

University of Houston Master Specification

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SECTION 28 2300 - VIDEO SURVEILLANCE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. The Contractor's attention is specifically directed, but not limited, to the following documents for additional requirements:
 - 1. The current version of the *Uniform General Conditions for Construction Contracts*, State of Texas, available on the web site of the Texas Facilities Commission.
 - 2. The University of Houston's Supplemental General Conditions and Special Conditions for Construction.

1.2 SECTION INCLUDES

- A. Cameras.
- B. Control equipment.
- C. Cable and accessories.

1.3 REFERENCES

- A. The latest editions and pertinent addenda of the following:
 - 1. NFPA 70 - National Electrical Code; National Fire Protection Association.
 - 2. ANSI/TIA-569-D Standard, Commercial Building Standard for Telecommunications Pathways and Spaces.
 - 3. ANSI-J-STD-607-C Commercial Building Grounding and Bonding Requirements for Telecommunications.
 - 4. National Electrical Code (NEC) (Latest revision and pertinent addenda).
 - 5. National Fire Protection Association (NFPA) Publications.
 - 6. Americans with Disabilities Act (ADA).
 - 7. NFPA 101, National Fire Protection Association.
 - 8. Building Officials and Code Administrators International, Inc. (BOCA) National Building Code.
 - 9. International Building Code (IBC).

1.4 SYSTEM DESCRIPTION

- A. Work includes, but is not limited to, the following:

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1. Video Surveillance System (VSS)
 - a. Perform camera pre-installation walk-through with Owner's Project Manager, UIT Project Manager and Electronic Access Control (EAC) and Campus Safety Representatives.
 - b. Coordinate with General, Electrical and Technology Contractors as required to facilitate installation of pathway and data cabling required for system operation.
 - c. Install and program cameras and Network Video Recorder.
 - d. Provide all required software and licenses to Owner.
 - e. Coordinate IP Address Assignments with the UIT Project Manager.
2. Description: Provide video communications between points of surveillance indicated on Drawings, Network Video Recorder and central monitoring station.
3. Provide all materials, equipment, labor and all other incidental material, tools, appliances and transportation as required for a complete and functional video surveillance system as described herein and on the Drawings.
4. General elements of the Work shall consist of but not be limited to:
 - a. Procure all permits and licenses required to complete this installation.
 - b. Prepare and process submittals prior to ordering equipment.
 - c. Coordinate conduit system, raceway and power distribution provided under Division 26,.
 - d. Coordinate with all trades and Owner's Project Manager, UIT Project Manager and EAC and Campus Safety Representatives as required to facilitate installation of the security equipment including: Section 08 7100 "Door Hardware," Section 28 3100 "Addressable Fire Alarm System," Division 26 and Division 27,
 - e. Provide security system sensors, cable, mounts, connectors, wiring, equipment enclosures and all other materials necessary to complete the security system per the Drawings and Specifications.
 - f. Verify conditions and dimensions at the job site prior to installation.
 - g. Coordinate all system programming and camera naming with UIT Project Manager.
 - h. Make final adjustments and calibrations as directed by UIT Project Manager and EAC and Campus Safety Representatives.
 - i. Demonstrate all systems and component operations for final acceptance.
 - j. Prepare O&M manuals and As-Built Drawings..

1.5 MEETINGS

- A. Attend pre-construction and pre-submittal meeting with Owner's Project Manager, UIT Project Manager and EAC and Campus Safety Representatives to review Project design.
- B. Attend weekly Owner-Architect-Contractor construction meetings to review the installation schedule and progress of the Work.

1.6 ACTION SUBMITTALS

- A. Comply with requirements of Section 01 3300 "Submittal Procedures."

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B. Product Data:

1. List all system components with an assigned item number, manufacturer, model number and quantities of each.
2. Provide manufacturer's literature sheets for all materials and equipment, including warranty information and recommended preventative maintenance and spare part inventory recommendations. Clearly mark literature that contains more than one device to identify item(s) included in the Work.
3. Indicate color or special finishes.
4. Indicate cable types including manufacturer's verification and acceptance information.
5. Provide a general functional description of each system including:
 - a. Description of operating systems and application software.
 - b. Power requirements and UPS sizing.
6. Schedule of Values:
 - a. Submit, in addition to Division 01 requirements, a Schedule of Values to include an itemized list of all equipment, materials and labor required for installation of the Video Surveillance System (VSS) as specified herein for Change Order pricing.
 - b. Include assigned item numbers, item descriptions, item model numbers, item quantity, unit costs and extended labor, material and installation costs to provide a complete and functional security system. Submit in electronic .xlsx format.

C. Shop Drawings:

1. Provide Shop Drawings no less than 15 days after the pre-installation walk-through.
2. Indicate camera location, camera model, camera lensing, mounting height, mount type, and other pertinent information.
3. Submit PDF version of the Shop Drawings for review and approval. Do not reproduce the Drawings to serve as Shop Drawings.
4. Include the following:
 - a. Drawing legend describing all symbols used on the Drawings.
 - b. Floor plans with all device locations, mounting height, mount type and wiring.
 - c. Wire runs to include tags for type, gauge, quantities and cable identifiers.
 - d. System riser diagram indicating all field devices, riser paths and room designations.
 - e. Elevations of equipment racks with new equipment.
 - f. Fabrication shop drawings for all custom equipment.

D. Camera/PPF schedule: Provide a schedule demonstrating that the selected camera and lens at each camera location meet the required use criteria. Refer to Article 2.1 "Components" for requirements. Include all PPF and lens calculations on the schedule.

E. Samples: Upon request of the Owner's Campus Safety Representative, submit samples of proposed devices.

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- F. Partial submittals will not be accepted by Owner. Do not commence any portion of the Work nor order equipment until Owner has approved all submittals.
- G. Resubmittals
 - 1. Make corrections or changes in Submittals as required by the Security Consultant's stamped instructions and review comments.
 - 2. Identify changes on resubmittals by clouding. Only indicated changes will be reviewed when resubmitted.
 - 3. Clearly identify new or added drawings.
 - 4. Contractor is responsible for project delays caused by rejected submittals.

1.7 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum three years of documented experience and with service facilities within 100 miles of Project.
- C. Supplier Qualifications: Authorized distributor of specified manufacturer with minimum three years of documented experience.
- D. Installer Qualifications: Authorized installer certified by manufacturer to install and program the VSS products specified.
- E. Products: Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and indicated.
- F. Red Line Drawings: Maintain one full-size set of Drawings at the Project Site during working hours with installation progress marked and up-to-date equipment and device labels noted. Make needed changes to the drawings and schedules in order to accurately depict the as-built condition of the security system as it is being installed. Ensure that Red Line Drawings are available for examination during construction meetings and field inspections.

1.8 PRODUCT STANDARDS

- A. Provide all materials, equipment and installation in compliance with the latest applicable standards in Article 1.3 "References."
 - 1. In the event of any conflicts between documents referenced herein and contents of this Specification, notify the Architect and Security Consultant in writing of such occurrences before the purchase of any equipment, materials or installation. The Architect and Security Consultant will notify the Contractor of actions required to resolve these conflicts. Such actions may include but are not limited to: design,

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equipment, materials or installation changes. In any event, Contractor shall not supersede specifications and standards from the latest NFPA and NEC publications.

2. All equipment, materials and articles incorporated in the Work shall be new and unused.
3. Provide at installation the latest current standard model and/or version of all equipment (hardware and software).

1.9 MAINTENANCE SERVICE

- A. Furnish service and maintenance of VSS for one year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Manufacturer's name and product lines are given in the Specifications for the purpose of establishing a standard of performance, quality, style and compatibility with the existing network and video surveillance infrastructure.
- B. These Specifications list approved equipment types and items. In instances where quantities are not detailed, obtain quantities from the Drawings.
- C. Substitutions will be considered only if unique business requirements cannot be met by the Owner's approved manufacturers and if specified features of proposed substitutions are fully supported by Owner's existing infrastructure.
 - a. Refer to Section 01 2500 "Substitution Procedures."
 - b. Obtain prior written approval for substitutions from the Owner's Project Manager, UIT Project Manager and EAC and Campus Safety Representatives.

2.2 COMPONENTS

- A. Cameras:
 - 1) Detection
 - a) Hanwha - XNV-6083RZ
 - 2) Observation
 - a) Hanwha - XNV-8081Z
 - b) Hanwha - PNM-7082RVD - Dual Sensor
 - c) Hanwha - PNM-9085RQZ1 - Quad Sensor
 - 3) Recognition
 - a) Hanwha XNV-8083RZ
 - 4) Identification
 - a) Hanwha - XNV-9083RZ

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- 5) License Plate Recognition
 - a) Hanwha - PNO-A9311RLP
 - b) Hanwha - TNO-7180RLP (High Speed)
- 6) Pan Tilt Zoom (PTZ)
 - a) Hanwha XNP-C7310R PTZ
- 7) Multi Sensor Cameras
 - a) Hanwha - PNM-7082RVD - Dual Sensor
 - b) Hanwha - PNM-C9022RV - 180Deg Panoramic
 - c) Hanwha - PNM-9085RQZ1 - Quad Sensor
 - d) Hanwha - PNM-C34404RQPZ - PTZ plus Quad Sensor

- B. PoE Switches. OFOI.
- C. Network Video Recorders. OFOI.
- D. NVR licenses required for proper surveillance camera operation.

2.3 VIDEO SURVEILLANCE SYSTEM (VSS)

- A. System Description: Provide and install an IP VSS including IP cameras, data cabling per Section 27 1500 "Communication Horizontal Cabling," mounts, domes, dedicated security patch panels and any required components/accessories.
- B. General:
 - 1. Provide cameras and support wiring to the common equipment location and video processing equipment in the BD.
 - 2. Provide common equipment location with mounting board, support equipment, wire management and power.
- C. Video Cameras:
 - 1. Camera location, camera view, lens and mounting method shown on the Drawings are for reference purposes. Coordinate these details with UIT Project Manager and EAC and Campus Safety Representatives.
 - 2. Contractor is responsible for lens calculation prior to installation of cameras; specify fields of view rather than exact position of cameras.
 - 3. Prior to camera installation, verify lens placement to optimize view. Refine for local focus and viewing during installation. Submit final camera position and lens schedule for approval by UIT Project Manager and EAC and Campus Safety Representatives.
- D. Camera Signal Transient/Surge Protection:

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1. Provide camera transient/surge protection as specified in the Drawings and Specifications.
2. Design protection to guard sensitive electronics against lightning induced surges, electrostatic discharge and ground loop energies.

E. Video Camera Power Supply(ies):

1. Provide power to cameras by Power over Ethernet (PoE).
2. Adjunct power may be required for enhanced pan, tilt, zoom applications.
3. PoE switches will be OFOI.

2.4 STATIC CAMERA SYSTEM

- A. Determine camera resolutions based on the desired pixels per foot to achieve the required level of detail at a specified distance from the area of interest in order to meet a specific application. Applications include: detection; observation; recognition; identification and license plate recognition.
- B. Inherent camera characteristics such as lux ratings, dynamic range, anti-bloom capabilities, and auto black and white mode are solely dependent on the location and environmental conditions of a given deployment.
- C. For outdoor installations, provide adequate surge protection measures to include the following:
1. Float cameras in their housings by using nylon washers.
 2. Ground camera casings using building ground.
 3. Provide adequate network equipment protection by installing POE circuit protection. Basis of Design Product: DTK-MRJPOE.
- D. PoE switch port utilization shall not exceed a maximum of 22 cameras per switch if other devices are drawing power from this switch. 15.4 watts per port is the minimum requirement. Consult with the UIT Project Manager for PoE switch requirements.

2.5 WIRE AND CABLE

- A. Refer to Section 27 1500 "Communications Horizontal Cabling" for materials and installation methods.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.

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- B. Verify that communications cable installation is complete, tested and operational prior to installing cameras.
- C. Protect connectors to all exterior devices in system against moisture.
 - 1. Install at video head end and at all exterior cameras.
 - 2. Connect to nearest communication ground bus or proper building ground.
- D. Ensure ground continuity by properly bonding all appropriate cabling, closures, cabinets, service boxes, and framework. Comply with Section 28 0526 "Grounding and Bonding for Electronic Safety and Security."
- E. Provide tamper resistant features and hardware for all exposed J-boxes or enclosures. Use tamper resistant fasteners (tamper-proof pin-in-hex or pin-in-torx button head screws).
 - 1. Label all cable, distribution devices, enclosures and outlet locations according to industry standards. Coordinate the numbering scheme with the UIT Project Manager and EAC and Campus Safety Representatives before installation.
 - 2. Furnish any special installation equipment or tools necessary to properly complete the installation.
 - 3. When using existing pathway, reseal existing water barrier and fire-rated assemblies as required to maintain rating. Update UL-required fire assembly labels in compliance with the requirements of Section 07 8413 "Penetration Firestopping."
 - 4. Use installation techniques and fixtures that result in ease of maintenance and ready access to all components for testing measurements.
 - 5. Use stainless steel for all external screws, nuts, and locking washers. Do not use self-tapping screws unless specifically approved by Owner.
 - 6. All parts shall be made of corrosion resistant material, such as plastic, anodized aluminum or brass. All materials used in installation shall be resistant to fungus growth and moisture deterioration.

3.2 INTERFACES WITH OTHER PRODUCTS

- A. Coordinate installation of video surveillance with electronic access control and intrusion detection systems. Refer to Sections 28 1300 "Access Control" and 28 1600 "Intrusion Detection."

3.3 MANUFACTURER'S FIELD SERVICES

- A. Provide the services of the manufacturer's technical representative to prepare and start systems and supervise final wiring connections and system adjustments.

3.4 DEMONSTRATION

- A. Demonstrate system operation and provide two hours of instruction by manufacturer's training personnel.

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- B. Conduct walking tour of Project with UIT Project Manager and EAC and Campus Safety Representatives. Briefly describe function, operation, and maintenance of each component.

3.5 SITE INSPECTION

- A. Continuously verify that site conditions are consistent with the Contract Documents and the security system design. Notify the Owner's Project Manager, UIT Project Manager and EAC and Campus Safety Representatives immediately of conditions that affect the performance of the installed system.
- B. Coordinate with required work that is not specified in the Contract Documents.

3.6 COORDINATION

- A. Confirm that adequate conduit and back boxes are provided for the specified system installation.
- B. Verify that adequate power has been provided for the specified system installation.
- C. Verify mounting location of all devices with the Owner's Project Manager, UIT Project Manager and EAC and Campus Safety Representatives prior to installation.

3.7 IDENTIFICATION, LABELING AND DOCUMENTATION

- A. Refer to Section 28 0553 "Identification for Electronic Safety and Security" for identification and labeling requirements.

3.8 SECURITY SYSTEM PROGRAMMING

- A. Provide security system programming to include commissioning of all controllers, points and related devices.
- B. Perform all system programming in the field to verify Owner-designated zones for all devices. Develop programming with input from Owner's Campus Safety Representative. Acceptance of system requires Owner's approval.

3.9 TECHNICAL VERIFICATION SESSIONS

- A. Provide security system walk throughs and verification for UIT Project Manager and EAC and Campus Safety Representatives to consist of four one-hour sessions.
- B. Submit complete product manuals and preliminary As-Built Drawings to Owner one week prior to technical verification sessions.

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- C. Technical verification and walk throughs shall consist of:
 - 1. Technical explanations sufficiently thorough that Owner personnel will be able to identify and trace circuits, analyze malfunctions and make changes as necessary to maintain system operation.
 - 2. Printed reference materials for each Owner trainee that document and explain in technical terms:
 - a. System block diagram with technical features.
 - b. Method and record of end-to-end testing.
 - 3. Review of preliminary As-Built Drawings.

3.10 SUBSTANTIAL COMPLETION

- A. Work shall meet the following requirements to qualify for Substantial Completion:
 - 1. Confirm that all cameras and monitoring devices are fully installed, tested and fully operational.
 - 2. Confirm that video cameras are powered and focused as approved by UIT Project Manager and EAC and Campus Safety Representatives.
 - 3. Provide end to end testing reports.
 - 4. Confirm that technical verification process has been completed.
 - 5. Confirm that Owner may use the system for its designed intent.
 - 6. Provide a list of remaining work items and approximate completion date.
 - 7. Certify in writing that all remaining work is minor in nature and will be completed in less than 30 days.

3.11 TESTING REQUIREMENTS

- A. Refer to Section 28 0600 "Testing for Electronic Safety and Security" for testing requirements.

3.12 PROJECT CLOSE-OUT DOCUMENTS

- A. Submit As-Built Drawings in in .rvt, .dwg and .pdf formats.
- B. As-Built Drawings shall include all revised information provided as submittals and reflect as-installed revisions.
- C. General Description and Requirements:
 - 1. Project close-out documents shall consist of As-Built Drawings and Operation and Maintenance Manuals.
 - 2. Submit a preliminary draft of the As-Built Drawings to Owner and Security Consultant prior to final acceptance testing and training.
 - 3. Update all As-Built Drawings to reflect changes or modifications made during final acceptance testing as required.

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4. Submit final, corrected As-Built Drawings to Security Consultant within 30 days from date of Final Acceptance in .rvt, .dwg and .pdf formats.
5. As-Built Drawings:
 - a. At minimum, include the following:
 - 1) Floor plan drawings (1/8 inch = 1 foot scale) indicating device location, with device legends indicating manufacturer and model number for each device.
 - 2) Floor plan drawings (1/8 inch = 1 foot scale) indicating wire routing or approximate routing for existing wiring. Tag wiring with cable identifier and terminal strip number, which refers to wiring schedules.
 - 3) Mounting details for all equipment and hardware.
 - 4) Functional block diagrams for each system and subsystem.
 - 5) Wiring details showing rack and support equipment elevations, equipment wiring and terminations, and inter-rack wiring.
 - 6) Typical point-to-point wiring for each piece of equipment and groups of equipment within the system.
 - 7) Security conduit routing and cable labeling.
6. Operation and Maintenance (O&M) Manuals:
 - a. Provide one complete O&M manual for all equipment and devices with Project title and Contractor's name on cover.
 - b. Submit O&M manuals in PDF format.
 - c. Include the following:
 - 1) Table of contents page with tabbed divider sections for each device or system.
 - 2) Tabbed sections with specific functions and system block diagram.
 - 3) List of manufacturers, their local representatives and subcontractors that performed work on the project. List to include contact names, addresses and phone numbers for each.
 - 4) Custom written instructions and procedures for system operation.
 - 5) Operator commands.
 - 6) Start-up and shutdown procedures.
 - 7) Detailed programming descriptions for each system.
 - 8) Manufacturer's operation manual for each piece of equipment in the system. Product data sheets are not acceptable.
 - 9) Custom written, quick users guide for inexperienced operators.
 - 10) System backup disk.
 - 11) System software licenses.
 - 12) Equipment list, including a brief description, model, and total number of each item used in the Project.
 - 13) A separate list of serial numbers for all items used in the system.
 - 14) Copies of all programming specific to the Project, including new code, initial parameters, and settings entered on site, etc.
 - 15) Setup procedures for each component in the system.
 - 16) Maintenance requirements for equipment, inspections and preventative maintenance schedules.

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- 17) Final test data (measured levels and other significant operating parameters).
- 18) List of system-associated mechanical locking keys and tamper resistant hardware types with key codes.

3.13 SYSTEM CHECK AND VERIFICATION

- A. Commission all security devices from field up to and including the head-end.
- B. Review all as-built and testing documentation with UIT Project Manager and EAC and Campus Safety Representatives. Revise and reissue as required.
- C. Demonstrate that video camera image as received at the head-end is noise free and focused and field of view is optimized for intended content.

3.14 ACCEPTANCE OF SYSTEMS

- A. Meet the following criteria under testing for each area of construction that has been completed and identified as complete:
 1. System must meet all requirements as described in these Specifications.
 2. Operational prints, O&M manuals, signal logs, and As-Built Drawings must be furnished.
 3. Owner will perform visual testing and signal verification at random locations to determine that equipment performs satisfactorily.
 4. Owner will check for compliance with the Specifications during periodic observation of construction. Failure to comply with the Specifications will be considered before the initial acceptance phase of the system commences.
 5. Within ten days of receipt of a request for Final Acceptance, UIT Project Manager and EAC and Campus Safety Representatives will schedule and perform the final inspection. When the Work is found acceptable under the Contract Documents and the contract is fully performed, Owner will declare the Project to be complete.

END OF SECTION 28 2300

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