# SECTION 283000 - ELECTRONIC SECURITY SYSTEMS (PROVIDED BY OWNER)

## PART 1 - GENERAL

### 1.01 RELATED DOCUMENTS:

A. Contract drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section and shall be considered a part of this section and shall have the same force as if specified herein full.

### 1.02 DESCRIPTION:

A. The Electronic Security System (intrusion alarm system) will consist of an alarm control panel, control keypad and motion detectors The alarm control panel shall include communication devices to allow transmission of alarm signals to UL Listed Central Station. There shall be a digital dialer that utilizes voice grade copper phone lines to transmit alarms signals to a UL List Central Station. Monitoring by a UL Listed Central Station is required. The supply and installation of the alarm control panel, keypads, motion detectors, alarm signal transmission devices and method of alarm signal transmission (such as phone line or cellular account) will be the responsibility of the Security Construction Professional.

### 1.03 QUALITY ASSURANCE:

A. Industry Referenced Standards. The following specifications and standards are incorporated into and become a part of this Specification by reference.
   1. NFPA 70 National Electric Code
   2. UL 50 Enclosures for Electrical Equipment

### 1.04 INSTALLER'S QUALIFICATIONS:

A. Firm with at least 3 years of successful application, installation, and testing experience on the specified systems and equipment. All supervisors and installers assigned to the installation of this system or any of its components shall have factory certification from each equipment manufacturer that they are qualified to install and test the provided products. General electric trade staff shall not be used for the installation of the security system and associated hardware. All installers assigned to the installation of this system or any of its components shall have a minimum of 3 years experience in the installation of the specified equipment.

B. Prior to beginning work, the Construction Professional shall submit a complete list of all employees that will be assigned to the project and that will work at the job site. This list shall be maintained and update continuously during all phases of construction.

C. The responsibilities of the Construction Professional shall include but not be limited to the following:
   1. Installation of all intrusion alarm system and associated equipment as documented in the drawings and specifications.
   2. Coordination of all intrusion alarm system and associated equipment (including coordination required with other trades).
   3. Conduit and wire for all intrusion alarm system and associated equipment.
   4. Wiring termination for all intrusion alarm system and associated equipment.
   5. Testing and check-out of all intrusion alarm system and associated equipment.
   6. Training for all intrusion alarm system and associated equipment.
   7. Warranty for all intrusion alarm system and associated equipment.
   8. As-Built drawings for the complete intrusion alarm system.
   9. One year (12 months of monitoring provided by a UL Listed Central Station.

1.05 SUBMITTALS

A. Product data for each component.

B. Shop Drawings: Prior to proceeding with the work: Provide detailed equipment assemblies and indicate dimensions, weights, required clearances, method of field assembly, components, and location of each field connection, and a complete schedule of all equipment and materials with associated manufacturers cuts sheets which are to be used.
   1. Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer-installed and field-installed wiring. Identify terminals to facilitate installation, operation, and maintenance. Include a single-line diagram showing cabling interconnection of components and levels throughout system and impedances.
   2. Artwork drawings and lists indicating proposed nameplate nomenclature and arrangements for control panels and plug panels prior to fabrication reflecting equipment used.
   3. Each drawing shall have a descriptive title and all sub-parts of each drawing shall be labeled. All drawings shall have the name and locations of the project, Systems Construction Professional's name in the title block.
   4. Details and descriptions of any other aspect of the system, which must differ from the contract documents due to field conditions or equipment, furnished.

C. FCC Approval: The system shall be approved for direct interconnection to the telephone utility under Part 68 of FCC rules and regulations. Systems, which are not FCC approved or utilize an intermediary device for connection, will not be considered. Provide the FCC registration number of the system being proposed as part of the submittal process.

D. Product Certificates: Signed by manufacturers of equipment certifying that products furnished comply with specified requirements.

E. Installer Certificates: Signed by manufacturer certifying that installers comply with requirements.

F. Manufacturer Certificates: Signed by manufacturers certifying that they comply with requirements.

G. Field Test Reports: Indicate and interpret test results for compliance with performance requirements. Include record of final matching transformer-tap settings, and signal ground-resistance measurement certified by Installer.

H. Maintenance Data: For equipment to be included in maintenance manuals specified in Division 1.
   1. Record of Owners equipment-programming option decisions.
   2. All instructions necessary for proper operation and manufacturer's instructions.
   3. "Proof of Performance" information.
   4. Manufacturer's maintenance information.
   5. Copies of non-proprietary computer programs and system set up disks documenting all programmable features of the installed system.

I. Record Drawings: Prior to final acceptance, provide three (3) complete sets of drawings indicating all cable numbers and construction details in accordance with the actual system installation. Revise all shop drawings to represent actual installation conditions. These Record Drawings will be used during "Final Acceptance Testing".

1.6 SYSTEM TRAINING:

A. Submit the following information describing the training programs and system trainers as outlined in paragraph 1.6 of this specification and in accordance with Division 1 specifications.
   1. Include with the submittal a preliminary staff development training program in outline form for review and approval by the Design Professional.
   2. Include with the submittal a current copy of the trainer's certification from the manufacturer that certifies and identifies the trainer(s) who are eligible to provide training and support for the project.
   3. Include with the submittal a current copy of trainer's need's assessment form which will be reviewed with the Design Professional for the system's preliminary system programming and configuration.
   4. Include with the submittal copies of all documentation used to identify for the owner those participants attending and completing the training programs.

1.7 DRAWINGS

A. The Drawings indicate the arrangement of Security equipment. Conditions indicated on architectural drawings shall govern for this work. Coordinate installation of equipment with other trades. Coordinate installation of recessed equipment with concealed ductwork and piping, and wall thickness.

B. All raceways required for intrusion alarm system are not shown on the Drawings. Raceways that are shown are minimum sizes and quantities. Construction Professional shall provide all additional quantities, routing, and sizes of raceways and pull/junction boxes to meet all codes, manufacturer's recommendations, and Specification requirements.

C. Raceway home runs shall be installed as shown on the Drawings, and as required by the associated equipment manufacturers.

1.8 FINAL CLOSEOUT DOCUMENTS

A. At the time of final inspection, provide complete data on equipment used in this project and all shop drawings in "as built" versions. Materials shall be provided in electronic format.

1.9 ACCEPTABLE MANUFACTURERS

A. The approved alarm control panel manufacturers for this project are Ademco, Honeywell and Bosch.

B. Reference the PRODUCTS Section for approved Manufacturers for other related equipment.

1.10 WARRANTY

A. A copy of the manufacturer's standard statement of warranty proving all equipment provided for the electronic security system is covered with the required five-year warranty shall be included with the project submittal. This statement of warranty shall be provided on the manufacturer's stationary.

B. The Security Construction Professional shall warrant all Division 28 Systems for one year from date of Owner's Acceptance against defects in equipment or workmanship. Failed equipment shall be replaced by the Security Construction Professional at no cost to the owner. Owner's personnel may perform initial trouble investigation but replacement of failed equipment and escalated problem support will be handled by the Security Construction Professional.

C. The warranty period shall not start until the Owner has provided a written Letter of Acceptance. It shall be the Security Construction Professional's responsibility to request and obtain the Letter of Acceptance from the Owner.

D. Once the Security Construction Professional has obtained a Letter of Acceptance from the Owner, the Security Construction Professional must provide a Warranty Letter to the Owner. The Warranty Letter must state the start date of the Warranty, instructions that explain how warranty request are to be made and contact name / phone number for service.

PART 2 – PRODUCTS

2.01 ALARM CONTROL PANEL

A. The control panel shall be UL Listed for Commercial Burglary.

B. The control panel shall be capable of providing 8 partitions.

C. The zones shall include 8 hard-wired zones and be expandable to 128 unique inputs. A combination of hardwired, looped and wireless may be utilized. All

wireless transponders must have constant supervision (constantly poled for communication failure and battery status).

D. Local sounders or sirens shall be provided with the system. Also, alarms shall be communicated to a UL Listed Central Station and indicated on the keypads.

E. Battery backup shall be provided for the Intrusion Alarm System. The battery shall be sized for this burglary application and provide a minimum of 4 hours battery back-up for the Control Panel, keypads, sensors and all field devices connected to the system.

F. The system shall be capable of multiple central station communication formats and providing individual as well as unique alarm signals for each alarm point in the system.

G. The entire alarm system shall be protected by surge protection.

H. System programming shall be nonvolatile and shall not be lost if there is a loss in power.

I. Load calculations must be performed to ensure that maximum output of the Alarm Control Panel's internal power supply has not been exceeded. Should the output of the internal power supply be exceeded due to the number of powered devices connected to and powered by the system, an external power supply must be added. The external power supply must be monitored and supervised for AC power fail, low battery and tamper.

J. The Alarm Control Panel shall allow for the programming of unique User codes for arming and disarming. Each User shall be provided with a unique code that is transmitted and saved (for report purposes) by the Central Station.

2.02 KEYPADS

A. Keypads shall be a 2-line, 32-character English language display for complete zone identification and system status, keypad addressable system control units. The keys shall be located behind a protective door and are continuously backlit. The keypad shall mount directly to a single gang electrical box.

2.03 OUTPUTS

A. The Alarm Control Panel shall provide outputs with a change-of-state for the following:
1. ARMED
2. DIS-ARMED
3. ALARM ACTIVATION

2.04 PARTITIONS / ZONES

A. The panel must allow for multiple partitions.

B. The panel must allow for each detector in the polling loop to be a zone and assigned to a unique partition.

2.05 DETECTORS

A. The Honeywell dual-technology devices are the only approved motion detectors for this project.

B. Dual technology, long range and wide-angle motion detectors shall be provided in the locations as shown on the drawings.

C. The long-range motion detectors shall be Honeywell, model DT-900 series with passive infrared and microwave technology. The long-range motion detectors shall provide a minimum coverage area of 120' x 10' and 90' x 70' (relative to masking be applied or not applied). The long-range motion detector shall include:
1. Digital Fluorescent light fixture filter
2. Self adjusting thresholds and self-test
3. Design for harsh environments
4. Diagnostic LEDs

D. The wide-angle motion detectors shall be Honeywell, model DT-435 series with passive infrared and microwave technology. The wire angle motion detectors shall provide a minimum coverage area of 50' x 40'. The motion detector shall include:
1. Diagnostic LED's

E. The motion detector detection pattern shall be easily adjustable at the time of installation to suit each individual application.

F. Locate the detector as shown on the drawings and so that the likely motion of intruders will cross the detection pattern. The mounting height of all wall mounted detectors shall be no less than 7 ft. Ceiling mounted detectors must be securely mounted with back box or rails in lift out tile ceiling. It shall be the responsibility of the Security Construction Professional to ensure that the motion detector's mounting location provides the optimal detection pattern.

2.06 MONITORING

A. Off-site monitoring by a UL Listed Central Station must be provided for the Intrusion Detection System. Provide one-year monitoring for the system as part of base contract.

B. Provide 1-year (12 months) of monitoring service. Open and closing reports (upon request by New Auburn City School) are required. Test reports are not required as part of the monthly monitoring service.

PART 3 – EXECUTION

3.1 WIRING

A. The Construction Professional shall provide drawings and calculations to insure the wire gauge has been selected per the manufacturer's requirements.

B. Intrusion alarm system wiring shall be installed per manufacturers recommendations to prevent interference with intercom, telephone, and data cabling.

3.2 INSTALLATION

A. The Intrusion Alarm System shall be supplied and installed by a Construction Professional that has been continuously engaged in the sales and installation of Intrusion Alarm Systems for a minimum of five (5) years. The Construction Professional shall provide a complete and operational system and include all power supplies, batteries, panels, and accessories required to have the system meet the required specifications.

B. Installation drawings shall be provided that show detector location, detector zone number, and detector partition number.

C. The Construction Professional shall provide a warranty per the contract terms and conditions.

3.3 TRAINING

A. The Construction Professional shall include in the base Contract all costs required to train owners operating and maintenance personnel in the use and maintenance of systems provided under this section of the Specifications. Training sessions shall be conducted by qualified instructors who are familiar with the equipment and with the system installation. "Quickstart" user guides developed by the Construction Professional shall be presented in these training sessions.

B. Time to be included in base Contracts for specific systems shall be as follows: Electronic Security Systems- 8 hours.

END OF SECTION 283000

# SECTION 283010 -VIDEO SURVEILLANCE SYSTEM (PROVIDED BY OWNER)

## PART 1 GENERAL

### 1.01 RELATED DOCUMENTS

A. Contract drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section and shall be considered a part of this section and shall have the same force as if specified herein full.

### 1.02 DESCRIPTION

A. This section includes furnishing and installing all materials and providing all labor and supervision pertaining to the installation of an IP Based Video Surveillance System.

B. The requirements of the IP Based Video Surveillance System shall include all raceway, cabling, devices, equipment, computer software and hardware required to provide a fully functional system. Provide all labor, materials, equipment, and supervision to install, check out, adjust, and calibrate the total system. Reference contract drawings for complete requirements.

C. The requirements of the IP Based Video Surveillance System shall include all power inserters and connection to electrical panels for power circuits at exterior camera locations for complete and fully operational system.

D. The requirements of the IP Based Video Surveillance System include all programming of the Video Server to record all cameras in Time Lapse and Motion / Alarm record modes. The Video Server shall be programmed to record all cameras in continuous Time Lapse Mode at a minimum frame rate of 5 frames per second (fps) continuous at 1080p resolution. The Video Server shall be programmed to record when activity is detected in the cameras field of view at 30 frames per second and at the full resolution of the camera. During alarm recording mode, cameras are to be recorded at full resolution so that full zoom capabilities are available when viewing archived alarm events. This level of programming has been difficult for most Security Construction Professionals. Obtaining Manufacturer's on-site / phone support and all associated cost are the full responsibility of the Security Construction Professional.

E. The requirements of the IP Based Video Surveillance System include all programming of the Video Server to ensure recorded video from all cameras is stored and archived for 31 days. The Security Construction Professional shall be responsible for sizing the archiver hardware storage capacity based on 31 days of constant recording of all cameras recorded at all times and at 5 fps as well as motion-based recording based on 50% motion, 30 fps and full resolution for 31 days.

F. This division of the Specifications covers the complete IP Based Video Surveillance system as indicated on the Drawings and specified herein. The Security Construction Professional shall provide all labor, materials, equipment, and supervision to install the specified system with the exception of cabling, patch panels, patch

cords, conduit & junction boxes. The installation of all cabling, patch panels & patch cords shall be responsibility of Security Construction Professional. The junction boxes and conduits shall be responsibility of electrical Construction Professional.

G. As part of the scope of this contract, the Security Construction Professional shall install and configure client software on up to three (3) Owner provided workstations. Each workstation shall be able to view all respective cameras.

H. The IP Based Video Surveillance System shall utilize an existing dedicated network. The Security Construction Professional must ensure that all Video surveillance cameras are connected to this network and that all video is routed to the Network Server (for live view and archiving).

I. The Security Construction Professional shall be responsible for coordinating the exact location of the IP Based Video Surveillance System network equipment in data racks provided by the Telecom Construction Professional.

J. A minimum of one (1) portable media with client monitoring software and one (1) Operating Instruction Manual (for the software) must be provided with each Client Workstation software application that is loaded onto Owner provided computer hardware. Additional copies of client monitoring software with loading and operating instructions on portable media must be available upon Owner's request at no charge for the duration of the warranty period.

K. All conflicts between the drawings and specifications shall be brought to the attention of the owner as soon as possible. In general, specification requirements shall take precedence over drawing requirements.

L. As part of the base bid, the Video surveillance management and recording system shall include a network-based Video Recording System.

1.03 QUALITY ASSURANCE

A. Industry Referenced Standards. The following specifications and standards are incorporated into and become a part of this Specification by reference.
   1. NFPA 70 National Electric Code
   2. UL 50 Enclosures for Electrical Equipment
   3. UL 1590
   4. FCC Part 15, Class B
   5. ICEA S-83-596 ICEA Standard for Fiber Optic Premises Distribution Cabling – Current Edition
   6. IEEE802.3at PoE
   7. IEEE802.3af PoE
   8. EN 60950-1
   9. EN 55022 Class B (Emissions)
   10. EN 55024 (Immunity), VCCI

1.04 INSTALLER'S QUALIFICATIONS

A. Firm with at least 5 years of successful application, installation, and testing experience on specified systems and equipment. All supervisors and installers assigned

to the installation of this system or any of its components shall have factory certification from each equipment manufacturer that they are qualified to install and test the provided products. General Electric trade staff shall not be used for the installation of the Video Surveillance System and associated hardware. All installers assigned to the installation of this system or any of its components shall have a minimum of 3 years' experience in the installation of the specified equipment.

B. Security Construction Professional must be a certified installer of the manufacturer of the IP Based Video Surveillance System.

C. The Security Construction Professional must be licensed in the State of Georgia as a Low Voltage Telecommunications (LV-T) or Low Voltage Unrestricted (LV-U) class certification.

D. The responsibilities of the Security Construction Professional shall include but not be limited to the following:
   1. Shop drawings on all IP Based Video Surveillance Systems and equipment.
   2. Installation of all new IP Based Video Surveillance Systems and equipment as documented in the drawings and specifications.
   3. Set up and programming of all alarm event and recording parameters for all cameras (as defined by Owner).
   4. Coordination with Owner to establish at list of common camera names. Then programming of all camera names into all Video Surveillance System displays.
   5. Testing and check-out of all IP Based Video Surveillance systems and equipment.
   6. Training for all IP Based Video Surveillance systems and equipment.
   7. Warranty for all IP Based Video Surveillance systems and equipment.
   8. As-Built drawings, operations, and maintenance for the complete IP Based Video Surveillance System.

E. The responsibilities of the Security Construction Professional shall include but not be limited to the following:
   1. Set up and programming of all motion detection.
   2. Wire and wiring termination for all IP Based Video Surveillance and control systems and equipment.

1.05 SUBMITTALS

A. Product data for each component.

B. Shop Drawings: Prior to proceeding with the work: Provide detailed equipment assemblies and indicate dimensions, weights, required clearances, method of field assembly, components, and location of each field connection, and a complete schedule of all equipment and materials with associated manufacturers cuts sheets which are to be used.
   1. Wiring Diagrams: Detail wiring for power, signal, and control systems and differentiate between manufacturer-installed and field-installed wiring. Identify terminals to facilitate installation, operation, and maintenance. Include a single-line diagram showing cabling interconnection of components and levels throughout system and impedances.

2. Each drawing shall have a descriptive title and all sub-parts of each drawing shall be labeled. All drawings shall have the name and locations of the project, Systems Construction Professional's name in the title block.
3. Details and descriptions of any other aspect of the system, which must differ from the contract documents due to field conditions or equipment, furnished.

C. FCC Approval: The system shall be approved for direct interconnection to the telephone utility under Part 68 of FCC rules and regulations. Systems, which are not FCC approved or utilize an intermediary device for connection, will not be considered. Provide the FCC registration number of the system being proposed as part of the submittal process.

D. Product Certificates: Signed by manufacturers of equipment certifying that products furnished comply with specified requirements.

E. Installer Certificates: Signed by manufacturer certifying that installers comply with requirements.

F. Manufacturer Certificates: Signed by manufacturers certifying that they comply with requirements.

G. Field Test Reports: Indicate and interpret test results for compliance with performance requirements. Include record of final matching transformer-tap settings, and signal ground-resistance measurement certified by Installer.

H. Maintenance Data: For equipment to be included in maintenance manuals specified in Division 1.
   a. Record of Owners equipment-programming option decisions.
   b. All instructions necessary for proper operation and manufacturer's instructions.
   c. "Proof of Performance" information.
   d. Manufacturer's maintenance information.
   e. Copies of non-proprietary computer programs and system set up disks documenting all programmable features of the installed system.

I. Record Drawings: Prior to final acceptance, provide three (3) complete sets of drawings indicating all cable numbers and construction details in accordance with the actual system installation. Revise all shop drawings to represent actual installation conditions. These Record Drawings will be used during "Final Acceptance Testing". Confirm with Owner that substitution of electronic copies is acceptable.

J. System Training: Submit the following information describing the training programs and system trainers as outlined in paragraph 1.6 of this specification and in accordance with Division 1 specifications.
   a. Include with the submittal a preliminary staff development training program in outline form for review and approval by the Design Professional.
   b. Include with the submittal a current copy of the trainer's certification from the manufacturer that certifies and identifies the trainer(s) who are eligible to provide training and support for the project.
   c. Include with the submittal a current copy of trainer's need's assessment form which will be reviewed with the Design Professional for the system's preliminary system programming and configuration.

d. Include with the submittal copies of all documentation used to identify for the owner those participants attending and completing the training programs.

K. A copy of the manufacturer's standard statement of warranty proving all equipment provided for the system is covered with the required five-year warranty shall be included with the project submittal. This statement of warranty shall be provided on the manufacturer's stationary.

1.06 DRAWINGS

A. The Drawings indicate the arrangement of IP Based Video Surveillance equipment. Coordinate installation of equipment with the structural, mechanical, and electrical equipment and access thereto.

B. Raceway home runs as shown on the IP Based Video Surveillance System shall be installed as shown on the Drawings, and as required by the associated equipment manufacturers.

C. Revit drawings (floor plans only) in electronic RVT format shall be provided to the Security Construction Professional for the production of shop drawings and As-built drawings. The Security Construction Professional is totally responsible for the conversion, if necessary, of the electronic files to whatever in house CAD program the Security Construction Professional utilizes to generate the as-built drawings.

1.07 ACCEPTABLE MANUFACTURERS

A. Reference products section of specifications for acceptable manufacturers.

1.08 WARRANTY

A. Provide a manufacturer's five-year warranty of the system against defects in material and workmanship. This warranty will cover all electronic equipment associated with the system. If any defects are found within the warranty period, the defective equipment shall be replaced at no cost (equipment only); a one-year warranty shall be provided for labor.

B. A copy of the manufacturer's standard statement of warranty proving all equipment provided for the system is covered with the required five-year warranty shall be included with the project submittal. This statement of warranty shall be provided on the manufacturer's stationary. The standard five-year warranty is an important element in establishing a standard in quality. Manufacturers who circumvent the five-year warranty by offering special "extended warranties" that are not part of their normal published warranty will not be accepted.

C. Construction Professional shall respond, excluding weekends and holidays, within 24 hours to any warranty service calls. If equipment cannot be repaired within 24 hours of service visit, the Construction Professional shall provide "loaner" equipment to the facility at no charge.

D. Make available a service contract offering continuing factory authorized service of the system after the initial warranty period.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Materials or equipment specified by manufacturer's name shall be provided unless approval of other manufacturers is listed in addendum to these Specifications. Any materials or equipment approved in addendum shall function the same as the equipment specified.

2.02 VIDEO SURVEILLANCE CAMERAS

A. All cameras shall be U.L. listed and shall be the standard product of one manufacturer complying with not less than the specifications contained herein. Installation of each camera shall include mounting brackets and/or camera housings fully compatible with the camera provided and as required by IP Based Video Surveillance System camera schedule.

B. All camera installations shall be securely attached to the mounting surface. Use lead shields on solid masonry, toggle bolts for hollow masonry, and machine bolts for steel. All anchoring devices shall be rated to support not less than five times the total equipment weight. All anchor bolts must be a minimum of 2 ½" inches in length. Reference mounting details in contract documents.

C. Indoor /Outdoor Fixed Dome, Wide Dynamic Range, 2 Megapixel Cameras (Type 1):
   1. The camera shall be the Avigilon H5A series vandal resistant, dome style camera.
   2. This camera shall also be available in a comparable outdoor rated version.
   3. All cameras, in this category, shall be equipped with variable focal (3.3mm to 9mm) lenses.

D. Indoor 270 Degree Field-of-View Multisensor, Dome Style, Wide Dynamic Range 15 Megapixel Camera (Type 2)
   1. The camera shall be the Avigilon H4 Multisensor vandal resistant, 270-degree dome style camera, 15 Megapixel (3X5MP).
   2. All cameras, in this category, shall be equipped with a 2.8mm fixed lens.
   3. Provide outdoor dome and cover for exterior locations.

E. Indoor /Outdoor Fixed Dome, Wide Dynamic Range, 6 Megapixel Cameras (Type 3):
   1. The camera shall be the Avigilon H5A series vandal resistant, dome style camera.
   2. This camera shall also be available in a comparable outdoor rated version.
   3. All cameras, in this category, shall be equipped with variable focal (4.9 to 8mm) lenses.

F. Indoor /Outdoor Fixed Dome, Wide Dynamic Range, 4 Megapixel Cameras (Type 4):
   4. The camera shall be the Avigilon H5A series vandal resistant, dome style camera.
   5. This camera shall also be available in a comparable outdoor rated version.
   6. All cameras, in this category, shall be equipped with variable focal (3.3mm to 9mm) lenses.

G. Indoor Fixed Dual Sensor Dome, Wide Dynamic Range, 10 Megapixel Cameras (Type 5):
   1. The camera shall be the Avigilon H5DH Dual Sensor series, dome style camera, 10

Megapixel (2X5MP).

2. All cameras, in this category, shall be equipped with variable focal (3.35 to 7mm) lenses.

H. Indoor /Outdoor Fixed Dome, Wide Dynamic Range, 8 Megapixel Cameras (Type 6):
   7. The camera shall be the Avigilon H5A series vandal resistant, dome style camera.
   8. This camera shall also be available in a comparable outdoor rated version.
   9. All cameras, in this category, shall be equipped with variable focal (4.9mm to 8mm) lenses.

I. It shall be the Security Construction Professional responsibility to ensure that the latest version of firmware, that is compatible with the Video Management System, is down-loaded to all cameras prior to Final Inspection.

J. Interior Mini-Domes: All mini-dome style cameras, installed in lay-in tile ceilings, shall be supported by T-bar Support Kits.

K. Reference camera details and schedule for housing types required.

2.03 VIDEO MANAGEMENT SYSTEM (VMS)

A. GENERAL
   1. Approved VMS Manufacturer(s).
      a. Owner Standard manufacturer to be determined. It is It is expected that basis of design will be Avigilon or comparable.
   2. The Video Management System (VMS) software shall be used to view live and recorded video from IP devices connected to local and wide area networks. The VMS software shall have a client/server-based architecture that can be configured as a standalone VMS system with the client software running on the server hardware and/or the client running on any network-connected TCP/IP workstation. Multiple client workstations shall be capable of simultaneously viewing live and/or recorded video from one or more servers. Multiple servers shall also be able to simultaneously provide live and/or recorded video to one or more workstations.
   3. The VMS shall not charge for the number of concurrent clients.
   4. Recording of all videos transmitted to the VMS shall be continuous, uninterrupted, and unattended.
   5. The VMS system shall offer the capability of video motion detection recording, such that video is recorded when the motion is detected in the camera's field-of-view or within a pre-programmed region of interest of the camera's view. Video prior to and after the detection of the motion shall also be stored. The exact amount of video stored prior to and after the event shall be determined by the OWNER.
   6. The VMS software shall have an open architecture supporting IP cameras and encoders from multiple manufacturers providing best-of-breed solutions ranging from low-cost, entry-level features to high-resolution, megapixel features.
   7. The VMS client software shall be able to view live video and audio, recorded video and audio, and be able to configure the complete system all from a single application.
   8. The VMS shall always continue to record video and audio during the administration and configuration of any feature.

9. The VMS client software shall have the same functionality when connected remotely as it does when it is run locally on the same computer as the server software.
10. The VMS client software shall add and remove features based on the permissions of the user and the licensed functionality.
11. The VMS shall also allow an authorized user to view video through a web client interface. The web client interface shall allow authorized users to view live video, view recorded video, control pan-tilt zoom (PTZ) cameras and activate triggers. The web client interface shall allow connections to multiple VMS servers simultaneously.
12. The VMS server software shall record and retrieve video, audio and alarm data and provide it to the VMS clients upon request.
13. The VMS software shall provide at no additional charge a purpose-built mobile application capable of viewing multiple simultaneous live video streams and playing a recorded video stream. Application shall be provided for both iOS and Android operating systems (including Kindle Fire).
14. The VMS shall license the total number of cameras on the system. This license shall be based on the MAC address of a single network card that is present on the system. The VMS shall only require that this network card be enabled and does not require that data is actually sent through it.
15. The VMS shall not require the manufacturer to be contacted when a camera fails.
16. The VMS server software shall run as a service. The VMS shall not require any application to be running in order to operate.
17. The VMS shall allow the use of maps. The maps will be accessible to users with the appropriate permission levels and display video sources and their status.

B. WEB CLIENT

1. The Web Client will be a thin client, using either an active-x control or an MJPEG streaming method.
2. The Web Client shall support IE, Firefox, Safari, Chrome, and Opera.
3. Licensing will not be required.
4. Users will not be able to change any settings within the server via the thin client.
5. Users will be able to select layouts for live viewing, or individual cameras or groups of cameras.
6. Users will be able to access recorded video and download recorded video from the system.
7. Users will be able to use the motion log to find recorded video.
8. The Web Client shall support the use of facility maps and support the use of custom layouts.
9. The Web client shall allow remote access for iPhone, Blackberry, Windows Mobile, and Android mobile phones without the installation of an app.

C. MONITOR STATION

1. The monitor station will be a thick client for viewing live and recorded video, along with handling administrative tasks.
2. The software shall not require a client license to operate.
3. The thick client will support an encrypted XML file for storing settings. The file can be set up to be shared between many clients, allowing the administrator to update all clients with a single file push.

4. Clients will be able to us Active Directory to authenticate users.
5. The Monitor Station will display the servers it is connected to along with the server's cameras in a tree view on the left-hand side.
    a. The tree view will allow the user to see the status of the servers that the instance of the monitor station is aware of.
    b. The tree view will also include access to custom layouts, facility maps and action buttons.
    c. There will be an option to hide the tree on start-up of the monitor station.
    d. The user shall be able search for cameras using a searchable box on the left-hand tree.
6. Live view will allow views of 1, 4, 8, 9, 10, 13, 16, 25 and 36 cameras. A widescreen option for 18 and 24 cameras will also be available.
    a. Layouts will be selectable via icon or keyboard function keys.
    b. Layouts will not be limited to cameras from a single server.
    c. Users will be able to get any combinations of layouts to cycle through on the main screen.
    d. Users will be able to designate cameras within a layout to be able to cycle between multiple cameras from multiple servers.
    e. Layouts shall be able to be put into groups.
7. If motion is detected on a camera, then the software, then the camera shall have a red pulse around the edge of the window.
8. Live view will allow cameras to be dragged and dropped onto the live view from the left-hand tree. Cameras can be duplicated in a view.
9. Users will be able to invoke a digital zoom by drawing a box. After invoking the digital zoom, the Monitor Station shall support the use of picture in picture within the zoomed image.
10. Digitally zoomed areas will be treated as a digital PTZ.
11. PTZ Presets shall be listed in a drop-down menu in the camera window.
12. Users shall be able to move the PTZ movements simply by clicking on the image or by using the scroll wheel.
13. Live view shall allow the user to de-warp the video from panoramic lenses and cameras.
14. Right clicking on a camera in live view will have the following behaviors:
    a. Right clicking on a camera within live view will allow the user to be able to review the recently recorded video for that camera.
    b. Right clicking on a camera within live view will also allow access to the properties dialog box for that camera.
    c. Right clicking on a camera will bring up the option to save a still image of the live view.
    d. Live audio will be able to be accessed by right clicking on a camera in the live view.
    e. Allowing access to recorded video.

15. Recorded video will be able to be accessed by right clicking the live view, expanding the camera in the tree view, or by opening the media player via the pull-down menus.

16. The Media player shall support the following functionality:

a. The ability to fast forward and rewind video at up to 16x normal playback speed.
b. The ability to generate clips of recorded video. The clips can be defined by either frame numbers or by using slider bars visible on the player.
c. The ability to save video directly to a CD or to a local hard drive or network share.
d. If motion detection and logging are enabled, a timeline of video will be displayed. The user will be able to zoom in on the timeline and use it to select where video will start playing from.
e. Users will have access to a motion log which will show motion events and how long they occurred for. Clicking on the entry will start the video from the appropriate spot.
f. The player will support digital zoom.
g. The player will have the option to allow an object search. The user will be able to define an area and seek out changes in the image within that area.
h. The User shall have the option of forcing export of video as the native codec of the camera or MJPEG.
i. User will have the option to burn time-date into the video as a clip.
j. Users will have the option to create a time index file for clips.
k. Users will be able to grab a snapshot of the recorded video.

17. Synchronized playback will allow for cameras to simply be dragged and dropped into the player. The Synchronized player shall allow for the exporting of the view of up to four cameras a single video file.
18. The Monitor Station will be able to display logging information, such as changes to the server, lost camera signals, who exported recorded video, when did users log-on/off and other errors. This functionality will be limited to administrative users. The log will be exportable as txt or to the Windows clipboard.
19. The Monitor Station shall also provide real time status updates for server status and camera status, including the CPU usage, disk usage, bandwidth usage, licensing and number and names of users who are logged in.
20. The system will support an Alarm Log to make it easier to find DIO based events.
21. Facility maps will be available in the software for viewing.
    a. When the user hovers over a camera in the facility map it will display the camera in a window off the side of the map.
    b. While a camera is displayed it will allow access to recorded video from that camera as well as the live stream.
    c. Cameras will display where they are pointed.
    d. Embedded layouts will change the layout of the Monitor station if they are clicked on.
    e. Embedded Facility maps will cause the current map to change to the embedded map if clicked on.
    f. The user will have the option of importing and placing doors from supported access control partners on the map. This shall allow them to see

badge events as well as alarm events. It shall also support the ability to lock and unlock doors from the map.

g. Panic button events from the Audio Enhancement systems will be visible on the map as well.

22. The Monitor Station will support the Axis Joystick as well as standard USB joysticks.
23. The software shall support the ability to open a live window that can be moved around. This window will be able to access the view of any camera or layout the user has access to.
24. The user will be able to enable or disable the following settings:
    a. Server name in the live view.
    b. Camera Name in the live view.
    c. Audio notification on motion.
    d. Forcing aspect ratio.
    e. Use Direct Show for display.
    f. Double clicking to change the server layout.
    g. Double clicking expands the camera.
    h. Allowing multiple live windows.
    i. Block live windows from popping up.
    j. Live window always on top.
    k. The speed in which layouts cycle.
    l. Hiding left tree on start up.
    m. Launching Facility maps on start up.
25. Users with Administrator privileges will be able to configure the server and camera settings. Users will also be able to test SMTP settings and database settings.
    a. Users will be able to configure the framerate of the camera, including the option to have the server record continuously at 1 fps with the option to go to the camera's maximum framerate on motion detection.
    b. Users will be able to select various time-lapse options for the camera.
    c. Users will be able to select the camera stream type.
    d. Users will be able to select camera or server-side motion detection.
26. Users will be able to access a graphic representation of what the server's motion detection settings are picking up.
27. Users will be able to configure user settings as well as layout settings from within the thick client.
28. The software shall allow users to send video or messages to other users in the form of a popup window.
29. The Monitor Station will allow users to send video to other users, allowing for remote live pop ups of video of important events.
30. The Monitor Station will support Layout touring. Selecting a layout will cycle through a list of cameras.

D. IP VIDEO SERVER

1. The Server shall be designed to run on a Windows platform, supporting both Desktop and Server class operating systems including Windows7.
2. Server shall run as a Window's Service. This service shall run as part of the local service account. This service shall be running as long as the system is

booted and has started Windows. It shall not require the user to be logged in.

3. The Server will store settings in SQL Express and shall not require a full MS-SQL license.
4. The Server shall have an option for a 32-bit binary and a true 64-bit binary. In a 64-bit OS, the server shall run as a native 64-bit application, not merely a 32-bit application.
5. The service shall connect to the camera and handle streaming to the server. It shall not require each client to connect to individual cameras.
6. This service shall allow the cameras to be placed on one network and the clients on a separate network using a different IP range.
7. The software shall support the ONVIF standard.
8. The software shall support Megapixel virtual cameras within a single camera license.
9. The server shall only require two ports for streaming video as well as handling any setting changes or commands from the client software.
10. The Server shall record the video streams from different cameras.
    a. The service shall handle transcoding of the camera streams if the cameras are MJPEG based. The video shall be re-encoded to WMV to reduce storage needs and to reduce the impact of streams to clients on the server.
    b. For MPEG-4 based cameras, the video shall be stored in the native codec of the server.
    c. For H.264 based cameras the video shall be stored in the native codec of the server.
    d. Each camera will have the option to be able to be stored in different locations (i.e., One locally, another on a NAS, a third on a different network share)
    e. Streaming from server to client shall support H.264.
11. The Server shall support H.264, MPEG-4, MJPEG and MXPEG based cameras.
12. The Server shall support motion detection at the camera and at the software levels.
13. The Server shall provide graphic examples of what it determines as motion to thick clients if the thick client requests it.
    a. The software shall display the motion detection as an outline around the area moving.
    b. The software shall provide a bar showing the total percentage of change. This bar shall have a slider on it to allow the user to quickly set motion detection.
14. The Server shall allow for multiple zones to be set within an image that support differing motion detection values within a cameras field of view.
    a. There shall be no limit on the total number of zones allowed, either on a per camera or per server basis.
    b. Zones should allow the ability to ignore motion within an area.
    c. The user shall have the ability to move the zones after the fact.
    d. Motion zones should be able to be tied into a rules engine to allow the software to use them as triggers for events.

15. The Server shall support the use of imported maps to show camera placement. These maps will be in .jpg, .gif, or .bmp formats as determined by the user.
    a. Hovering over a camera on a map shall cause it to be displayed in a window on the side.
    b. When the camera is displayed on the side, the option to review recently recorded video will be available to them.
    c. The user shall be able to embed layouts onto the facility map. Clicking on the layout shall change the display of the client software.
    d. Alarms from DIOs shall be able to be embedded as well.
    e. Audio sources shall also be an option.
    f. Other facility maps shall also be an option to embed. Clicking on a different embedded map shall bring up that map.
    g. Doors from certain access control systems can be imported and displayed. Hovering over the door shall display the last badge used to badge in, a live view of the camera associated with the door. The user from this pop up shall be able to see badge events and alarm events along with the associated video.
16. The Server shall not require the administrator to contact the manufacturer to replace a camera.
17. The Server shall support reporting to a diagnostic tool.
    a. The server will report the number of active cameras.
    b. The server shall report active cameras offline.
    c. The version of the server.
    d. The amount of disk space left.
    e. The recording status of the server.
18. The server shall support pre-motion and post motion recording.
19. The server shall support customizable layouts. The layouts will allow for blank spaces within the layout.
20. The server shall support an unlimited number of users.
    a. Users can be drawn from either an Active Directory server, Novell eDirectory or entered manually.
    b. There will be five different levels of user.
    c. Users can be members of a group with settings set for the group. Individual user settings can override the group settings.
    d. Permissions can be set for live viewing, access to recorded video, control of PTZ cameras, access to audio, the ability to export video, custom layouts, facility maps and rules. Permissions can be defined on a per camera basis.
    e. The server shall support the option of having the users limited to being signed into a single location.
21. The server will include a diagnostic version with limited interface, to allow for testing of the server.
22. The server shall support an optional secondary server with fall-over capacity.
23. A rules engine shall be included to allow the server to handle more complex tasks.
    a. Triggers will include:

1. Dry contacts (DIO)
2. Motion detection of a camera stream.
3. Scheduled events. Events can be scheduled on daily, weekly, or monthly basis. Individual events can be handled as well.
4. An alert button for the user interaction in the monitor station.
5. Inputs sent programmatically via appropriate APIs.
6. Access control events from supported Access Control Vendors.

b. Actions will include:

1. Logging the event.
2. Opening or closing a dry contact.
3. Sending an e-mail with a custom text message tied to the trigger. Multiple texts will be allowed for different triggers.
4. Sending an e-mail with an .avi clip from a selected camera.
5. Sending an e-mail with a .jpg of a selected event from a camera.
6. Opening a live window for a user who is viewing.
7. Move a PTZ to a certain preset location.
8. Force recording.
9. Force recording with audio.
10. Instant Replay
11. Sending video to a Network Decoder
12. Switching single camera or layout views.
13. Message Instruction
14. Moving, copying, or deleting of files.
15. Execute a program or batch file.
16. Send an ASCII string to a TCP port.

24. The server shall support time out functionality.
25. A universal RTSP option shall exist for adding cameras if they are not currently supported through native APIs.
26. Full PTZ functionality shall be supported.
27. Dewarping of Panoramic shall be supported for the following manufacturers:
    a. Sentry 360
    b. Vivotek
    c. Panasonic
    d. Axis
    e. Immervision
    f. Mobotix
    g. ACTi
    h. Advidia
28. The server will only stream video to clients that the clients request.
29. If live video is paused, then the server shall stop streaming video to the clients to conserve bandwidth.
30. The server shall support integration with various access control platforms, including:
    a. S2
    b. Lenel
    c. Monitorcast
31. The server shall have support for the Audio Enhancement's panic button functionality.

32. The server shall have the ability to handle a total throughput of 600 mbit/s total throughput for the server for camera connections.

2.04 ETHERNET NETWORK SWITCHES

A. All network switches shall be as selected by the Owner's IT Support Group and provided by Security Construction Professional.

B. Minimum requirements for Gigabyte PoE Ethernet Network Switches are as follows:
   1. Ethernet switches shall be UL listed and shall meet with regulatory agency approval for Safety Certification, Electromagnetic Emission Certification, and Network Equipment-Building System (NEBS) guidelines.
   2. All switches to be capable of mounting in standard 19" equipment racks.
   3. All switches must support Quality of Service (QOS) and shall support IEEE 802.1p COS and Internet Protocol (IP) Differentiated Services Code Point (DSCP) services as a minimum.
   4. All switches shall support rate-limiting based on source/destination IP address, source/destination MAC address, or Layer 4 TCP/UDP information.
   5. All switches shall provide Power over Ethernet and support the following standards: IEEE 802.3ad, IEEE 802.1Q, 802.1D, 802.1X, and 802.3af.

C. Acceptable manufacturers shall include Cisco Systems and Hewlett-Packard.

2.05 PATCH PANELS (PROVIDED BY SECURITY CONSTRUCTION PROFESSIONAL)

A. All patch panels shall be provided by security Construction Professional except where noted on drawings that patch panels will be provided as part of the structured cabling system. See plans for quantity and size of each patch panel. Provide additional patch panels as required to land all cables as necessary.

2.06 PoE INSERTERS (MIDSPAN)

A. Minimum configuration shall be:
   1. 10/100/1000 Mbps pass through rate
   2. Each device / port shall meet IEEE PoE or upcoming IEEE PoH standards

B. Minimum number of ports shall be 12. See Contract drawings to verify the exact quantity of ports required at each facility. Note that spare ports are required for future expansion.

C. PoE power options shall be 15.4, 30, 36 or 72 watts.

D. Acceptable manufacturers shall be PowerDsine and Transition Networks. NO SUBSTITUTIONS ALLOWED.

E. Acceptable models are the 9000 and 9500 series.

2.07 PoE EXTENDERS

A. Minimum configuration shall be:
   1. 10/100/1000 pass through rate
   2. Each device / port shall meet EEPoE standards
   3. Each port extends data and PoE connections 200 meters

B. Acceptable manufacturers shall be PowerDsine, Veracity, and Transition Networks. NO SUBSTITUTIONS ALLOWED.

2.08 COPPER WIRING REQUIREMENTS (Provided by Security Construction Professional, except for locations as noted on drawings where cables are provided by the Voice/Data Construction Professional)

A. CAT 6 cable between IP Camera location and the closest MDF / IDF shall be provided. The following requirements shall be for any miscellaneous cables needed to make the IP Based Video Surveillance System fully operational:

   1. Indoor: Data cables shall be 100 Ohm, un-shielded twisted pair (UTP), 23 AWG, plenum rated with solid copper conductors. Cables shall exceed ANSI/TIA/EIA-568-B.2 Category 6 requirements and the spool shall be labeled as such. Cables shall be tested to 250 MHz. Cables shall be UL or ETL verified to exceed Category 6 requirements and cable jacket shall be labeled to indicate verification. Cable color shall be yellow.

   2. Outdoor Rated: Data cables shall be 100 Ohm, un-shielded twisted pair (UTP), 23 AWG, outdoor rated with solid copper conductors with water blocking properties. Cables shall exceed ANSI/TIA/EIA-568-B.2

      Category 6 requirements and the spool shall be labeled as such. Cables shall be tested to 250 MHz. Cables shall be UL or ETL verified to exceed Category 6 requirements and cable jacket shall be labeled to indicate verification. Cable color shall be black.

2.09 CATEGORY 6 CONNECTIVITY (Provided by Security Construction Professional)

A. Termination jacks for CAT 6 cable between IP Camera location and the closest MDF / IDF shall be provided. The following requirements shall be for any miscellaneous connectors needed to make the IP Based Video Surveillance System fully operational:
   1. Each jack shall be power sum rated, with a power sum NEXT performance equal to or better than the ANSI/TIA/EIA-568-B.2-1 Category 6 pair-to-pair NEXT performance specifications.
   2. Each jack shall be T568B wiring configuration.

2.10 SURFACE MOUNT BOXES "BISCUIT" (Provided by Security Construction Professional)

A. Surface mount boxes shall house two jacks.

B. Bases shall be installed with two screws to building structure.

C. Boxes shall be compatible with connectivity.
D. Blanks shall be provided for each unused port.

2.11 CATEGORY 6 PATCH CORDS (Provided by Security Construction Professional)

A. Category 6 patch cords shall be provided by security Construction Professional. Coordinate length of each patch cord with Security Construction Professional.

2.12 WIRING DUCT (Provided by Electrical Construction Professional)

A. Construction Professional shall provide surface mount raceway for cables installed below ceiling.

B. Wiring duct shall be typical to Hubbell PS3 series.
C. Wiring duct shall be painted to match existing wall color.

2.13 UNINTERRUPTIBLE POWER SUPPLY (UPS)

A. (UPS) Units shall be provided by security Construction Professional for:
   1. Equipment Racks in MDF / IDF Rooms where Video Surveillance System servers and archiving equipment / hardware is installed.
   2. Equipment Racks in MDF / IDF Rooms where Video Surveillance System network switches, routers, fiber optic receivers and transmitters are installed.

B. (UPS) Units shall be provided and installed at the following locations:
   1. Video monitors, either wall mounted or placed on work surfaces in the Administrative Offices.
   2. All locations where Video Surveillance System client workstations are installed.

C. All UPS Units must be sized adequately to support the complete load connected equipment and to provide battery backup for a minimum of 15 minutes.

D. UPS batteries shall be valve regulated (sealed or maintenance free) lead-acid cell type. Batteries shall be installed within the UPS enclosure or in a standard enclosure provided for that purpose by the UPS manufacturer.

E. Furnish calculations with shop drawings verifying UPS sizing in compliance with these specifications.

2.14 TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS) (Provided by Security Construction Professional)

A. Protect all equipment against surges induced on all control, video, and power cables. All copper cables and conductors which serve as 120V power,

control, or video conductors shall have surge protection circuits installed at each end and locations where conductors enter or exit a building. Fuses shall not be used for surge protection.

B. Surge suppression devices shall meet the following standards/publications:
   1. UL 497B
   2. UL 1449 (must meet 330 Volt suppression rating)
   3. IEEE Category B impulse and ring wave tests

C. Acceptable Manufacturers: Northern Technologies, Inc., EDCO, Ditek. Product shall be warranted against defect for a period of not less than five (5) years.

D. All power connections, including 24 VDC and 24 VAC power supplies and direct wired or plug-in 120 VAC power connections, for all systems and components specified herein, shall be equipped with surge suppression devices. Devices shall be bonded to building grounding system in accordance with Article 250 of the National Electric Code.

E. Grounding: Provide a dedicated, separate No. 6 AWG copper conductor from building grounding system to the security equipment room, security equipment cabinets, and central control room. Connect all lightning protection devices and security equipment non-current carrying metal parts to grounding conductor in accordance with Article 250 of the National Electric Code. Provide ground bus bar in equipment room and control room with dedicated ground conductor to each cabinet, enclosure, pull/junction box and all equipment.

F. Ground Resistance Measurement: Each signal ground system D.C. resistance shall be measured between any point on the signal ground bus and the earth ground. An instrument designed specifically to measure the resistance of a point to each earth ground shall be used. The systems sub–Construction Professional shall measure ground resistance in accordance with the procedure as outlined by the test equipment manufacturer. Instrument shall be Biddle earth resistance test instrument or approved equal.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

A. System components and appurtenances shall be installed in accordance with NFPA 70, manufacturer's instructions, and as shown. Necessary interconnections, services, and adjustments required for a complete and operable signal distribution system shall be provided. Penetrations in fire-rated construction shall be fire-stopped in accordance with contract documents. Conduits and raceways shall be installed in accordance with the National Electric Code (NEC). Cables shall not be installed in the same cable tray, utility pole compartment, or floor trench compartment with AC power cables. Metal conduits shall not be continuous between buildings. Construction Professional to provide ground isolation between

buildings by breaking continuous copper cabling and metal conduit runs.

B. Equipment: All monitor and camera mount support brackets shall be securely attached to mounting surfaces. Use lead shields on solid masonry, wood screws on wood, and machine bolts on structural steel. All anchoring devices shall be rated to support not less than five times the total equipment weight. See installation details for mounting to gypsum board and lay-in ceilings.

C. Surge Protection:
   1. All copper cables and conductors which serve as control, power, or data conductors shall have surge protection devices installed at each end that complies with electrical and security specifications.
   2. Protect all video and data equipment from surges induced on all control, power and data cables. All cooper cables and conductors which serve as control, power, or data conductors shall have surge protection circuits installed at each end that meet the IEEE 472 surge withstand capability test. Fuses shall not be used for surge protection.

D. Power: All interior and exterior cameras shall be powered from central power supplies in the security equipment rooms.

3.02 TESTING

A. Materials and documentation to be furnished under this specification are subject to inspections and tests. All components shall be terminated prior to testing. Equipment and systems will not be accepted until the required inspections and tests have been made, demonstrating that the video distribution system conforms to the specified requirements, and that the required equipment, systems, and documentation have been provided.

B. The Construction Professionals shall complete the Commissioning Form (provided as part of the Bid Document Package). The form must be completed and signed off by the Construction Professionals prior to Final Inspection. Final Inspection of the equipment and systems will not be granted until the required inspections and test have been completed by the Construction Professional.

3.03 LABELING

A. Cable labeling:
   1. All cable and wire installed for VIDEO SURVEILLANCE SYSTEM Systems shall be properly tagged. Use the following standard labeling scheme to identify the physical location of both ends of each cable.
      a. A100 –C1
      b. Camera #: Use one number per cable.
      c. Room number where camera is installed.
      d. Room Camera
      e. Number Number
      f. A100 C-1

g. Format Example
h. A100-C1

B. Complete two (2) labels for each cable, one for each end. Secure label to end of cable, within view of the termination of the cable at each end. Labels shall be white with a protective wrap-around plastic transparent cover that will serve to protect the ink from smearing and secure the label to the cable. All labels shall be typed with black ink.

3.04 TRAINING

A. The Construction Professional shall include in the base Contract all costs required to train owners operating and maintenance personnel in the use and maintenance of systems provided under this section of the Specifications. Training sessions shall be conducted by qualified instructors who are familiar with the equipment and with the system installation. "Quickstart" user guides developed by the Construction Professional shall be presented in these training sessions.

B. Time to be included in base Contracts for specific systems shall be as follows: Video Surveillance Systems- 16 hours.

END OF SECTION 283010