and per KDOT Field Erection special provisions. The seal of a licensed professional engineer is not required. Field erection and field erection plans are incidental to the site bid and no additional payment will be made.

11.3.3 DMS CONTROLLER CABINET
Install the DMS controller cabinet; this includes providing anchor rods for pad mounted cabinets as shown on the Plans. Connect the DMS controller to the appropriate communication equipment specified in the plans to access the network as shown on the Plans and as directed by the Engineer. Contractor shall provide and install a raised nameplate with label "KDOT ITS" for all DMS controller cabinet doors. Nameplates shall be of similar material as the controller cabinet.

NO.	DATE	REVISIONS	BY	APP'D

KANSAS DEPARTMENT OF TRANSPORTATION

ITS EQUIPMENT SPECIFICATIONS

ITS-S05 VERSION DATE: 05-29-17

APP'D			
DESIGNED	DETAILED	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN. CK.	TRACE CK.

Plotted : 14-NOV-2017 10:56
Drawn By : examples
File : ITS-S05.dgn