

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	87 N-0720-01	2023	344	517

Ensure that the divided support arm and receiver brackets are designed to self-align the contact unit with the pole center line during installation and ensure the contact unit cannot twist under high wind conditions. Provide a camera-lowering device that withstands sustained 100 mile per hour winds with a 30 percent gust factor using a 1.65 safety factor. Deliver to the Engineer the lowering device manufacturer independent laboratory testing documents certifying adherence to the stated wind force criteria utilizing, as a minimum effective projected area (EPA), the actual EPA or an EPA greater than that of the camera system to be attached.

Provide a camera-lowering device product from a manufacturer with a minimum of 2 years of experience in the successful manufacturing of such systems. Provide documentation by the lowering device provider identifying a minimum of 3 previous projects where the proposed system has been installed successfully.

As part of this contract, the lowering device manufacturer is required to furnish a factory representative to assist with the assembly and testing of the first installation of the lowering system onto the pole assembly. Receive approval by the Engineer for this installation to lowering device manufacturer is required to be available to assist in a second installation or possibly a third installation until the manufacturer and KDOT are satisfied with proper installation. Furnish from the manufacturer the applicable documentation certifying instruction on the installation, operation, and safety features of the lowering device. Provide operational instructions to the Engineer.

Provide the suspension contact unit with a load capacity of 600 pounds with a 4 to 1 safety factor. Use a locking mechanism between the fixed and moveable components of the lowering device. Use a movable assembly with a minimum of 2 latches. Use a latching mechanism that securely holds the device and its mounted equipment. Use a latching mechanism that operates by alternately raising and lowering the assembly using the winch and lowering cable. When latched, ensure that all weight is removed from the lowering cable. Use a fixed unit that has a heavy duty cast tracking guide and means to allow latching in the same position each time. Use a contact unit housing that is weatherproof with a replaceable neoprene gasket provided to seal the interior from dust and moisture. Ensure that the entire unit has a minimum temperature rating of -35 degrees Celsius to 50 degrees Celsius.

Ensure that the prefabricated components of the lift unit support system are designed to preclude the lifting cable from contacting the power or video cabling. Supply an internal 1.25 inch PVC conduit in the pole for the lifting/lowering cable. Ensure that a conduit mount adapter for housing the lowering cable with an interface to allow the connection of a 1.25 inch PVC conduit is located just below the cable stop block at the back of the lowering device. Ensure that the only cable permitted to move within the pole or lowering device during lowering or raising is the stainless steel lowering cable. Ensure that all other cables remain stable and secure during lowering and raising operations.

Provide one hand-operated lowering tool for up to 10 lowering devices, and one additional tool for each 10 additional devices. Lowering tools must be submitted to the Engineer prior to the start of the 60-day test period for any device or system. Ensure that the camera lowering device is operated by use of a portable lowering tool. Ensure that the tool consists of a lightweight metal frame and winch assembly with a quick release cable connector and an adjustable safety clutch (socket). Ensure that this tool is compatible with accessing the support cable through the handhole of the pole. When attached to the handhole, the tool will support itself and the load assuring lowering operations and provide a means to prevent freewheeling when loaded. Ensure that the lowering tool has a reduction gear to reduce the manual effort required to operate the lifting handle to raise and lower a capacity load. Provide the lowering tool with an adapter (socket) for operating the lowering device by a portable drill using a clutch mechanism.

Ensure that the lowering tool is equipped with a positive locking mechanism to secure the cable reel during raising and lowering operations and prevent freewheeling. Ensure that the lowering tool is made of durable and corrosion-resistant materials, powder coated, galvanized, or otherwise protected from the environment by industry accepted coatings to withstand exposure to a corrosive environment. The lowering tools are incidental to other items of work.

Provide a camera junction box that is of two piece clamshell design with one hinge side and one latch side to facilitate easy opening. Ensure that the general shape of the box is cylindrical to minimize the EPA. Ensure that the Camera Junction Box is cast aluminum with stabilizing weights on the outside of the box to increase room on the interior. Ensure that the box is capable of having up to 40 pounds of stabilizing weights. Ensure that the bottom of the Camera Junction Box is drilled and tapped with a 1-1/2" NPT thread to accept industry standard dome housings and be able to be modified to accept a wide variety of other camera mountings. Install gaskets with the junction box to prevent water intrusion. Ensure that the bottom of the box has a screened and vented hole to allow airflow and reduce internal condensation.

Ensure that all pulleys for the camera lowering device and portable lowering tool have sealed, self lubricated bearings, oil tight bronze bearings, or sintered-oil impregnated bronze bushings. Ensure that the lowering cable is a minimum 1/8 inch diameter stainless steel aircraft cable with a minimum breaking strength of 1740 pounds with (7) strands of 19 AWG wire each.

Ensure that all electrical and communications connections between the fixed and movable lowering device components are protected from exposure to the weather by a waterproof seal to prevent degradation of the electrical contacts. Ensure that the electrical connections between the fixed and movable lowering device components are designed and tested to conduct video signals as well as the power for operation of dome environmental controls.

Provide a camera lowering system for IP cameras that is equipped with a contact block specifically designed for use with IP cameras in an outdoor environment and includes an outdoor rated Cat 6 cable for the operations of video, power, data, and control molded directly to the contact block.

Ensure that the current carrying male contacts are gold plated, beryllium, and 0.09 inch in diameter at the contact area. Ensure that all current carrying female barrel contacts are also gold-plated, beryllium copper, and at least 0.09 inches I.D. at the contact area. Ensure that each individual female barrel contact has a stainless steel sleeve which prevents foreign matter from entering the contact area as well as preclude the possibility of the leaves of the female contact from opening beyond allowable limits and ensure a snug fit around the respective male pins. Ensure that there is at least one female contact that is positioned closer to the face of the female connector body than all the others, which will allow it to make first contact and break last contact to provide optimum grounding performance.

Ensure that each IP male/female connector includes (8) contacts mechanically crimped to Cat 6 wire and (5) contacts mechanically crimped to #18/1 UL lead wire, which may be used for additional camera requirements including, but not limited to: power, alarms, or grounds. Connect these wire ends to the contractor-provided power/signal cable in the pole and CCTV accordingly in a manner acceptable to Engineer. Ensure that each male pin is self wiping. During production, the contacts must be successfully tested and verified for Ethernet data speeds up to a minimum of 1000 Base T requirements.

Ensure that each male contact and female barrel contact is individually encased in their respective male and female molded rubber blocks to provide protection from moisture.

Ensure that the contacts are self-wiping with a shoulder at the base of each male contact so that it will recess into the female block, thereby giving a rain-tight seal when mated. Ensure that the facility manufacturing the electrical contact connector complies with Mil Spec Q-9858 and Mil Spec I-45208.

Ensure that the interface and locking components are made of stainless steel or aluminum. Ensure that all external components of the lowering device are made of corrosion resistant materials, powder coated, galvanized, or otherwise protected from the environment by industry accepted coatings to withstand exposure to a corrosive environment.

The lowering unit shall have sufficient weight to disengage the camera and its control components in order that it can be lowered properly. Provide counterweights as necessary to assure that the alignment of pins and connectors are proper for camera support to be raised into position without binding. Ensure that the pole top and/or camera junction boxes have the connectors for attachment to the bare leads in the pole top and/or junction boxes.

Install a drip shield above the lowering device connection to prevent moisture from infiltrating the camera assembly.

#### 12.2.3 CCTV POLE

Provide poles in accordance with the latest edition of AASHTO **LRFD** Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals, **First Edition** including all interims. Other design requirements, such as MRI, wind speed, fatigue, and foundation are listed on the pole detail or foundation detail sheets. Furnish and install camera poles as shown on the Plans and details.

Submit camera pole shop drawings and detailed calculations, signed and sealed by a Professional Engineer, to the Engineer for approval prior to pole and lowering device fabrication. The Contractor is responsible for the design and construction of all poles. All steel poles must meet the requirements outlined in these specifications.

Provide steel poles that are designed with the following considerations:

1. Pole dimensions shall be determined by the manufacturer's design.
2. Only round or hexadecagonal (16 sided) shapes will be allowed.

Ensure that the pole is designed such that the deflection does not exceed one inch (1") at the top of the pole in a sustained 30 mile per hour wind condition. Use a service limit load factor of 1.0 for deflection. Provide a pole shaft that is one-piece construction up to 50 feet in length and poles with a maximum of one splice for greater lengths and conforms to ASTM A595 Grade A with minimum yield strength of 55 ksi or ASTM A572 with minimum yield strength of 55 ksi. Provide a pole with a constant linear taper of greater than or equal to 0.14 in/ft and contain only one longitudinal seam weld. Ensure that hexadecagonal poles have a 4 in. corner radius. Circumferential welded tube butt splices and laminated tubes are not permitted.

Ensure that longitudinal seam welds within 6 in. of complete penetration pole to base plate welds are complete penetration welds. Ensure that tube longitudinal seam welds are free of cracks and excessive undercut, performed with automatic processes, and be visually inspected. Ensure that longitudinal welds suspected to contain defects are magnetic particle inspected. Ensure that all circumferential butt-welded pole and arm splices are ultrasonically or radiographically inspected.

Provide a single, large, bottom handhole opening that is reinforced with a minimum 2-inch-wide hot rolled steel rim. Ensure that the nominal outside dimension is approximately 6 inches x 27 inches. Ensure that the handhole has a tapped hole for mounting the portable winch thereto. Ensure that a tenon is welded or bolted to the pole top with mounting holes and slot as required for the mounting of the camera-lowering system. Ensure that the tenon is of dimensions necessary to facilitate camera lowering device component installation. Ensure that each slot is parallel to the pole centerline for mounting the lowering device.

Provide a pole with a custom plate-mounted tenon that allows the field modification of the arm/camera orientation up to 360 degrees. Ensure that the tenon has mounting holes and slot as required for the mounting of the camera-lowering system. Ensure that the tenon is of dimensions necessary to facilitate camera lowering device component installation. Ensure that each slot shall be parallel to the pole centerline for mounting the lowering device.

Ensure that top and bottom electrical cable guides are located within the pole aligned with each other. Position one cable guide 2 inches below the handhole and position the other 1 inch directly below the top of tenon. Position a parking stand 1.5 inches below the top of the handhole on the inner portion of the handhole frame and located at 90, 180, and 270 degrees.

Construct CCTV pole foundations as indicated on the Plans.

#### Direct Tension Indicators:

DTIs are to comply with the requirements of the latest edition of ASTM F959 for the ASTM F3125 bolts. The DTIs on the anchor rods are to comply with the requirements of the latest edition of ASTM F2437. Installation will adhere to the Plans and the KDOT Standard Specifications.

Demonstrate compliance with the requirements shown on the Plans and herein. Submit calculations for poles that include analysis of the pole, base plate, and anchor rods. Submit pole calculations that are analyzed at six-inch (6") intervals from the base plate to the pole top. At each of these locations, give the following information:

1. The pole diameter, thickness, section modulus, moment of inertia, and cross-sectional area.
2. The centroid, weight, projected area, drag coefficient, velocity pressure, and wind force of each trapezoidal pole segment.
3. The factored axial force, shear force, primary moment, total moment, axial stress, bending stress, axial resistance, bending resistance, and demand over capacity ratio at each elevation.
4. The pole angular and linear deflection at each elevation.
5. The factored axial force, shear force, primary moment, and total moment at the top of the foundation for foundation design.

Submit weld details with pole shop drawings, referencing approved weld procedures in KDOT Specification 744. Weld procedures will be approved by KDOT prior to use. All welding shall be in accordance with AWS D1.1 (latest revision). All handholes and weld backing rings shall have CJP at splices unless made from a solid.

#### 12.2.4 CABLES AND CONNECTORS

Furnish and install camera control cables. Furnish and install all necessary connectors to make the CCTV system operational. Determine the proper cable lengths. Splices in the control cables are not allowed.

#### 12.2.5 ASSOCIATED CONTROL EQUIPMENT

Furnish and install equipment in the cabinet as specified in the construction Plans including associated patch cables and incidental items.

#### 12.2.8 AIR TERMINAL

Furnish and install a solid or tubular aluminum, copper, or stainless steel at least 5/8 inch in diameter air terminal. Use air terminals that are UL listed.

#### 12.2.9 POLE GROUNDING

Provide pole grounding that meets the requirements of the Power Supply Assembly, Power, and Grounding sections of these specifications.

#### 12.2.10 TRANSPORTATION

Obtain the correct transportation guidelines from the manufacturer and implement these guidelines. Take precautions to ensure no damage to the lowering system.

### 12.3 CONSTRUCTION REQUIREMENTS

#### 12.3.1 CAMERA ASSEMBLIES

Install the dome so that the pole does not block the camera's view of traffic. Refer to the Plans for guidance on where the allowable blind spot is located.

#### 12.3.2 POLE AND FOUNDATION

Contact the Engineer a minimum of two weeks prior to final placement of the CCTV foundation to schedule the final location review.

#### 12.3.3 NETWORK SWITCH CONNECTIONS

Request port assignments from the Engineer/owner at least 4 weeks prior to making the physical connections to the network switch. Supply technicians with at least one year of experience installing and configuring Cisco network switches. Submit experience resume to the Engineer for approval prior to performing any work.

KANSAS DEPARTMENT OF TRANSPORTATION			
ITS EQUIPMENT SPECIFICATIONS			
<del>ITS-S07</del> VERSION DATE: 02-12-21			
APPD			
DESIGNED	DETAILED	QUANTITIES	TRACED
DESIGN CK.	DETAIL CK.	QUAN. CK.	TRACE CK.