

(NOTE TO DESIGNER: These Specifications are basic minimum criteria to be met in preparing the final specifications for this section, which is the responsibility of the Designer.)

SECTION 28 23 00
VIDEO SURVEILLANCE

PART 1 GENERAL

1.1 SECTION INCLUDES

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

1.2 RELATED SECTIONS

- A. Section 08 71 00 - Door Hardware.
- B. Section 11 12 00 - Parking Control Equipment.
- C. Section 14 20 10 - Passenger Elevators.
- D. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables (600 V and Less).
- E. Section 28 05 00 - Common Work Results for Electronic Safety and Security
- F. Section 28 05 26 - Grounding and Bonding for Electronic Safety and Security.
- G. Section 28 05 28 - Pathways for Electronic Safety and Security.
- H. Section 28 05 53 - Identification for Electronic Safety and Security.
- I. Section 28 06 00 - Testing for Electronic Safety and Security.
- J. Section 28 13 00 – Access Control.
- K. Section 28 16 00 – Intrusion Detection.
- L. Section 28 26 00 - Electronic Personal Protection System.
- M. University of Houston Campus Design Guideline and Standards Security System Standards (latest edition)
- N. Conduit, cable tray and back boxes for this system shall be furnished and installed by the electrical contractor under the supervision of the security contractor.
- O. See Division 26 for all information relating to the fire alarm system and required relay interface to release emergency delay exit doors. The fire alarm integrator shall provide the control relays as required.
 - 1. See Division 26 for all specifications governing the performance of work associated with the installation of raceway, system junction and pull boxes and device rough-in boxes for all work shown in the Access Control System refer to the SC series security drawings.

1.3 REFERENCES

- A. NFPA 70 - National Electrical Code; National Fire Protection Association; 2005
- B. EIA/TIA-569 Standard, Commercial Building Standard for Telecommunications Pathways and Spaces
- C. EIA/TIA-607 Commercial Building Grounding and Bonding Requirements for Telecommunications
- D. National Electrical Code (NEC) (Latest revision and pertinent addendums)

- E. National Fire Protection Association (NFPA) Publications (Latest revisions and pertinent addendums)
- F. Americans with Disabilities Act (ADA)
- G. NFPA 101, National Fire Protection Association
- H. UL 294, Underwriter's Laboratories Access Control Systems
- I. UL 1037, Underwriter's Laboratories Anti-Theft Alarms and Devices
- J. UL 1076, Underwriter's Laboratories Propriety Burglar Alarms Units and Systems
- K. EIA-RS-170 Broadcast Standards
- L. NTSC Color System Standards
- M. Building Officials and Code Administrators International, Inc. (BOCA) National Building Code
- N. Uniform Building Code (UBC)
- O. Local Governing Authorities Having Jurisdiction

1.4 CONTRACT DOCUMENTS

- A. All work of this Section shall comply with the requirements of the Conditions of Contract (including: Bidding requirements, Contract forms, Conditions of Contract and Standard forms), with all Specification Sections of Division 1 General Requirements, with the Drawings, and with all other Contractual Documents.
- B. Coordinate with other Division sections as required.

1.5 SYSTEM DESCRIPTION

- A. This Section specifies the requirements for the Video Surveillance system for the University of Houston [Project Name]. [Insert Project description].

A. Scope of Work

1. The work detailed by these specifications and drawings has been specified to meet certain requirements for performance. Some information, such as exact equipment layout, wire routing, additional conduit and power requirements, etc. has been omitted. It shall be the responsibility of the Contractor to translate these specifications and drawings into a complete design package containing all necessary elements for a complete turnkey installation including all material, labor, warranties, shipping and permits.
2. Work shall include the installation and commissioning of the following:
 - a. Video Surveillance System (VSS)
3. Work to include, but not limited to the following:
 - a. Perform camera pre-installation sign-off walk through with Owner and Security Consultant.
 - b. Installation of cameras and camera cabling
 - c. Provide all required software and licenses to the Owner.
 - d. Contractor shall provide continuous on-site supervision of the installation technicians. On-site supervision shall include: daily supervision of the work, updating work site progress drawings to reflect changes and installations details, preparing weekly progress reports and attendance at site coordination meetings as directed by the Owner and Security Consultant.
 - e. The Contractor shall provide continuous engineering and programming support during the installation as required to accommodate existing conditions and unforeseen conditions that may arise during performance of the work.
 - f. The Contractor shall provide all miscellaneous hardware including cable management devices, termination cabinets, wire and cable labeling materials, fasteners, hangers and brackets as required.
 - g. The contractor will coordinate the delivery and storage of all materials, wire, cable,

- equipment and miscellaneous hardware.
4. Description: Provide video communications between points of surveillance indicated on Drawings and central monitoring station.
 5. The contractor shall provide all materials, equipment, labor and all other incidental material, tools, appliances and transportation as required for a complete and functional video surveillance system (VSS) as described herein and supplementary drawings.
 6. General elements of the work shall consist of but not limited to:
 - a. Procure all permits and license required to complete this installation.
 - b. Submission of Schedule of Values for all equipment, materials and labor.
 - c. Attend pre-construction/pre-submittal meeting with Owner and Security Consultant to review design package for security and finish hardware.
 - d. Submittal preparation and processing prior to ordering equipment.
 - e. Attend finish hardware submittal review meeting.
 - f. Coordination of conduit system, raceway and power distribution provided by Division 26 contractors.
 - g. Coordination with all trades and Owner representatives as required facilitating the installation of the security equipment including: Door Hardware, Fire Alarm and Electrical Divisions.
 - h. Provide security system sensors, cable, connectors, wiring, equipment enclosures and all other materials necessary to complete the security system per the design documents.
 - i. Verify conditions and dimensions at the job site prior to installation.
 - j. Coordinate all system programming and camera naming with Owner.
 - k. Perform pre-installation camera position and view sign off with Owner.
 - l. Perform installation according to contract documents and manufacturers recommendations.
 - m. Protect new facilities finishes and equipment.
 - n. Maintain construction materials and refuse within the area of work.
 - o. Clean the work area at the end of each day.
 - p. Perform initial testing and adjustments with written reports.
 - q. Make final adjustments and calibrations as directed by the Owner and Security Consultant.
 - r. Demonstrate all systems and component operations for final acceptance.
 - s. Preparation of O&M manuals and as-built documents for Owner's use.
 - t. Provide training for Owner's security staff, facility personnel and technical staff.
 - u. Provide warranty service for a period of one year from acceptance date.
 - v. Provide extended maintenance service.

1.6 SUBMITTALS

- A. See Section 01 33 00 - Submittal Procedures.
- B. Shop Drawings: Indicate electrical characteristics and connection requirements, including system wiring diagram.
- C. Camera/PPF schedule: As further described in UH Telecommunication Infrastructure Standards Section 12.0.2.1 "Camera Model Specifications and Use Requirements" provide a schedule demonstrating that the selected camera and lens at each camera location meets the required use criteria. Schedule shall include all PPF and lens calculations.
- D. Product Data: Provide showing electrical characteristics and connection requirements for each component.
- E. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.
- F. Project Record Documents: Record actual locations of cameras and routing of television cable.
- G. Operation Data: Instructions for starting and operating system.
- H. Maintenance Data: Routine trouble shooting procedures.
- I. The submittal shall be a detailed response describing methods, procedures and specific equipment

proposed to conform to the system design detailed in these documents.

- J. Submittals shall consist of product data, shop drawings, samples and detailed completion schedules.
- K. Partial submittals shall not be accepted without prior approval by Owner.
- L. No portion of the work shall commence or equipment ordered until the Owner has approved the submittals.
- M. The Contractor shall not be relieved from any contract-required responsibility by the Owner's approval of submittals.
- N. Nothing in the specification shall relieve the Security Contractor of responsibility in delivering a functioning turnkey security system.

1.7 SUBMITTAL REQUIREMENTS

A. Product Data

- 1. Provide Submittals no less than 10 working days after notice to proceed.
- 2. Submit data in 3-ring binder divided into separate section (Access Control, Video Surveillance, etc.) for each system.
- 3. Equipment lists and equipment data sheets shall be 8.5" x 11" in size.
- 4. Each section to include the following:
 - a. List all system components with an assigned item number, manufacturer, model number and quantities of each.
 - b. Manufacturer's literature sheets for all materials and equipment, including warranty information and recommended preventative maintenance and spare part inventory recommendations. Literature containing more than one device shall be clearly marked to delineate item(s) included in the work.
 - c. Clearly indicate color or special finishes.
 - d. Cable types including manufacturer's verification and acceptance information.
 - e. General functional description of each system including:
 - 1) Description of operating systems and application software.
 - 2) Power requirements and UPS sizing.
- 5. Schedule of Values
 - a. Contractor shall submit in addition to Division 1 requirements, a Schedule of Values, which includes itemized listing of all equipment, materials and labor required for the installation of the VSS as specified herein for Change Order pricing. Listing shall contain: assign item number, item description, item model number, item quantity, unit cost and extended labor, material and installation cost to provide a complete and functional security system. Submit in electronic format (Microsoft Excel).
- 6. Shop Drawings
 - a. Provide Shop Drawings no less than 25 working days after notice to proceed.
 - b. Reproducing Contract Documents for shop drawing is not acceptable.
 - c. Submit 3 complete sets of shop drawings along with CD-ROM copy to the Security Consultant.
 - d. Produce all shop drawings on latest version of AutoCAD.
 - e. Shop drawings to include the following:
 - 1) Drawing legend sheet describing all symbols used on the drawings.
 - 2) Floor plans with all device locations and wiring.
 - 3) Wire runs to include tags for type, gauge, quantities and cable identifiers.
 - 4) System riser diagram indicating all field devices, riser paths and room designations.
 - 5) Block diagram for each system showing: all equipment, interconnections, network connections and data flow.
 - 6) Point schedule-defining interconnection of all inputs and outputs for all equipment including fire alarm interface, data connections and other systems.
 - 7) Schedule of device power requirements, power source and load calculations.
 - 8) Elevations of equipment racks with new equipment.
 - 9) Elevations of electrical closet(s) with security DGP panel, termination enclosure, wire

management, lock power supply(s), UPS, and power routing, etc.

10) Fabrication shop drawings for all custom equipment.

7. Samples
 - a. Upon specific request of the Owner and Security Consultant, submit samples of any proposed devices.
8. Resubmitting
 - a. Make corrections or changes in Submittals as required by the Security Consultant's stamped instructions and attached comments and resubmit.
 - b. Identify changes on resubmittals by clouding. Only indicated changes will be reviewed when resubmitted.
 - c. Added drawings shall be clearly identified.
 - d. Contractor shall be responsible for project delays caused by rejected submittals.
 - e. Security Consultant shall be compensated for additional services for submittals rejected more than twice. The amount of such compensation shall be incorporated by change order and withheld from the Contractor's Application for Payment.

1.8 RECORD DOCUMENTATION

- A. Furnish 3 complete sets of record documents.
- B. Record documents shall include all revised information provided as submittals and reflect as installed revisions.
- C. General Description and Requirements
 1. Record drawings shall consist of As-Built Drawings and Operation and Maintenance Manuals.
 2. Transmit 3 copies of a preliminary draft of the Record Documents to the Owner and Security Consultant prior to final acceptance testing and training.
 3. Update all Record Documents to reflect changes or modifications made during final acceptance testing as required.
 4. Submit 3 sets of final corrected Record Documents to the Security Consultant within 30 days from the date of final acceptance.
 5. As-Built Drawings
 - a. Furnish 3 complete sets of as-built drawings along with a complete CD-ROM copy.
 - b. Maintain on the job site, current up to date as-built drawings and schedule(s) including most recent changes. Included field notes shall be neat and legible. The Contractor shall make any needed changes to this drawing and schedule set as to accurately depict the as-built condition of the security system as it is installed.
 - A. As-built Drawings shall, at a minimum, include the following:
 - 1) Floor plan drawings (1/8"=1' scale) indicating device location, with device legends indicating manufacturer and model number for each device.
 - 2) Floor plan drawings (1/8"=1' scale) indicating wire routing or approximate routing for existing wiring. Wiring shall be tagged with cable identifier and terminal strip number, which references wiring schedules.
 - 3) Mounting details for all equipment and hardware.
 - 4) Functional block diagrams for each system and subsystem.
 - 5) Wiring details showing: rack elevations, DGP 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) Schedule of all devices with associated panel termination, zoning, power circuit numbers, etc.
 6. Operational and Maintenance (O&M) Manuals
 - a. Provide 3 complete operation and maintenance manuals for all equipment and devices with project title and contractor's name on cover and spine.

- b. Submit operation and maintenance manuals in 3 ring binders.
- c. O&M manuals shall include:
 - 1) Provide table of contents page with tabbed divider sections for each device or system.
 - 2) Tabbed sections shall include: theory of operation, design philosophy, specific functions and system block diagram.
 - 3) List of manufacturer's, 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 the 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 job, 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.
 - 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.

1.9 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 documented experience and with service facilities within 100 miles of Project.
- C. Supplier Qualifications: Authorized distributor of specified manufacturer with minimum three years documented experience.
- D. Installer Qualifications: Authorized installer of specified manufacturer with service facilities within 100 miles of Project.
- E. Products: Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and indicated.
- F. Contractor Qualifications
 - 1. An experienced Contractor shall perform the installation. Contractor shall have at least 5 years' experience in the installation of security systems of similar size and scope.
 - 2. The installation shall be performed by a Contractor licensed by the Texas Board of Private Investigators and Private Security Agencies and shall be bonded and insured.
 - 3. All installation personnel shall also be licensed as required by local and/or state jurisdictions.
 - 4. Contractor shall provide all licensing documentation as part of the bid.
 - 5. Owner's representative may make such investigations as deemed necessary to determine that the Contractor is responsive, responsible and qualified in the area of work contemplated by the contract. In this regard, the security system installation firm shall furnish to the Owner such

information and data as shall be requested for this purpose. Information and data may include (but not necessarily be limited to): Date of organization and/or incorporation and number of years engaged in this business under present firm's names; list of major equipment owned by the company; list of principal personnel who will be involved in the execution of this contract with the experience and qualifications of each person.

6. The Contractor shall provide a project manager that shall be constantly in charge of the VSS installation. The project manager shall be the same person authorized to make decisions and answer questions asked by the Architect and Owner Representatives. The project manager shall also be responsible for system programming, preparation of Operation and Maintenance Manuals, Training, Programs, Schedules and Test Protocols, documentation of system testing, maintenance of Record Drawings and coordination and scheduling of all labor.
7. Provide evidence of site supervisor's qualifications and work history
8. Contractor shall be or have direct relations through their subcontractors, and authorized manufacturer's representatives for all products they furnish or install.
9. Provide documentation that the Contractor and or subcontractor are factory certified to install, program, train and repair all major components or systems to be used in the project.
10. Contractor shall have a local organization capable of providing maintenance and service for the specified system. Facility shall be no more than 100 miles from Owner's site. The security system installation firm shall be capable of providing emergency service on a 24-hour, 7 days a week basis.

1.10 PRODUCT STANDARDS

- A. The Contractor will provide all materials, equipment and installation in compliance with the latest applicable standards from ANSI, FCC, ASTM, EIA/TIA, IEEE, NEC, NFPA, NEMA, REA and UL including but not limited to:
 1. EIA/TIA-569 Standard, Commercial Building Standard for Telecommunications Pathways and Spaces.
 2. EIA/TIA-607 Commercial Building Grounding and Bonding Requirements for Telecommunications
 3. ANSI T1.404 (DS3) and CATV Applications
 4. National Electrical Code (NEC) (Latest revision and pertinent addendums)
 5. National Fire Protection Association (NFPA) Publications (Latest revisions and pertinent addendums)
 6. Americans with Disabilities Act (ADA).
 7. In the event of any conflicts between documents referenced herein and the contents of this specification, the Contractor shall notify in writing to Engineer of any such occurrences before the purchase of any equipment, materials and/or installation by the Contractor. The Engineer will notify the Contractor of any actions required to resolve these conflicts. Such actions may include but are not limited to: design changes, equipment, materials and/or installation changes. In any event Contractor shall not supersede specifications and standards from the latest NFPA and NEC publications.
 8. All equipment, materials and articles incorporated in the work covered by this contract are to be new and unused.
 9. The contractor shall provide at installation time the latest current standard model and/or version of all equipment (hardware and software).

1.11 MAINTENANCE SERVICE

- A. Furnish service and maintenance of surveillance system for one year from Date of Substantial Completion.

PART 2 PRODUCTS

2.1 COMPONENTS

- A. Models:

Part	Manufacturer / Product Lines	Application - Model Choice
IP Security Camera	Pelco SUREVISION Sarix IX Series Sarix IM-E Series Environmental Sarix IM-V Vandal Resistant Sarix IM Mini Domes INDOOR FIXED DOME Sarix ID Indoor Domes Sarix IM Vandal Resistant Sarix IM Mini Domes Camclosure IP Fixed IP Dome OUTDOOR FIXED DOME Sarix IE Environmental Sarix IM Environmental Mini Dome PTZ DOME Spectra HD Spectra IV H.264 Spectra IV IP Spectra Mini IP	<p>APPLICATIONS: Activity Detection; License Plate Reading; Recognition; Identification. Model appropriateness depends on the camera's ability to provide adequate Pixels per Foot (PPF)</p> <p>MODEL SELECTION: Specific models are based on business use requirements as determined by the business owner – The University of Houston Department of Public Safety. The UH Information Technology Operations Group will select the appropriate model to meet these requirements.</p> <p>The model selection process is based on the following criteria:</p> <ul style="list-style-type: none"> • PPF – Pixels per foot • Lighting conditions • Environmental Variables • Analytics requirements • Network Impact <p>MULTIPIXEL AVAILABLE CAMERA RATINGS: 0.5 MP 1.3 MP 2.1 MP 3.0 MP</p> <p>***Consult with the UH IT Network Operations Video Analyst and the UH DPS Manager of Public Safety Systems for final design approval.</p>
Panoramic IP	Scallop	D7 180 – day time color best suited for indoor with consistent ambient lighting. Suited for Activity Detection in wide open spaces. (does not support motion

		<p>recording)</p> <p>M6-200 – day/night black and white with exceptional detail in low lighting conditions. Suited for Activity Detection in wide open spaces. (does not support motion recording)</p> <p>***Consult with the UH IT Network Operations Video Analyst and the UH DPS Manager of Public Safety Systems for final design approval</p>
Specialty Camera (Infrared IP Camera)	Pelco	<p>License Plate Readers; Confined areas under very low light.</p> <p>***Consult with the UH IT Network Operations Video Analyst and the UH DPS Manager of Public Safety Systems for final design approval</p>
Analog Camera	Pelco	<p>***Consult with the UH IT Network Operations Video Analyst and the UH DPS Manager of Public Safety Systems for final design approval</p>
DVR	Pelco	<p>***Consult with the UH IT Network Operations Video Analyst and the UH DPS Manager of Public Safety Systems for final design approval.</p>
NVR	Strand	<p>NVR P-6 NVR P-8 NVR E-24 NVR E-32 Pelco Digital Sentry NVR ***Consult with the UH IT Network Operations Video Analyst and the UH DPS Manager of Public Safety Systems for final design approval</p>
Cable Video	Commscope	<p>Cat 6 Indoor Flooded Cat6 Outdoor</p>

B. PoE Switches. OFOI

C. NVR licenses required for proper surveillance camera operation.

2.2 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 surveillance video infrastructure.

- B. These specifications list approved equipment types and items. In instances where quantities are not detailed, they shall be obtained from the drawings.
- C. Alternatives will only be considered if a unique business requirement cannot be met by the UH IT approved product line, and if specified features are fully supported by the existing infrastructure.

2.3 Video Surveillance System

- A. System Description: Provide and install an IP Video Surveillance system including IP cameras, data cabling per division 27, mounts, domes, dedicated security patch panels and any required components/accessories.
- B. General
 - 1. Cameras and support wiring to the common equipment location and video processing equipment in the MDF.
 - 2. Common equipment location with mounting board, support equipment, wire management and power.
- C. Video Cameras
 - 1. Camera schedule location, camera view, lens and mounting method are for reference purposes. Contractor is responsible for coordinating these details with Owner and Security Consultant.
 - 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, contractor will verify lens placement to optimize view. Refine for local focus and viewing during installation. Final camera position and lens schedule shall be submitted for Security Consultant's approval.
- D. Camera Signal Transient/Surge Protection
 - 1. Provide camera transient/surge protection as specified in the drawings and specifications.
 - 2. Protector to guard sensitive electronics against lightning induced surges, electrostatic discharge and ground loop energies.
 - 3. Install at video head end and at all exterior cameras
 - 4. Connect to nearest communication ground bus or proper building ground.
- E. Video Camera Power Supply(s)
 - 1. Cameras will be PoE. PoE switches will be OFOI.

2.4 STATIC CAMERA SYSTEM

- A. Camera resolutions will be determined by 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: Activity Detection; License Plate Reading; Facial Recognition; and Facial Identification
- 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. Provide ground isolation transformers as required to eliminate hum bars and ground loops.
 - 1. Pelco IDE20DN-PMO
 - 2. or UH IT approved equal.
- D. 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 utilizing building ground.
 - 3. Provide adequate network equipment protection by installing POE circuit protection such as DTK-MRJPOE or approved equal.
- E. NVR-DVR recording resolutions must meet pixel per foot camera requirements.
- F. NVRs must have a Gigabit uplink on the building's network distribution switch.
- G. PoE switch port utilization must not exceed a maximum of 22 cameras per switch and less if other devices

are drawing power from this switch. 15.4 watts per port is the minimum requirement. Consult with the UH IT Network Operations group for PoE switch requirements.

2.6 CAMERA VIDEO AND POWER TRANSIENT/SURGEVPROTECTION DEVICE

- A. Provide inline camera video signal and power protection at all outdoor camera locations with grounds connected to closest electrical ground as specified in the drawings and specifications

2.7 CAMERA POWER SUPPLY

- A. Camera power to be provided by Power over Ethernet (PoE)

2.8 WIRE AND CABLE

- A. Category 6 per Division 27 specifications

2.9 ACCESSORIES

- A. Rack: Provide free-standing equipment Rack.
 - 1. Size: 7' x 19" with minimum 6" vertical cable managers on each side.

PART 3 EXECUTION

3.1 INSTALLATION

- A. This section covers the general requirements for the installation of the security system by the Contractor.
- B. Install in accordance with manufacturer's instructions.
- C. The Contractor shall be responsible for providing all wire and cable as required for complete and operational system.
- D. All cables must be continuous runs from device location to the final point of termination. No mid run cable splices will be allowed.
- E. The cable installation techniques shall be such that the mechanical and communications characteristics of the cables are not degraded at the time of installation. Any special environmental requirements for equipment shall be specified.
- F. Distribution of the cabling will be accomplished through cable trays, cable runways, conduit raceways, ducts, core holes, extended columns, false half columns and plenums. Cabling shall be run at right angles. Horizontal cable segments will be placed in cable trays and when they leave cable trays will be supported by distribution rings or J-hooks. Where cables converge at equipment room locations, they will be supported by cable runways and distribution rings. All cable placements shall be based on the enclosed drawings.
- G. The contractor shall not place security wiring in the same conduit or raceway with wire for electrical power distribution.
- H. Connectors to all devices in system shall be protected against moisture. Approval of the method shall not relieve the contractor of full responsibility for proper application and workmanship of the materials in the manner specifically approved. All connector threads shall be treated with an approved silicone lubricant.
- I. The Contractor shall be responsible for providing an approved ground and ground bus bars at all newly installed systems insuring proper bonding to telecommunications facilities. The Contractor shall also be responsible for ensuring ground continuity by properly bonding all appropriate cabling, closures, cabinets, service boxes, and framework. All grounds shall consist of a minimum 6 AWG copper wire and shall be supplied from an approved building ground and bonded to the main electrical ground.

Contractor must notify the Owner prior to making any changes in submitted system design and/or installation.

- J. All exposed J-boxes or enclosures shall have tamper resistant features and hardware. Tamper resistant fasteners to be Tamper-Proof pin-in-hex or pin-in-torx button head screws.
1. Use of common wires for input or output circuits is not allowed.
 2. Configure all zones to be normally closed loop with an end of line resistor (EOL) at the most distant point of the zone.
 3. The Contractor shall obtain Owner's permission before proceeding with any work necessitating cutting into or through any part of building structures such as girders, beams, concrete or tile floors and partition ceilings.
 4. The Contractor shall exercise reasonable care to avoid any damage to Owner's property. Contractor shall be responsible for and repair all damage due to carelessness of workers. Contractor will report to Owner any damage to the building, which may exist or may occur during the occupancy of the quarters.
 5. The Contractor shall be responsible for proper electrical grounds.
 6. The Contractor shall take necessary steps to ensure that required fire fighting apparatus is accessible at all times. Flammable materials shall be kept in suitable places outside the building.
 7. The Contractor shall install the materials in accordance with the manufacturers' specifications.
 8. The Contractor shall promptly correct all defects for which the Contractor is responsible.
 9. The Contractor shall insure that all records and reports, City relations, engineering, metering, inspections, testing, quality or service standards and safety measures comply with standards applicable for the State of Texas.
 10. The Contractor shall coordinate all work with Owner's designated representative.
 11. The Contractor shall maintain a work area free of debris, trash, empty cable reels, scrap wire, etc., and dispose of such items on a daily basis.
 12. All work shall be done in a thorough and conscientious manner according to industry standards and shall be subject to inspection and acceptance.
 13. The Contractor shall be certain that all installation work areas are secure and made safe in accordance with Occupational Safety and Health Administration (OSHA) regulations.
 14. The installation crew should include at least one installation supervisor, or lead technician, for on-site management of the project at all times.
 15. The Contractor shall be responsible for completing a standardized report form addressing the weekly progress of the installation schedule.
 16. The Contractor shall maintain conductor polarity in accordance with industry practices.
 17. The Contractor shall provide any necessary screws, anchors, clamps, tie wraps, distribution rings, miscellaneous grounding and support hardware, etc., necessary to facilitate the installation of the distribution system.
 18. The Contractor shall be responsible for labeling all cable, distribution devices, enclosures and outlet locations, according to industry standards. Numbering scheme shall be coordinated with Owner's representative before installation.
 19. It shall be the responsibility of the Installation Contractor to furnish any special installation equipment or tools necessary to properly complete the installation.
 20. The Contractor shall not roll or store cable reels without an appropriate underlay.
 21. The Contractor shall not place any distribution cabling alongside power lines, or share the same conduit, channel or sleeve with electrical apparatus.
 22. The Contractor shall insure that the maximum pulling tensions of the specified distribution cables are not exceeded at any time during the placement facilities. Failure to follow the appropriate guidelines may require the Contractor to provide additional material and labor necessary to properly rectify the situation. This shall also apply to any and all damages sustained to the cables by the installation Contractor during the implementation.
 23. The Contractor shall be responsible for testing all cable prior to the installation of the cable. If the Installation Contractor fails to perform this testing operation, the Installation Contractor shall

accept the cable as good and assume all liability for the replacement of the cable should it be found defective at a later date.

24. The Contractor shall plug conduits where cabling has been installed by the Installation Contractor in all equipment rooms and other cable entrance locations with re-enterable duct seal of flame retardant putty.
25. Materials shall be consistent throughout the building. Where two or more units of the same class of equipment are required, these units shall be the product of a single manufacturer and shall be the same product with the same material, model, and manufacturer number.
26. Wiring, materials, and equipment will be delivered and stored in a clean dry space. They will be properly packaged in factory fabricated type containers and protected from damaging fumes, construction debris and traffic until job completion.
27. The wiring, materials, and equipment furnished for this request shall be essentially the standard product of the manufacturer.
28. All wiring, materials, and equipment must be listed and labeled by a nationally recognized testing laboratory.
29. All installation techniques and fixtures shall result in ease of maintenance and ready access to all components for testing measurements. All external screws, nuts, and locking washers shall be stainless steel. No self-tapping screws shall be used unless specifically approved by Owner. 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.
30. An inert dielectric material shall separate dissimilar metals apt to corrode through electrolysis under the environmental operating conditions specified.
31. The cable pulling operation shall be performed such that a minimum bending of the cable shall occur in the unreeling and pulling operations. The pulling tension shall not be allowed to exceed the maximum tension specified by the manufacturer of the cable.
32. Jacketing and insulation shall satisfy the Underwriters Laboratories (UL) listed fire rated cable insulation requirements in plenum areas.
33. Any pulling compound or lubricant used in cable installation shall not deteriorate the conductor or the insulation.
34. Parts and components not specifically mentioned in these specifications, which are required to provide a complete unit, shall be included as a part of the equipment to be furnished.
35. Nothing in the specification shall relieve respondents of system package design responsibility, including, but not limited to, all equipment furnished under this contract. The successful respondent is, in all cases, solely responsible for the performance of the delivered system, and for furnishing complete system documentation for each and every part of the system.

3.2 INTERFACES WITH OTHER PRODUCTS

- A. Interface installation of video surveillance with security access and intrusion detection systems.

3.3 MANUFACTURER'S FIELD SERVICES

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

3.4 ADJUSTING

- A. Adjust manual lens irises to meet lighting conditions.

3.5 DEMONSTRATION

- A. Demonstrate system operation and provide two hours of instruction with manufacturer's training personnel.
- B. Conduct walking tour of project and briefly describe function, operation, and maintenance of each component.

3.6 WEEKLY CONSTRUCTION MEETING

- A. The Security Consultant and/or Owner will hold weekly construction meetings to review the installation schedule. It is mandatory that the Contractor's project manager attend each meeting.

3.7 SITE INSPECTION

- A. Continuously verify that the site conditions are in agreement with the Contract Documents and the security system design. Notify Owner's representative immediately of conditions that affect the performance of the installed system.
- B. Coordinate any required work that is not specified in the Contract Documents.

3.8 COORDINATION

- A. Adequate conduit and back boxes are provided for the specified system installation.
- B. Verify value of end of line supervision module with Owner.
- C. Adequate power has been provided for the specified system installation.
 - 1. Verify mounting location of all devices with Owner prior to installation.

3.9 IDENTIFICATION, LABELING AND DOCUMENTATION

- A. The Contractor shall label all termination devices, panels, enclosures and equipment rooms. The Contractor will mark each unit with permanently attached markings that will not impair the equipment or present a hazard to maintenance personnel.
- B. Place wire identification numbers on each end of all conductors by using sleeve type heat shrinkable markers. Install markers to be readable from left to right or top to bottom. Wire numbers shall be computer printed (Brady TLS2200 with Permasleeve cable marking labels or equivalent). Hand written labels are not acceptable.
- C. Mark all spare conductors.
- D. If changes occur prior to acceptance testing altering the documentation previously furnished, the contractor shall formally update and reissue the relevant documentation to the Security Consultant and Owner.
- E. Security Consultant and Owner will review all documentation for accuracy and completeness and may reject substandard submittals.
- F. The Contractor shall establish and maintain complete system documentation, including documentation procedures, operational information, configuration information, historical records, and drawings. Documentation shall include the following:
 - 1. Floor plan drawings indicating device locations, unique system point numbers with device legends indicating manufacturers and model numbers for each device.
 - 2. The unique system point number of a device shall identify either through the software or hardware connection, the specific device or group of devices associated with the unique point number in the system.
 - 3. Floor plan drawings indicating conduit and wire routing and junction box locations.
 - 4. Wire routing shall include cable identification and terminal strip numbers.
 - 5. Mounting details for all equipment and hardware.
 - 6. Functional block diagrams for each system.
 - 7. Wiring details showing rack elevations, equipment wiring and terminations and inter-rack wiring.

3.10 SECURITY SYSTEM PROGRAMMING

- A. Security System Programming to include commissioning of all controllers, points and related devices.

- B. All system programming shall take place in the field to verify Owner-designated zones for all devices. Programming shall be developed with Owner's input and shall not be accepted without Owner's approval.

3.11 WARRANTY

- A. The Contractor shall warrant the system for parts and labor for one (1) year. Warranty commences at the time of substantial project completion and acceptance by Owner. Nothing shall be construed to limit this obligation to a shorter period.
- B. Warranty service shall be rendered on-site by request of Owner to repair or replace any defective materials, equipment and workmanship without cost to the Owner, unless the Owner has previously given the Contractor a written acceptance of such condition.
- C. The Owner shall give prompt notice of the defect(s) either verbally or in writing to Contractor.
- D. Contractor shall purchase and provide to Owner one spare camera per type purchased. Spare cameras will be held by Owner for use by Contractor during warranty period. Contractor to replace spare parts used with new. Spare parts are property of Owner.
- E. Perform preventative maintenance during the warranty period, which includes:
 - 1. Quarterly cleaning and inspection of all devices.
 - 2. Quarterly inspection, cleaning and testing of all power supplies/UPS.
 - 3. Quarterly test and replace of batteries as necessary.
 - 4. Clean and vacuum MDF console and rack equipment
 - 5. Service technician performing service / warranty work shall check-in and out for each visit.
 - 6. Provide a written report to Owner documenting any work performed during the warranty period within 24 hours of such event. Report shall detail work performed, equipment repaired or replaced, etc.
 - 7. Provide loaner equipment which is equivalent to the malfunction equipment for any equipment not field repairable.
 - 8. Repair or Replacement Service
 - a. Repair or replacement service during the warranty period shall be performed 7 days a week, 24 hours a day and with a 4 hour response time.
 - b. Emergency repair or replacement service during the warranty period shall be performed 7 days a week, 24 hours a day and with a 1 hour response time.
 - c. If the Contractor can not restore system operation during the warranty period within 2 business days of the system failure, the Owner reserves the right to require the Contractor to provide on-site manufacturer's service technicians at no additional cost.
 - d. The Owner reserves the right to expand or add to the system during the warranty period using firm(s) other than the contractor for such expansion without affecting the Contractor's responsibilities, provided the expansion is performed by an authorized dealer for the affected equipment.
 - e. On-line software and hardware service shall be provided and shall be password protected and controlled by the Owner.

3.12 TECHNICAL VERIFICATION SESSION

- A. Security system walk through and verification shall be provided for the technical staff and shall minimally consist of 4 ea. 1-hour session.
- B. A complete product manuals and preliminary as-built drawings shall be delivered to the owner one week prior to the training sessions.
- C. Technical verification and walk through shall consist of:
 - 1. Technical explanation sufficiently thorough that: staff personnel shall be able to identify and trace circuits, analyze malfunctions and make changes as necessary to maintain system operation.

2. Provide printed reference material for each trainee that documents and explains in technical terms:
 - a. System block diagram with technical features
 - b. Method and record of end-to-end testing
 - c. Review of as-built drawings.
 - d. Q & A session.

3.13 SUBSTANTIAL COMPLETION

- A. Work must meet the following requirements to qualify for the Owner's consideration of Substantial Completion:
 1. All cameras and monitoring devices shall be fully installed, tested and fully operational
 2. Video cameras powered and focused.
 3. End to end testing reports produced
 4. Technical verification process complete.
 5. Owner may utilize the system for its designed intent.
 6. Contractor will provide a list of remaining work items and approximate completion date.
 7. Contractor will certify in writing that all remaining work is minor in nature and will be completed in less than 30 days.

3.14 TESTING REQUIREMENTS

- A. The contractor shall perform sample tests in the presence of the Security Consultant and Owner. Performing the testing procedures specified herein assures that the communication cabling and system electronics meets the performance characteristics specified. All testing shall comply with EIA/TIA Standards and that of the equipment manufacturers. If testing indicates that the performance characteristics are not met, the test shall be failed test and any other test that may be affected by the modification and/or repair shall be rerun and verified.
- B. Test equipment will be provided by the contractor to test and to certify the 100% operational condition of all materials and equipment.
- C. The Vendor shall prepare and submit all test procedures and data forms for the pre-installation, post installation and subsystem test to Owner. The test procedures shall have Owner approval before the tests.

3.15 SYSTEM CHECK OUT AND VERIFICATION

- A. Commission all security devices from field up to and including the head-end.
- B. Contractor supplied "As Built" Drawings shall show security conduit routing and cable labeling.
- C. Review all as-built and testing documentation with Owner. Revise and reissue as required.
- D. Video camera image as received at the head-end is noise free, focused and field of view of view is optimized for intended content.

3.16 ACCEPTANCE OF SYSTEMS

- A. Each area of construction completed and submitted as complete shall meet the following criteria under testing:
 1. System must meet all specifications as described in these instructions.
 2. Operational prints, manuals, signal logs, and as built prints must be furnished.
 3. Visual testing and signal verification will be conducted at random locations to determine that equipment performs satisfactorily.
 4. Specifications set forth for construction of the system have been devised in order to insure system compatibility and performance. Compliance to these specifications will be determined during periodic observances of construction. Repeated failure to comply with the specification will be

- considered before the initial acceptance phase of the plant commences.
5. Within ten days receipt of the final acceptance notice, the Owner's representatives shall schedule and perform the final inspection. When the work is found acceptable under the contract documents and the contract is fully performed, the project will be declared complete.

END OF SECTION