

**SECTION 28 23 00
VIDEO SURVEILLANCE**

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Provide and install a complete Video Surveillance System, which is hereinafter referred to as the VSS System as specified in this section.
- B. This Section includes video surveillance system consisting of cameras, data transmission wiring, and associated equipment.
- C. VSS shall be fully compatible with existing VA campus system and seamlessly integrate with it.
- D. Camera assemblies include camera, lens, housing, and mount. Provide and install wiring and low voltage power from the security wall field/rack to the camera locations.
 - 1. Scope of work shall be complete from point of origin (camera) to point of termination (security rack).
- E. Coordinate all work that must be performed in security head end spaces with the General Contractor, the Electrical Contractor, and the Telecommunications contractor. (if applicable)
- F. Camera images shall support H.264 and MPEG4 compression formats used as required.
- G. The NVR shall not be loaded to exceed 50% of the camera and/or storage capacity to allow room for expansion.
- H. Camera lenses for fixed cameras shall be varifocal and sized to provide the owner approved field of view. The lens shall be IR corrected and have megapixel resolution.

1.2 RELATED WORK

- A. Section 01 00 00 - GENERAL REQUIREMENTS. For General Requirements.
- B. Section 14 21 00 - ELECTRIC TRACTION ELEVATORS. Requirements for elevators.
- C. Section 26 05 11 - REQUIREMENTS FOR ELECTRICAL INSTALLATIONS. Requirements for connection of high voltage.
- D. Section 26 05 21 - LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW). Requirements for power cables.
- E. Section 28 05 00 - COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY. Requirements for general requirements that are common to more than one section in Division 28.
- F. Section 28 05 13 - CONDUCTORS AND CABLES FOR ELECTRONIC SAFETY AND SECURITY. Requirements for conductors and cables.

- G. Section 28 05 26 - GROUNDING AND BONDING FOR ELECTRONIC SAFETY AND SECURITY. Requirements for grounding of equipment.
- H. Section 28 05 28.33 - CONDUITS AND BACKBOXES FOR ELECTRONIC SAFETY AND SECURITY. Requirements for infrastructure.
- I. Section 28 08 00 - COMMISSIONING OF ELECTRONIC SAFETY AND SECURITY. Requirements for commissioning, systems readiness checklists, and training.

1.3 DEFINITIONS

- A. AGC: Automatic gain control.
- B. B/W: Black and white.
- C. CCD: Charge-coupled device.
- D. CIF: Common Intermediate Format CIF images are 352 pixels wide and 88/240 (PAL/NTSC) pixels tall (352 x 288/240).
- E. 4CIF: resolution is 704 pixels wide and 576/480 (PAL/NTSC) pixels tall (704 x 576/480).
- F. H.264 (also known as MPEG4 Part 10): a encoding format that compresses video much more effectively than older (MPEG4) standards.
- G. ips: Images per second.
- H. MPEG: Moving picture experts group.
- I. MPEG4: a video encoding and compression standard that uses inter-frame encoding to significantly reduce the size of the video stream being transmitted.
- J. NTSC: National Television System Committee.
- K. UPS: Uninterruptible power supply.
- L. PTZ: refers to a movable camera that has the ability to pan left and right, tilt up and down, and zoom or magnify a scene.

1.4 QUALITY ASSURANCE

- A. The Contractor shall be responsible for providing, installing, and the operation of the VASS System as shown. The Contractor shall also provide certification as required.
- B. The security system shall be installed and tested to ensure all components are fully compatible as a system and can be integrated with all associated security subsystems, whether the security system is stand-alone or a part of a complete Information Technology (IT) computer network.
- C. The Contractor or security sub-contractor shall be a licensed security Contractor as required within the state or jurisdiction of where the installation work is being conducted.

D. Manufacturers Qualifications: The manufacturer shall regularly and presently produce, as one of the manufacturer's principal products, the equipment and material specified for this project, and shall have manufactured the item for at least three years.

E. Product Qualification:

1. Manufacturer's product shall have been in satisfactory operation, on three installations of similar size and type as this project, for approximately three years.
2. The Government reserves the right to require the Contractor to submit a list of installations where the products have been in operation before approval.

F. Contractor Qualification:

1. The Contractor or security sub-contractor shall be a licensed security Contractor with a minimum of five (5) years experience installing and servicing systems of similar scope and complexity. The Contractor shall be an authorized regional representative of the Video Assessment and Surveillance System's (VASS) manufacturer. The Contractor shall provide four (4) current references from clients with systems of similar scope and complexity which became operational in the past three (3) years. At least three (3) of the references shall be utilizing the same system components, in a similar configuration as the proposed system. The references must include a current point of contact, company or agency name, address, telephone number, complete system description, date of completion, and approximate cost of the project. The owner reserves the option to visit the reference sites, with the site owner's permission and representative, to verify the quality of installation and the references' level of satisfaction with the system. The Contractor shall provide copies of system manufacturer certification for all technicians. The Contractor shall only utilize factory-trained technicians to install, program, and service the VASS. The Contractor shall only utilize factory-trained technicians to install, terminate and service cameras, control, and recording equipment. The technicians shall have a minimum of five (5) continuous years of technical experience in electronic security systems. The Contractor shall have a local service facility. The facility shall be located within 60 miles of the project site. The local facility shall include sufficient spare parts inventory to

- support the service requirements associated with this contract. The facility shall also include appropriate diagnostic equipment to perform diagnostic procedures. The COTR reserves the option of surveying the company's facility to verify the service inventory and presence of a local service organization.
2. The Contractor shall provide proof project superintendent with BICSI Certified Commercial Installer Level 1, Level 2, or Technician to provide oversight of the project.
 3. Cable installer must have on staff a Registered Communication Distribution Designer (RCDD) certified by Building Industry Consulting Service International. The staff member shall provide consistent oversight of the project cabling throughout design, layout, installation, termination and testing.
- G. Service Qualifications: There shall be a permanent service organization maintained or trained by the manufacturer which will render satisfactory service to this installation within four hours of receipt of notification that service is needed. Submit name and address of service organizations.

1.5 SUBMITTALS

- A. Submit below items in conjunction with Master Specification Sections 01 33 23, Shop Drawings, Product Data, and Samples, and Section 02 41 00, Demolition Drawings.
- B. Provide certificates of compliance with Section 1.4, Quality Assurance.
- C. Provide a pre-installation and as-built design package in both electronic format and on paper, minimum size 1220 x 1220 millimeters (48 x 48 inches); drawing submittals shall be per the established project schedule.
- D. Pre-installation design and as-built packages shall include, but not be limited to:
 1. Index Sheet that shall:
 - a. Define each page of the design package to include facility name, building name, floor, and sheet number.
 - b. Provide a list of all security abbreviations and symbols.
 - c. Reference all general notes that are utilized within the design package.
 - d. Specification and scope of work pages for all security systems that are applicable to the design package that will:

- 1) Outline all general and job specific work required within the design package.
 - 2) Provide a device identification table outlining device Identification (ID) and use for all security systems equipment utilized in the design package.
2. Floor plans, site plans, and enlarged plans shall:
- a. Include a title block as defined above.
 - b. Define the drawings scale in both standard and metric measurements.
 - c. Provide device identification and location.
 - d. Address all signal and power conduit runs and sizes that are associated with the design of the electronic security system and other security elements (e.g., barriers, etc.).
 - e. Identify all pull box and conduit locations, sizes, and fill capacities.
 - f. Address all general and drawing specific notes for a particular drawing sheet.
3. A riser drawing for each applicable security subsystem shall:
- a. Indicate the sequence of operation.
 - b. Relationship of integrated components on one diagram.
 - c. Include the number, size, identification, and maximum lengths of interconnecting wires.
 - d. Wire/cable types shall be defined by a wire and cable schedule. The schedule shall utilize a lettering system that will correspond to the wire/cable it represents (example: A = 18 AWG/1 Pair Twisted, Unshielded). This schedule shall also provide the manufacturer's name and part number for the wire/cable being installed.
4. A system drawing for each applicable security system shall:
- a. Identify how all equipment within the system, from main panel to device, shall be laid out and connected.
 - b. Provide full detail of all system components wiring from point-to-point.
 - c. Identify wire types utilized for connection, interconnection with associate security subsystems.
 - d. Show device locations that correspond to the floor plans.
 - e. All general and drawing specific notes shall be included with the system drawings.

5. A schedule for all of the applicable security subsystems shall be included. All schedules shall provide the following information:
 - a. Device ID.
 - b. Device Location (e.g. site, building, floor, room number, location, and description).
 - c. Mounting type (e.g. flush, wall, surface, etc.).
 - d. Power supply or circuit breaker and power panel number.
 - e. In addition, for the VASS Systems, provide the camera ID, camera type (e.g. fixed or pan/tilt/zoom (P/T/Z), lens type (e.g. for fixed cameras only) and housing model number.
6. Detail and elevation drawings for all devices that define how they were installed and mounted.
- E. Pre-installation design packages shall be reviewed by the Contractor along with a VA representative to ensure all work has been clearly defined and completed. All reviews shall be conducted in accordance with the project schedule. There shall be four (4) stages to the review process:
 1. 35 percent
 2. 65 percent
 3. 90 percent
 4. 100 percent
- F. Provide manufacturer security system product cut-sheets. Submit for approval at least 30 days prior to commencement of formal testing, a Security System Operational Test Plan. Include procedures for operational testing of each component and security subsystem, to include performance of an integrated system test.
- G. Submit manufacture's certification of Underwriters Laboratories, Inc. (UL) listing as specified. Provide all maintenance and operating manuals per the VA General Requirements, Section 01 00 00, GENERAL REQUIREMENTS.

1.6 APPLICABLE PUBLICATIONS

- A. The publications listed below (including amendments, addenda, revisions, supplement, and errata) form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American National Standards Institute (ANSI)/Electronic Industries Alliance (EIA):

- 330-09.....Electrical Performance Standards for CCTV
Cameras
- 375A-76.....Electrical Performance Standards for CCTV
Monitors
- C. Institute of Electrical and Electronics Engineers (IEEE):
 - C62.41-02.....IEEE Recommended Practice on Surge Voltages in
Low-Voltage AC Power Circuits
 - 802.3af-08.....Power over Ethernet Standard
- D. Federal Communications Commission (FCC):
 - (47 CFR 15) Part 15 Limitations on the Use of Wireless
Equipment/Systems
- E. National Electrical Contractors Association (NECA):
 - 303-2005.....Installing Closed Circuit Television (CCTV)
Systems
- F. National Fire Protection Association (NFPA):
 - 70-08.....Article 780-National Electrical Code
- G. Federal Information Processing Standard (FIPS):
 - 140-2-02.....Security Requirements for Cryptographic Modules
- H. Underwriters Laboratories, Inc. (UL):
 - 983-06.....Standard for Surveillance Camera Units
 - 3044-01.....Standard for Surveillance Closed Circuit
Television Equipment

1.7 COORDINATION

- A. Coordinate arrangement, mounting, and support of video surveillance equipment:
 - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
 - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
 - 3. To allow right of way for piping and conduit installed at required slope.
 - 4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

- C. Coordinate location of access panels and doors for video surveillance items that are behind finished surfaces or otherwise concealed.

1.8 WARRANTY OF CONSTRUCTION

- A. Warrant VSS System work subject to the Article "Warranty of Construction" of FAR clause 52.246-21.
- B. Demonstration and training shall be performed prior to system acceptance.

PART 2 - PRODUCTS

2.1 CAMERA SPECIFICATIONS

- A. All cameras shall be a Dome Camera unless otherwise specified
 - 1. Compatible with the VMS
 - 2. Vandal resistant with polycarbonate dome
 - 3. Wide Dynamic Range Feature: All exterior cameras and interior cameras that have exterior lighting or headlights in their field of view shall have a Wide Dynamic Range feature to improve picture quality in situations with strong backlighting.
 - 4. Multi-stream so that recording and viewing can be at different frame rate and compression.
- B. Exterior Fixed Dome Cameras:
 - 1. Shall be IP, PoE IEEE 802.3af
 - 2. Outdoor rated
 - 3. Day-night Color/B&W camera with cut filter
 - 4. Include an SD card sized to allow for scheduled and event based storage of images
 - 5. Smoked lower dome, unless otherwise specified
 - 6. Resolution shall be a minimum of 1.3MP at 30 FPS
 - 7. Van-focal auto-iris fixed lens sized to provide the owner approved field of view.
 - 8. Shall include remote focus and zoom over the network
 - 9. Shall have a minimum sensitivity of 0.05 Lux at:
 - a) 30 IRE
 - b) 75% reflectance
 - c) AGC off
 - d) 1.2 f-stop
 - e) Sense-Up off
 - 10. Shall include a heater to permit fog-free viewing in low temperatures
 - 11. Fan to prevent overheating in high temperatures

2.2 NETWORK VIDEO RECORDER

- A. The Network Video Recorder shall be compatible with the video management system along with the following minimal requirements:
 - 1. Provide hot swappable storage drives in a RAID 5 or 6 array
 - 2. Support dual stream cameras.
 - 3. Include a dual Network Interface Card (NIC) that supports dual IP addressing as well as:
 - a) Full duplex
 - b) Fault tolerance
 - c) Link aggregation
 - d) Load Balancing
 - e) Traffic prioritization
 - f) Hot swap
 - 4. Support H.264, MPEG-4 & MJPEG compression
 - 5. Provide video storage capacity for 30 days using the following minimum criteria
 - a) All cameras using H.264 compression
 - b) Interior cameras: 1.3MP
 - c) Exterior cameras: Use native camera resolution
 - d) Motion triggered recording
 - 1) Assume that motion will be detected 50% of the day
 - 2) Motion detection will be configurable by camera and schedule to mitigate nuisance triggers
 - 3) Record video at 12 FPS when motion is detected
 - 4) Record video at 1 FPS when no motion is detected
- B. Coordinate with owner on the number of user licenses required
- C. Provide UPS for backup power to the NVR and peripheral equipment
 - 1. Follow provisions of Section 280000 for UPS power requirements
 - 2. Coordinate with Division 26 to provide a dedicated Emergency Power circuit

2.3 ACCEPTABLE MANUFACTURERS

- A. Video Management System (VMS) Platform Software: (Hirsch existing)
 - 1. OnSSI
 - 2. Salient
 - 3. DVTell
 - 4. Owner Approved Equivalent
- B. NVR Hardware: Compatible with NVR Manufacturer Requirements: (Panasonic DVR existing)

1. Panasonic DVR (Existing)
 2. NVR manufacturer hardware
- C. Network Video Recorder Software
1. VMS compatible
- D. Video Monitor: Min 20" flat panel, high resolution compatible with system
1. Viewsonic
 2. Samsung
 3. Optiquest
 4. LG
 5. Owner Approved Equivalent
- E. Interior Color Camera Mini Dome:
1. Panasonic (Existing)
 2. Axis Communications
 3. Pelco
 4. Vicon
 5. Owner Approved Equivalent
- F. Exterior Color Camera Mini Dome Mini Dome
1. Panasonic (Existing)
 2. Axis Communications
 3. Pelco
 4. Vicon
 5. Owner Approved Equivalent
- G. Exterior Parapet/Roof Deck Camera Mount
1. Panasonic
 2. Axis
 3. Pelco
 4. Owner Approved Equivalent
- H. Wide Angle Megapixel Camera Lens
1. Computar
 2. Theia
 3. Owner Approved Equivalent
- I. Camera Power Supply
1. Altronix
 2. Alarm-Saf
 3. LifeSafety Power
 4. Owner Approved Equivalent
- J. Media Converter - Copper-to-Fiber Outdoor rated (Hardened for extreme

temperatures)

1. Axis Communications
2. IFS / UTC Security
3. Owner Approved Equivalent

K. Network Switch Box - Remote Video Recording

1. Cisco
2. Intel
3. H P
4. Owner Approved Equivalent

L. PoE Network Switch

1. Cisco
2. Intel
3. H P
4. Owner Approved Equivalent

M. Video Wire & Cable

1. Windy City
2. General Cable
3. Belden
4. CommScope
5. Owner Approved Equivalent

N. Uninterruptible Power Supply (UPS)

1. APC Smart-UPS Series
 - a) SMT series for workstations
 - b) Smart-UPS on-Line series for rack mounted equipment
2. MinuteMan
 - a) Pro series for workstations
 - b) Enterprise Plus series for rack mounted equipment
3. Owner Approved Equivalent

PART 3 - EXECUTION

3.1. GENERAL

- A. Installation: The Contractor shall install all system components including Owner furnished equipment, and appurtenances in accordance with the manufacturer's instructions, ANSI C2 and as shown, and shall furnish all necessary connectors, terminators, interconnections, services, and adjustments required for a complete and operable data transmission system.

B. Identification and Labeling: The Contractor shall supply permanent identification labels for each cable at each end that will appear on the as-built drawings. The labeling format shall be identified and a complete record shall be provided to the Owner with the final documentation. Each cable shall be identified by type or signal being carried and termination points. The labels shall be printed on letter size label sheets that are self laminated vinyl that can be printed from a computer data base or spread sheet. The labels shall be E-Z code WES12112 or equivalent.

1. The Contractor shall provide all personnel, equipment, instrumentation, and supplies necessary to perform all testing.

C. IP PoE Cameras

1. The Security contractor/integrator shall coordinate network and IP address requirements with VA to identify the Medium Access Control (MAC) address (Layer 2) of each provided camera, the location to be installed, and the port configuration needed for communication.
2. Make all necessary adjustments to camera lenses to obtain clear, crisp images and desired field of view to VA satisfaction.
 - a) Substitute camera lenses as necessary to obtain required field of view at no additional cost.
 - 1) Adjust all cameras to produce high-definition images with no blooming, streaking or noticeable lag.
 - 2) Provide and install in-line PoE injectors as required when non PoE network switches are used or when manufacturer specified power is not available to the camera.
 - 3) All camera power shall comply with the specified power requirements.

3.2 POWER REQUIREMENTS

A. Provide uninterruptible power supplies for all active surveillance equipment

1. Rack mounted components, including all active network communication hardware, shall be on an Uninterruptible Power Supply <UPS> system.
2. Refer to Section 280000 for UPS and power requirements
3. Camera power supplies shall be on an Auxiliary Power Supply <APS>, system as required, with a battery backup.
 - a) The Auxiliary power supply shall be furnished with a power distribution panel with each camera individually fused or protected with an over-current protector.

B. Power supplies shall provide:

1. 120 VAC input and output voltage as required
2. UL Listed
3. Power fail contacts to monitor the status of the input power
 - a) Connect each power supply power fail alarm as a separate alarm input into PAC system
4. Key lockable wall mount metal enclosure with tamper switch
5. Independently fused outputs

3.3 INSTALLATION

A. Refer to provisions of Section 280000

B. All surveillance system devices and components shall be compatible.

C. Camera Housings and Mounts

1. Cameras shall include housings and mounts as indicated in the Drawings.
 - a) Provide the smallest available housing for each camera application.
 - 1) Integrated miniature dome cameras are preferred
2. Wiring to cameras shall pass from the back-box through the mount and into the housing.
 - a) Exposed wiring or conduit shall not be acceptable.
3. Provide sun shields for camera housings in outdoor locations exposed directly to sunlight.
4. Provide surge protection for power and copper video cables for exterior cameras at the camera and at the point of termination (security rack).
5. Field verify the exact camera location, position, and mounting prior to installation.
6. Roof mounted cameras shall use roof deck brackets.

D. Video Management Control System

1. System platform software shall be 'open architecture' allowing for compatibility and integration with other building automated systems.
2. The system shall allow for secure remote viewing of live and recorded video as required.

E. Provide labeling suitable to Owner for all major equipment components. Coordinate with Owner on numbering scheme to match existing. Major equipment components:

1. Video monitors, IP camera Patch Panels, PoE Switches (or mid-span units), Network Video Recorders (NVR), and fiber mux units (if required).

- F. Coordinate with Telecommunication subcontractor for network and patch panel provisions for security connections in the IT room. (If applicable)
- G. Coordinate with Owner for all system programming and database requirements.
 - 1. Provide all programming, setup, camera and device titling and data entry
 - 2. Camera and device title and descriptions shall be consistent for all components
- H. Install all Point-to-Point wiring with appropriate terminal connections for every wire and component termination so that all connections are mechanically and electrically secure.
- I. Install field wiring in continuous lengths, without splices.
- J. Verify upon job completion that all wiring and terminations are clearly labeled to identify the wire and terminal.
- K. System installation shall be in accordance with NECA 303, manufacturer and related documents and references, for each type of security subsystem designed, engineered and installed.
- L. Components shall be configured with appropriate "service points" to pinpoint system trouble in less than 30 minutes.
- M. The Contractor shall install all system components including Government furnished equipment, and appurtenances in accordance with the manufacturer's instructions, documentation listed in Sections 1.5 of this document, and shall furnish all necessary connectors, terminators, interconnections, services, and adjustments required for a complete and operable system.
- N. The VSS System will be designed, engineered, installed, and tested to ensure all components are fully compatible as a system and can be integrated with all associated security subsystems, whether the system is a stand alone or a complete network.
- O. For programming purposes refer to the manufacturers requirements for correct system operations. Ensure computers being utilized for system integration meet or exceed the minimum system requirements outlined on the systems software packages.
- P. A complete VSS System shall be comprised of, but not limited to, the following components:
 - 1. Cameras
 - 2. Lenses

3. Camera Housings and Mounts
 4. Controlling Equipment
 5. Recording Devices
 6. Wiring and Cables
- Q. The Contractor shall visit the site and verify that site conditions are in agreement/compliance with the design package. The Contractor shall report all changes to the site or conditions that will affect performance of the system to the Contracting Officer in the form of a report. The Contractor shall not take any corrective action without written permission received from the Contracting Officer.
- R. Existing Equipment
1. The Contractor shall connect to and utilize existing video equipment, video and control signal transmission lines, and devices as outlined in the design package. Video equipment and signal lines that are usable in their original configuration without modification may be reused with Contracting Officer approval.
 2. The Contractor shall be held responsible for repair costs due to Contractor negligence, abuse, or incorrect installation of equipment.
- S. Enclosure Penetrations: All exterior enclosure penetrations shall be from the bottom of the enclosure unless the system design requires penetrations from other directions. Penetrations of interior enclosures involving transitions of conduit from interior to exterior, and all penetrations on exterior enclosures shall be sealed with rubber silicone sealant to preclude the entry of water and will comply with VA Master Specification 07 84 00, Firestopping.
- T. Cold Galvanizing: All field welds and brazing on factory galvanized boxes, enclosures, and conduits shall be coated with a cold galvanized paint containing at least 95 percent zinc by weight.
- U. Cameras:
1. Install the cameras with the focal length lens as indicated for each zone.
 2. Connect power and signal lines to the camera.
 3. Aim camera to give field of view as needed to cover the alarm zone.
 4. Aim fixed mounted cameras installed outdoors facing the rising or setting sun sufficiently below the horizon to preclude the camera looking directly at the sun.

5. Focus the lens to give a sharp picture (to include checking for day and night focus and image quality) over the entire field of view

V. Network Switch:

1. Install the network switch per design and construction documents, and as specified by the OEM.
2. Connect network switch to AC power (UPS).
3. Connect network cameras to network switch.
4. Configure the network switch per manufacturer's recommendation and project requirements.

W. Network Recording Equipment

1. Install the NVR or video storage unit as shown in the design and construction documents, and as specified by the OEM.
2. Connect recording device to AC power (UPS).
3. Connect recording device to network switch as shown and specified.
4. Configure network connections
5. Provide recording unit programming per VA guidance and the requirements provided by the Owner. Programming shall include:
 - a. Camera names
 - b. Screen views
 - c. Camera recording schedules (continuous and event) driven recording. Events include alarms from other systems (sensors), manual input, and video motion detection.
 - d. Video detection zones for each camera requiring video motion detection
 - e. Alarm interface
 - f. Alarm outputs
 - g. GUI maps, views, icons and actions
 - i. Reports

X. Camera Housings, Mounts, and Poles:

1. Install the camera housings and mounts as specified by the manufacturer and as shown, provide mounting hardware sized appropriately to secure each camera, housing and mount with maximum wind and ice loading encountered at the site.
2. Provide a foundation for each camera pole as specified and shown.
3. Provide a ground rod for each camera pole and connect the camera pole to the ground rod as specified in Division 26 of the VA Master Specification and the VA Electrical Manual 730.

4. Provide electrical and signal transmission cabling to the mount location via a hardened carrier system from the Physical Access Control System and Database Management to the device.
5. Connect signal lines and AC power to the housing interfaces.
6. Connect pole wiring harness to camera.

3.4 SYSTEM START-UP

- A. The Contractor shall not apply power to the VSS System until the following items have been completed:
 1. VSS equipment items and have been set up in accordance with manufacturer's instructions.
 2. A visual inspection of the VSS has been conducted to ensure that defective equipment items have not been installed and that there are no loose connections.
 3. System wiring has been tested and verified as correctly connected as indicated.
 4. All system grounding and transient protection systems have been verified as installed and connected as indicated.
 5. Power supplies to be connected to the VSS have been verified as the correct voltage, phasing, and frequency as indicated.
- B. The Commissioning Agent will observe startup and contractor testing of selected equipment. Coordinate the startup and contractor testing schedules with the Resident Engineer and Commissioning Agent. Provide a minimum of 7 days prior notice.
- C. Satisfaction of the above requirements shall not relieve the Contractor of responsibility for incorrect installation, defective equipment items, or collateral damage as a result of Contractor work efforts.

3.5 SUPPLEMENTAL CONTRACTOR QUALITY CONTROL

- A. The Contractor shall provide the services of technical representatives who are familiar with all components and installation procedures of the installed VSS; and are approved by the Contracting Officer.
- B. The Contractor will be present on the job site during the preparatory and initial phases of quality control to provide technical assistance.
- C. The Contractor shall also be available on an as needed basis to provide assistance with follow-up phases of quality control.
- D. The Contractor shall participate in the testing and validation of the system and shall provide certification that the system installed is fully operational as all construction document requirements have been fulfilled.

3.6 COMMISSIONING

- A. Provide commissioning documentation in accordance with the requirements of Section 28 08 00 - COMMISSIONING OF ELECTRONIC SAFETY AND SECURITY SYSTEMS for all inspection, start up, and contractor testing required above and required by the System Readiness Checklist provided by the Commissioning Agent.

3.7 DEMONSTRATION AND TRAINING

- A. Testing of the surveillance system includes checkout of installed cameras back to the Security head end equipment to confirm proper operation of camera assemblies.
 - 1. Security contractor/integrator shall provide all necessary test equipment to fully demonstrate proper performance of field devices. Copies of test results shall be included in the project completion submittals given to the Owner.
- B. All testing and training shall be compliant with the VA General Requirements, Section 01 00 00, "GENERAL REQUIREMENTS".
- C. Provide services of manufacturer's technical representative for four hours to instruct VA personnel in operation and maintenance of units.
- D. Submit training plans and instructor qualifications in accordance with the requirements of Section 28 08 00 - "COMMISSIONING OF ELECTRONIC SAFETY AND SECURITY SYSTEMS".

-----END-----