

# **Integrated Security Automation Systems Upgrade Design for the Marathon County Jail and Juvenile Facility**

Owner: Marathon County Facilities and Capital Management

## **Project Manual Issue with: Construction Documents November 1<sup>st</sup>, 2025**

### **Volume 1 – Electronic Security and Electrical**

- Section 280510 Cabinets and Enclosures for Electronic Security
- Section 282350 Electronic Security Systems Network Integration
- Section 283105 Auxiliary Control System
- Section 284619 Security Automation System
- Section 284620 Video Graphic User Interface
- Section 285123 IP Audio Communication System

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## SECTION 280500 – COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY

### PART 1: Scope of Project:

Marathon County will be accepting proposals for a project that will encompass phased upgrades for the Adult Detention facility and the Juvenile Detention facility. This project will be conducted in two phases of work.

The first phase of this project will be to upgrade the existing audio system that is located in both Adult and Juvenile facilities as well as updating the existing Wonderware software platform to the Indusoft platform in both facilities. It will be the responsibility of the bidding contractor to provide a construction schedule for the demolition and installation of the Audio and VGUI systems for the Adult and Juvenile facilities.

The Second phase of this project will include replacement of the headend PLC equipment for the door/ utility control systems for both the Adult and Juvenile facilities. It will be the responsibility of the bidding contractor to provide a construction schedule for the demolition and installation of the door utility systems for the Adult and Juvenile facilities.

The ESSS will include the "electrical" scope of work under the proposal as to submit one complete proposal to the county.

### PART 2: GENERAL

#### 2.01 SECTION INCLUDES

- A. This section includes electronic security systems as shown on the contract documents.
- B. All approved ESSS's providing a proposal for this project must comply with all requirements to provide a "non-proprietary" security electronics hardware and software package. If it is determined that the ESSS has not complied completely with the specified turnover of the "NON-PROPRIETARY" software codes including turning over all software licenses and passwords to the Owners prior to project final closeout, the ESSS shall be responsible for all costs incurred to all parties to provide a complete NON-PROPRIETARY system. There will be no exception to these requirements.
- C. Summary of work includes providing the following products, labor, and services for the installation of a fully functional Electronic Security System indicated and specified herein including any items necessary for a complete installation. The ESSS must provide all systems within this specification. The following individual specification section comprise the entire Electronic Security System:
  - 1. Section 280510 Cabinets and Enclosures for Electronic Security
  - 2. Section 282350 Electronic Security Systems Network Integration
  - 3. Section 283105 Auxiliary Control System
  - 4. Section 284619 Security Automation System
  - 5. Section 284620 Video Graphic User Interface
  - 6. Section 285123 IP Audio Communication System
- D. Products furnished but not installed under this section.
  - 1. Special back boxes which include but are not limited to speaker back boxes.
  - 2. Equipment cabinets and racks.
  - 3. Special back boxes, racks and cabinets that must be connected to the conduit/raceway system shall be supplied by this contractor and turned over to the electrical contractor for installation.
- E. Electrical Contractor shall provide all conduit and wiring for ESSS work. See part 2.2B for other specific details.

#### 2.02 DELINEATION OF RESPONSIBILITY

- A. Electronic Security Systems Subcontractor (ESSS):
  - 1. Furnish to facility a complete fully functional Security Electronics system as defined by the ESSS, related specifications and as shown on the drawings. This shall also include all requirements for proper control of detention hardware.
  - 2. Provide coordination of the installation and electrical requirements of the Security Electronics systems with the Electrical Contractor.

3. Provide low voltage relay panels for control of lighting and power circuits in detention areas.
  4. Prior to fabrication, coordinate exact location and installation of Security Electronics with other trades.
  5. Provide complete system test and written operational certification to the Security Systems Designing Agency and owner prior to substantial completion.
  6. Provide Agency training by factory-trained and authorized personnel as specified.
  7. Turn over to owners all termination point and interconnection schedules, all programming source codes including Touch Screen software, PLC development software, VMS viewing software, and applicable license required for operations. This is to also include the touch screen and security management systems runtime licenses.
  8. Provide authentication of Software to Security Systems Designing Agency prior to both Owner software presentation and final commissioning of system by Security Systems Designing Agency. See section 284620 Video Graphic User Interface System for Software Authentication responsibilities.
  9. Obtain all required permits and licenses and pay all required fees.
- B. Electrical Contractor included in (ESSS) proposal:
1. Coordinate electrical requirements of all Security Electronics systems with ESSS.
  2. Provide termination of all 120-volt power connections required by the Security Electronics system. Lighting and Receptacle control terminations shall be done by the electrical contractor at the terminal strip provided by the ESSS.
  3. Provide to all equipment requiring 120-volt power connections, power from emergency panels or generator.
  4. Provide UPS circuits for all ESSS supplied control room computers and monitors as well as head end equipment racks, cabinets and enclosures.
  5. Furnish and install a complete conduit raceway system including back boxes, junction boxes, mortar boxes, and equipment room gutters/cable trays required by the ESSS.
  6. Install all specialty back boxes including racks, cabinets, and speaker back boxes provided by the ESSS. Set all equipment racks in place and provide and install conduits from cable tray to equipment racks.
  7. The raceway system provided by Electrical Contractor shall be installed to facilitate continuous cable runs, if cable runs cannot be installed without splice the electrical contractor shall modify conduit as needed.
  8. Furnish and install a complete Security Electronics cable plant including power, signal and ground wiring, per NEC, as shown in the project documents and as per ESSS specific system requirements.
  9. Provide fiber end termination and testing if required.
  10. Provide and install fiber optic patch panels If required.
  11. Provide all necessary ladders, lifts, standard tooling, and specialized tooling.
- C. Owners/Others:
1. Provide data connections to the Security Management System computer for remote diagnostics by the ESSS.
  2. Provide dark Fiber connection between the Adult and Juvenile facilities.

## 2.03 QUALITY ASSURANCE

- A. The only change orders that will be considered or accepted are those initiated by the Owners.
- B. All items of equipment including wire and cable requirements shall be based on an Accurate Controls design and shall function as a complete system and shall be accompanied by the ESSS's complete service notes and drawings detailing all interconnections.
- C. Supply only non-proprietary equipment. For equipment to be considered non-proprietary it shall be manufactured by a company that has produced a product line of compatible products for at least fifteen years.
- D. Provide only non-proprietary software. For software and software vendors to be considered non-proprietary it must have a minimum of five system manufacturers proficient in the programming, integration and maintenance of the manufactured software and shall have a minimum of two distributors (located within the state of the project but preferred to have distribution in every state in the country) with annual sales over one hundred thousand dollars. All software logic shall be developed in the InduSoft environment and not developed in third party software or provided in a compiled DLL, EXE, NET files or other encrypted files. Any software approach that is found to be

- provided with this approach shall be removed. All costs to remove and rewrite the software shall be the ESSS's responsibility. Refer to 1.01 C. for specific details regarding bonding and software confirmation requirements.
- E. The ESSS supplying the equipment shall show satisfactory evidence, upon request, that he maintains a fully equipped service organization capable of furnishing adequate inspection and service to the system, including replacement parts. The ESSS shall be prepared to offer a service contract for the service of the system after the guarantee period. The ESSS shall produce evidence that he/she has had a fully experienced and established service organization with at least ten years and proven satisfactory installations during that time.
  - F. Furnish and install only new equipment and materials required (less than 1 year from manufacturer), unused without blemish or defect.
  - G. All equipment of the same type shall be the product of one manufacturer.
  - H. Submit all items necessary to obtain all required permits and licenses to the appropriate Regulatory Agencies.
  - I. All work shall conform to the National Electrical Code (NEC) and to applicable National Fire Protection Association (NFPA) codes.
  - J. All work shall conform to all federal, state and local ordinances.
  - K. Where applicable, all fixtures, equipment, and materials shall be as approved or listed by the following:
    - 1. Factory Mutual Laboratories (FM)
    - 2. Underwriters Laboratories (UL)
    - 3. National Electrical Manufacturers Association (NEMA).
    - 4. Include all items of labor and material required to comply with such standards and codes. Where quantity, sizes or other requirements indicated on drawings or herein specified are in excess of the standard or code requirements, the specifications or drawings respectively, shall govern.
    - 5. In addition, all equipment cabinets and racks capable of being labeled shall be have an UL508A listing mark. This labeling must be provided by the ESSS at their assembly facility. No third-party listings shall be considered.

#### 2.04 SUBMITTALS

- A. A principal of the manufacturing firm shall sign all submittals and shop drawings indicating conformance with plans and specifications before submitting to the Security Systems Designing Agency.
- B. Section 280500 shall be submitted as a complete entity. Partial submittals will not be considered.
- C. All submittals shall include adequate descriptive literature, catalog cuts, shop drawings and other data necessary for the architect/engineer to ascertain that the proposed equipment and materials comply with the specification requirements. Catalog cuts shall be legible and shall clearly identify the equipment being submitted.
- D. The ESSS shall submit documentation showing the type, size rating, style, catalog number, manufacturer's names, photos, and/or catalog data sheets for all items to ensure compliance with these specifications. Two copies of this information shall be submitted to the Security Systems Designing Agency and be subject of approval.
- E. Submit the layout and operational description of all the Video Graphic User Interface on CD or Flashdrive, which shall indicate all device icons and operations. It is mandatory that the ESSS provide a minimum of three scheduled meetings with the owner's representatives for video graphic user interface design layout so as to perform all operations and control styles these representatives require as to how they relate to the equipment specified and shown on the plans.
- F. Include a software data flow diagram/chart indicating in what programs and where all control logic will reside. Provide a detailed description of software approach and provide a signed statement that all software shall be developed in the Wonderware or InduSoft environment. No software is allowed to be a compiled DLL, EXE, NET file or other encrypted software. ESSS shall provide a sample of their programming passwords and source codes to confirm their non-proprietary approach to the development of the custom software.
- G. Scaled location and layout of all field equipment on floor plans.
- H. Large-scale elevation drawing to scale of all Security Electronic rooms depicting all racks, consoles, cabinets, equipment, outlets, etc.
- I. Block diagrams depicting system integration details specific to this project.
- J. Scale elevations of all security equipment racks showing equipment-mounting locations (front and rear if any equipment is rear mounted).
- K. Wire management details for the installation of cable harnesses inside racks, equipment cabinets,

- and consoles, control panels and other areas of exposed cable.
- L. Point to point wiring diagrams for all equipment and devices specific to this project.
  - M. Vendors will be required to provide a bid bond and P&P bond in the amount of 10% of the overall project cost.
  - N. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

## 2.05 WARRANTY AND SERVICE

- A. Electronics Security System Subcontractor (ESSS) shall warrant the material and workmanship on this project for a period of one (1) year from the date of substantial completion. ESSS agrees to repair or replace any defective materials or work when given written notice during Warranty period. Warranty period shall begin on the date of substantial completion.
- B. Preventative Maintenance: ESSS shall include in his proposal, without additional cost to the owner, 4 service and inspection trips during the 12-month warranty period. Equipment shall be inspected for function. Necessary adjustments and programming shall be made as required, and a written account provided to the Owner. Schedule the first visit 2 months after operational turn-over. The remaining trips will be equally spaced three months apart.
- C. ESSS shall provide emergency service during the 12-month warranty period, should a break down occur. Classifications of component failures and the required response time for each classification are as follows:
  - 1. "Critical" - Items which compromise the security of the facility or have an adverse effect on the operations of the facility. Items in this category shall be returned to service within twenty-four (24) hours after receipt of a service call. Service shall be available seven (7) days per week and twenty-four (24) hours per day. The ESSS shall call the designated Owner's Representative within 2 hours of receiving the service call to inform him of the estimated arrival time of the service personnel. The following items are considered "critical":
    - a. Uninterruptible Power Supply – all components.
    - b. Door Control and Door Monitoring – building perimeter doors and all other monitored doors.
    - c. Programmable Logic Controllers – all components or software.
    - d. Control Panels and Consoles – touchscreen control systems.
    - e. IP Audio Communications System – all components.
    - f. Security Automation System – PLC network, LAN network, touchscreen terminals.
    - g. Grounding and Surge Protection – all components.
  - 2. "Sensitive" - Items which adversely impact the operations of the facility but are not considered "critical" as defined above. Items in this category shall be returned to service within forty-eight (48) hours after receipt of a service call. Service shall be available seven (7) days per week and twenty-four (24) hours per day. The Security Electronics Contractor shall call the designated Owner's Representative within 2 hours of receiving the service call to inform him of the estimated arrival time of the service personnel. The following items are considered "sensitive":
    - a. IP Audio Communication System – single intercom station.
    - b. Security Automation System – file server and printer.
  - 3. "Normal" - Items which require maintenance support but are not "critical" or "sensitive" as defined above. These are typically items that facility personnel identify and accept that maintenance will be performed by the SEC during the next quarterly maintenance visit. The following items are considered "normal":
    - a. Control Panels and Consoles – all other components not listed in "critical" or "sensitive" above.
    - b. IP Audio Communication System – single paging station.

- D. Provide additional service agreement for three (3) additional years past the end of the warranty period for security electronics equipment.

### Part 3: Payments

#### 3.01 Payment Process

- A. The awarded proposer will submit a schedule of values at the beginning of the project. Monthly progress payment requests will be made utilizing the AIA G703 and G702 forms. 5% will be held as retainage until successful completion and sign off of the project.

### PART 4: PRODUCTS

#### 4.01 GENERAL REQUIREMENTS

- A. Reference individual specification sections included as part of the complete system for product specifications.

### PART 5: EXECUTION

#### 5.01 DELIVERY STORAGE AND HANDLING

- A. Transport, handle, store, and protect materials under provisions of the General Conditions.
- B. Transport materials in manufacturer's unopened original dry containers to avoid damage during shipment, with all tags and labels intact and legible, for timely installation. All enclosures, equipment racks and cabinet back planes shall be shipped to site in packaging built by the ESSS specific to the enclosure, equipment racks and cabinets supplied to avoid damage during shipment.

#### 5.02 SERVICE GUARANTEES

- A. Guarantee:
  - 1. All work and materials shall be guaranteed to be free of defects for a period of one year from the date of occupancy of the facility.
  - 2. Due to the sensitive nature of this type of facility, the contractor agrees that warranty services shall be completed promptly, and that where necessary, premium overnight freight will be used to obtain replacement parts.
  - 3. During the guarantee period there shall be no charges to the owner for service calls for guaranteed work.
- B. Service:
  - 1. The ESSS shall provide service to the system throughout the guarantee period in a timely manner and shall provide, upon request, a quotation for an additional year of service.
  - 2. Service response requirements shall include the following:
    - a. Twenty-four (24) hour phone number.
    - b. Ability to restore functionality within twenty-four (24) hours after notification on a twenty-four (24) hour basis.
    - c. Factory technicians trained by the manufacturers of the system components, with two years' experience servicing systems of the type included in this project.
    - d. The ability to troubleshoot the system remotely from the ESSS office.
- C. Software maintenance:
  - 1. During the initial one-year warranty/guarantee period the contractor shall provide the owner with one update/revision of schedule definitions.
    - a. Revise schedule of openings assigned to groups.
    - b. Review functions allowed at openings if no hardware or wiring changes is required.
- D. Demonstration:
  - 1. Prior to owner acceptance the ESSS shall demonstrate the functionality of the entire system to the Security Systems Designing Agency, and owner's representative.

2. Provide the Security Systems Designing Agency with a detailed test report showing results of performance tests done on every device that makes up the security and function in the system.
  3. Perform such tests as the Security Systems Designing Agency may require satisfying them as to the accuracy of the submitted test report. More than two discrepancies between the observed performance and the reported performance shall be grounds for rejection of the entire test report and requiring the contractor to repeat this entire final test procedure. If a second test and demonstration is required, Security Systems Designing Agency expenses shall be the responsibility of the ESSS.
  4. Conduct a complete visual inspection of all appearance items and of workmanship in the presence of the Security Systems Designing Agency and owner's representative.
- E. Training:
1. Provide complete operator training for the owner's personnel.
    - a. Provide four (4) four-hour sessions on consecutive days at times set by the owner. These should be scheduled as part of the owner's pre-occupancy transition training.
    - b. Provide a complete training agenda that coincides with the owners training plan.
  2. Provide an interactive training DVD's or Flash drive that has been developed by the ESSS for all VGUI operations and system troubleshooting. Provide VGUI operations and system troubleshooting training on separated DVD's of flash drive. Provide two copies of each.
    - a. This training DVD or flash drive shall also include troubleshooting and maintenance of all systems. This DVD or flash drive shall be carefully organized and segmented so that training may be given on the complete system or on specific functions as may be appropriate.
    - b. The DVD or flash drive shall contain computer generated screen animation with narration describing icon selection, graphic animation and operation.
    - c. The maintenance portion of this DVD or flash drive shall contain still images with graphics and narration describing all equipment states and troubleshooting methods including LED indication and text read out.
    - d. No video tape of VGUI operations which is recorded to a DVD or flash drive shall be considered acceptable.
- F. Test Plan and Documentation:
1. Submit a complete testing plan for all systems for approval.
  2. Plan submitted must include testing of every field device and control function.
  3. Plan submitted must include examples of testing documentation that will be submitted when requesting final Demonstration/Inspection.
- G. Shake Down Period:
1. The ESSS shall provide 5 days of system shakedown, which shall include providing a fully trained employee of the ESSS who shall provide additional training, system repairs and alterations during normal operations of the facility. The system shall be fully operational and certified prior to the shakedown period beginning.
  2. This person shall be onsite during the 1<sup>st</sup> shift and be available or on-call during 2<sup>nd</sup> and 3<sup>rd</sup> shift.
- H. Owner and Operator Manual:
1. Furnish three copies of an operations and maintenance manual consisting of a flash drive with equipment specifications, programming instructions, maintenance instructions and full scale as built drawings.
  2. Provide names and telephone numbers of contacts by system for manufacturer's warranty and Service departments.
  3. Deliver to the owner with training DVD's or flash drive during the training process.

**END OF SECTION**



## SECTION 280510 – CABINETS AND ENCLOSURES FOR ELECTRONIC SECURITY

### PART 1: GENERAL

#### 1.01 System Description

- A. Furnish and install all equipment, materials and labor necessary to complete the installation of specific systems described herein and integration of all systems as indicated, specified herein or both. The work includes the following, as well as work not listed below but described elsewhere:
- B. Cabinets / Racks / Panels
- C. Non-standard manufacturer furnished enclosures and back boxes.

#### 1.02 PRODUCTS

- A. General
  - 1. Equipment specified is intended as a reference standard for level of quality.
  - 2. Substitutions of equal quality will be accepted. All substitutions are to be approved prior to bid and listed by addenda. Substitutions will not be accepted after the schedule bid time.
  - 3. Provide materials listed by UL or ETL.
- B. Free Standing Electronic Equipment Racks
  - 1. Provide freestanding equipment cabinets to house 19" rack mountable equipment in the equipment room. Each cabinet shall have a rectangular frame with removable top panel, side panels and doors. Installed cabinets shall include thermal, power, and cable management accessories that control airflow through the cabinet and keep signal and power cables separate and organized
  - 2. The cabinet frame shall be rectangular with four corner posts, manufactured from steel with welded frame construction. The sides of the frame shall be punched at the top and bottom with a hole pattern to allow attachment of equipment mounting rails and thermal, cable and power management accessories. The cabinet frame shall support 2000 lbs of equipment.
  - 3. The cabinet shall be a minimum of 27.6" wide by 36.3" deep by 88.8" high when doors, top panel and side panels are installed. Leveler feet will add approximately 1" to the height of the frame/cabinet.
  - 4. Each cabinet shall include two pairs of equipment mounting rails. Mounting rails shall bolt to the side of the cabinet frame at the top and bottom of the frame and shall be adjustable in depth to provide front and rear support for equipment. Equipment Mounting Rails shall be spaced horizontally to support 19" wide EIA-310-D compliant rack-mount equipment and shall provide up to 30.3" of rail-to-rail depth for equipment. Mounting rails shall be square-punched according to the EIA-310-D Universal hole pattern with equipment mounting holes on alternating 5/8" – 5/8" – 1/2" vertical hole centers. Square-punched holes shall accept cage nut hardware with various threads. Rack mount spaces or units (RMU) shall be 1-3/4" high and shall be marked and numbered on the mounting rails. Numbering shall start at the bottom of the rail. Mounting rails shall provide 48 RMU for equipment
  - 5. The cabinet shall include a solid top panel with one 3" x 11.5" cable access port located near the center of the frame. The cable access port shall be plastic with a brush seal to allow easy addition and removal of cables while limiting bypass airflow.
  - 6. The cabinet shall include two locking solid side panels with spring loaded latches for easy installation and removal. The cabinet shall be designed to allow baying with or without side panels installed.
  - 7. The cabinet shall include a single front door with a perforated metal panel, hidden tamper-resistant hinges with quick-release hinge pins and a swing handle. The door shall be removable and reversible to open from the right or left. The door shall open to 150° when the cabinet is bayed with other cabinets. The front door shall have a single-point slam latch with a keyed lock.
  - 8. The cabinet shall include a Single rear door with a perforated metal panel, hidden tamper-resistant hinges with quick-release hinge pins and a swing handle. The door shall be removable and reversible to open from the right or left. The door shall open to 150° when the cabinet is bayed with other cabinets. The front door shall have a single-point slam latch with a

- keyed lock.
9. The cabinet frame, top panel and side panel shall be manufactured from steel. The door frames shall be manufactured from steel and aluminum. Door panels shall be steel. The door handle, side panel latches, rear door hinges and top panel cable access ports shall be plastic. The cabinet frame and front and rear door shall be welded and bolted. Cabinet components shall assemble with hardware.
  10. The mounting rails, top panel, side panels and doors shall be electrically bonded to the cabinet frame.
  11. The cabinet shall be UL Listed as an Information Technology and Communications Equipment Cabinet, Enclosure and Rack System to standard UL 60950 under category NWIN. UL Listing will be stated in the manufacturer's product literature.
  12. The metal components of the cabinet frame, top panel, side panels, and doors shall be painted black with epoxy-polyester hybrid powder coat paint. The mounting rails shall be zinc-plated and silver-colored. Plastic components shall be black.
  13. The cabinet shall include (4) leveling feet, (4) clamps for securing the leveling feet to the floor, cage nuts of size and type required to mount all equipment and a means for bonding the cabinet to the Telecommunications Grounding Busbar.
  14. Acceptable Manufacturers
    - a) Lowell
    - b) Chatsworth Products, Inc.
    - c) Emcor
- C. Miscellaneous Rack Panels and Vents
1. Blank Panels
    - a) Specifications
    - b) 16-gauge steel.
    - c) Flanged top and bottom.
    - d) Durable textured black powder coat finish.
    - e) Available in 1-6 space sizes.
  2. Vent Panels
    - a) 1/16" diameter hole with 1/8" staggered centers. 23% open area
    - b) 16-gauge perforated steel.
    - c) Flanged top and bottom.
    - d) Durable black powder coat finish.
    - e) Available in 1-4 space sizes.
- D. Free Standing Equipment Rack Cooling Fan
1. Specifications
    - a) 115V 10" fan
    - b) Ball bearing design
    - c) Fan guard
    - d) Proportional speed control
    - e) Free air CFM, 500
    - f) Thermostatic fan control
    - g) Acceptable Manufacturer: Lowell
- E. Power Distribution Unit
1. Specifications
    - a) 120 VAC output nominal
    - b) Max total current draw 16 Amps
    - c) NEMA L5-20P single phase locking plug
    - d) NEMA 5-20R receptacles (quantity of 24)
    - e) One, 3-meter line cord
    - f) Vertical rack design
    - g) Acceptable Manufacturer: Lowell
- F. NEMA Rated Wall Mounted Security Equipment Enclosures

1. Specifications

- a) All equipment enclosures installed indoors shall be NEMA 12 enclosures.
- b) Provide double door, continuous hinge enclosures
- c) Enclosures shall be constructed of 14 gauge rolled steel, minimum.
- d) Enclosure doors shall be furnished with key lock-able doors with all Enclosures under ESSS keyed alike.
- e) All enclosures shall be furnished with removable steel back panels for mounting equipment.
- f) 60" x 48" and larger enclosures will be equipped with floor standing "feet"
- g) Enclosures shall be grounded to existing building earth ground bonding system.
- h) All enclosures shall be furnished with black-on-white laminated plastic nameplates identifying each cabinet.
- i) Enclosures finish shall be ANSI 61 gray inside and out.
- j) Enclosures shall be sized in strict accordance with the NEC. Minimum size is as indicated on the drawings.
- k) Enclosure back panels shall be furnished with a grounding lug to be used to connect the cabinet to the existing signal grounding system.
- l) Enclosures shall be furnished with cross-ventilated, forced-air cooling to maintain the optimum temperature performance range of the equipment.
- m) Acceptable Manufacturers:
  1. Hoffman.
  2. Hammond Manufacturing
  3. Saginaw Control and Engineering

1.03 INSTALLATION

A. General

1. Equipment specified is intended as a reference standard for level of quality.
2. The System shall be installed by qualified personnel in strict compliance with manufacturer's instructions.
3. All equipment cabinets are to be assembled and tested in the Security Electronics Contractor's facility prior to on-site installation. Except for field wiring, all interconnecting cables should be terminated and installed. All power distribution shall be completed.
4. Wiring shall be color coded, uniform and in accordance with national electric codes and manufacturer's instructions.
5. Equipment shall be firmly secured, plumb and level.
6. Cabinets shall be installed with the minimum NEC clearance of three feet in the front and three feet in the rear of the cabinet.
7. All cable shall be tagged and identified.
8. Provide Panduit IN-Cabinet cable management system. segregate cabling into groups based on signal type and voltage.
9. All power cables lengths are to be kept to a minimum and plugged into the nearest power outlet. Additional cable length shall be bundled and tied together using nylon cable ties.
10. Maintain separation between 120VAC power cables and all signal level cables. When necessary, cross 120vac power cables perpendicular to all other cable types.
11. Coordinate all work with General Contractor and other trades contractors.
12. Grounding of audio cables and peripheral equipment shall be installed per manufacturer's direction to eliminate noise induction and achieve optimum system performance.
13. All entrance and exit conduit shall utilize grounding bushings to terminate the conduit to the equipment enclosure. Route a green insulated ground conductor to the TMGB/TGB. See drawings for conductor sizing based on length.
14. Blank panels and vent panels shall be used to fill all unused rack space.
15. Every equipment rack shall be equipped with a ventilation fan and adequate venting. The fan shall be installed to bring air in from the bottom of the rack, drawing the cool air up and exiting out the top. Provide security covers for all rack mounted electronic components that do not require user interface.
16. The Trade Contractor is responsible for 120VAC power distribution within the equipment racks.
17. Upon completion of the work, remove excess debris, materials, equipment, apparatus, tools

etc. and leave the premises clean, neat and orderly.

18. Substitutions of equal quality will be accepted. All substitutions are to be approved prior to bid and listed by addenda. Substitutions will not be accepted after the schedule bid time.
19. Provide materials listed by UL or ETL.

#### 1.04 WARRANTY AND SERVICE

- A. Electronics Security System Subcontractor (ESSS) shall warrant the material and workmanship on this project for a period of one (1) year from the date of substantial completion. ESSS agrees to repair or replace any defective materials or work when given written notice during Warranty period. Warranty period shall begin on the date of substantial completion.

#### 1.05 DELIVERY STORAGE AND HANDLING

- A. ESSS shall transport, handle, store, and protect materials under provisions of the General Conditions.
- B. Transport materials in manufacturer's unopened original dry containers to avoid damage during shipment, with all tags and labels intact and legible, for timely installation. All enclosures, equipment racks and cabinet back planes shall be shipped to site in packaging built by the ESSS specific to the enclosure, equipment racks and cabinets supplied to avoid damage during shipment. Electrical Contractor shall receive on site and store equipment racks and wall cabinets prior to installation in equipment rooms and connection to conduit system.

**END OF SECTION**

## SECTION 282350 - ELECTRONIC SECURITY SYSTEMS NETWORK INTEGRATION

### PART 1: GENERAL

1. RELATED DOCUMENTS
  - A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this section.
2. DESCRIPTION OF WORK
  - A. Provide an industrial Ethernet network that shall include connections between the programmable logic controller (PLC) system, video graphic user interfaces (VGUI), IP audio system, and other systems as required.
  - B. Configure all switches and devices for operation on the network.
3. NETWORK SCHEME
  - A. Private, dedicated networks shall be established using layer 3 subnetting and layer 2 virtual local area networks (VLAN) for each of the following:
    1. The IP audio system.
    2. The IP camera and video management system.
    3. The PLC/Door Control System
    4. The Access Control System
    5. The switches and network management system
    6. Any additional systems that require a separate network.
  - B. A standard IP scheme shall be used unless this scheme overlaps any existing or planned network at the facility. The standard scheme shall consist of:
    1. An overall IP space of 172.28.0.0/20.
    2. An IP space of 172.28.0.0/25 for switches and management.
    3. An IP space of 172.28.0.128/26 for access control.
    4. An IP space of 172.28.0.192/26 for other systems as needed.
    5. An IP space of 172.28.1.0/24 for other systems as needed.
    6. An IP space of 172.28.2.0/23 for IP audio.
    7. An IP space of 172.28.4.0/22 for PLCs.
    8. An IP space of 172.28.8.0/21 for IP cameras and video management.
  - C. The owners shall inspect this scheme and notify the ESSM in writing at the soonest possible opportunity if there is an overlap.
    1. Notification shall be given even if the owner and ESSM networks will not be linked to avoid the possibility of conflicts in the future.
  - D. The notification shall include a proposal for an alternative, non-conflicting IP scheme.
    1. The alternative scheme shall use the same subnet masks as the standard scheme.
4. LINKING TO OWNER NETWORK
  - A. A link between the owner and ESSM networks shall be required if:
    1. The owners want to view cameras from outside the control room where ESSM video equipment is installed or,
    2. The owners want to view cameras from a mobile device (smartphone or tablet) or,
    3. The owners want the electronic security equipment to synchronize to a time server on the existing network.
  - B. The link shall be established through a subnet independent of either network.
    1. A layer 3 switch at the ESSM main distribution frame shall provide routing between the linking subnet and the ESSM network.
    2. The owners shall provide a firewall with NAT on the owner side of the link. Routing between the linking subnet and the owner network shall either be integrated into the firewall or at an owner provided device behind.
      - a. The owners shall be responsible for all configuration of these devices.
      - b. The ESSM shall provide the owners a list of ports that must be opened on the firewall.
    3. The routing device on each side shall have a static route to the other.
    4. Unless the owners notify the ESSM of an overlap, the linking subnet shall have the following characteristics:
      - a. An IP space of 10.0.0.0/30.
      - b. A static IP address of 10.0.0.2 on the owner side of the link (outward facing side of the firewall).
      - c. A static IP address of 10.0.0.1 on the ESSM side of the link.

5. NETWORK TOPOLOGY

- A. All switches installed in the same location shall be connected to each other, either directly or through other switches, by means of CAT6 or better patch cables or Direct Attach Cooper(DAC).
- B. One location having many connections, high expected traffic volume, and forming a core section of the network shall be designated the main distribution frame (MDF).
- C. Secondary locations having many connections and high expected traffic volume shall be designated intermediate distribution frames (IDF).
- D. Smaller locations with few connections and low expected traffic volume shall be designated edge locations.
- E. Outside locations that require network connectivity shall be designated exterior locations.
  - 1. Exterior devices may be connected to an interior switch by means of fiber optic media converters, or to an exterior switch, as deemed appropriate by the number of exterior devices.
- F. Each IDF, edge location, and exterior location with a switch shall have a trunk to the MDF, either directly or through other distribution frames, consisting of fiber optic or copper as referenced on design documents.

6. NETWORK BANDWIDTH

- A. Provide during the submittal phase, network bandwidth calculations for each connection from an equipment room connecting to another equipment room.
- B. When more than one switch in a single room is connected to another, provide bandwidth calculations for switch to switch connections.
- C. Bandwidth of the link shall be calculated such that traffic does not exceed 50% capacity.
- D. If bandwidth exceeds the capacity of the connection, the ESSM shall be responsible for changing or upgrading equipment to provide appropriate bandwidth.

7. SERVER CONNECTIONS

- A. Servers shall have two network ports for camera connections/viewing via NIC teaming.
- B. Provide out of band management for each of the Video Management Systems servers.

8. REDUNDANCY

- A. Where shown on the design documents, redundant core shall be used.
  - a. All interconnects between other equipment rooms shall run to each core switch.
  - b. Each switch shall be independently managed.
  - c. Switches shall be configured for VRRP in such a way that a single core failure should not interrupt routing abilities.

9. OWNER ACCEPTANCE

- A. At end of project, the owners shall receive the following information.
  - a. Usernames/Passwords for all switches
  - b. Backup network configurations
  - c. As built documentation, documenting what each port is connected to.

PART 2: PRODUCTS

1. NETWORK SWITCHES

- A. Provide Ethernet network switches and all accessories necessary for operation.
  - 1. Each location shall have 10% spare RJ-45 ports.
  - 2. Each MDF(Main Distribution Frame) and IDF(Intermediate Distribution Frame) location shall have at least one spare SFP/SFP+ port.
- B. MDF, IDF, shall be managed and support the following features:
  - 1. Hardware based multicasting.
  - 2. Rapid spanning tree.
  - 3. VLAN.
  - 4. Quality of Service (QoS).
  - 5. Link Aggregation.
  - 6. Web based configuration.
  - 7. In band command line configuration.
  - 8. Out of band command line configuration.
  - 9. Mountable in a standard 19-inch rack.
  - 10. Power over Ethernet: IEEE 802.3at (PoE+), sufficient budget for the total maximum draw of all scheduled devices, plus 10% spare PoE capacity
  - 11. Indicators:
    - a. System status.
    - b. Port link integrity.
    - c. Port speed.

- d. Port PoE status.
- 12. Input power: 100 – 240 V AC, auto ranging.
- 13. Operating temperature: 0 – 45 degrees C.
- 14. Operating relative humidity: 15% - 95% non-condensing.
- 15. Certifications: UL listed, FCC part 15 Class A.
- C. MDF and IDF switches shall support the following features:
  - 1. Layer 3 routing.
    - a. OSPFv3
    - b. RIP
    - c. Static
  - 2. IGMP multicast snooping.
  - 3. IP multicast routing.
  - 4. Virtual router redundancy protocol (VRRP).
  - 5. PIM Sparse and Dense Mode
- D. MDF switches shall be from the HP Aruba 5400R line or HP Aruba CX 6200 as deemed appropriate by calculated bandwidth requirements. All switches shall be of the same line.
  - 1. 5400R z12 line switches shall meet the following requirements:
    - a. Switching fabric speed: 960 Gbps – 2,030 Gbps.
    - b. Forwarding rate: 571 – 1,143 Mpps.
    - c. Memory: 4 GB SODIMM, 1 GB SD card, 16 MB flash for management module
    - d. MAC address table size: 64,000 entries.
    - e. Routing table size: 10,000 entries.
    - f. Power consumption: Maximum 5,500 W.
    - g. Module slots: Provide HP Aruba 24 port RJ-45 10/100/1000 PoE modules, 20 port RJ-45 10/100/1000 PoE/4 port SFP modules, HPE Smart Rate Multi-Gigabit, or 8 port SFP modules in any compatible combination as appropriate.
    - h. Management modules: Minimum 1.
    - i. Power supply: Provide compatible HP Aruba power supplies as appropriate. All power supplies shall be of the same model.
  - 2. CX 6200 line switches shall meet the following requirements:
    - a. Switching fabric speed: 56- – 176 Gbps.
    - b. Forwarding rate: up to 130.9 Mpps.
    - c. Memory: 8 GB DDR4 SDRAM and 16 GB eMMC.
    - d. MAC address table size: 32,768 entries.
    - e. Routing table size: 8,192 entries.
    - f. Power consumption: Maximum 1,596 W.
    - g. RJ-45 ports: 24 – 48 10/100/1000 PoE.
    - h. Uplink expansion slot: Provide HP Aruba 4 port SFP/SFP+ modules as appropriate.
    - i. Power supply: Provide compatible HP Aruba power supplies as appropriate. All power supplies shall be of the same model.
- E. IDF switches shall be from the HP Aruba 2930F/M or HP Aruba CX 6000/6100 as deemed appropriate by calculated bandwidth requirements. All switches shall be of the same line.
  - 1. HP Aruba 2930F/M line.
    - a. Forwarding rate: 95 – 112 Mpps.
    - b. Memory: 1 GB DDR3 SDRAM and 4 GB eMMC.
    - c. MAC address table size: 32,768 entries.
    - d. Routing table size: 2,000 entries.
    - e. Power consumption: Maximum 459 W.
    - f. RJ-45 ports: 24 – 48 10/100/1000 PoE.
    - g. SFP/SFP+ ports: 4.
  - 2. IDF switches shall be from the HP Aruba CX 6000/6100 line.
    - a. Switching Capacity: 128Bbps to 176 Gbps
    - b. Forwarding rate: up to 98.6 Mpps
    - c. Memory: 4GB DDR3 and 16GB eMMC
    - d. MAC address table size: 1024
    - e. Power consumption: Maximum 890 W.
    - f. RJ-45 ports: 24-48 10/100/1000 PoE.
    - g. SFP/SFP+ ports: 4.
- F. Exterior switches shall be from the Phoenix Contact FL line.
  - 1. Quality of Service (QoS).
  - 2. DIN rail mountable.

3. Power over Ethernet: IEEE 802.3at (PoE+), sufficient budget for the total maximum draw of all scheduled devices.
  4. RJ-45 ports: 2 – 8 10/100/1000 PoE.
  5. SFP ports: 1 – 2.
  6. Managed
  7. Input power: 24 – 55 V DC.
  8. Power consumption: Maximum 297.6 W.
  9. Operating temperature: -40 – 70 degrees C.
  10. Operating relative humidity: 5% - 95% non-condensing.
  11. Ingress protection: Minimum IP30.
  12. Certifications: UL listed.
2. ETHERNET MEDIA CONVERTERS
- A. Provide Ethernet fiber optic media converters for each exterior device not utilizing an exterior switch. Converters shall be from ComNet.
1. RJ-45 ports: 1 – 4 10/100 PoE.
  2. SFP ports: 1 – 4.
  3. PoE: IEEE 802.3at (PoE+), sufficient budget for the total maximum draw of all scheduled devices.
  4. Indicators:
    - a. Power.
    - b. PoE status.
    - c. Connection status.
  5. Operating temperature: -40 to 75 degrees C.
  6. Input power: 48 - 56 V DC.
  7. Power consumption: Maximum 75.6 W.
  8. Certifications: UL listed, FCC part 15 Class A.
3. SFP TRANSCEIVER MODULES
- A. Provide HP Aruba SFP or SFP+ fiber optic transceivers, as appropriate to bandwidth, for all fiber optic connections to HP Aruba switches.
- B. Where 10Gbps bandwidth is needed via copper using Cat 6A or better, provide appropriate SFP+ connections, unless it exceeds the maximum SFP+ distance via copper, then supply multi-gigabit port switches to maintain the use of category cabling.
- C. Provide Phoenix Contact SFP fiber optic transceivers for all fiber optic connections to Phoenix Contact switches.
- D. Provide ComNet SFP fiber optic transceivers for all fiber optic connections between ComNet media converters.
4. CAT 6 PATCH PANELS
- A. Provide 48-port and 24-port CAT6 or better patch panels to support all network security electronics field cabling terminations at head end equipment racks. Electrical contractor shall provide CAT6 or better cabling between head end equipment racks/cabinets.
- B. Acceptable manufacturers:
1. Leviton.
  2. TrendNet.
  3. Triplite.

**END OF SECTION**

## SECTION 283105 - AUXILIARY CONTROL SYSTEMS

### PART 1: GENERAL

#### 1.01 RELATED SECTIONS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions apply to this and other sections of ESSS.
- B. Refer to ESSS control schedules and plans for the locations of devices that will be controlled and locations of ESSS supplied relay panels.

#### 1.02 DESCRIPTION OF WORK

- A. Auxiliary control systems; included shall be located in:
  - 1. Remote control of cell and dayroom lighting.
  - 2. Remote control of power receptacles for inmate TV's in dayrooms.
- B. The PLC shall control via output points and interposing relays each device as scheduled.

#### 1.03 COORDINATION

- A. Coordinate work with Electrical Contractor. Turn over to the Electrical Contractor completely assembled and tested utility control panels for mounting and termination of line-voltage wiring.

### PART 2: PRODUCTS

#### 2.01 DESCRIPTION

- A. This section shall be a subsystem of the PLC.

#### 2.02 LIGHTING CONTROL

- A. Each auxiliary control system shall be a subsystem within the PLC.
- B. All contactors shall be by Panasonic or Douglas Lighting Systems.
- C. Control relays will be enclosed single pole, double throw (SPDT) type ballast rated at 30 amps 277VAC power circuits.
- D. Control relays will be mounted in cabinets.

#### 2.03 RECEPTACLE and TELEVISION RECEPTACLE

- A. Each auxiliary control system shall be a subsystem within the PLC.
- B. All contactors shall be by Panasonic or Douglas Lighting Systems.
- C. Control relays will be enclosed single pole, double throw (SPDT) type at 30 amps 277VAC power circuits.
- D. Control relays will be mounted in cabinets.

**END OF SECTION**

## SECTION 284619 – SECURITY AUTOMATION SYSTEM

### PART 1: GENERAL

#### 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including general and supplementary conditions and specifications, apply to this and other sections of division 28 05 00.

#### 1.02 DESCRIPTION OF WORK

- A. The security automation system shall be comprised of one or more programmable controllers with redundant processors, communications networks and operator interfaces. This system shall provide the necessary remote I/O, power supplies, input modules, output modules and any other required equipment to provide a fully functional system. The system will receive discrete inputs and through use of an internal control logic program, control output relay operations and perform remote control functions via the video graphic user interfaces.
- B. Schneider Electric Modicon TM3, or Omron CJ2 Series are the approved programmable logic controllers. No other systems are approved. All components that comprise the PLC system shall be from the same manufacturer.
- C. Provide labor, equipment, materials and supervision to install, program, calibrate, adjust, document, and test the total system as required herein, as shown on the drawings and required for the complete integration of the security system.

#### 1.03 CONTROL MONITORING AND ANNUNCIATION

- A. The security automation system shall control all electrically operated door hardware, monitor all doors, door position and bolt position limit switches as separate inputs (minimum 2 per door), annunciation of all door status and alarms upon violation. Lighting, receptacle, intercom, paging, duress, access control, and CCTV control shall be integrated into the security system. As part of video graphic user interface system provide an integral security management system that shall record to disk, paper or screen all occurrence of the system. Provide video graphic user interface terminals and security management system computers at locations as shown on the plans. The video graphic user interfaces in central control must be configured as hot-redundant backups to one another and be fully transferable.

### PART 2: PRODUCTS

#### 2.01 GENERAL REQUIREMENTS

- A. Provide a complete and fully functional security automation system using materials and equipment of types, sizes and rating, as required to meet performance requirements. Use materials and equipment that comply with referenced standards and manufacturers' standard design and construction, in accordance with published product information. Coordinate the features of all materials and equipment so they form an integrated system, with components and interconnections matched for optimum performance of specified functions.
- B. The programmable logic controller (hereafter referred to as the PLC) and all components in the control system shall be the product of Schneider Electric Modicon TM3 or Omron CJ2 Series. All assemblies and sub-assemblies performing similar functions in separate controllers purchased under this specification shall be interchangeable. The PLC processors shall be configured as a hot-redundant system in conjunction with the video graphic user interfaces as referenced under part 1.03 description. No other PLC manufacturers shall be considered. All components of the PLC system shall be by the same manufacturer, no mixing of multiple manufacturers shall be

- considered.
- C. All components shall be housed in structurally sound and finished metal cabinets. All switches and other operator-controlled devices shall be of the size and durability for their intended use as is normally offered for industrial applications.
  - D. Modular components of the system shall be listed or recognized by a nationally recognized testing laboratory.
  - E. The programmable controller shall be housed in lockable enclosures hereafter referred to as security equipment cabinets or racks. The equipment cabinets or racks shall house the following items.
    - 1. Input and output modules related to the monitoring and control of doors, lights, intercoms, CCTV, utility control functions, and duress alarm annunciation.
    - 2. Regulated power supplies.
    - 3. Terminal strips and fusing. Fuse holders shall be manufactured by Phoenix Contacts, Sprecher, Schuh or Square D and shall provide indication when the fuse has blown. Fuses shall be rated for the specific load. Each door shall be equipped with a minimum of two fuses, all output voltage for door control and indication shall be fused independently.
    - 4. Interposing door, lighting and receptacle control relays.
    - 5. The programmable controller, or where applicable, transmitting and receiving modules to communicate with the PLC or remote input and output racks.
    - 6. The intercom amplifiers and switching relays.
  - F. Other necessary items as determined by the Electronic Security System Subcontract (ESSS) design.
  - G. All Inputs and Outputs of the integrated system shall go through the input and output cards of the PLC. Direct connection to LED's, relays or other devices will not be acceptable.
  - H. Door monitoring and Control: Each door shall be equipped with a minimum of two fuses, all output voltage for door control and indication shall be fused independently.
  - I. Locks, whether solenoid, motor drive types and other required devices such as elevator interface, corridor indicator lights shall be controlled via mechanical interposing relay driven by the PLC. All interposing relays shall be included with an LED to indicate when the relay is energized. Provide all required power to control doors. If DC power supplies are required, provide only Class 2 power supplies and design the system so that the total ampacity shall be 100% greater than the worst case connected load, including inrushes. Group or emergency openings of doors shall cause doors to sequentially open with no more than 3 doors opening simultaneously. No relay boards manufactured by the electronic security system subcontractor shall be considered acceptable. Acceptable relay manufacturers are Finder, Square D, Omron or Idec.
  - J. Interlocks shall be via software. Any door shall have the ability to be programmed to become a member of an interlock scheme. The Security Systems Designing Agency shall reserve the right to redefine interlocks during the submittal and shakedown phase without additional costs. Refer to plans for interlock groups.
  - K. Upon a loss of power, all doors shall de-energize. Sliding and overhead doors shall remain in their present state.

### 2.03 PLC EQUIPMENT AND MATERIALS

- A. The programmable logic controller (PLC) shall be Schneider Electric Modicon TM3, or Omron CJ2 Series or approved equal. Input and output modules shall be bulletin 1771 and 1791 hardware.
- B. Each PLC shall be password protected against unauthorized entry to software.
- C. Local and remote networking shall be via dedicated interface modules providing serial communications at rates, which are selectable from 62.5K to 1M, bits per second. The interface modules shall be capable of I/O drops at distances of up to 7,500 feet and control up to 32 remotes.
- D. Schneider Electric Modicon TWIDO Input/output cards shall be optically isolated and designed to accept an input signal of 24 volts AC or DC. These modules shall be rack mounted. Each input/output point shall have a corresponding red LED indicator on the upper front of the module,

which illuminates when the input is read as on by the microprocessor. These modules shall be configured with 32 inputs/outputs.

- E. The PLC shall have a communications card capable of communicating with an industry standard stand-alone computer.
- F. Communication between the PLC and the computer(s) shall be a peer to peer network; no master station (central hub or server) shall be required.
- G. Communication on the peer to peer network shall be a minimum of 50 K baud of data transmission.
- H. There shall be no noticeable delay between any video graphic user interface icon or field device input and the resulting output on the video graphic user interface or in the field.
- I. DipSwitch Programming is not acceptable.
- J. No proprietary PLC system shall be acceptable. Each PLC shall be a standard industrial grade product designed for high reliability. The PLC shall be manufactured by a company that has produced a product line of compatible PLCs for at least fifteen years. Additionally, the PLC manufacturer must have a minimum of five national integrators proficient in the programming, integration and maintenance of the manufacturer PLC equipment.

#### 2.04 NETWORK SWITCHES

- A. Provide a network that shall include connections between the PLC system, video graphic user interfaces, IP audio system, and other systems as required.
- B. This network shall be a high speed, fault tolerant, Ethernet industrial communication network. It shall be a 100Mbps ring topology using fiber optic media as required and be in compliance with IEEE 802.3
- C. See section 282350 Electronic Security Systems Network Integration.
- D. Provide network switches by HP or Cisco

#### 2.05 UNINTERRUPTIBLE POWER SUPPLIES

- A. ESSS head end equipment and control room computer stations shall be powered by individual UPS units in base bid.

#### 2.06 SPARES FOR ALL ELECTRONIC SECURITY SYSTEM SECTIONS

- A. Provide adequate capacity in equipment racks/cabinets, PLC, relay capacity and spare terminal to increase number of control points in the future by 10 percent above those indicated for work of this project.
- B. Provide the following shelf spares:
  - a. PLC processor (1)
  - b. PLC backplane (1) of each type used
  - c. PLC input module (1) of each type used
  - d. PLC output module (1) of each type used
  - e. PLC system power supply (1)
  - f. VGUI touch screen operator station with PC loaded with software for plug and play operation (1)
  - g. Terminal block of each type used (20)
  - h. Relay of each type used (5)
  - i. Power supply (1) of each type used
  - j. Intercom station (2)
  - k. Speaker with baffle (1)

**END OF SECTION**

## SECTION 284620 -VIDEO GRAPHIC USER INTERFACE

### PART 1: GENERAL

#### 1.01 SECTION INCLUDES

- A. This section contains the requirements and operational characteristics for a security automation system. The system shall feature video graphical user interfaces (VGUI) as shown on the plans allowing control for the automated security system. The Control functions to be initiated by the VGUI include, but are not limited to the following:
  - 1. Door control and monitoring.
  - 2. Interface between intercom stations and speaker output selections.
  - 3. Interface between video surveillance system alarm inputs and monitors.
  - 4. Interface between the control of power circuits for lighting and receptacles.
  - 5. Interface, control and monitoring of push buttons, duress stations and motion detectors.
  - 6. Interface to existing owner card access system.
  - 7. Other controls as described elsewhere in these documents.
- B. System shall also include a Security Management System (SMS) which shall operate as separate terminal as shown on the plans. The system shall provide administrative viewing and retrieval of database information. Data stored within the database shall be stored in Windows-compatible files for exportation and report generation. The SMS shall be capable of audio recording and playback of audio intercom files via the VGUI's audio system. Audio recording shall be provided for all intercom stations from every operator station.

#### 1.02 OPERATIONAL DESCRIPTION

- A. General Description - The VGUI display shall be divided into three main sections: the Map Display, the Site Map and the Global Function Control Bar. The VGUI graphic display will consist of no less than ten screens (screens based on actual floor plan, icon sizes and development meetings as previously addressed in other sections), one for each area and alarm display screen.
- B. The Map Display is the main section of the monitor screen displaying a 2-dimensional view of a selected area in the facility. Each view is referred to as a "Map". The Maps shall have graphic icons representing all monitored and controlled devices placed on the floor plan in their approximate location. The graphics shall optimize the use of screen resolution and color to enhance and simplify the information displayed. Each operator station located in the top left-hand corner of the Map Display area shall have an "Emergency Shutdown" Icon, red in color that shall allow the operator of that station to shut down both operator stations if under duress. To re-enable each station, the operator must select the "re-start" system icon and enter a series of administrative passwords.
- C. The Map Display shall make use of multi-touch technology. The end user may manipulate the Map Display screens with two or more fingers. Standard multi-touch gestures for Pinch and Stretch to resize the map and Slide to pan the map must be supported. The Map Display shall consist of an entire floor or a large area of the facility. Individual map breakouts without support for multi-touch gestures shall not be considered.
- D. The Site Map is the section of the screen that is used to navigate between maps and view the other areas of the facility. The operator shall select an area in the Site Map by clicking on the area with the mouse/touch point. Although the Map Display can be manipulated using multi-touch technology, the Site Map can still be used to jump to different areas of the Map Display without the need to pan and will allow movement to different areas of the Map Display with the mouse. The area will be highlighted in white in the Site Map and be displayed in the Map Display area. The time duration to generate any screen within the GUI shall not exceed one ½ second. The Site Map area shall have an Intercom Call Pending List Display that shall display all current incoming intercom calls. In order to perform a function the operator must select an intercom call. Once the intercom is selected the station shall be connected to the intercom master station as well as display

the area on the Map Display where the call was originated. The Site Map area shall also have an Active Call Station Display that will be activated when an operator selects an intercom call. This Display shall also have a function button. The "Disconnect" function will simply disconnect the intercom station.

- E. Control between the housing control station and other jail control stations shall be fully transferable. Each operator station shall have a log on/off icon which shall end the "session" and automatically transfer control to the opposite station. To transfer control for a Central Control station to the Sub control stations the operator shall select the "transfer control" button on the site map and a "pop-up" window shall ask if the operator wishes to transfer control. If the operator selects yes, then control shall be transferred if the operator selects no then control shall not be transferred. If control is transferred, the operator must enter their password into the Sub control operator station prior to the control screens being made available.
- F. This section of the monitor screen is used to control devices in the facility. Door control functions shall require a two-step operation. The two-step operation is to protect the operator from accidentally opening a door. Owners can decide between two different two-step options for controlling doors.
  - 1. Function Icon followed by Door Icon – Under this approach the operator will select a function icon in the GFCB and then select a Door Icon for a normal door unlock.
  - 2. Door Icon followed by Function Icon – Under this approach the operator will select a Door Icon in the Display Map and then a Function Icon in the GFCB.
- G. The GFCB shall have a "Utility" Icon. The Utility control is a hidden function on the VGUI screen; therefore, the operator will not see any utility icons on the Map Display until the Utility Icon in the GFCB is selected. Once the Utility Icon is selected the utilities alone will display graphically on the Map display for three seconds. If a Utility Icon on the Map display is not selected within three seconds, the command cancels. Activating a utility (i.e. lights) shall be done by selecting the appropriate icon on the Display map. When a utility has been selected or turned on, the icon symbol will change to a yellow color and will stay yellow until it is selected again or turned off.
- H. Included in the operator control panel is a PLC Status Icon that will allow the operator to check the state of all the PLC modules in the facility. The PLC modules shall be grouped by PLC equipment cabinet or rack in black print and will be highlighted in red print if offline.
- I. In the event a PLC or PLC module does go offline, a pop up will appear on the screen which will allow the operator to go directly to the PLC status screen.

#### 1.05 VIDEO GRAPHIC USER INTERFACE EVENT SUMMARY

- A. An event-based strategy shall be applied to the development of the VGUI screens. Color utilized in the screen development shall be neutral gray in nature. Events shall be exceptions to the screen and shall be highlighted both visually using color. The following colors shall be used for annunciation of the various device states.
  - 1. Red shall indicate alarm state.
  - 2. Yellow shall indicate interlocked sallyport and/or over sallyport.
  - 3. Green shall indicate an authorized operation, such as an operator unlocking a door.
  - 4. Amber shall indicate intercom call, paging zones, sound threshold alarms.
  - 5. Blue shall indicate cameras.
  - 6. No color shall indicate secure or non-active device.
  - 7. Owner shall be able to change color designations at no additional cost.
- B. The system shall also incorporate the use of voice announcements and beeps and chimes so that all operator actions, system warnings and emergencies and other important information are announced to the operator. Alarm announcements shall be displayed until they are acknowledged, regardless of screen display. The operator will not have to wait for the sound to be completed before proceeding to other screen functions unless it is an emergency function.
- C. The operator shall be able to choose between full voice interaction or partial voice interaction. Full voice interaction uses voice announcements for all screen operations and partial voice interaction uses beeps and chimes during normal operations and voice announcements for alarm conditions.

#### 1.06ALARM PRIORITIES

- A. As part of the VGUI, provide priority of alarms and calls associated with different events and icons. Prioritization of alarms shall be limited to a total of seven levels. The owner shall reserve the right to provide two additional priority levels or change the priority levels listed below during the development stage of the VGUI software. Priority Levels are as follows:
1. Level # 1: Duress Alarms
  2. Level # 2: Breach of Interlocked Sallyport
  3. Level # 3: Door Alarms
  4. Level # 4: Intercom Calls
  5. Level # 5: Inmate Intercom Calls

#### 1.07DEVICE ICONS

- A. The VGUI shall have Device Icons located in the Map Display including, but not limited to Door Icon, Intercom Icon, Camera Icon, Page Zone Icon, Duress Icon, Card Reader Icon and Group Control Icon. The VGUI shall also have Function Icons located in the GFCB including Unlock Icon, Stop Icon, Hold Open Icon, Door Isolate Icon, Intercom Isolate Icon, Local Access Icon, Interlock Override Icon, Silence Icon and Reset Icon.

#### 1.08 DOOR CONTROL

- A. The steps required to open a swinging, sliding or overhead door are the same. The operator will first select the Unlock Icon in the GFCB and then within three seconds, select the Door Icon in the Map Display. Other doors may be commanded to unlock by selecting other Door Icons within the three seconds of the first. After a door has been unlocked for a specified amount of time it will then relock automatically, assuming the door hardware will allow for this operation (this is a ½ cycle door lock operations).
- B. To stop motion of a sliding or overhead door the operator will select the Stop Icon in the GFCB.
- C. Selecting the Hold Open Icon in the GFCB will unlock the door and keep it electrically unlocked until the operator selects the Door Icon only. The Function Icon in the GFCB shall stay illuminated during the three second selection process.
- D. The Door Icons in the Map Display shall have a graphical representation of the door. If it is a swinging door it depicts the door swing and if it is a sliding or overhead door it shall depict the door as secure, in mid travel or fully open.
1. The Door Icon is gray, and the door graphic is gray and is shown closed when the door is locked and secured.
  2. The Door Icon is gray, and the door graphic is green when the door is powered and opened.
  3. The Door Icon is gray, and the door graphic is fast flashing red when the door is violated or manually opened.
  4. The Door Icon is gray, and the door graphic is slow flashing red when the door alarm has been acknowledged by the operator.
  5. The Door Icon is gray again and the door graphic is gray again when the door has been reset by the operator.
  6. If there is a camera associated with door in alarm it shall be displayed on the call up monitor and the Camera Icon shall change to red.
- E. Interlocked doors are bordered around their Icons in yellow when a door in a designated interlock group is unsecured. If two interlocked doors are attempted to be unlocked at the same time, a pop-up warning shall display on the screen along with a voice announcement.

#### 1.09 DOOR ISOLATE

- A. Electrically controlled doors or doors that are controlled by card readers can be isolated so that

they cannot be opened. To isolate a door the operator selects the Door Isolate Icon in the GFCB and then selects the Door Icon. Other doors can be isolated within three seconds of the first. After three seconds the Door Isolate function cancels. Repeating the process on the same Door Icon will reverse the condition. When a door is isolated, the Door Icon will have a black "X" over it indicating the door cannot be opened. If an operator attempts to unlock an isolated door, a pop-up warning shall display on the screen along with a voice announcement.

#### 1.10 EMERGENCY RELEASE

- A. There shall be an "Emergency Evac" button located in the GFCB. When the operator selects this button a pop-up screen shall ask the operator if they would like to continue. If the operator selects the "Yes" button he/she will be able to emergency release doors by selecting the door icons on the display map. Opening the doors shall be a single step approach during an emergency release. The door icon shall flash red/green to acknowledge it has been opened. To re-close doors after and emergency release the operator shall select the "Emergency Evac" button again which shall cycle the door locks and allow them to be closed and locked again.

#### 1.11 LOCAL ACCESS

- A. Electrically controlled doors that are interfaced with the PLC can be designated to be Local Access doors. By granting local access to a door, the key switch, card reader or pushbutton becomes enabled. When the key switch is turned, card reader scanned or pushbutton pressed, the door will unlock and relock after a defined amount of time. To allow local access of a door the operator will select the Local Access Icon in the GFCB and then the Door Icon in the Map Display. Other doors may be commanded to have local access if the operator selects other Door Icon within the three seconds. After three seconds the local access command cancels. Repeating the process on the assigned Local Access door will reverse the condition.

#### 1.12 INTERCOM

- A. Establishing audio communication at the VGUI with the remote intercom station shall be accomplished by either selecting the Intercom Icon on the Map Display or selecting the intercom call in the Pending Call List Display located below the site map.
  - 1. The Intercom Icon shall flash an orange color when there is incoming call.
  - 2. When the operator selects the Intercom call the orange color shall become solid until the call is terminated, at which time it shall change back to gray.
- B. In addition to a visual color change to the Intercom Icon, a voice announcement shall alert the operator that there is an intercom call.
- C. If there is a camera associated with an intercom the camera shall be displayed on the call up monitor and the Camera Icon shall change to orange when there is an intercom call on that intercom.

#### 1.13 ISOLATE INTERCOM

- A. This feature shall allow the operator to turn off an intercom station. Incoming calls will still be received, and the Intercom Icon on the Display map will still flash an orange color, but no voice announcement will be given, and the operator will not have to answer the call. The operator shall select the Icon Isolate Icon in the GFCB and then the Intercom Icon in the Map Display and the Intercom Icon in the Map Display will have a white "X" over it indicating it has been isolated. Repeating the process will reverse the Intercom Isolate.

#### 1.14 PAGE

- A. This function allows the operator to select one or more paging zones for a paging announcement.

The operator will select the Page Icon in the Map Display. The Page Icon will change to an orange color during the paging operation and back to gray when the paging operation is completed.

1.15 ALL PAGE

- A. The GFCB shall also have an All Page Icon that shall allow the operator to perform a paging operation in the entire facility. This function shall also include all intercom stations.

1.16 VIDEO

- A. Establish video communications at the VGUI with a owner existing Genetec CCTV camera system . Operator shall accomplish by selecting a Camera Icon in the Map Display.
  - 1. Upon selection of a Camera Icon the Camera Icon will turn blue and the CCTV image will be displayed on the video monitor at the operator station.
  - 2. Selecting the Camera Icon again shall cancel the video and return the Camera Icon to its gray color.

1.17 DURESS ALARM

- A. When a duress alarm is activated the duress alarm icon on the screen shall flash red and there shall be a voice announcement alerting the operator that there is a duress alarm. If there is a camera associated with the duress alarm the camera shall be automatically displayed on the spot monitor at the operator station.

1.18 ACCESS CONTROL SYSTEM

- A. The security automation system shall be capable of accepting dry contact inputs from the owner existing card access system for remote opening of door locations.

1.19 UTILITY CONTROL

- A. Utility control icons shall be placed on hidden map that shall be selected via the function keypad.
- B. This function shall allow operators to select lighting, TV receptacle control points for on/off control. The operator will select the Icon in the Map Display. Each utility control icon will change to from gray to yellow when on.
- C. For each housing unit provide a group control icon to turn on all utility control functions. Note that when doing a group control sequence on/off operations to not overload any electrical circuits.

1.20 SECURITY MANAGEMENT SYSTEM

- A. The system shall record all the previously mentioned operations activity on the hard disk to allow for computerized sorting and report generation. The recorded information for each activity shall include the time, date, point description and the activity.
- B. Changes in state of all inputs and outputs including door sensors, door locks, intercom call buttons, paging zones, duress stations, card readers, lighting, receptacle, inmate phone, water solenoid, camera and visitation controls that are displayed to the operator of any VGUI.
- C. Operator activity including acknowledging alarms, resetting alarms, log on functions, opening doors, turning on cameras, and responding to intercom calls.
- D. The SMS at a minimum shall provide the following maintenance and diagnostic functions.
  - 1. Diagnostic function for troubleshooting door position switch and latch bolt position switch adjustment.
  - 2. Time and date resetting counter, which shall provide information as to the number of times that a door has been remotely operated and an intercom call has been placed.
- E. The SMS shall also allow for audio recording and playback of audio intercom files via the VGUI's

audio system. Audio recording shall be provided for each cell intercom station from every operator station.

- F. The SMS configuration software shall be a standard, off-the-shelf software package distributed nationwide with distributors located in all 50 states. This software must be 32-bit format.
- G. The SMS software must operation on Windows 11. No other platform shall be acceptable.
- H. All monitoring and login logic shall be programmed within the Indusoft program. The Security Management System software and the IO/DA (Input Output / Data Access) Servers shall be Indusoft brand; no other approach shall be considered. No proprietary .DLL, .EXE, .NET or other encrypted software shall be considered unless identified prior to bid and accepted by addendum. If it is found that system integrator provided any proprietary programming language or encrypted software but did not disclose this information the system shall be completely redeveloped with non-proprietary programming methods at the integrators expense.
- I. The system integrator shall turn over all programming passwords, source codes and programming schedules at the end of the project. Prior to final payment all software shall be authenticated as being non-proprietary by the owners or owners designated representative.

## PART 2: PRODUCTS

### 2.01 COMPUTERS

- A. Video Graphical User Interface (VGUI) and security management system shall consist of PC-based workstations and microcomputer controllers of modular design providing the minimum distributed processing capability as per the following.
  - 1. The PC-based workstations shall be an industrial fanless computer with Intel Core™ i7-8650U (1.9GHz Quad Core Processor), Windows 11 Professional, 64-bit. Memory shall be a minimum of 16GB SO-DIMM DDR4 and include a hard drive with 128GB M.2 SSD.
  - 2. The PC-based workstation shall be an Onlogic Model ML100G-31, Teguar or approved equal.
  - 3. Include a wired keyboard & mouse from Logitech, HP or Dell.

### 2.02 MONITORS

- A. Provide for each VGUI operator station a 24" TFT active LCD Flat Panel, touch screen with 1920x1080 resolution and support for multi-touch technology.
- B. Acceptable Manufacturers:
  - 1. 3M
  - 2. NEC
  - 3. HP
  - 4. Elo
  - 5. or approved equal

### 2.03 STANDARD MONITOR FOR SECURITY MANAGEMENT SYSTEM, DVR WORKSTATION, ACCESS CONTROL COMPUTER

- A. Provide 24" LCD color monitors capable of resolution of 1920x1080 pixels with refresh rates of 75Hz. It shall be capable of 32 colors in graphics mode.
- B. Acceptable Manufacturers:
  - 1. 3M
  - 2. NEC
  - 3. HP
  - 4. Elo
  - 5. or approved equal

### 2.04 VIDEO GRAPHIC USER INTERFACE, TABLET PC WORKSTATION AND SECURITY

## MANAGEMENT SYSTEM SOFTWARE

- A. The software shall be a commercial SCADA (Supervisory Control and Data Acquisition) system that is distributed worldwide for such automation systems. The manufacturer shall have produced a line of SCADA software for at least ten years and currently provides Internet support of its products including on-line updates and technical support.
- B. All software shall be licensed (registered) to the owner.
- C. The software shall operate on the Microsoft Windows 11 professional platform and exhibit strong compliance with Microsoft's Windows Open Systems Architecture (WOSA) standards. The system must support running as a service under Windows 11 PROFESSIONAL.
- D. All configuration changes shall be capable of being made on-line, while the system is operating.
- E. The system shall provide complete user documentation in an electronic format and on-line "help" based upon Windows standard Hypertext. Both shall provide *context-sensitive* information on the use of the package.
- F. All control and monitoring as well as login logic shall be programmed within the InduSoft application. The Video Graphic User Interface and Security Management System software and the IO/DA (Input Output / Data Access) Servers shall be InduSoft; **no other approach shall be considered**. No proprietary .DLL, .EXE, .NET or other encrypted software shall be considered. If it is found that the ESSM provided any proprietary programming language or encrypted software, their P&P bond shall be pulled, and the software shall be completely redeveloped with non-proprietary programming methods at the ESSS expense.
- G. ESSS shall turn over with submittals a sample of their programming passwords and source codes to confirm their non-proprietary approach to the development of the custom software.
- H. All PLC I/O addresses from InduSoft environment shall have continuous communication with the PLC. No InduSoft programming tag PLC addresses shall be changed during run time.
- I. ESSS shall not include any web server, cloud-based services or require any subscription for any portion of the VGUI or SMC system including but not limited to the security management system, touch screen workstations, active directory services, password assignments or integration with the audio communication system, video management system, video management storage servers, access control system or other system as specified and required.
- J. The system integrator shall turn over all programming passwords, source codes and programming schedules at the end of the project. Prior to final payment all software shall be authenticated as being non-proprietary by the Owners or Owners designated representative.

## PART 3: EXECUTION

### 3.01 SOFTWARE REVIEW

- A. A preliminary VGUI operations schedule shall be submitted for review during the submittal phase of this project. The owner's representative shall determine and direct the exact layout and operations of the VGUI software based upon a working demonstration of the proposed operation.
- B. Provide at a minimum of two (2) meetings at the owner's representative's facility to discuss and determine final layout and operations of the VGUI and security management system software. Prior to the last scheduled meeting as determined by the owner's representative the ESSS's shall provide a 90% complete working system, with a method of controlling and manipulating ALL field devices to demonstrate all operations of the system. After this last scheduled meeting as determined by the owner's representative the ESSS's shall completely shop test and certify the software with the actual headend hardware prior to delivery of any headend equipment to the project site.
- C. The complete security electronics system shall be assembled and tested at the ESSS's shop. The ESSS shall include in their bid all expenses (travel, per diem, hotel and food) for three (3) Owner's representatives to attend the factory testing of the systems for a one (1) day period.

### 3.02 SOFTWARE AUTHENTICATION

- A. ESSS shall send on USB Flash Drive the Indusoft software to the Security Systems Designing Agency for review. Security Systems Designing Agency shall send to Indusoft or Wonderware for Authentication.
- B. ESSS shall provide on USB Flash Drive logic created Indusoft, Wonderware InTouch I/O DA Server or Aveva Edge. License numbers specific to each control station for the project shall be provided as well as specific usernames and source codes.
- C. Software authentication shall be provided to Security Systems Designing Agency two (2) weeks prior to first scheduled Software review meeting with owners and two weeks prior to final on-site commissioning and punchlist by Security Systems Designing Agency

**END OF SECTION**

## SECTION 285123 -IP Hybrid AUDIO COMMUNICATION SYSTEM

### PART 1: GENERAL

#### 1.01 DESCRIPTION OF WORK

- A. Audio communications systems included are:
  - 1. Intercom
  - 2. Zone paging
  - 3. Intercom with sound threshold monitoring as shown on the drawings
- B. This system consists of voice communication between operator stations to intercom stations and paging zones as indicated on drawings.
- C. Provide all software and hardware necessary to allow audio recording to the security management system of the video graphic user interface station communications to intercom stations, speakers, horns, paging zones and sound threshold monitoring speakers.

### PART 2: PRODUCTS

#### 2.01 DESCRIPTION OF PRODUCTS

- A. The IP Hybrid audio communication system and associated equipment shall be manufactured by Audiotec, Quam, Stentofon or approved equal and located in (new and/or existing) floor mounted equipment racks adjacent to the door control panels.
- B. The equipment rack assemblies shall provide adequate panel mounting space to mount all equipment with a minimum 25% spare rack space. These same racks may be utilized to house network switching equipment and patch panels. Provide blank panels for unused spaces.
- C. The system shall be a Hybrid VoIP Solution with intercom stations and VoIP control room master stations.

#### 2.02 AUDIO APPLIANCE

- A. The Audiotec AIS-1001 audio appliance hardware shall incorporate the latest in technology, providing complete software, and programming source code which shall be utilized to allow users full access to configure the system as required by the contract documents. Virtualization of software on remote hardware is not acceptable.
- B. The audio appliance shall have a minimum capacity to support 1,024 field devices and up to 32 control room master stations per appliance. Approved manufacturers must provide with the proposals the same minimum capacity.
- C. The system shall be capable of networking 16 audio appliances and operate as one complete system.
- D. The control network must be Modbus TCP/IP Ethernet.
- E. The system must be non-blocking communication between any VoIP master station and VoIP field device.
- F. The audio appliance shall include sound threshold monitoring with the ability to provide multiple settings for daily scheduling. Provide a minimum of 64 daily schedules.
- G. The system must be capable of configuration changes while the audio appliance is both on-line and off-line. In addition, the system must utilize a YAML configuration file for editing functionality.
- H. Remote system access shall be through SSH and be managed through a single port.

#### 2.03 VOIP SWITCH BANK AMPLIFIER

- A. The audio communication system shall also support 25-volt intercom stations and paging zones.
- B. As required provide ASB-3210 VoIP switch bank analog intercom and paging amplifier. This unit shall utilize no more than 1U rack space and be capable of supporting no less than 32 channels with 2 independent non-blocking talk paths.

#### 2.04 VOIP CONTROL ROOM GRAPHICAL USER INTERFACE MASTER STATIONS

- A. Provide a Audiotec TMS-1002 VoIP control room graphical user interface desktop master station as shown on the contract documents which includes a compact design, rugged 16 ga. steel face plate, rubber shock isolation mounting feet, stainless steel push-to-talk button, 3" square loudspeaker with 2.35 oz ceramic magnet with moisture resistant cone, replaceable 16" metal cardioid condenser gooseneck microphone, volume control push buttons, and RJ45 connection.

- B. The control room graphical user interface desktop master station shall be non-proprietary, open source and open standard SIP and MQTT protocols using minimum Broadcom BCM2837 SoC with 1024 Mbytes of RAM and 8 Gbyte of eMMC flash.
- C. The system shall include a high-performance audio codec with 24-bit audio and be industry standard Voice over Internet Protocol (VoIP).
- D. The VoIP control room graphical user interface desktop master station must be powered by PoE (power over Ethernet), standard IEEE 802.3af class 0.
- E. The control room graphical user interface desktop master station must support external privacy Bluetooth headset.

#### 2.05 VOIP DESKTOP PHONE STATION

- A. Provide a Audiotec DMS-1001 VoIP desktop phone station. The VoIP desktop phone station shall be non-proprietary, open source and open standard SIP.
- B. The station shall be a small desktop unit with high-definition audio technology with a minimum of 7KHz audio and include a minimum of 3.5" TFT color LCD display.
- C. The station shall provide audio communications between desktop phone station to any VoIP intercoms station.
- D. The station shall have the ability to be configured for predefined hard keys, call transfer, mute, and one-touch redial.
- E. The station shall allow for master-to-master communications.
- F. The control room graphical user interface desktop master station must include automatic gain control with digital volume adjustments with up/down toggle button. Unit shall also support external Bluetooth privacy headset.

#### 2.06 REMOTE INTERCOM STATIONS - INTERIOR

- A. Provide Audiotec ATI-IC-2 series intercom station.
- B. The intercom station shall mount to a 2-gang standard back box and a vandal resistant IP call-in station with integrated speaker/microphone. The intercom faceplate must be a minimum of 12-gauge stainless steel.
- C. The loudspeaker must be a 2.5" square frame loudspeaker with 2.35 oz ceramic magnet and include a phenolic impregnated, moisture resistant cone. The push-to-call, program selection, lighting control or other predetermined push buttons shall be a momentary contact, stainless steel, and vandal resistant.
- D. The station shall include electronics for programmable selection to include but not limited to a call request. In addition, the station electronics shall include Class-D BTL speaker driver with an output of 2.5 watt into 4 ohms or 1.6 watts into 8 ohms.
- E. The station electronics shall be non-proprietary, open source and open standard SIP and MQTT protocols using a minimum Broadcom BCM2837 SoC with 1024 Mbytes of RAM and 8 Gbyte of eMMC flash.
- F. The station electronics shall include a high-performance audio codec with 24-bit audio and be industry standard Voice over Internet Protocol (VoIP).
- G. The VoIP station electronics must be PoE (power over Ethernet) standard IEEE 802.3af class 0 and include an RJ-45 Ethernet connector.
- H. Attachment screws shall be security types in compliance with Section 11196 – Detention Fasteners.
- I. Assembly shall be able to withstand damage caused from physical abuse, dust, vibration, and temperature extremes from 150° F. to 10° F.
- J. Unit shall have protective metal barrier designed to protect the loudspeaker from physical damage. Barrier shall be mounted to the rear of the faceplate in front of the loudspeaker.

#### 2.07 REMOTE INTERCOM STATIONS - EXTERIOR

- A. Provide Audiotec ATE-IC-2 series intercom station.
- B. The intercom station shall mount to a 2-gang standard back box and a vandal resistant IP call-in station with integrated speaker/microphone. The intercom faceplate must be a minimum of 12-gauge stainless steel.
- C. The loudspeaker must be a 2.5" square frame loudspeaker with 2.35 oz ceramic magnet and include a phenolic impregnated, moisture resistant cone. The push-to-call, program selection, lighting control or other predetermined push buttons shall be a momentary contact, stainless steel, and vandal resistant.

- D. The station shall include electronics for programmable selection to include but not limited to a call request. In addition, the station electronics shall include Class-D BTL speaker driver with an output of 2.5 watt into 4 ohm or 1.6 watts into 8 ohms.
- E. The station electronics shall be non-proprietary, open source and open standard SIP and MQTT protocols using a minimum Broadcom BCM2837 SoC, 1024 Mbytes of RAM, and 8 Gbyte of eMMC flash.
- F. The station electronics shall include a high-performance audio code with 24-bit audio and be industry standard Voice over Internet Protocol (VoIP).
- G. The VoIP station electronics must be PoE (power over Ethernet) standard IEEE 802.3af class 0 and include an RJ-45 Ethernet connector.
- H. The VoIP station electronics must include conformal coating to provide protection in exterior applications.
- I. Attachment screws shall be security types in compliance with Section 11196 – Detention Fasteners.
- J. Assembly shall be able to withstand damage caused from physical abuse, moisture, corrosion, dust, vibration, and temperature extremes from 150° F. to -40° F.
- K. Unit shall have protective metal barrier designed to protect the loudspeaker from physical damage. Barrier shall be mounted to the rear of the faceplate in front of the loudspeaker.

#### 2.08 LOUDSPEAKERS

- A. Loudspeakers to be nominal 8" diameter dual cone type units. Loudspeakers to incorporate 6-ounce permanent magnet and include a 5-watt multi tap transformer for use on 25 volt and 70-volt constant voltage type distribution systems.
- B. Each loudspeaker to be provided with a security baffle plate and flush or surface mounted enclosure has required. Refer to finish ceiling plan for locations. Baffle and enclosure to be all metal construction and finished in polar white baked on enamel.

#### 2.09 HORN LOUDSPEAKERS

- A. Horn loudspeakers to be weatherproof compression driver units with integral screwdriver adjustable multi-tap transformer for use on both 25 volt and 70-volt constant voltage distribution systems. Integral mounting plate suitable for mounting on a standard outlet box to include swivel type alignment bracket.
- B. Units to be rated to handle 15 watts input power. Nominal sensitivity 110 dB SPL at 3 feet with 1 watt input.

#### 2.10 CALL BUTTONS

- A. Single gang stainless steel call buttons shall be installed in all existing cells where there is only a ceiling speaker. This call button will be a normally open contact closure. The intent of the call button is to allow the inmate to initiate a call to the control room security electronics control station. This button press will indicate there is an intercom call. Refer to section 284619 for programming of intercom calls.

### PART 3: EXECUTION

#### 3.01 INSTALLATION

- A. All intercom stations are intended to be mounted in existing intercom back boxes.
- B. Coordinate opening, back box, and conduit routing requirements with Electrical Contractor if new back boxes are required.
- C. All exposed fasteners shall utilize security screws.

**END OF SECTION**