## ACCESS CONTROL ENTERPRISE SYSTEM (ACES) - ACCESS CONTROL CONTRACTOR'S INSTALLATION GUIDELINES

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PART 1 - GENERAL

1.1 DIVISION INCLUDES

A. This Specification contains a combination of prescriptive and performance requirements. The Access Control Contractor is responsible for fully implementing the functions described in the Specifications and shown on the Drawings. This will require the Access Control Contractor to perform substantial work selecting system components, integrating system functions, and integrating the various access control systems with each other and with equipment provided and installed by other Divisions.

1.2 RELATED DIVISIONS

A. The following is a list of related FDG 17920 documents that shall be referenced by the Security Contractor. These related FDG 17920 Division documents provide a detailed description of the Security Contractor’s requirements and specifications at the ACES component level:

1. Division 17920.100: Access Control Enterprise System (ACES) – Card Access
2. FDG Drawings CM-100 through CM-118.1

1.3 ACCESS CONTROL CONTRACTOR RESPONSIBILITIES

A. Coordinate conduit, backboxes, and wiring for 120VAC operating power to control panels and security equipment locations with Electrical Work in Division 16.

B. Materials, equipment fabrication, installation including all raceways, and wiring, and tests in conformity with applicable Codes and authorities having jurisdiction for the following security systems (refer to specific Divisions for additional requirements):

C. The Access Control Contractor shall coordinate installation of 120VAC power, conduit, standard backboxes, door hardware including designated power supplies, fire alarm interconnection, and Stanford’s LAN network and connection points as shown on Drawings.

D. Coordinate Door Hardware requirements with the Architect and General Contractor.

E. Coordination with the Stanford ITS Project Team regarding connection of the Access Control System, Access Control Servers, and workstations to Stanford’s LAN network. IP addresses and or DHCP naming conventions will be provided by Stanford ITS.

F. Coordination of the installation of Stanford-provided ACES workstations and servers (LCD monitor, CPU, mouse, keyboard). The client software applications will be installed by the ACES VAR.
G. Coordination of conduit, raceways, back-boxes, and pull boxes for infrastructure with Electrical Work in Division 16.

H. Conduit, wire, and cable installations performed under this Division 17 shall comply with the requirements of relevant Division 16.

I. Drawings and General Provisions of the Contract, including General Conditions and other Division 1 Specifications.

1.4 ACCESS CONTROL CONTRACTOR REQUIREMENTS

A. The Access Control Contractor shall be responsible for coordinating the installation of all building electronic security devices specified in referenced Divisions. Security Contractor shall meet the following minimum qualifications:

Possess all applicable Contractor’s licenses.

The Access Control Contractor personnel performing work shall be supervised by a person who has successfully installed similar systems by the same equipment manufacturers at five locations.

B. All work shall be in accordance with acknowledged industry and professional standards and practices, existing building conditions, and as specified herein.

C. Provide a complete working installation of all devices with all necessary equipment in proper operating condition. Documents do not undertake to show or list every item to be provided. When an item not shown or listed is clearly necessary for proper installation and operation of the equipment and systems, provide, install and test/certify the item at no increase to the Contract price.

D. The Access Control Contractor shall maintain a competent supervisor and supporting technical personnel, acceptable to Stanford, during the entire installation. A personnel change of the supervisor during the Project shall not be acceptable without prior written approval from Stanford or Stanford’s Agent.

E. The Access Control Contractor shall provide all required cables, cable support materials, conduit, backboxes, fiber optic cables, connectors, mounting hardware and trim materials for a completely functional/operational system.

F. This Specification contains a combination of prescriptive and performance requirements. The Access Control Contractor is responsible for fully implementing the functions described in the Specifications and shown on the Drawings. This will require the Security Contractor to perform substantial work selecting system components, integrating system functions, and integrating the various security systems with each other and with equipment provided and installed by other Divisions.

1.5 REFERENCES

A. Published specifications, standards, tests, codes, or recommended standards of trade, industry, or governmental organizations apply to work in these Divisions, including:

ADA - Americans with Disabilities Act

ASCII - American Standard Code for Information Interchange

ASTM - American Society for Testing and Materials

EIA - Electronic Industry Association
NEMA - National Electrical Manufacturers’ Association

NFPA - National Fire Protection Association with California amendments

NEC - National Electrical Code

UL - Underwriters Laboratories, Inc.

CBC – California Building Code

B. Electronic devices radiating “RF” energy shall comply with Federal Communication Commission regulations, particularly Part 15, and shall meet minimum Class “B”. Provide FCC certificate numbers indicating that products have been approved by the FCC.

1.6 QUALITY ASSURANCE:

A. Where applicable, all equipment supplied by the Access Control Contractor shall be listed by a nationally recognized testing laboratory.

B. All equipment and accessories to be the product of a manufacturer regularly engaged in its manufacture.

C. All items of a given type shall be the products of the same manufacturer.

D. All items shall be of the latest technology; no discontinued models or products are acceptable.

E. No ‘beta’ products will be accepted.

F. The Manufacturer, or their Authorized Representative, shall confirm that within 100 miles of the Project site there is an established agency which:

1. Stocks a full compliment of parts.

2. Offers service during normal working hours as well as (24 hour/7 days a week) emergency service on all equipment to be furnished.

3. Will supply parts and service without delay and at reasonable cost.

G. The Access Control Contractor shall be capable of performing service or maintenance work on the specified or accepted systems. Access Control Contractor shall be factory-certified where such certification is available.

H. In the event of a discrepancy between the Specifications and the Drawings, whichever is more stringent or calls for the highest quantity or quality of materials has precedence. Specifications and Drawings are complementary and what is required by one is as binding as if required by all.

1.7 SUBMITTALS

A. Submittals shall be provided for review and acceptance by Stanford’s representative prior to commencement of the work. Specific products have been mandated in the specification. When the specified product is provided by the Access Control Contractor, only the detailed bill of material need be provided.

1. All submittal drawings shall be in AutoCAD *.DWG format.
2. Manufacturer’s name, brand name, catalog references for all equipment supplied, indicating UL Listings, for all system components. When a cut sheet is supplied that shows multiple items, clearly identify the specified parts being used including any optional items. Stanford has provided a list of standard products that shall be conformed to, unless prior approval is received.

3. Complete written sequence of operations for all functions of the system.

4. Provide complete elevation, mounting showing all modules and/or components exactly as located within the control panels, point-to-point, and termination drawings for all work showing all devices and each conductor identified. "Typical" drawings will be accepted. Use provided drawing details to assist the process of detailed point to point drawings.

5. Battery calculations are required for all batteries. Voltage-drop calculations are required for all lock and camera circuits. (POE cameras require a distance calculation for each camera verifying that cable path does not exceed manufacturer’s specifications.)

6. All drawing submittals and schedules shall identify work by phase as shown on bid documents.

7. Supply bill of materials for all new equipment.

8. Provide Service information, including address of nearest representative. Provide written approval from each manufacturer affirming that Access Control Contractor is certified and approved for systems installation and service for all systems in this Division.

9. Proposed training program, including name and qualifications of trainer(s), schedule of training, curricula, and written training materials per each individual system.

10. Provide for Stanford’s review and approval of proposed programming, including device names and descriptions, timings, and sequence of operation prior to the actual programming of the system.

B. All ACES submittals shall be complete and in a similar format for ease of review. Stanford and General Contractor reserve the right to reject any submittals determined to be incomplete.

C. The Access Control Contractor should not consider the General Contractor, Architect or Stanford’s review of submittals to be exhaustive or complete in every detail. Approval of submittals, including substitutions, indicates only the acceptance of intent to comply with the general design or method of construction and quality as specified. The functional requirements, operations, arrangements, and quantities must comply with the Contract Documents unless changes are specifically approved in writing. Submittal approval does not relieve the Access Control Contractor of responsibility for errors or omissions in dimensions, details, and sizes or for coordinating items with actual building conditions.

D. Work provided without approved submittals is done at the Access Control Contractor’s risk and may be changed at no cost to Stanford.

E. Access Control Contractor shall provide “6” sets of product data information and installation shop drawings as part of the submittal package.
F. All submittal drawings shall be in AutoCAD.DWG format.

G. Manufacturer’s name, brand name, catalog references for all equipment supplied, indicating UL Listings, for all system components. When a cut sheet is supplied that shows multiple items, clearly identify the specified parts being used including any optional items. Stanford has provided a list of standard products that shall be conformed to, unless prior approval is received.

H. Complete written sequence of operations for all functions of the system.

I. Provide complete elevation, mounting showing all modules and/or components exactly as located within the control panels, point-to-point, and termination drawings for all work showing all devices and each conductor identified. “Typical” drawings will be accepted. Use provided drawing details to assist the process of detailed point to point drawings.

J. Battery calculations are required for all batteries. Voltage-drop calculations are required for all lock and camera circuits. (POE cameras require a distance calculation for each camera verifying that cable path does not exceed manufacturer's specifications.)

K. All drawing submittals and schedules shall identify work by phase as shown on bid documents.

L. Supply bill of materials for all new equipment.

M. Provide Service information, including address of nearest representative. Provide written approval from each manufacturer affirming that Access Control Contractor is certified and approved for systems installation and service for all systems in this Division.

N. Proposed training program, including name and qualifications of trainer(s), schedule of training, curricula, and written training materials per each individual system.

O. Provide for Stanford review and approval proposed programming, including device names and descriptions, timings, and sequence of operation prior to the actual programming of the system.

P. All security system submittals shall be complete and in a similar format for ease of review. Stanford and the General Contractor reserve the right to reject any submittals determined to be incomplete.

Q. Work provided without approved submittals is done at the Access Control Contractor’s risk and may be changed at no cost to Stanford.

R. Access Control Contractor shall provide “6” sets of product data information and installation shop drawings as part of the submittal package.

1.8 SUBSTITUTIONS

A. All materials and equipment shall conform to these specifications. No substitute materials may be used, unless previously requested in writing and accepted in writing by the General Contractor and Stanford.

B. Manufacturers listed as acceptable are normally engaged in the type of work specified. The listing of equipment part numbers or particular types of systems by specific manufacturers is to establish the performance quality, type, and parameters of the equipment and material specified. The equipment shall be as specified. The General Contractor and Stanford must approve all substitutions in writing.
1.9 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Stanford recommends the Access Control Contractor use “Kitting” of all components when possible. "Kitting” provides for less waste and more efficient delivery of product under a compressed schedule. The following parts may be assembled and placed in a single box under a single part number for ease of ordering and handling. The phoenix terminal blocks and din rails may be premounted to the Hoffman back panel per stanford specifications. Additionally, the kit (box) should be labeled and barcoded per stanford university specifications to be provided. When “Kitting” is not possible, ship equipment in original packages to prevent damage or entry of foreign matter. All handling shall be in accordance with manufacturers’ recommendations. Provide protective covering during construction.

B. Replace, at no expense to Stanford, equipment and material damaged during storage and installation as directed by the Architect, General Contractor or Stanford’s representative.

C. Products delivered to the job site in racks and consoles shall be protected from water, dust, dirt, and foreign matter. All racks and consoles shall be protected from water, dents, bumps, and scratching.

1.10 WARRANTY

A. Installation, equipment, software (including all software support and all available upgrades, patches and revisions), and all parts and labor shall be guaranteed by Access Control Contractor and manufacturer for one year from written notification of acceptance by Stanford.

B. The installing Access Control Contractor shall provide, upon notification of any problem, a field service technician to correct the problem within 8 hours of notification at no cost to Stanford.

C. At least 60 days prior to expiration of guarantee, provide maintenance Contract proposals for an additional year of service for each system to Stanford.

D. Warranty shall be extended as described in 3.5 F, below.

PART 2 - PRODUCTS

2.1 ACES PRODUCTS

A. Refer to applicable FDG 17920 Divisions for applicable product specifications.

B. No substitutions will be permitted unless approved by in writing by Stanford’s representative.

PART 3 - EXECUTION

3.1 REQUIREMENTS

A. Coordinate all work with the General Contractor, including schedule and integration of work with other trades.

B. Coordinate work with Stanford- I&M Group for all network connections.
C. Systems shall be complete and operational in all respects.

D. Coordinate installation of all wiring, raceway, conduit, and approved wireways with Division 16. Coordinate connection of power to security systems as required.

E. Wiring in wet or damp locations, including all underground conduits, shall be "gel" filled and rated for wet applications.

F. Access Control Contractor shall consult manufacturer’s recommendations for cabling and conduit and use whichever is greater in size, quality, quantity, gauge, shielding and number of conductors at no additional cost to Stanford. ITS Cabling Contractor shall provide a “composite cable” from the door junction box to the control panel termination enclosure. All other required cables shall be provided and installed by the Access Control Contractor.

G. All ACES equipment exposed in public areas shall be installed utilizing tamper proof mounting hardware. Provide a minimum of 2 driver bits or hand tools for each type of security fastener to Stanford. The standard type of security screw shall be a star configuration with a security center piece.

H. Cables are to be protected from excessive tension, abrasion, or damaging bends or kinks during installation. Care shall be taken not to bend, crush or kink cables.

I. Cables shall be combed straight and formed in a neat and orderly manner. Hook and loop tie wraps are to be used for cable management, not support. Use hook and loop tie wraps of the appropriate size and type. Do not over-tighten tie wraps.

J. Provide service loops at each termination point per Drawings so devices can be dismounted for service and inspection.

K. Cables shall not be laid directly on ceiling tiles or rails. Cables shall not be attached to ceiling grid support wires.

L. Provide bracing for all equipment, including equipment racks and consoles.

M. Provide seismic restraint for all equipment, including equipment racks and consoles.

3.2 RECORD DRAWINGS

A. Maintain a complete set of prints of Contract Drawings of the work forming a part of the security systems. As work is installed, carefully draw on prints, in colored pencil, actual location of work including depth of underground runs, if any, with dimensions from permanent structures. Wiring diagrams and details shall be included.

B. Upon completion of the Project, transfer this information to reproducible Drawings and updated CAD (AutoCAD.DWG files) disks, and submit to Stanford, along with hand marked field record set.

C. The Access Control Contractor shall provide three bond sets of drawings, and two CD-ROMs with all AutoCAD drawing files.

D. One additional complete bond set shall remain on the job site in folders secured inside the electronic racks.

E. Record Drawings shall include:
1. Complete typical wiring diagrams for all components, including cable types and quantities, routings, floor plans indicating device locations, room numbers, conduit sizes.

2. Complete elevation, mounting, and point-to-point and termination drawings for all devices. "Typical" drawings will be accepted.

3. A Master Legend/Spreadsheet on the drawings that identifies all devices, device location on the drawings, wire label verbiage, panel termination points and detail numbers. Each spreadsheet will be specific to the control panel. The legend/spreadsheet will also be place in each control panel for service support and termination assistance.

4. A complete written sequence of operations for all functions as installed and programmed for each system.

5. A complete list of all equipment installed organized by building.

**TRAINING**

**A.** The Access Control Contractor shall provide a minimum of two copies of Operation and Maintenance manuals for all equipment furnished under the security systems Divisions at initial training. Include complete sets of up-to-date Record Drawings, bill of material, and theory of operation for all systems with each manual.

**B.** Provide all software and current files, printed ladder-logic files, and access codes for all programmable equipment and submit to Stanford project management team. Provide an additional 4 copies of O&M manuals for use as training materials by Stanford.

3.3 **PROGRAMMING**

**A.** ACES VAR shall provide initial programming for all applicable systems. The ACES VAR shall provide a full time system administrator to provide the below services during the application installation and as the setup and construction installation proceeds. Stanford will not provide field device programming and or testing support as the system is made active and commissioned. The ACES VAR programming shall include, but not be limited to:

1. Stanford shall provide system administrative rights for the ACES VAR administrator during the construction phase of the project.

2. An English-language description of each alarm point, door, card reader, and camera location, and alarm annunciator. The descriptions will be provided by Stanford and follow a campus wide standard.

3. All door alarm conditions shall be made active for door forced and door held monitoring. Each of the two conditions may be controlled independently.

4. Build floor plan maps including all levels reflecting specific device types and locations. Floor plan maps will be dynamically linked to device locations in access control and CCTV system monitoring systems database.

5. Tamper switches will be installed at all door junction boxes and controller enclosures and termination enclosures. Each tamper switch will be for graphic annunciation and system monitoring. Each building TR location shall have a
general AC power loss monitoring requirement and a power supply specific low battery monitoring circuit programmed.

6. Camera sequences and call-up functions.

7. Access cards will be provided by Stanford for initial testing.

8. Text messages describing post orders for different alarm actions.

9. Global alarm annunciation outputs to be linked to individual alarm outputs driving voice annunciation at each door location.

10. A single output at each door location link to the alarm annunciation system at each door location, triggered by the door status input.

11. Time schedules will be programmed into the access system based on a pre-defined list provided by Stanford project team.

12. All descriptions, numbering, and labeling shall be consistent throughout the electronic security systems.

B. Software device naming convention shall be consistent between various integrated systems, including Access Control and CCTV systems.

C. Upon Stanford’s request, each system shall be reprogrammed by the ACES VAR one time during the warranty period at no additional cost.

3.4 COMMISSIONING/ACCEPTANCE TESTING

A. There are two distinct types of tests for which the Access Control Contractor is responsible:

1. The first type is the Pre-Functional Performance Test. These tests ensure that all equipment, wiring, and systems are installed in accordance with the Specifications, Drawings, and manufacturers’ requirements.

2. The second type of test is the Substantial Completion Test. These tests ensure that all equipment and systems operate in accordance with design intent. These are dynamic tests, and test the systems through all possible modes of operation.

B. Perform systems tests using personnel who have attended a manufacturer’s training school for installation and testing of the systems as described above. Perform testing with the test instruments as required by the manufacturer; testing by means other than the manufacturer’s procedures will not be acceptable unless agreed to by Stanford, Consultant, and manufacturer.

C. Upon completion of the installation of the security systems, the Access Control Contractor shall submit to Stanford Pre-Functional Performance Test reports including, but not limited to, the following information:

1. A complete list of all equipment installed, including serial numbers of major components.

2. Certification that all equipment is properly installed and functional, and conforms with Contract Specifications and Drawings.
3. Test reports of all new and existing inputs and outputs, devices, and equipment.

4. Test technician’s name, company, and dates of test.

D. Following review of the Pre-Functional Performance Test report by Stanford projects team, the Access Control Contractor, along with the ACES VAR, shall schedule a substantial completion test with Stanford project team. A Substantial Completion Test shall include performance tests of each device, switch, control unit, power supply, battery standby unit, monitor panel, controller, and all other equipment and material required by the Contract. Tests will only be conducted at completed buildings, partial testing of buildings will not be performed by Stanford project team.

E. At a minimum, perform tests to demonstrate that:
   1. All systems are free from grounding and open circuits.
   2. Each alarm-initiating device consistently functions as specified and produces the specified alarm actions.
   3. Automatic display of CCTV camera display on the designated monitor, building maps showing alarming device changing status and reflecting location, and automatic display of designated post orders upon activation of an alarm event.
   4. An abnormal condition of any circuit or device required to be electrically supervised will result in activating the specified trouble or tamper alarm signal.
   5. Doors lock and unlock at programmed times and allow access upon activation from a valid card.
   6. Systems operate properly during and while on emergency generator power.
   7. Alarm signals are audible at the monitoring workstation location.
   8. The system is operable under specified trouble conditions.
   9. All software functions properly as specified, and all equipment is fully programmed. The ACES VAR Contractor shall be responsible for programming system English-language descriptors as specified by Stanford’s representative.
   10. System Record Drawings correspond with actual installation.

F. If retesting is required due to Access Control Contractor equipment failure, incorrect programming, omission, or error, the Access Control Contractor shall compensate Stanford for all Stanford’s additional costs associated with retesting.

PART 4 – GENERAL

4.1 DIVISION INCLUDES

A. Materials, equipment fabrication, installation, and tests in conformity with applicable Codes and authorities having jurisdiction for the following:
   1. Provide a complete Access Control Enterprise System as shown on Drawings.
   2. Complete system is defined as all conduit, raceways, cables, backboxes, card readers, cards, controllers, printers, alarm contacts, glass break detectors, programming, software, licenses, and upgrades needed to achieve a complete and functional system. Also included are all required power supplies, power filtering, mounts, housings, equipment stand, and interfaces to equipment furnished by others.
3. A typical system shall be configured to allow access with the presentation of a DESFire access card or a legacy corporate 1000 HID 37 bit card. A door contact shall indicate to the system that a door has been opened and closed and an Request-to-Exit device will indicate egress. The system shall be able to detect a forced or held door and indicate in several ways the condition of the door. The system shall be able to record and store all events, and provide a means to review an event log that has unlimited storage capacity.

4. Furnish and install new DESFire proximity card readers.

5. Furnish and install card reader controllers and other equipment as shown on the Drawings.

6. Coordinate system requirements with the Owner-Architect-Contractor (OAC) project management team.

7. Establish system communication with the Access Control System Server and panels via the Stanford’s LAN network.

8. Provide system administrative support throughout the installation process to meet the specific needs of the project scope of work.

9. Furnish and install required interface relays, materials, and cabling to the designated point of interface with the fire alarm control system.

10. Provide installation, testing, adjustment, and initial programming for all equipment.

11. Provide written documentation and instructions for system as installed.

12. Provide training to the Stanford in the operation, adjustment, servicing, and repair of this system.

B. .

4.2 RELATED DIVISIONS

A. The following is a list of related FDG 17920 documents that shall be referenced by the Access Control Contractor. These related FDG 17920 Division documents provide a detailed description of the Access Control Contractor’s requirements and specifications at the ACES component level:

Division 17920.100: Access Control Enterprise System (ACES) – Card Access

1. 
2. FDG DRAWINGS CM-100 THROUGH CM-118.1

B. Wire and cable installations performed under this Division shall comply with the requirements of Division 16.

PART 5 - PRODUCTS

5.1 ACCESS CONTROL PRODUCTS

A. System Specifications
1. Manufacturer’s catalog and system numbers of equipment listed in FDG 17920 documents and specifications indicate the type, quality, and functions of the equipment required, and represent the minimum acceptable standards. Provide all compatible parts for the submitted system. Acceptable manufacturers include Integrated Engineering (HID), Altronix, Bosch, GE Security (Sentrol), Visonic, Quam, and. The Access Control system shall be Lenel or Software House, no substitutions will be accepted.

2. When possible “Kitting” will be used by the Access Control Contractor to assemble and pre-wire devices that make up an assembly of parts. Parts are to be assembled and placed in a single box under a single part number for ease of ordering and handling. All manufacturer product packaging is to be recycled off site from the job site at the kitting location. See drawing for kit details and parts lists. (Local distribution channels that provide these services for Stanford include Anixter)

B. Wire and Cable

1. Access Control Contractor shall follow the manufacturers’ recommendation for cabling. Wire and cable sizes, number of conductors, shielding, or other data listed in this specification or shown on Drawings are a guide to the correct product required to achieve a working system and represent minimum acceptable equipment.

2. The ITS Cabling Contractor shall install the composite cable from the TR locations to the door security junction box.

3. Wiring shall be grouped and harnessed to facilitate access to all equipment, as well as maintenance and replacement of equipment.

4. All cable shall be labeled at origin and termination, referencing to a master legend schedule shown on submittal drawings. Labeling and any splice locations shall be noted on Record Drawings.

5. Cabling shall be sized and installed according to National Electric Code requirements.

6. Cables are to be shielded as necessary and as shown on Drawings to preclude any outside noise or interference from entering the cable and degrading system performance and follow all system manufacturer cable requirements.

7. Any cabling or raceway exposed to weather or installed underground shall be rated for that use.

C. Client workstations

1. The ACES VAR should program Stanford provided computer workstations to allow ACES client access to host server. Alarm conditions to be manually displayed and automatically called up on alarm activation. Provide display maps (showing building, walls, level, and doors) reflecting the specific device and its status. Provide complete software integration of the CCTV and ACES functions on the designated GUI workstations.

2. The ACES VAR provided video client workstations will also serve as the ACES client work stations. All workstations will be HP Proliant or preapproved equal.

D. Card Readers

1. Card Readers shall be manufactured HID SmartTrans 800-8100DF, with configuration 01SMR-5801.
2. Card readers shall support DESFire “Smart Cards” and legacy HID corporate 1000 37 bit cards. Generation 2 series card readers from HID shall support all HID card formats.

3. The readers will mount on standard single gang electrical rings or on the frames of the doors. Adapters are required for single gang ring mounting. Mounting on custom optional standoffs may be required when mounting on or near metal surfaces.

E. Access Control Cards

1. Test cards shall be provided by the Stanford for Access Control Contractor testing and commissioning.

F. Access Control Panels

1. Access Control equipment shall be Lenel. No substitutions will be accepted.

2. Access Panel Controllers, I/O boards, and new power supplies for DC locks shall be provided with battery back-up sufficient to maintain full operation of monitoring functions for a minimum of 4 hours, plus a minimum of 25 lock activations in the event of power failure. Provide complete with input, outputs, and sufficient power for 8 and 16 reader-controlled doors.

3. Furnish and install interfacing relays between Access Controller Panel (ACP) outputs and locks being controlled. Install diode noise suppression on all relay coils and electric lock coils.

4. Provide sufficient input boards to accept all monitored points on the Access Control System.

5. Provide sufficient output boards to accept all outputs on the Access Control System. Each speech processor module requires one output located at the controller.

6. Furnish and install reed tamper switches on each equipment cabinet, including door junction boxes.

7. Include input points to connect AC power fail and low battery conditions from power supplies to ACES system. AC power fail may be common to each power supply location. Low battery monitoring must be unique to each power supply.

G. Door Position Sensors

1. Furnish and install GE Security 1078T concealed contacts in steel door frames. Furnish and install GE Security 1125TW on wood door frames. Furnish and install GE Security 2505A Series armored cable contacts on “back of house” steel doors in concrete filled jambs or other special circumstances. Provide and install GE Security 3010 tamper switches in all enclosures and door junction boxes that are not provided with a tamper switch from the manufacturer.

2. Coordinate with other trades the contact and wire placement in the door frames. Cable shall not be exposed and raceway shall be hidden.

3. Where there are contacts on a set of double doors, each leaf will have a contact and will be wired in a series circuit.

H. Lock Power Supplies
1. Furnish and install 24VDC power supplies for all electrically controlled door locks. Where supplies are provided as part of the hardware group, coordinate the installation with Electrical Work in Division 16 and connect these supplies to the ACES system and local electric lock.

2. Size all power supplies to permit simultaneous continuous-duty activation of all door locks, with an additional minimum 30% capacity on each supply. Provide battery back-up sufficient for 25 activations for all DC locks.

3. Furnish and install interfacing relays between Access Control Panel (ACP) and electric locks being controlled. Install noise suppression diodes on all locks as close as possible to the lock and at the control relay coil. Mount all interface relays within the power supply equipment enclosures. Relay interface board shall be Altronix ACM8CB. Every eight electric locks require a ACM8CB module.

4. Provide U.L. listed power supply with fire alarm system interface for automatic unlocking of upon activation of building fire alarm. Coordinate and provide connection to building fire alarm system when required. Provide individual control of fail safe/fail secure operation of each lock relay based on lock requirements and fire input alarm signals to power supply.

5. Lock power supplies shall be Altronix Maxim37E

6. Fail Safe lock hardware release modules shall be Altronix DSACM8/CB

7. Fused power distribution boards shall be Altronix PD8CB.

I. Door Annunciation Speaker and Speech Processor

1. Security Contractor to provide and install Visonic SP-3 speech processor in each door junction box. The Visonic device will be mounted as part of the door junction box “kit” to the Phoenix connector assembly and DIN rail.

2. Provide a Qaum Model 0602-CISX/8 8 ohm speaker (vandal resistant, stainless steel with tamper proof screws (2 gang mounting) to be connected to the Visonic SP-3 speech processor

J. Power-Over-Ethernet Switch (IP Networked Edge Devices)

1. When and where specified, the Access Control Contractor to provide and install a Stanford ITS approved power-over-ethernet IP network switch, in the security junction box at the door, to support IP networked communication edge devices, i.e. camera, entry telephone, etc.

2. When and where specified, the Access Control Contractor to provide and install a Stanford ITS approved 12VDC to 48VDC power convertor, in the security junction box at the door, to power the power-over-ethernet network switch

K. Request-to-Exit Motion Sensors

1. Furnish and install Bosch DSI 160I request to exit motion sensors when the RX switch can not be embedded in the door hardware. Provide and install trim plates model TP160 when installed on electrical back boxes. All Card Reader and Local Alarm locations shall incorporate a request to exit device. Local Alarm door’s will be emergency exit only or free egress based on software settings in the Lenel application.
L. Equipment Termination Enclosures

1. Furnish and install a security junction box 16"H x 12"W x 4"D at all door locations (Hoffman Type 1 Control Box with Perforated Panel, Part number ASE16X12X4, equip with perforated panel, Part Number A16N12FF, and if specified by the building client, a tamper switch Part Number ALFSWD).

2. Install Hoffman flush mount cover when enclosure is installed in above ceiling locations or exposed in utility closets. Hoffman model AFE16X12. A custom manufactured oversized cover, with rounded corners, shall be installed on all flush mounted installations.

3. Install tamperproof screws (TORX #8-32 flat head security configuration) on all enclosures when screw covers are used. Use countersunk finish washers to hide the cover slot and dress the flat head screw installation.

4. Furnish and install Hoffman A-TC36246S panel for termination of composite cable terminated in Telecommunication Rooms (TR).

5. Furnish and install Phoenix Contact Part No's as follows:
   - DIN MOUNTING RAIL – ORDER NO.: 0801733, TYPE: NS 35/7, 5 PERF 2000MM
   - TERMINAL BLOCKS – PHOENIX CONTACT PART NO. 3044636 UTTB 2.5 DOUBLE-LEVEL TERMINAL BLOCK WITH SCREW CONNECTOR, GRAY.
   - TERMINAL BLOCKS – PHOENIX CONTACT PART NO. 3044665 UTTB 2.5-PE DOUBLE-LEVEL TERMINAL BLOCK WITH SCREW CONNECTOR, GREEN/YELLOW.
   - END CLAMP - PART NO. 1201442
   - COVER – PART NO. 3047293
   - TERMINAL MARKER STRIP CARRIER – PART NO. 0800307
   - ZACK STRIP – PART NO. 1050295 ZB: SO/CMS (STANFORD LABEL)

6. It is recommended that the din rail for the door junction boxes and the back panel for the TR room termination enclosure be provided in “kit” form and not assembled on the construction site.

PART 6 - EXECUTION

6.1 REQUIREMENTS

A. Refer to Division 17920.101, Part 3, for requirements regarding Record Drawings, Training, Tests and Reports, and Warranty.

B. Special coordination is required with the Stanford regarding programming requirements. Meet with the Stanford’s representatives and submit proposed labels for all input and output points for Stanford review and comment. Software labels shall be consistent between various integrated systems, including Access Control, CCTV System and Entry Telephones.

C. Programming for manual door unlock, time zones, and access levels as directed by the Stanford.
D. Provide a minimum of 16 hours of scheduled training for the equipment furnished under this Division, including programming, operation, service, and maintenance.

E. PROVIDE AND INSTALL DATA INTERFACE INCLUDING PROGRAMMING TO CCTV HEAD-END EQUIPMENT CPU FOR CAMERA CALL-UP UPON ALARM ACTIVATION.

PART 7 – GENERAL

7.1 SECTION INCLUDES

A. Materials, equipment fabrication, installation, and tests in conformity with applicable Codes and authorities having jurisdiction for the following:

1. Provide a complete Network based Closed Circuit Television Surveillance System as shown on Drawings.

2. Complete systems are defined as all cables, fiber, backboxes, POE/IP color cameras, enclosures, digital CCTV Network Video Recorders/servers, networking equipment, software, and programming needed to achieve a complete and functional system. Also included are all required, mounts, housings, and interfaces to equipment furnished by others. Stanford will provide the network infrastructure from the Telecommunication Room ("TR") to the CCTV Headend location.

3. Program Stanford-provided computer workstations to allow CCTV cameras to be manually displayed and automatically called up on alarm activation. Provide display maps (showing building, walls, level, and doors) reflecting the specific device and its status. Provide complete software integration of the CCTV and Access Control System functions on the designated GUI workstations.

4. Provide automatic camera call-up upon activation of alarm detection, video motion detection, or input from other security or building systems. Program at minimum one alarm activation call-up for each video camera. Alarm conditions shall be linked to local door alarm events.

5. Install all field control panel equipment in the Telecommunication Room ("TR") as shown on Drawings. Network connectivity and PoE power to be provided by Stanford in each TR room.

6. Provide installation, testing, adjustment, and all necessary system programming for all equipment.

7. Provide written documentation and instructions for system as installed.

8. Provide training to Stanford in the operation, adjustment, servicing, and repair of this system.

7.2 RELATED SECTIONS

A. The following is a list of related FDG 17920 documents that shall be referenced by the Security Contractor. These related FDG 17920 Division documents provide a detailed description of the Access Control Contractor’s requirements and specifications at the ACES component level:
PART 8 - PRODUCTS

8.1 CLOSED CIRCUIT TELEVISION SYSTEM

A. System Specifications

1. Stanford-ITS shall pre-approve all Closed Circuit Television (CCTV) systems. The CCTV systems shall be IP Network Camera Systems. Cameras will be Fixed or Pan-Tilt-Zoom (PTZ) as specified on the drawings.

2. When and where specified, the Access Control Contractor to provide and install a Stanford ITS approved power-over-ethernet IP network switch, in the security junction box at the door, to support IP networked communication edge devices, i.e. camera, entry telephone, etc.

3. WHEN AND WHERE SPECIFIED, THE ACCESS CONTROL CONTRACTOR TO PROVIDE AND INSTALL A STANFORD ITS APPROVED 12VDC TO 48VDC POWER CONVERTOR, IN THE SECURITY JUNCTION BOX AT THE DOOR, TO POWER THE POWER-OVER-ETHERNET NETWORK SWITCH.

B. Wire, Fiber, and Cable

1. Access Control Contractor shall follow the manufacturers’ recommendation for cabling. Wire and cable sizes, number of conductors, shielding, or other data listed in this specification or shown on Drawings are a guide to the correct product required to achieve a working system and represent minimum acceptable equipment.

2. All cable from the TR location to the door junction box will be provided by the Owner and installed by the contractor. The cable shall be a “composite construction” with spiral wrap and include a CAT6 cable for PoE IP camera support.

3. All cable from the door junction box to the individual devices shall be provided and installed by the Access Control Contractor.

4. Wiring shall be grouped and harnessed to facilitate access to all equipment, as well as maintenance and replacement of equipment.

5. All cable shall be labeled at origin and termination, referencing to a master legend schedule shown on submittal drawings. Labeling shall be noted on submittal drawings and Record Drawings.

6. Cabling shall be sized and installed according to National Electric Code requirements and meet industry standards for CAT6 data infrastructure.

7. Any cabling or raceway exposed to weather shall be rated for that use.

C. CCTV Cameras.
1. Stanford-ITS shall pre-approve all Closed Circuit Television (CCTV) systems. The CCTV systems shall be IP Network Camera Systems. Cameras will be Fixed or Pan-Tilt-Zoom (PTZ) as specified on the drawings.

2. Camera mounts and housings shall be as shown on the Drawings. Provide proper backing at all locations.

3. Secure all cameras and housings as appropriate to structural requirements and construction conditions. Utilize tamperproof-mounting hardware.

4. Camera housings installed in ceilings shall have attachments to building structure independent of ceiling, fire sprinkler, conduit, or other system supports.

5. Cameras installed at outdoor locations shall have proper weather proofing with fans and heaters (where required).

6. Contractor shall replace or adjust lenses at no cost to Owner if necessary to obtain proper field of view.

7. Provide various focal lengths with auto iris lenses where required.

8. Provide color corrected lens with glass optics.

9. Coordinate the installation of cameras with Stanford for desired views.

10. Cameras shall support both MPEG4 and JPEG video formats.

PART 9 - EXECUTION

9.1 REQUIREMENTS

A. Refer to Section 17920.101, Part 3, for requirements regarding Record Drawings, Training, Tests and Reports, and Warranty

B. The SU I&M Group to provide network connectivity of the ACES CCTV unit (Telecommunications Room to the SU network).

C. The Access Control Contractor will coordinate full functionality testing of the ACES CCTV unit with the SU-ITS I&M Group to ensure ACES network operability.

D. Software labels shall be consistent between various integrated systems, including ACES Access Control, CCTV Camera System and Entry Telephone Units.

E. Provide training to the owner for the equipment furnished under this Section, including programming, operation, service, and maintenance.

PART 10 - GENERAL

10.1 DIVISION INCLUDES

A. Work Included in this Section: Installation, and tests in conformity with applicable Codes and authorities having jurisdiction for the following:

1. Access Control Contractor to furnish and install specified ACES Entry Telephone Units (VoIP) at designated locations as specified in the Drawings.
2. Stanford will specify the Entry Telephone Unit (VoIP) to be furnished and installed by the Access Control Contractor.

10.2 RELATED DIVISIONS

A. The following is a list of related FDG 17920 documents that shall be referenced by the Security Contractor. These related FDG 17920 Division documents provide a detailed description of the Security Contractor’s requirements and specifications at the ACES component level:
   □ Division 17920.100: Access Control Enterprise System (ACES) – Card Access
   □ FDG Drawings CM-100 through CM-118.1

B. Wire and cable installations performed under this Division shall comply with the requirements of Division 16.

PART 11 - PRODUCTS

11.1 ENTRY TELEPHONE SYSTEMS

A. System Specifications
   1. Stanford-ITS shall pre-approve the ACES Entry Telephone Unit (VoIP). The ACES Entry Telephone Unit shall be installed as specified on the drawings.
   2. The ACES Entry Telephone Unit shall be IP network capable (VoIP).
   3. When and where specified, the Access Control Contractor to provide and install a Stanford ITS approved power-over-ethernet IP network switch, in the security junction box at the door, to support IP networked communication edge devices, i.e. camera, entry telephone, etc.
   4. When and where specified, the Access Control Contractor to provide and install a Stanford ITS approved 12VDC to 48VDC power convertor, in the security junction box at the door, to power the power-over-ethernet network switch.

B. Wire and Cable
   1. A CAT6 4-pair cable will be furnished and installed by the Access Control Contractor from a port on the specified power over ethernet switch, located in the door security junction box, to the Entry Telephone Unit (VoIP), to provide network connectivity.
   2. A 22/4 conductor cable will be furnished and installed by the Access Control Contractor from the door security junction box provide to the Entry Telephone Unit to provide provide lock hardware interface to the ACES.

PART 12 - EXECUTION

12.1 REQUIREMENTS

A. Refer to Section 17920.101, Part 3, for requirements regarding Record Drawings, Training, Tests and Reports, and Warranty
B. All telephone entry device programming will be provided by Stanford prior to installation by the Access Control Contractor. Each unit will be assigned to a specific door location and the contractor will verify the operation of the unit after installation by testing a pre-programmed test number

1. A valid request to unlock signal to the entry unit from the tenant will activate the entry phone door unlock relay. An input on the access control system at the control panel will connect through the entry phone output and be linked in software to the electric lock activation relay

2. The access control application provide an audit trail whenever the door is release through the telephone entry system. An event will link the valid entry with the video camera associated with the entry phone unit. The Owner will provide programming parameters for this event linking.

C. Substantial completion testing and final commissioning will be required on each of the phone units and will require all lock hardware connection and activation.

D. The SU I&M Group to provide network connectivity of the entry telephone unit (Telecommunications Room to the VoIP network).

E. The Access Control Contractor will coordinate full functionality testing of the ACES entry telephone unit with the SU I&M Group to ensure ACES and VoIP operability.

F. Software labels shall be consistent between various integrated systems, including ACES Access Control, CCTV Camera System and Entry Telephone Units.

G. Provide training to the owner for the equipment furnished under this Section, including programming, operation, service, and maintenance.