ADDENDUM

Public Building Commission of Chicago | Richard J. Daley Center | 50 West Washington Street, Room 200 | Chicago, Illinois 60602 | (312) 744-3090 | pbcchicago.com

ADDENDUM NO.: 02

PROJECT NAME: Columbia Explorers Elementary Academy Modular

PROJECT NO.: 19130

CONTRACT NO.: C1592

DATE OF ISSUE: February 2, 2018

NOTICE OF CHANGES, MODIFICATIONS, OR CLARIFICATIONS TO CONTRACT DOCUMENTS

The following changes, modifications, or clarifications are hereby incorporated and made an integral part of the Contract Documents. Unless clearly expressed otherwise by this Addendum, all terms and conditions defined in the original Contract Documents shall continue in full force and effect and shall have the same meaning in this Addendum. Issued Addenda represent responses/clarifications to various inquiries. Contractors shall be responsible for including all associated labor/material costs in its bid. Drawings/specifications corresponding to inquiry responses will be issued with the Issue for Construction Documents, upon issuance of building permit.

ITEM NO. 1: CHANGE TO KEY DATES
None.

ITEM NO. 2: REVISIONS TO BOOK 1 – PBC INSTRUCTIONS TO BIDDERS
None.

ITEM NO. 3: REVISIONS TO BOOK 2 – PBC STANDARD TERMS AND CONDITIONS
None.

ITEM NO. 4: REVISIONS TO BOOK 3 – TECHNICAL SPECIFICATIONS

Change 1 Book 3 – Volume 1 – REVISED – Spec Section 28 31 00 – Fire Detection and Alarm: Edited section 1.1 (scope). Edited section 2.2; Edited section 2.3; Deleted Section 2.9; Edited section 2.12; Deleted Section 2.14; Edited section 3.1, B; Deleted section 3.1,H; Deleted Section 3.3,G. Edited section 3.8.

ITEM NO. 5: REVISIONS TO DRAWINGS

Change 1 REVISED Drawing E00: Added Fire Alarm Symbols for Smoke Detector, Trouble Bell, and Test & Silence Switch With Lamp.

Change 2 REVSISED Drawing E01: Noted the Combination Meter & CT Cabinet per ComEd and City of Chicago requirements. Revised Note #10 under Keynotes to clarify the Fire Alarm System and trouble bell. Added Smoke Detector in Modular Electrical Closet.

Change 3 REVISED Drawing E03: Added the trouble bell location in the Main Office. Removed any connectivity at Engineer's Office to Existing Fire Alarm Control Panel. Revised Note #3 under Keynotes pertaining to the Fire Alarm and trouble bell. Added Keynote #15 for the trouble bell.

ITEM NO. 6: REQUESTS FOR INFORMATION

RFI-1.

Question: Drawing E01 Note 10

Will the fire alarm system for the new modular be a stand alone system, connected however to the security system interface to central security office? Will the fire alarm system have trouble and alarm bells in the engineer's office and/or the principal's office with a silence switch?

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Response: Per Drawing E01, Note 10, a stand alone Fire Alarm Panel (FAP) shall be provided in the modular building. It will not be tied into the FAP in the existing school building. Its signal shall be monitored by the Intrusion Detection System Control Panel located in the Administration offices of the existing school. The FAP will not initiate an alarm to the City System or to a third party monitor. A trouble bell with silence test switch and indicator light shall be provided in the Main office. This bell shall be wire-connected into the modular building FAP to initiate a local alarm/trouble signal within the existing school. Please refer to the revised Addendum Specification Section 28 31 00 for additional information.

RFI-2.

Question: Can we get a specifications and manufacturers for the Corrugated metal panels and the Prefabricated Curved Metal Canopies. Theses items are not being supplied by the Modular Manufacturer.

Response: The Corrugated metal panels and the Prefabricated Curved Metal Awning are provided by the Modular Manufacturer. Please refer to Specification Section 13 12 40, of the Contract Documents.

List of Attachments and Drawings:

This Addendum includes the following attached Specifications and/or Documents:

1. Section 28 31 00 – Fire Detection and Alarm

This Addendum includes the following attached Drawings:

1. E00 Electrical Symbols, Abbreviations, and Notes, dated 01/29/18
2. E01 New 6-Classroom Modular Power Plan, dated 01/29/18
3. E03 First Floor Power Plan – Main Building, dated 01/29/18

END OF ADDENDUM NO. 02

SECTION 28 31 00

FIRE DETECTION AND ALARM

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes a Class 1, zoned, noncoded, UL-certified, microprocessor-based, addressable system, with multiplexed signal transmission, dedicated to fire-alarm service only.

1. NOT USED
2. Scope – Addition: ~~Replace existing fire alarm system headend equipment and~~ Provide new fire alarm **system and** devices as indicated on the Drawings. Provide fire alarm device layout as required by City of Chicago Fire Prevention Bureau and Mayor's Office of People with Disabilities.
3. NOT USED

B. Supervisory sprinkler and smoke duct detector systems shall be of the addressable type and shall be separately identified at the panel and the annunciator panel.

C. Complete and operational fire alarm system will consist of the following:

1. Fire-alarm control panel.
2. Manual fire-alarm boxes.
3. Smoke detectors.
4. Notification appliances.
5. Backlit remote annunciator.
6. Addressable interface device.
7. Sprinkler valve supervisory system, control panel and annunciator.
8. Trouble bell stations.
9. Data Gathering Panels
10. Power Supplies/Battery System

1.2 DEFINITIONS

A. Definitions in NFPA 72 apply to fire-alarm terms used in this Section.

B. FCP: Fire alarm control panel.

C. Addressable Analog System: Utilizing a signaling method characterized by the simultaneous or sequential transmission, or both, and the reception of multiple signals in a communication channel, including means for positively identifying each signal.

D. FAA: Fire alarm annunciator panel.

E. FCP: Fire alarm control panel.

F. NAC: Notification appliances circuit.

G. IAC: Initiating appliances circuit.

H. SSA: Sprinkler supervisory system annunciator.

I. SSCP: Sprinkler supervisory system control panel.

J. SLC: Signaling line circuit.

K. CBT - City fire alarm box tie and disconnect panel.

L. LED: Light-emitting diode.

M. NICET: National Institute for Certification in Engineering Technologies.

N. Pathway Class Designations.

1. Pathways shall be designated as Class A, Class B, Class C, Class D, Class E, or Class X, depending on their performance.

O. Signaling Line Circuit – Addressable Loop

1. Class A. A pathway shall be designated as Class A when it performs as follows:

a. It includes a redundant path.
b. Operational capability continues past a single open.
c. Conditions that affect the intended operation of the path are annunciated.
d. Isolator module located every 15 devices.

P. Notification Appliance Circuits, and Initiating Device Circuits

1. Class B. A pathway shall be designated as Class B when it performs as follows:

a. It does not include a redundant path.
b. Operational capability stops at a single open.
c. Conditions that affect the intended operation of the path are annunciated.

Q. WLAN, LAN, Internet Wireless or POTS

1. Class C. A pathway shall be designated as Class C when it performs as follows:

a. It includes one or more pathways where operational capability is verified via end-to-end communication, but the integrity of individual paths is not monitored.
b. A loss of end-to-end communication is annunciated.

R. NOT USED

S. Unsupervised Circuits

1. Class E. A pathway shall be designated as Class E when it is not monitored for integrity.

T. Panel to Panel to Annunicator (SLC old Class A, Style 7)

1. Class X. A pathway shall be designated as Class X when it performs as follows:

   a. It includes a redundant path.
   b. Operational capability continues past a single open or short-circuit.
   c. Conditions that affect the intended operation of the path are annunciated.

1.3 SUBMITTALS

A. General Submittal Requirements:

1. All submittals shall be approved by the City of Chicago Bureau of Fire Prevention and Bureau of Electrical Inspection prior to the beginning of any work.
2. Shop Drawings shall be prepared by persons with the following qualifications:

   a. Trained and certified by manufacturer in fire-alarm system design.
   b. NICET-certified fire-alarm technician, Level III minimum.

B. Submission to the City of Chicago Bureau of Fire Prevention and Bureau of Electrical Inspection:

1. Submit detailed drawings in accordance with the BFP's procedures and requirements for the fire alarm plan review.
2. Provide identical submittal to the Architect for concurrent review.
3. Upon receipt of the comments from BFP, submit a copy of all the annotated drawings or correction sheets to the Architect.
4. Incorporate all comments into the detailed drawings and resubmit to the BFP until approval is obtained.

C. Product Data: For each type of product indicated. Provide manufacturers product data sheets, showing the types and models and manufacturer's installation/instruction of all equipment, devices and wire/cable proposed. Evidence of FM & ULI Listings and local approvals shall be submitted with the data sheets. Catalog numbers alone are not acceptable. Each document shall be highlighted indicating the model proposed, specific data, and cross out items that are not applicable for the work.

D. Shop Drawings: For fire-alarm system. Include plans, elevations, sections, details, and attachments to other work.

1. Comply with the requirements of the City of Chicago Bureau of Fire Prevention and recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72.
2. Include voltage drop calculations for notification appliance circuits. Provide circuit calculations that include all system requirements including any requirements for notification appliance circuits, or any other auxiliary function powered by the system. All notification appliance circuit(s) shall be sized with 10% voltage drop at 24 volts.
3. Include battery-size calculations. Battery calculations shall list the type of devices and modules, quantities, unit and extended amperage draw for quiescent and alarm conditions, total amperage draw and battery amp/hour rating. For design criteria, the

battery amp/hour rating listed by the manufacturer shall be de-rated by 20%. Include all system requirements including any requirements for visual signaling appliances, or any other auxiliary function powered by the system.

4. Include system operation description: Detailed description for this Project, including method of operation and supervision of each type of circuit and sequence of operations for manually and automatically initiated system inputs and outputs. Manufacturer's standard descriptions for generic systems are not acceptable.
5. Include system riser diagram with device addresses, conduit sizes, cable and wire type and sizes.
6. Include wiring diagrams: power, signal and control wiring. Include diagrams for equipment and for system with all terminals and connections identified. Show wiring color code.
7. Include performance parameters and installation details for each detector, verifying that each detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
8. Include device address list: Coordinate with final system programming.
9. Point List: Provide complete zone list each initiating zone (device address), annunciator zone, custom message descriptor, notification appliance circuits, auxiliary function circuit, and the specific device associated with each function or zone. Descriptors shall be based on Room Signage Numbers.
10. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits.
11. Submit electronic copy of drawings, on CD or DVD, to Architect.

E. Qualification Data: For Installer.

F. Field Test Reports: Submit test reports documenting the activities and procedures specified. Submit reports within two weeks of completion of start-up procedures.

G. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," deliver copies to the Board Authorized Representative, Architect and to the City of Chicago Bureau of Fire Prevention and Bureau of Electrical Inspection. Provide six (6) copies of materials, both hardcopy and electronic, in format required by Board Authorized Representative. Include the following:

1. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72 and City of Chicago Bureau of Fire Prevention requirements.
2. Provide "Record of Completion Documents" according to City of Chicago Bureau of Fire Prevention and NFPA 72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.
3. Provide "Maintenance, Inspection and Testing Records" according to City of Chicago Bureau of Fire Prevention and NFPA 72 article of the same name and include the following:
4. Frequency of testing of installed components.
5. Frequency of inspection of installed components.
6. Requirements and recommendations related to results of maintenance.
7. Manufacturer's user training manuals.
8. Manufacturer's required maintenance related to system warranty requirements.

9. Provide spare parts data. Provide the name, addresses, and telephone numbers of service organizations that carry stock of repair parts for the system to be furnished.
10. Abbreviated operating instructions for mounting at fire-alarm control unit.

H. Training Reports: Submit reports on training documenting topic covered, dates and attendance.

I. Software and Firmware Operational Documentation:

1. Software operating and upgrade manuals.
2. Program Software Backup: Complete with data files, in format required by Board Authorized Representative.
3. Device address list.
4. Printout of software program.

1.4 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installation shall be by personnel certified by NICET as fire-alarm Level III technician.
2. As a precondition to the contract, the Installer shall be regularly engaged in the design, servicing, installation and testing of fire detection and alarm notification systems, shall have at least five years of experience in the installation of fire detection and alarm notification systems.
3. Shop Drawings shall be prepared by persons with the following qualifications:
4. Trained and certified by manufacturer in fire-alarm system design.
5. NICET-certified fire-alarm technician, Level III minimum.

B. Source Limitations for Fire-Alarm System and Components: New fire alarm components shall be compatible with, and operate as an extension of, the existing system.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in the Chicago Electrical Code, and marked for intended location and application.

D. Comply with City of Chicago Building Code.

E. Comply with NFPA 72, current Edition.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver fire alarm system components and devices in original factory shipping cartons, with original labels intact.

B. Handle fire alarm system components and devices in accordance with manufacturer's written instructions, to avoid damage.

C. Store fire alarm system components and devices indoors in clean, dry space with uniform temperature to prevent condensation. Protect fire alarm system components and devices from exposure to dirt, fumes, water, corrosive substances, and physical damage.

D. Install temporary plastic covers on smoke detectors. Remove covers immediately before final system testing.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Fire-Alarm Service: Do not interrupt fire-alarm service to facilities occupied by Owner unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:

1. Notify Architect and Board's Authorized Representative no fewer than ten working days in advance of proposed interruption of fire-alarm service.
2. Do not proceed with interruption of fire-alarm service without Architect's and Board Authorized Representative's written permission.
3. Guard service shall be provided for 24 hours each day for the duration of the fire alarm system interruption. Fire watch personnel shall make rounds on hourly intervals.

1.7 SEQUENCING AND SCHEDULING

A. Existing Fire-Alarm Equipment: Maintain existing equipment fully operational. ~~until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service and label existing fire-alarm equipment "NOT IN SERVICE" until removed from the building.~~

B. NOT USED

1.8 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Lamps for Annunciator Unit: Quantity equal to 10 percent of amount installed, but no fewer than 1 unit.
2. Smoke Detectors, Heat Detectors: Quantity equal to 10 percent of amount of each type installed, but no fewer than 1 unit of each type.
3. Detector Bases: Quantity equal to 5 percent of amount of each type installed, but no fewer than 1 unit of each type.
4. Keys and Tools: Two extra sets for access to locked and tamper-proof components.
5. Audible and Visual Notification Appliances: Quantity equal to 5 percent of each type installed, but no fewer than 1 unit of each type.

1.9 MAINTENANCE SERVICE

A. Maintenance Service Contract: Provide maintenance of fire alarm systems and equipment for a period of 12 months commencing with Preliminary Acceptance/Substantial Completion, using factory-authorized service representatives.

1. Basic services: Respond to service calls within 24 hours of notification of system trouble. Adjust and replace defective parts and components with original manufacturer's replacement parts, components, and supplies.

2. Additional Services: Perform services within the above 12-month period not classified as routine maintenance or as warranty work when authorized in writing. Compensation for additional services must be agreed upon in writing prior to performing services. Provide in the 11 month of the 12 months commencing with Substantial Completion a Test, Inspect and Report of the fire alarm system. Renewal of Maintenance Service Contract: No later than 60 days prior to the expiration of the 1 Year System Warranty contract, deliver to the Board a proposal to provide contract maintenance and repair services for an additional two-year term which includes labor rates for Year 2 and 3 of Warranty Period. The Board will be under no obligation to accept maintenance service contract renewal proposal.
3. Software Service Agreement:
4. Comply with UL 864.
5. Technical Support: Beginning with Preliminary Acceptance/Substantial Completion, provide software support for one year.
6. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within one year from date of Substantial Completion.
7. Provide 30 days notice to Owner to allow scheduling and access to system.

1.10 WARRANTY

A. Warranty all materials, installation and workmanship for three (3) years from date of acceptance, unless otherwise specified. Provide a copy of the manufacturers' warranty with closeout documentation the operation and installation manuals as required in Division 01 Sections “Closeout Procedures” and “Operation and Maintenance Data”.

B. The System Supplier shall maintain a service organization with adequate spare parts stock within 50 miles of the installation. Any defects that render the system inoperative shall be repaired within 24 hours of the Owner notifying the contractor.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Edwards Systems Technology, EST, A UTC Fire & Security Company.

2.2 SYSTEMS OPERATIONAL DESCRIPTION

A. Class I system fire-alarm signal initiation shall be by one or more of the following devices:

1. Manual stations.
2. Heat detectors.
3. Smoke detectors.
4. Automatic sprinkler system water flow.
5. NOT USED

B. Fire-alarm signal shall initiate in the general alarm condition the following actions or sequence of operations:

1. Continuously operate alarm notification appliances.
2. Identify alarm at fire-alarm control unit and local remote annunciator.
3. NOT USED
4. Unlock electric door locks in designated egress paths.
5. Release fire and smoke doors held open by magnetic door holders.
6. Transmit signal to the Building Automation System to switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
7. NOT USED
8. **Transmit signal to intrusion detection system for monitoring alarm and trouble signals.**
9. Record events in the system memory.

C. General alarm initiation on SSCP and SSA shall be by the following conditions:

1. NOT USED
2. Flow Switch activation.

D. Supervisory signal initiation on SSCP shall be by one or more of the following devices and actions:

1. Valve supervisory switch.
2. NOT USED

E. Supervisory signal initiation on SSCP shall initiate the following actions:

1. Initiate supervisory audible and visible signal indication on SSCP and SSA.

F. System trouble signal initiation shall be by one or more of the following devices and actions:

1. Open circuits, shorts, and grounds in designated circuits.
2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
3. Loss of primary power at fire-alarm control unit.
4. Ground or a single break in fire-alarm control unit internal circuits.
5. Abnormal ac voltage at fire-alarm control unit.
6. Break in standby battery circuitry.
7. Failure of battery charging.
8. Abnormal position of any switch at fire-alarm control unit or annunciator.
9. System Trouble Signal Actions: Initiate notification appliance and annunciate at FCP, or SSCP and respective local remote annunciators.

G. Priority of Signals: Automatic response functions shall be accomplished by the first zone initiated. Alarm functions resulting from initiation by the first zone shall not be altered by subsequent alarms. An alarm signal shall be the highest priority. Supervisory or trouble signals shall have second- and third-level priority. Signals of a higher level priority shall take precedence over signals of lower priority even though the lower priority condition occurred first. Annunciate all alarm signals regardless of priority or order received.

H. Noninterfering: Provide zoned, powered, wired, and supervised system so a signal on one zone does not prevent the receipt of signals from any other zone. All zones shall be manually resettable from the FCP after the initiating device or devices have been restored to normal. Systems that require the use of batteries or battery backup for the programming function are not acceptable.

I. Silencing at control panel: Switches shall provide capability for acknowledgment of alarm; supervisory, trouble, and other specified signals at the FCP or SSCP; and capability to silence the local audible signal and light an LED (light emitting diode). Subsequent zone alarms shall cause the audible signal to sound again until silenced in turn by switch operation. Restoration to normal of alarm, supervisory, and trouble conditions shall extinguish the associated LED and cause the audible signal to sound again until the restoration is acknowledged by switch operation.

J. The system shall have spare installed capacity enabling it to support a twenty percent (20%) increase in initiating, control and indicating device circuits. Spare circuit capacity shall be evenly distributed throughout the system.

K. Annunciators shall have an additional fifty percent (50%) spare spaces available for future building additions.

2.3 FIRE-ALARM CONTROL UNITS (FCP AND SSCP)

A. General Requirements for Fire-Alarm Control Unit:

1. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864 and listed and labeled by an NRTL.
2. System software and programs shall be held in flash electrically erasable programmable read-only memory (EEPROM), retaining the information through failure of primary and secondary power supplies.
3. Include a real-time clock for time annotation of events on the event recorder and printer.
4. Addressable initiation devices that communicate device identity and status.
5. Smoke sensors shall additionally communicate sensitivity setting.
6. Temperature sensors shall additionally test for and communicate the sensitivity range of the device.

B. Cabinet: Lockable steel enclosure. Arrange panel so all operations required for testing or for normal care and maintenance of the system are performed from the front of the enclosure. If more than a single unit is required to form a complete control panel, provide exactly matching modular unit enclosures. Provide cabinets large enough to accommodate all components and to allow ample gutter space for interconnection of panels as well as field wiring. Identify each enclosure and each component by an engraved red laminated phenolic resin nameplate. Lettering on the enclosure nameplate shall not be less than 1 inch high. Identify individual components and modules within the cabinets by engraved laminated phenolic resin nameplates.

C. Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.

1. Annunciator and Display: Liquid-crystal type, 2 line(s) of 80 characters, minimum.
2. Keypad: Arranged to permit entry and execution of programming, display, and control commands.

D. Circuits:

1. Initiating Device, and Signaling Line Circuits: NFPA 72 2010.
2. Initiating Device Circuits: Class B.
3. Addressable Loop Signaling Line Circuits: Class A.
4. Provide isolator module every 15 devices.
5. Signaling Line Circuit (Network Data, Panels and Annunciators): Class X.
6. Notification Appliance: Circuits: NFPA 72, Class B.
7. NOT USED

E. Notification Appliance Circuit: Operation pattern shall be as directed by the City of Chicago Bureau of Fire Prevention and Fire Department.

F. NOT USED

G. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to ~~City Fire Department via City Tie Fire Alarm Box using direct wire connection.~~**CPS intrusion detection system control panel.**

H. Primary Power: 24-V dc obtained from 120-V ac service that is to be connected to the building source of the emergency power and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals and supervisory signals shall be powered by 24-V dc source.

1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.

I. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.

J. Automatic transfer switch: Transfer the load to the battery without loss of signals or status indications in the event of failure of primary power.

K. Batteries: System control equipment shall receive secondary operating power from batteries integral to the equipment. Power Supply for Supervision Equipment: Supply for audible and visual equipment for supervision of the ac power shall be from a dedicated dc power supply, and power for the dc component shall be from the ac supply. Provide sufficient capacity to operate the complete system in normal or supervisory (nonalarm) mode for a period of 24 hours. Following this period of operation on battery power, the batteries shall have sufficient capacity to operate all components of the system, including all alarm indicating devices in alarm or supervisory mode for a period of 15 minutes.

L. Battery Charger: Solid state, fully automatic, variable charging rate type. Provide for 150 percent of the connected system load while maintaining the batteries at full charge. In the event batteries are fully discharged the charger shall recharge them fully within four hours. Charger output shall be supervised as part of system power supply supervision.

M. Surge Protection:

1. Install surge protectors recommended by control panel manufacturer. Install on all system wiring external to the building housing the control panel.

N. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

O. Systems: Alarm and supervisory systems in FCP/SSCP shall be completely separate and independent. The alarm initiating zone boards in the FCP/SSCP shall consist of plug-in cards. Construction requiring removal of field wiring for module removal is not acceptable.

P. Control Modules: Types and capacities to perform all functions of the fire alarm system. Provide local, visible, and audible signals to notify of any alarm, supervisory, and trouble condition. Provide each type of audible alarm with a distinctly different sound.

Q. Indicating Lights: Provide individual alarm and trouble LED for each zone. Provide a System LED test switch for each FCP/SSCP section that will illuminate all LED devices on that section of the control panel. Alarm and supervisory signals shall light a red LED of the associated zone. Trouble signals shall light an amber LED for the associated zone.

R. Smoke/Fire Zones

1. Each floor shall be group zoned by building according to the fire partition construction with further breakdown as to the device type.
2. Additional zones shall be dedicated to:

   a. Each electrical equipment room.
   b. Each mechanical/pump room.
   c. Each telephone/data room.

2.4 MANUAL FIRE-ALARM BOXES

A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be metallic finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.

1. Double-action mechanism requiring two actions to initiate an alarm, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
2. Approved by the City of Chicago Bureau of Fire Prevention.
3. Stations requiring the breaking of the glass panel are not acceptable.
4. Station Reset: Resetting the manual fire alarm stations after operation shall require the use of a key. Manual stations which use a screwdriver or allen wrench for reset are not acceptable. Keyed the same as FCP/SSCP.

5. Indoor Protective Shield: Factory-fabricated clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm. Lifting the cover actuates an integral battery-powered audible horn intended to discourage false-alarm operation.

2.5 SYSTEM SMOKE DETECTORS

A. Requirements for Analog Addressable System Smoke Detectors:

1. Comply with UL 268; operating at 24-V dc, nominal.
2. Intelligent Addressable Analog Type: Designed to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
3. Multipurpose type, containing the following:

   a. Integrated Addressable Module: Arranged to communicate detector status (normal, alarm, dirty, trouble or maintenance) to the FCP.
   b. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
   c. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
   d. Integral Visual-Indicating Light: Blinking LED type indicating detector is communicating properly and turn RED in alarm.

4. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
5. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:

   a. Primary status.
   b. Device type.
   c. Present average value.
   d. Present sensitivity selected.
   e. Sensor range (normal, dirty, etc.).

2.6 HEAT DETECTORS

A. General Requirements for Analog Addressable Heat Detectors: Comply with UL 521.

B. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F or a rate of rise per minute. Fixed temperature sensing shall be independent from rate-of rise sensing.

1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
2. Integrated Addressable Heat Detector: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
3. Provide devices in ordinary ambient temperature rooms.

C. Heat Detector, Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature of 190 deg F.

1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
2. Integrated Addressable Heat Detector: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
3. Provide devices in high ambient temperature rooms.

2.7 NOTIFICATION APPLIANCES

A. General Requirements for Notification Appliances: Connected to notification appliance signal circuits, zoned as indicated, equipped for mounting as indicated and with screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated and with screw terminals for system connections.

B. Trouble Bells: Electric-vibrating, 24-V dc, under-dome type; with provision for housing the operating mechanism behind the bell. Bells shall produce a sound-pressure level of 94 dBA, measured 10 feet from the bell. 4-inch size, unless otherwise indicated. Bells are weatherproof where indicated.

C. Audible Alarm-Indicating Devices (Horns): Comply with UL 464; factory finish: red. Devices shall be constructed for safe use in boiler rooms, kitchens and exterior locations without impairing the quality of tone reproduction in ambient conditions ranging from 30 degrees Fahrenheit to 150 degrees Fahrenheit. Horns shall be sound level setting of 92dB at 10 feet using the coded signal prescribed in UL 464 Test Protocol. Horn shall mount to surface or flush box. When flush mounted, the Horn shall extend less than one inch from the wall.

1. Horns shall be field configurable for continuous, temporal, or march time pattern.
2. In temporal or march time mode horn operation shall be synchronized.

D. Visible Notification Appliances: Xenon strobe lights comply with UL 1971, with clear or nominal white polycarbonate lens. The word "FIRE" is engraved in minimum 1-inch- high letters on the lens.

1. Rated Light Output: 15/30/75/110 cd, selectable in the field.
2. Mounting: Wall mounted unless otherwise indicated.
3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
4. Flashing shall be synchronized with other units in common viewing areas per ADA and NFPA 72. Provide properly sized outlet box to accommodate synchronizing device on strobe circuit.
5. Strobe Leads: Factory connected to screw terminals.
6. Mounting Faceplate: Factory finished, red.

2.8 NAC POWER SUPPLY:

A. The NAC power supply shall be independent unit that will provide power to visual strobe notification appliances. It shall be possible to configure NAC power supply activated from intelligent synchronized modules. The power supply NAC’s must be configurable to operate independently at any one of the following rates: continuous synchronized, or 3-3-3 temporal.

Fault conditions on the power supply shall not impede alarm activation of host NAC circuits or other power supplies. The NAC power supply must be able to provide concurrent power for notification devices, security devices, access control equipment and auxiliary devices such as door holders. . All the NAC Power Supplies shall be synchronized. The power supply shall support up to 24 amp hour batteries.

1. Power supply shall be minimum of 8 amps and UL 864 Listed.
2. Four independent 2 amp NAC circuits. Each being configurable as auxiliary power.
3. All circuits shall be synchronized.

2.9 NOT USED

2.10 WATERFLOW SWITCHES AND AIR PRESSURE SWITCHES

A. Provided and installed by Division 22, wired by Division 26.

2.11 SPRINKLER VALVE TAMPER SWITCHES

A. Provided and installed by Division 22, wired by Division 26.

2.12 REMOTE ANNUNCIATORS: FAA, SSA.

A. Provide ~~separate~~ annunciators for FAA and SSA. ~~as required and approved by the Chicago Bureau of Fire Prevention.~~

B. Description: Annunciator functions shall match those of fire-alarm control units (FCP and SSCP) for alarm, supervisory, and trouble indications.

C. NOT USED

D. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide status indication with separate annunciation for each zone. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.

2.13 ADDRESSABLE INTERFACE DEVICE

A. Description: Microelectronic monitor module, NRTL listed for use in providing a system address for alarm-initiating devices for wired applications with normally open contacts.

B. Integral Relay: Capable of providing a direct signal to elevator controller to initiate elevator recall or to interface with BAS system.

C. Three supervised relays shall be provided for each elevator controller to activate for primary recall, alternate recall and fire hat indicator in the car.

2.14 NOT USED

2.15 DEVICE WIRE GUARDS

A. Description: Welded wire mesh of size and shape for the notification device, smoke detector, or other device requiring protection.

1. Factory fabricated and furnished by manufacturer of device.
2. Finish: Paint of color to match the protected device.

2.16 WIRE AND CABLE

A. Wire and cable for fire alarm systems shall be UL listed and labeled as complying with CCBC, Article 760.

B. Signaling Line Circuits: Twisted, shielded pair, or solid copper conductor, not less than No. 14 AWG, or size as recommended by system manufacturer.

C. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.

1. Low-Voltage Circuits: No. 14 AWG, minimum.
2. Line-Voltage Circuits: No. 12 AWG, minimum.

2.17 SPARE CAPACITY

A. Provide twenty percent (20%) spare capacity in all panels, annunciators, on every SLC and NAC for future expansion.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

A. Comply with Chicago Building Code and NFPA 72 for installation of fire-alarm equipment.

B. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.

1. NOT USED
~~2.~~ Connect new equipment to existing intrusion detection system monitoring ~~equipment at the supervising station.~~
3. ~~Expand, modify, and supplement existing [control] [monitoring] equipment as necessary to extend existing [control] [monitoring] functions to the new points.~~ New components shall be capable of merging with existing configuration without degrading the performance of either system.

C. Smoke- or Heat-Detector Spacing:

1. Comply with NFPA 72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing.
2. Comply with NFPA 72, “Heat-Sensing Fire Detectors” Section in the “Initiating Devices” Chapter, for heat-detector spacing.
3. Smooth ceiling spacing shall not exceed 30 feet.
4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Appendix B in NFPA 72.
5. HVAC: Locate detectors not closer than 3 feet from air-supply diffuser or return-air opening.
6. Lighting Fixtures: Locate detectors not closer than 12 inches from any part of a lighting fixture.

D. Remote Status and Alarm Indicators: Install near each sprinkler water-flow switch and valve-tamper switch that is not readily visible from normal viewing position.

E. Audible Alarm-Indicating Devices: Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille, at height indicated in the Drawings.

F. Visible Alarm-Indicating Devices: Install at height indicated in the Drawings.

G. Device Location-Indicating Lights: Locate in public space near the device they monitor.

H. NOT USED

I. FAA/SSA: Install with top of panel not more than 72 inches above the finished floor.

3.2 CONNECTIONS

A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Division 08 Section "Door Hardware." Connect hardware and devices to fire-alarm system.

1. Verify that hardware and devices are NRTL listed for use with fire-alarm system in this Section before making connections.

B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 3 feet from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.

1. Supervisory connections at valve supervisory switches.

C. System Trouble Bell: Furnish and install, where shown the drawings, a semi-flush mounted, 6-inch diameter, red trouble bell. Immediately adjacent to each trouble bell location, install a sign with a red background and 1/2-inch black lettering engraved as follows: “FCP (or SSCP or DSCP) TROUBLE BELL”.

D. Immediately adjacent to each trouble bell location, provide a trouble bell silence switch mounted on a single gang plate with the following features: A switch to silence the bell, a red light to indicate when the bell is silenced, and a momentary switch to test the trouble bell.

3.3 WIRING INSTALLATION

A. Install wiring according to the following:

1. City of Chicago Building Code
2. NECA 1.

B. Wiring Method: Install wiring in metal raceway according to Division 26 Section "Raceways and Boxes for Electrical Systems."

1. Fire alarm circuits and equipment control wiring associated with the fire alarm system shall be installed in a dedicated raceway system. This system shall not be used for any other wire or cable.

C. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

D. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

E. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and a different color-code for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red. Identify the accessible raceway with color-coded, self-adhesive red vinyl tape applied in bands.

F. SLC Risers: Install at least two vertical cable risers to serve the fire alarm system or as required by Fire Prevention Bureau. Separate risers in close proximity to each other with a minimum **[1] [2]** -hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signals from other floors or zones.

G. NOT USED

H. Install separate and completely independent conduits for fire alarm and sprinkler supervisory systems.

3.4 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

B. Install framed instructions in a location visible from fire-alarm control unit.

3.5 GROUNDING

A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

3.6 CLEANING

A. On completion of installation, vacuum dirt and debris from interiors; do not use compressed air to assist in cleaning.

B. Inspect exposed surfaces and repair damaged finishes to match original factory finishes.

C. Prior to the acceptance testing, remove plastic covers from smoke detectors.

3.7 CONTRACTOR START UP AND REPORTING

A. Field tests shall be witnessed by Owner Representative, City of Chicago Bureau of Electrical Inspections and City of Chicago Bureau of Fire Prevention.

B. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Tests and Inspections:

1. Before requesting final approval of the installation, submit a written statement using the form for Record of Completion shown in NFPA 72 and as required by the City of Chicago Bureau of Fire Prevention.
2. Perform each electrical test and visual and mechanical inspection listed in NFPA 72 and as required by the City of Chicago Bureau of Fire Prevention.
3. Certify compliance with test parameters. All tests shall be conducted under the direct supervision of a NICET technician certified under the Fire Alarm Systems program at Level III.
4. Include the existing system in tests and inspections.
5. Visual Inspection: Conduct visual inspection prior to testing.
6. Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA 72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter and as required by the City of Chicago Bureau of Fire Prevention.

    a. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.

7. Pretesting:

    a. Upon completing installation of the system, align, adjust, and balance the system and perform complete pretesting.

b. Determine, through pretesting, the conformance of the system to the requirements of the Drawings and Specifications.
c. Prepare forms for systematic recording of pretest results.
d. Report of Pretesting: After pretesting is complete, provide a letter certifying the installation is complete and fully operable. The letter shall include the names and titles of the witnesses to the preliminary tests.

8. Final Test Notice: Provide 10 days minimum notice in writing when the system is ready for final acceptance testing.
9. Minimum System Tests: Test the system in accordance with the procedures outlined in NFPA 72 Chapter 10 and as required by the City of Chicago Bureau of Fire Prevention.
10. Minimum required tests are but not limited to the ones listed below:

a. Correct deficiencies observed in pretesting.
b. Replace malfunctioning or damaged items with new and retest until satisfactory performance and conditions are achieved.
c. Verify the absence of unwanted voltages between circuit conductors and ground.
d. Test all conductors for short circuits utilizing an insulation testing device.
e. With each circuit pair, short circuit at the far end of the circuit and measure the circuit resistance with an ohmmeter. Record the circuit resistance of each circuit on the record drawings.
f. Verify the control units are in the normal condition as detailed in the manufacturer's operating and maintenance manual.
g. Test initiating and indicating circuits for proper signal transmission under open circuit conditions. One connection each should be opened at not less than 10 percent of the initiating and indicating devices. Proper signal transmission in accordance with class of wiring used shall be observed.
h. Test each initiating and indicating device for alarm operating and proper response at the control unit. Test smoke detectors with actual products of combustion.
i. Test the system for all specified functions in accordance with the manufacturer's operating and maintenance manual. Systematically initiate specified functional performance items at each station including making all possible alarm and monitoring initiations and using all communications options. For each item, observe related performance at all devices required to be affected by the item under all system sequences. Observe displays, signal tones, and annunciator indications. Observe all voice audio for routing, clarity, quality, freedom from noise and distortion, and proper volume level.
j. Test both primary power and secondary power. Verify, by test, the secondary power system is capable of operating the system for the period and in the manner specified.

11. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" as required in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72 and the "Inspection and Testing Form" as required in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
12. Provide all documentation as required by the City of Chicago Bureau of Fire Prevention.
13. Reacceptance Testing:

a. Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.
b. Tag all equipment and stations and other components at which tests have been satisfactorily completed. Place tags upon completion of tests.

D. Fire-alarm system will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.8 COMMISSIONING AND DEMONSTRATION

A. Provide the services of a factory-authorized service representative to demonstrate and train The Board's maintenance personnel as specified below.

1. Train The Board's maintenance personnel in the procedures and schedules involved in operating, troubleshooting, servicing, and preventive maintaining of the system. Include City of Chicago Bureau of Fire Prevention requirements. Provide a minimum of 8 hours' training.
2. Schedule training with the Board at least seven days in advance.
3. Occupancy Adjustments: When requested within one year of date of Substantial Completion, provide on-site assistance in adjusting sound levels and adjusting controls to suit actual occupied conditions. Provide up to three visits to the site for this purpose.

B. Train Owner's maintenance personnel on procedures and schedules for starting up and shutting down, troubleshooting, servicing, and maintaining the equipment. The training shall occur after the startup report has been provided to the owner and the trainer will provide two (2) Installation and Operations manuals for the use of the owner’s personnel during training. Provide a minimum of two (2) sessions of four (4) hours of training. Provide no more than one training session per day.

1. Training Agenda:

a. Format shall be an outline broken up into (2) 4 hour sessions.
b. The material to be covered shall be sub divided into the description of the material to be covered for each 15 minutes intervals.
c. The descriptions shall include not only the material to be covered but also its location in the Installation and Operations manuals, including Section and page number.

2. Documentation of training: After each 4 hour session the engineer shall initial and date the items on the training agenda that were covered that day.

C. Review data in maintenance manuals. Refer to Division 01 Section "Operation and Maintenance Data." All required and recommended maintenance will be reviewed as well as operational trouble shooting. If the IOM does not include a written trouble shooting guide one will be provided.

D. Demonstrate proper operation of equipment to commissioning agent or designated owners personnel. The scope of the demonstration will include functional performance requirements

under both local and building automation control as well as any commissioning requirements in Division 01 or 15.

END OF SECTION

GENERAL ELECTRICAL SYMBOLS

CONDUIT RUN CONCEALED IN CEILING OR WALL	ARROWHEAD DENOTES HOMERUN TO PANELBOARD. SLASH LINES INDICATE QUANTITY OF WIRE; NEUTRAL WIRE SHOWN AS A LONG LINE. PHASE WIRES AND SWITCH LEGS SHOWN AS SHORT LINES, AND GROUND WIRE SHOWN AS A LONG LINE WITH A DOT.
CONDUIT RUN CONCEALED IN OR BELOW FLOOR	
CONDUIT RUN EXPOSED ON CEILING OR WALL	
CONDUIT, WHERE "X" IS THE TYPE OR FUNCTION OF CONDUIT. "C" INDICATES CLOCK "CO" INDICATES CONDUIT ONLY "CTV" INDICATES CCTV "D" INDICATES DATA "FA" INDICATES FIRE ALARM "I" INDICATES INTERCOM "LV" INDICATES LOW VOLTAGE "NC" INDICATES NURSE CALL "S" INDICATES SOUND "T" INDICATES TELEPHONE "TVA" INDICATES TELEVISION ANTENNA "TVC" INDICATES CABLE TELEVISION	
CONDUIT STUBBED UP	
CONDUIT STUBBED DOWN	
FLEXIBLE CONDUIT	
CONDUIT TERMINATION: "CS" INDICATES CAP AND STAKE "GB" INDICATES GROUNDING BUSHING "IB" INDICATES INSULATING BUSHING "TB" INDICATES TERMINAL BUSHING	
CONDUIT SEAL	
MULTI-OUTLET DIVIDED WIREWAY FOR POWER AND DATA	
CABLE TRAY	
UNDERGROUND DUCTBANK	
UNDERGROUND DIRECT BURIAL CABLE	
PULL BOX	
JUNCTION BOX- CEILING OR WALL	
ELECTRICAL CONNECTION TO EQUIPMENT	
JUNCTION BOX WITH FLEXIBLE CONDUIT AND FINAL CONNECTION TO EQUIPMENT.	

LIGHTING SYMBOLS

2' X 4' LIGHTING FIXTURE.	LIGHTING FIXTURES: "A" INDICATES LIGHTING FIXTURE TYPE. REFER TO LIGHTING FIXTURE SCHEDULE FOR DESCRIPTION AND MOUNTING. "1" INDICATES CIRCUIT NUMBER "a" INDICATES CONTROL.
1' X 1' LIGHTING FIXTURE.	
1' X 4' LIGHTING FIXTURE.	
INDUSTRIAL LIGHTING FIXTURE- LENGTH AS INDICATED.	
WALL MOUNTED LIGHTING FIXTURE- LENGTH AS INDICATED.	
LINEAR FLUORESCENT	
WALL MOUNT LIGHTING FIXTURE	
1' X 4' LIGHTING FIXTURE USED FOR NIGHT LIGHT	
2' X 4' LIGHTING FIXTURE USED FOR NIGHT LIGHT	
BATTERY PACK, EMERGENCY LIGHTING UNIT	
REMOTE EMERGENCY HEAD CONNECTED TO BATTERY PACK.	
EXIT SIGN "#X" INDICATES INSCRIPTION, ARROWS, AND SINGLE OR DOUBLE FACED, AS SHOWN BELOW. SHADED QUADRANTS INDICATES DIRECTION OF LIGHTED FACES. "Y" INDICATES CIRCUIT	

SINGLE FACE

"#1"	FIRE ESCAPE
"#2"	STAIRWAY
"#2A"	STAIRWAY
"#3"	EXIT
"#4"	FIRE ESCAPE
"#5"	STAIRWAY
"#5A"	STAIRS
"#6"	EXIT
"#7"	FIRE ESCAPE
"#8"	STAIRWAY
"#8A"	STAIRS
"#9"	EXIT
"#10"	FIRE ESCAPE
"#11"	STAIRWAY
"#11A"	STAIRS
"#12"	EXIT
"#13"	EXIT - RECESSED
"#15"	ELEVATOR
"RAS"	AREA OF RESCUE ASSISTANCE

DOUBLE FACE

"#14"	TRIANGLE
"#16"	FIRE ESCAPE
"#17"	STAIRWAY
"#18"	EXIT
"#19"	FIRE ESCAPE
"#20"	STAIRWAY
"#20A"	STAIRS
"#21"	EXIT
"#22"	FIRE ESCAPE
"#23"	STAIRWAY
"#23A"	STAIRS
"#24"	EXIT
"RAS"	AREA OF RESCUE ASSISTANCE

NOTES:

1. ALL WORK IS NEW, UNLESS NOTED OTHERWISE
2. ALL CONDUIT IS 3/4" MINIMUM. ALL CONDUCTORS ARE #12 THHN, MINIMUM.

LIGHT SWITCH, SINGLE POLE UNLESS NOTED OTHERWISE: "a" INDICATES LIGHTS CONTROLLED "EP" INDICATES EXPLOSION PROOF "K" INDICATES KEY OPERATED "P" INDICATES PILOT LIGHT "XX" INDICATES CIRCUIT NUMBER "WP" INDICATES WEATHERPROOF "2P" INDICATES 2 POLE "3P" INDICATES THREE POLE "3W" INDICATES THREE-WAY "4W" INDICATES FOUR-WAY	
LIGHTING CONTACTOR	
DAYLIGHT SENSOR	
LIGHTING DIMMING CONTROLLER RELAY	

POWER SYMBOLS

WALL MOUNTED	FLOOR BOX	POKE-THROUGH	CEILING MOUNTED	
				DUPLEX RECEPTACLE
				QUAD RECEPTACLE
IG	IG	IG	IG	IG DUPLEX RECEPTACLE
IG	IG	IG	IG	IG QUAD RECEPTACLE
IG	IG	IG	IG	COMBINATION IG DUPLEX RECEPTACLE, DUPLEX RECEPTACLE AND TELEPHONE/ DATA SYSTEMS OUTLET

ADJACENT LETTERS IN THE SYMBOLS ABOVE INDICATE THE FOLLOWING:

"CR"	INDICATES CHILD RESISTENT (SAFETY TYPE)
"CS"	INDICATES CHARGING STATION
"D"	INDICATES RECEPTACLE ON A DEDICATED CIRCUIT
"E"	INDICATES RECEPTACLE FED BY EMERGENCY CIRCUIT
"EP"	INDICATES RECEPTACLE IS EXPLOSION PROOF
"EWC"	INDICATES RECEPTACLE SERVES ELECTRIC WATER COOLER
"GFI"	INDICATES RECEPTACLE HAS GROUND FAULT CIRCUIT INTERRUPTER
"IG"	INDICATES RECEPTACLE IS ISOLATED GROUND-COMPUTER
"TVS"	INDICATES RECEPTACLE HAS TRANSIENT VOLTAGE SURGE SUPPRESSION
"WP"	INDICATES RECEPTACLE HAS WATERPROOF COVER
"XX"	INDICATES RECEPTACLE CIRCUIT NUMBER
"S"	INDICATES RECEPTACLE IS SAFETY TYPE

	DUPLEX RECEPTACLE - MOUNTING HEIGHT ABOVE COUNTER. PER NOTES, DETAILS, ARCH. DWGS.
	CLOCK OUTLET AND CLOCK FOR INTEGRATED CLOCK SYSTEM. "DF" INDICATES DOUBLE FACE CLOCK OUTLET
	MANUAL MOTOR CONTROL "M" INDICATES LOCKOUT MOTOR SWITCH "K" INDICATES KEY OPERATED "P" INDICATES PILOT LIGHT "TH" INDICATES THERMAL OVERLOAD PROTECTION "XX" INDICATES CIRCUIT NUMBER "2P" INDICATES 2 POLE SWITCH "3P" INDICATES 3 POLE SWITCH "T" INDICATES THERMOTOGGLE SWITCH
	CONTROL PANEL
DS	NON-FUSED DISCONNECT SWITCH,
	SURFACE MOUNTED DISTRIBUTION PANELBOARD
	SURFACE MOUNTED NORMAL BRANCH CIRCUIT PANELBOARD
	EQUIPMENT BRANCH PANELBOARD (208/120V)

TRADE SIZE *	CABLE OUTSIDE DIAMETER cm (in.)									
	0.33 (0.13)	0.46 (0.18)	0.56 (0.22)	0.61 (0.24)	0.74 (0.29)	0.79 (0.31)	0.94 (0.37)	1.35 (0.53)	1.58 (0.62)	178 (0.70)
1/2	1	1	0	0	0	0	0	0	0	0
3/4	6	5	4	3	2	2	1	0	0	0
1	8	8	7	6	3	3	2	1	0	0
1 1/4	16	14	12	10	6	4	3	1	1	1
1 1/2	20	18	16	15	7	6	4	2	1	1
2	30	26	22	20	14	12	7	4	3	2
2 1/2	45	40	36	30	17	14	12	6	3	3
3	70	60	50	40	20	20	17	7	6	6
3 1/2	-	-	-	-	-	-	22	12	7	6
4	-	-	-	-	-	-	30	14	12	7

* CPS STANDARD MIN. - 3/4"C

1. CATEGORY 5e CABLE APPROXIMATELY SIZED AT .22" O.D. CATEGORY 6 APPROXIMATELY SIZED AT 0.24/O.26" O.D. VERIFY WITH APPROVED MANUFACTURER PRODUCT.
2. CABLE TABLE 5.9 FROM 2000 BICSI TDMM, 10TH EDITION MANUAL, CH. 5 HORIZONTAL CABLING SYSTEM. INCORPORATES GUIDELINES FROM ANSI/ TIA/EIA - 569-B

FIRE ALARM SYMBOLS

A	AUDIBLE GENERAL ALARM
VS	VISUAL STROBE (NUMBER INDICATES CANDELA RATING) V1=15, V3= 30
AV	AUDIBLE GENERAL ALARM AND VISUAL STROBE
S	FIRE ALARM MANUAL PULL STATION
B	SPRINKLER ALARM BELL
SD	SMOKE DETECTOR
TB	TROUBLE BELL
ST	TEST AND SILENCE SWITCH WITH LAMP

1

A 1a	LED 4 in. WALL -ARM MOUNT LUMINAIRE WITH HORIZONTAL LAMP, FLAT LENS, FULL CUTOFF.
DOWNLIGHT	

GENERAL NOTES

1. THE CONTRACTOR PROPOSING TO PERFORM THE ELECTRICAL WORK SHALL VISIT THE JOB SITE AND FULLY FAMILIARIZE HIMSELF/HERSELF OF ALL CONDITIONS THAT AFFECT THE WORK, OR COST THEREOF, AND EXAMINE THE DRAWINGS AND SPECIFICATIONS PRIOR TO SUBMITTING HIS BID.
2. ALL ELECTRICAL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE PROJECT SPECIFICATIONS AND ALL OTHER DRAWINGS RELATED TO THE PERFORMANCE OF THE WORK.
3. THE CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THIS WORK SHALL BECOME THOROUGHLY FAMILIAR WITH THE PROJECT SPECIFICATIONS BEFORE COMMENCING ANY WORK. THE PROJECT SPECIFICATIONS AND DRAWINGS FORM THE BASIS OF THIS CONTRACT REQUIREMENTS AND INCLUDE THE TYPE AND GRADE OF MATERIALS TO BE INSTALLED, EQUIPMENT TO BE FURNISHED, THE MANNER BY WHICH TO BE INSTALLED AND WHERE TO BE LOCATED. IN THE EVENT OF A CONFLICT BETWEEN THE PROJECT SPECIFICATIONS AND DRAWINGS, SPECIFICATIONS GOVERN UNLESS THE ARCHITECT/ENGINEER DIRECTS OTHERWISE.
4. THE ELECTRICAL CONTRACTOR SHALL CHECK CAREFULLY ALL CONSTRUCTION DRAWINGS AND SPECIFICATIONS THAT ARE PART OF THIS PROJECT TO INSURE THAT NO FIXTURE, LIGHT SWITCH, CONTROL AND POWER WIRING IS OMITTED. HE/SHE SHALL CONSULT ALL TRADES FURNISHING EQUIPMENT AND OBTAIN FROM THEM ALL DATA. IN SOME CASES EQUIPMENT, FIXTURES AND DEVICES ARE SHOWN ONLY. ASCERTAIN AND PROVIDE THE WIRING AND CONTROL STATIONS REQUIRED FOR THE PROPER FUNCTION OF BUILDING EQUIPMENT. NO EXTRA CHARGES SHALL BE ACCEPTED BY OWNER AFTER BIDDING FOR SUCH EQUIPMENT AND LABOR.
5. EQUIPMENT LABELS AND INSTRUCTIONS REGARDING THE APPLICATION AND INSTALLATION OF THE LISTED EQUIPMENT SHALL BE FOLLOWED TO INSURE THAT THE EQUIPMENT IS BEING INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S LISTING INSTRUCTIONS. THE TEMPERATURE RATING OF THE EQUIPMENT TERMINATIONS MUST BE CAREFULLY CORRELATED WITH THE CONDUCTOR AMPACITY TO PREVENT OVERHEATING AND PREMATURE FAILURE.
6. ALL WORK IS TO BE DONE IN ACCORDANCE WITH THE LATEST REQUIREMENTS OF THE APPLICABLE CODES AND REGULATIONS.
7. PROVIDE TEMPORARY POWER AND LIGHTING AND ASSOCIATED DEVICES AND WIRING AS REQUIRED DURING CONSTRUCTION.
8. PREPARE AND SUBMIT 1/4" SCALE INSTALLATION DRAWINGS PRIOR TO ORDERING EQUIPMENT AND ROUGHING FEEDERS. LOCATE ALL ELECTRICAL EQUIPMENT, INDICATE CLEARANCES AND ROUTING OF ALL UNDERGROUND AND OVERHEAD FEEDERS.
9. UTILIZE THE SERVICES OF THE MANUFACTURER'S TECHNICAL REPRESENTATIVE FOR EACH ELECTRICAL SYSTEM FOR GUIDANCE DURING THE PREPARATION OF SHOP DRAWINGS, INSTALLATION, WIRING, TESTING AND COMISSIONING.
10. COORDINATE WORK WITH OTHER TRADES AND INSTALL CONDUIT AND BOXES TO CLEAR EMBEDDED DUCTS, OPENINGS AND OTHER STRUCTURAL FEATURES.
11. CONDUIT RUNS SHOWN ON DRAWINGS ARE DIAGRAMMATIC. PROVIDE CONDUITS CONCEALED IN FLOOR, WALLS, ACCESSIBLE CEILINGS AND EXPOSED IN EQUIPMENT ROOMS. FOR OUTDOOR LOCATIONS USE IMC CONDUITS AND WP BOXES. EXPOSED CONDUIT/RACEWAY IN FINISHED SPACES SHALL NOT BE USED WITHOUT ARCHITECT/OWNER'S APPROVAL.
12. SEAL ALL WALL AND FLOOR CONDUIT PENETRATIONS TO PRESERVE THE ROOM FIRE RATING.
13. ALL OUTDOOR ENCLOSURES SHALL BE NEMA 3R CORROSION RESISTANT AND GASKETED.
14. ELECTRICAL EQUIPMENT SHALL NOT BE INSTALLED BELOW WATER PIPES. IF THIS IS NOT POSSIBLE PROVIDE LEAK DETECTORS WITH GALVANIZED METALS SHIELDS (DRIP PANS) TO DEFLECT ALL WATER SPRAY AWAY FROM SUCH EQUIPMENT. LEAK DETECTOR ALARMS SHALL BE MOUNTED IN THE SCHOOL ENGINEER'S ROOM.
15. FOR BRANCH CIRCUITS, PROVIDE WIRE SIZE AS SHOWN BELOW BASED ON LENGTH OF CIRCUIT:

    UP TO 50 FT USE #12 AWG
    50 FT TO 70 FT USE #10 AWG
    OVER 70 FT USE #8 AWG OR LARGER TO LIMIT THE VOLTAGE DROP TO MAXIMUM 3% AT THE FARTHEST OUTLET.
16. CIRCUITS ARE SIZED ASSUMING NO MORE THAN FOUR CURRENT CARRYING CONDUCTORS IN A SINGLE CONDUIT. FOR CONDUITS CONTAINING MORE THAN FOUR, PROVIDE APPROPRIATE DERATING OF CONDUCTORS PER CHICAGO CODE.
17. THIS SHEET OF SYMBOLS AND NOTES IS A STANDARD LIST. NOT ALL ITEMS MAY BE USED OR APPLY TO THIS SPECIFIC JOB.
18. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS AND MOUNTING HEIGHT OF ALL WIRING DEVICES, OUTLETS, LIGHTING FIXTURES, LIFE SAFETY SPEAKERS, SMOKE DETECTORS, ETC.
19. REFER TO PANEL DIVISION LINES FOR BRANCH CIRCUIT HOMERUN PANELBOARD DESIGNATION, UNLESS NOTED OTHERWISE.
20. MANUAL PULL STATIONS SHALL BE PROVIDED WITH PROTECTIVE COVER. LIFTING THE COVER SHALL ACTIVATE AN INTEGRAL BATTERY-POWERED AUDIBLE HORN.
21. ALL WORK RELATED TO EXISTING SYSTEMS SUCH AS FIRE ALARM, LOW VOLTAGE SYSTEMS, POWER OUTAGES, ETC. SHALL BE PERFORMED WITHOUT ANY DISRUPTION OF THEIR OPERATION DURING TIMES WHEN EXISTING SCHOOL IS OCCUPIED.

WIRING NOTES

A. BRANCH CIRCUIT WIRING FOR 120 VOLT 20 AMP CIRCUITS WIRED TO 208Y/120V SYSTEMS SHALL BE ADJUSTED FOR DISTANCE VOLTAGE DROP AND LOAD HARMONIC CONTENTS AS FOLLOWS:

1. GENERAL RECEPTACLES, INCANDESCENT LIGHTING, AND RESISTIVE LOADS:
   UP TO 50 FEET IN LENGTH: 3#12, 1#12N, 1#12G - 3/4"C
   50 FEET TO 70 FEET IN LENGTH: 3#10, 1#10N, 1#10G - 3/4"C
   OVER 70 FEET IN LENGTH: 3#8, 1#8N, 1#10G - 3/4"C
2. COMPUTER RECEPTACLES, FLUORESCENT AND HID LIGHTING, AND INDUCTIVE LOADS:
   UP TO 50 FEET IN LENGTH: 3#12, 1#10N, 1#12G - 3/4"C
   50 FEET TO 70 FEET IN LENGTH: 3#10, 1#8N, 1#10G - 3/4"C
   OVER 70 FEET IN LENGTH: 3#8, 1#8N, 1#8G - 3/4"C

COMMUNICATIONS

WALL MOUNTED	CEILING MOUNTED	
H		HDMI CONNECTION
S	S	SPEAKER
S P	S P	PAGING SPEAKER
S		CLASSROOM INTERCOM SPEAKER/MICROPHONE
		INTERCOM, WALL MOUNTED AT 42" A.F.F.
	MD	MOTION DETECTOR - 9'-0" AFF FOR CEILINGS GREATER THAN 9'-6" - OR 6" BELOW CEILING WHEN LESS THAN 9'-6"
CR		CARD READER
ES		ELECTRIC STRIKE
DC		DOOR CONTACT
DR		DOOR RELEASE
KP		KEYPAD
DB		DOORBELL
T		TRANSFORMER

WALL MOUNTED	FLOOR BOX	POKE-THROUGH	CEILING MOUNTED	SUBSCRIPT INDICATES THE FOLLOWING FOR BELOW WALL MOUNTED OUTLETS, (U.N.O.):
				"H" HANDICAP MOUNTED AT 48" AFF. "P" PAY PHONE MOUNTED AT 54" AFF. "W" WALL MOUNTED AT 54" AFF. "M" AUTOMATIC METER READER OUTLET "AS" ATTENDANCE SWIPE "K" FOR KRONOS
				TELEPHONE OUTLET
				DATA SYSTEMS OUTLET
K				DATA OUTLET FOR KRONOS TERMINAL
DVS				DIGITAL VIDEO SURVEILLANCE SERVER
PCAM				DVS IP CAMERA (PTZ = PAN TILT ZOOM, W = WALL MOUNTED) REFER TO SPECIFICATION SECTION 28 23 09 FOR INTERIOR AND EXTERIOR CAMERA SPECIFICATIONS.
WS				DIGITAL VIDEO SURVEILLANCE WORKSTATION
TV				CABLE TELEVISION, CATV
DB				DOOR BELL
PP				PUSH PLATE FOR ADA DOOR OPERATOR
AP				AIPHONE ENTRY STATION
MS				AIPHONE MASTER STATION
SM				AIPHONE SUB-MASTER STATION

SENSOR LEGEND

S O	LINE VOLTAGE WALL SWITCH WITH DUAL TECHNOLOGY OCCUPANCY SENSORS
PS	PHOTO SENSOR DAYLIGHT
OS	LOW VOLTAGE WALL MOUNT WIDE VIEW SENSOR.DUAL TECHNOLOGY USE OPTION WV-BR FOR CEILING MOUNTING
OS	LOW VOLTAGE CEILING MOUNT SENSOR: DUAL TECHNOLOGY

1. SENSORS IN ELECTRICAL/MECHANICAL LOCATIONS NEED TO BE VERIFIED WITH AUTHORITY HAVING JURISTICTION.
2. ONE POWER PACK IS NEEDED PER CIRCUIT /ZONE TO BE CONTROLLED BY LOW VOLTAGE SENSORS. PLEASE RECHECK COUNTS TO VERIFY THE NUMBER OF POWER PACKS NEEDED TO MAKE A COMPLETE SYSTEM.
3. ADDITIONAL SENSORS MAY BE REQUIRED TO PROVIDE COMPLETE COVERAGE DEPENDING ON PARTITION, FURNITURE, AND SHELVING PLACEMENT
4. LIGHTING CONTROL SYSTEM COMPONENTS AND QUANTITY OF DEVICES MAY VARY WITH THE MANUFACTURER. PROVIDE ALL COMPONENTS AND WIRING AS REQUIRED BY MANUFACTURER FOR A COMPLETE FUNCTIONAL SYSTEM.

ABBREVIATIONS

NOTE: ABBREVIATIONS ARE ALPHABETICALLY LISTED BY DESCRIPTION.

ABBREV.	DESCRIPTION
AFF	ABOVE FINISHED FLOOR
ACL	ACROSS THE LINE
ALM	ALARM
AC	ALTERNATING CURRENT
A	AUXILARY CONTACTS
AMP	AMPERE
AIC	AMPERES INTERRUPTING CAPACITY
AL	ALUMINUM
ANN	ANNUNCIATOR
ATS	AUTOMATIC TRANSFER SWITCH
BAL	BALLAST
BAS	BUILDING AUTOMATION SYSTEM
BR	BRANCH
BRKR	BREAKER
BGB	BUILDING GROUND BOX
CAB	CABINET
CATV	CABLE TELEVISION
C.B.	CIRCUIT BREAKER
CBT	CITY TIE BOX
CCT	CIRCUIT
CCTV	CLOSED CIRCUIT TELEVISION
CLO	CLOSET
COAX	COAXIAL
C.U.	COEFFICIENT OF UTILIZATION
CECO	COMMONWEALTH EDISON COMPANY
C	CONDUIT
CONN	CONNECTION
CONV	CONVENIENCE
CR	CHILD RESISTANT
CU	COPPER
CUH	CABINET UNIT HEATER
CT	CURRENT TRANSFORMER
HZ	HERTZ (CYCLES/SECOND)
DC	DIRECT CURRENT
DHR	DOOR HOLDER RELAY PANEL
DS	DISCONNECT SWITCH
DPDT	DOUBLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
DO	DRAWOUT
DT	DUSTTIGHT
E.C.	ELECTRICAL CONTRACTOR
ECP	ELEVATION CONTROL PANEL
ELEC	ELECTRIC
EWC	ELECTRIC WATER COOLER
EWH	ELECTRIC WATER HEATER
EM	EMERGENCY
EMT	ELECTRIC METALLIC TUBING (THIN WALL CONDUIT)
EQ	EQUIPMENT
EUH	ELECTRIC UNIT HEATER
EX	EXISTING
EP	EXPLOSION PROOF
FPB	FAN POWERED BOX
FA	FIRE ALARM
FDC	FIRE DEPARTMENT CONNECTION
FB	FLOORBOX
FLUOR	FLUORESCENT
F	FUSE
F.S.	FUSED SWITCH
GEN	GENERATOR
GRD	GROUND
GFI	GROUND FAULT INTERRUPTER
GHW	GALVANIZED HEAVYWALL STEEL CONDUIT
HD	HAND DRYER
HV	HIGH VOLTAGE
HP	HORSE POWER
INC	INCANDESCENT
IC	INTERRUPTING CAPACITY
IMC	INTERMEDIATE GRADE CONDUIT
JB	JUNCTION BOX
KW	KILOWATT
KWH	KILOWATT-HOUR
KVA	KILOVOLT-AMPERE
KO	KNOCKOUT
LTG	LIGHTING
LS	LOUD SPEAKER
LV	LOW VOLTAGE
MH	MANHOLE
MFR	MANUFACTURER
MV	MULTI VAPOR
MERC.	MERCURY VAPOR
MTR	MOTOR
MCC	MOTOR CONTROL CENTER
MTD	MOUNTED
NEC	NATIONAL ELECTRICAL CODE
NEUT	NEUTRAL
NC	NORMALLY CLOSED
NO	NORMALLY OPENED
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
OEMC	OFFICE OF EM MANAGEMENT
PNL	PANEL
PH	PHASE
PT	POTENTIAL TRANSFORMER
PWR	POWER
PRI	PRIMARY
PROT.	PROTECTION OR PROTECTIVE
PA	PUBLIC ADDRESS
PB	PULL BOX
RT	RAINTIGHT
RECP	RECEPTACLE
RC	REMOTE CONTROL
R	RESISTANCE
SEC	SECONDARY
SC	SHORT CIRCUIT
SP	SINGLE POLE
SPST	SINGLE POLE SINGLE THROW
SPKR	SPEAKER
SPEC	SPECIFICATION
SS	STAINLESS STEEL
STA	STATION
S	SWITCH
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
SYM	SYMMETRICAL
SYS	SYSTEM
TC	TERMINAL CABINET
TEL	TELEPHONE
TEL.CL.	TELEPHONE CLOSET
TTC	TELEPHONE TERMINAL CABINET
TV	TELEVISION
TERM.	TERMINAL
TP	TECHNICAL PANEL
TX	TRANSFORMER
T	TRIP
TL	TWIST LOCK
UL	UNDERWRITER'S LABORATORIES
UNG	UNGROUNDED
UH	UNIT HEATER
UNO	UNLESS NOTED OTHERWISE
VP	VAPORPROOF
VT	VAPORTIGHT
V	VOLT
VA	VOLT-AMPERE
W	WATT
WG	WIREGUARD
WP	WEATHERPROOF
WT	WATERTIGHT

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CPS PROJECT NO.: 2017 - 20071 - TUS

WGA PROJECT NO.: 17119

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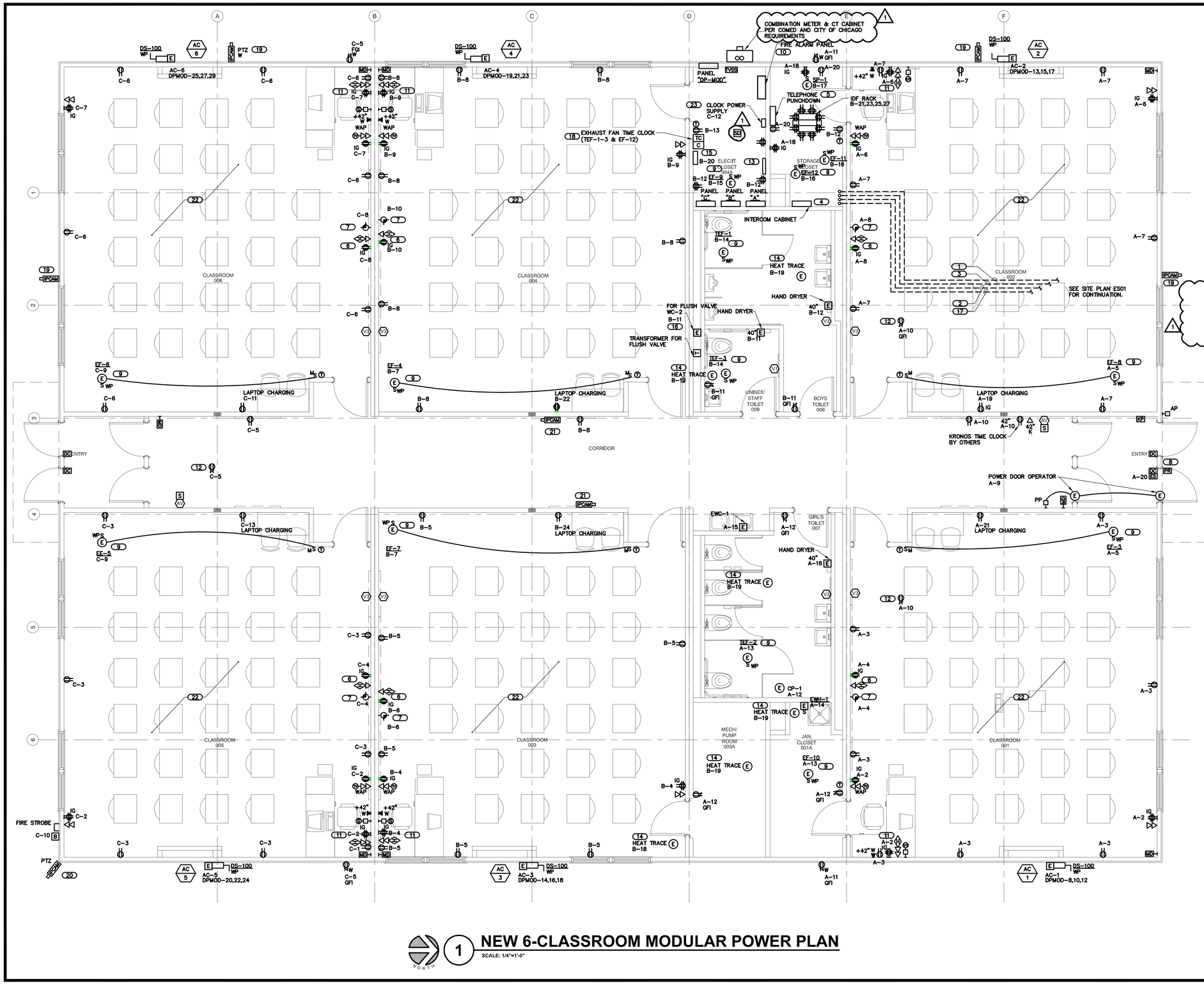
TITLE:
ELECTRICAL SYMBOLS, ABBREVIATIONS, AND NOTES

SHEET
E00

0 30' 60' 1" = 30'-0"
0 20' 40' 1" = 20'-0"
0 16' 32' 1/16" - 1'-0"
0 8' 16' 1/8" - 1'-0"
0 4' 8' 1/4" - 1'-0"
0 2' 4' 1/2" - 1'-0"
0 1.5' 3' 3/4" = 1'-0"
0 1' 2' 1" = 1'-0"
0 6" 1' 1 1/2" = 1'-0"
0 6" 3" = 1'-0"



1 NEW 6-CLASSROOM MODULAR POWER PLAN

SCALE: 1/4"=1'-0"

KEYNOTES

1. 2" CONDUIT WITH 6 INTERCOM CABLES (ONE PER EACH CLASSROOM) FOR INTERCONNECTION SYSTEM AND RG11 COAX CABLE FOR CATV. FROM EXISTING INTERCOM HEAD END LOCATED IN WORKROOM TO INTERCOM TERMINAL CABINET.
2. 2" CONDUIT WITH 25 PAIR CABLE CAT 5e FOR TELEPHONE SYSTEM AND AIPHONE SYSTEM, AND 6-STRAND OM3 FIBER FOR INTERNET SERVICE AND INTRUSION DETECTION SYSTEM. FROM EXISTING MDF ROOM TO NEW IDF CLOSET.
3. 2" CONDUIT WITH INTERCONNECTION OF EXISTING FIRE ALARM PANEL AND NEW FIRE ALARM PANEL.
4. PROVIDE NEW INTERCOM TERMINAL CABINET. WITH REQUIRED PUNCH DOWN BLOCKS, STANDOFF BRACKETS, STATION LINE SUPPRESSOR MODULES AND PUNCH DOWN GROUND
5. NEW TELEPHONE CABINET. PROVIDE NEW 66 BLOCK WITH LIGHTNING PROTECTION EQUIPMENT. EXTEND CABLES TO EQUIPMENT RACK.
6. SMARTBOARD – PROVIDE DUPLEX RECEPTACLE, DATA OUTLET, AND HDMI OUTLET TO THE TEACHER'S DESK. COORDINATE ROUGH-IN LOCATION WITH SMARTBOARD DISPLAY/PROJECTOR MOUNTING HARDWARE. COORDINATE REQUIREMENTS WITH CURRENT CPS STANDARDS.
7. CLOCK– PROVIDE RECEPTACLE FOR CLOCK OUTLETS.
8. KEY FOB PROXIMITY READER – PROVIDE A WIRELESS KEY FOB READER/PIN LOCK AT EXTERIOR DOOR. PROVIDE ADDITIONAL LOCK COMPATIBLE WITH EXISTING NETWORX WIRELESS SYSTEM. VERIFY COMPATIBILITY WITH EXISTING SYSTEM, PRIOR TO INSTALLATION. PROVIDE ACCESSORIES REQUIRE TO INTEGRATE WITH DOOR OPERATOR, SECURITY SYSTEM, AND DOOR HARDWARE.
9. EXHAUST FANS LOCATED ON ROOF. COORDINATE WITH MECHANICAL CONTRACTOR FOR EXACT LOCATION.
10. PROVIDE A NEW FIRE ALARM SYSTEM IN THE MODULAR BUILDING. THE NEW FIRE ALARM CONTROL PANEL SHALL INCLUDE LOCAL TROUBLE AND ALARM NOTIFICATION AND SHALL NOT BE CONNECTED INTO THE CITY TIE-IN. THE FIRE ALARM IN MODULAR BUILDING SHALL BE MONITORED BY THE INTRUSION DETECTION SYSTEM CONTROL PANEL. IN ADDITION PROVIDE A TROUBLE BELL WITH TEST SWITCH IN THE MAIN OFFICE TO LOCALLY INDICATE FIRE ALARM OR TROUBLE IN THE MODULAR BUILDING.
11. TEACHER LOCATION – PROVIDE QUAD ISOLATED GROUND OUTLET, STANDARD RECEPTACLE, 2 DATA OUTLETS, WALL VOICE OUTLET AND HDMI OUTLET.
12. PROVIDE WEATHERPROOF RECEPTACLES WITH IN-USE COVER PLATES ON ROOF FOR EQUIPMENT MAINTENANCE. REFER TO DETAIL 6 ON SHEET E62 FOR CONDUIT ROOF PENETRATION.
13. TELECOMMUNICATION GROUND BUS. FIELD COORDINATE EXACT LOCATION WITH TECHNOLOGY CONTRACTOR.
14. PROVIDE 120V ELECTRICAL CONNECTION FOR HEAT TRACE. ELECTRICAL CONNECTION TO BE LOCATED IN CRAWL SPACE. PROVIDE DELTA-THERM HT SERIES, 5 WATT PER LINEAR FOOT, SELF- REGULATED CABLE CONSTRUCTED OF AN IRRADIATED CROSS-LINKED CONDUCTIVE POLYMER CORE MATERIAL EXTRUDED OVER TWO MULTI-STRANDED, TIN-PLATED, 16-GUAGE COPPER BUS WIRES FOR ALL 4" PIPES REQUIRING HEAT TRACE. CABLES SHALL HAVE A MAXIMUM MAINTENANCE TEMPERATURE OF 150°F DEGREE AND A MAXIMUM INTERMITTENT EXPOSURE OF 185°F. ALL HEAT TRACE CABLES AND ASSOCIATED EQUIPMENT, INCLUDING ANY MONITORS, ANNUNCIATORS OR CONTROLS SHALL BE UL, CSA OR FM LISTED. COORDINATE EXACT LOCATION WITH PLUMBING CONNTRACTOR.
15. HEAT TRACE CONTROL PANEL. PROVIDE TWO DELTA-THERM #TM-II-CTR-120 THERMOSTATS WITH REMOTE MONITORS. ONE FOR INCOMING WATER SERVICE AND ONE FOR THE SANITARY DRAIN FLOOR P-TRAPS. COORDINATE WITH PLUMBING CONTRACTOR FOR LOCATION OF P-TRAPS AND INCOMING WATER SERVICE.
16. PROVIDE ELECTRICAL CONNECTION FOR AUTOMATIC FLUSH VALVE. COORDINATE THE EXACT ROUGH-IN HEIGHT AND TRANSFORMER LOCATION WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.
17. PROVIDE A 2" CONDUIT FOR SPARE WITH NYLON PULL STRING AT EACH END. FROM EXISTING MDF ROOM TO NEW IDF CLOSET.
18. PROVIDE DIGITAL MULTI-CHANNEL TIME CLOCK FOR CONTROL OF EXHAUST FANS. PROVIDE CONTACTORS FOR EXHAUST FANS TO BE CONTROLLED ON THE SAME SCHEDULE. REFER TO MOTOR SCHEDULE FOR INITIAL SCHEDULING. CONFIRM EXACT SCHEDULE WITH OWNER. TIME CLOCK TO BE MANUFACTURED BY TORK, INTERMATIC, OR EQUAL.
19. PROVIDE CAMERA AXIS 3225LVE MOUNTED ON EXTERIOR.
20. PROVIDE CAMERA AXIS Q6055E MOUNTED ON EXTERIOR.
21. PROVIDE CAMERA AXIS 3225LV MOUNTED IN INTERIOR.
22. PROVIDE ISOLATED GROUND ONLY TO THE CIRCUITS CIRCUITS WITH THE "IG" SUBSCRIPT.
23. CONNECT INTO NEW BUILDING CLOCK SYSTEM.

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TITLE:
NEW 6-CLASSROOM MODULAR POWER PLAN

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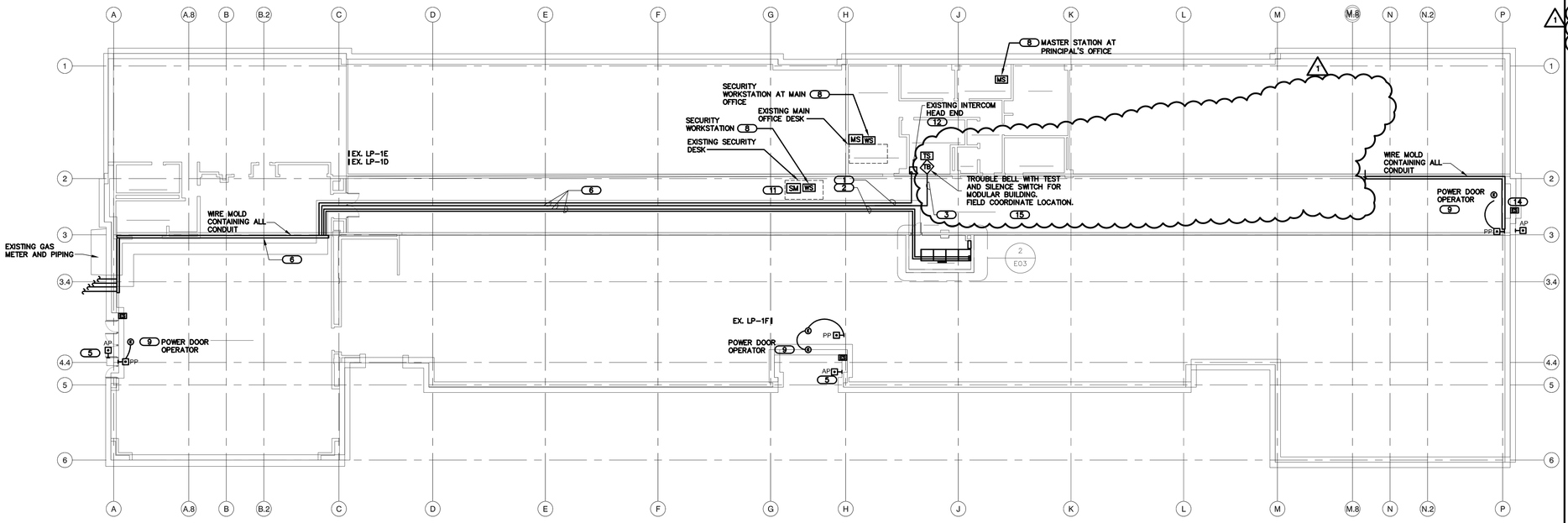
REFERENCE SCALE IN INCHES
0 1 2 3

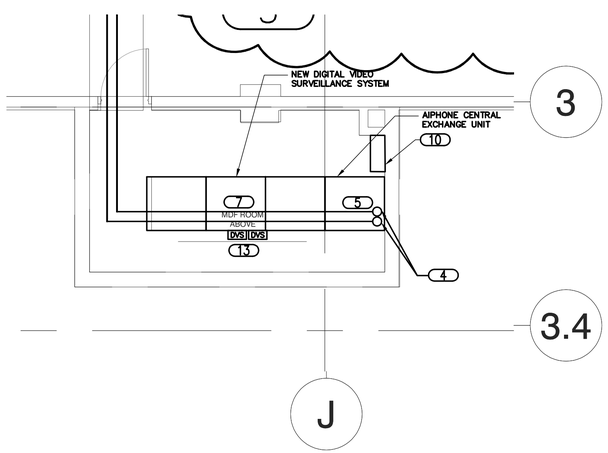
SHEET
E01

1" = 30'-0" | 1" = 20'-0" | 1/16" - 1'-0" | 1/8" - 1'-0" | 1/4" - 1'-0" | 1/2" - 1'-0" | 3/4" = 1'-0" | 1" = 1'-0" | 1 1/2" = 1'-0" | 3" = 1'-0"



1 FIRST FLOOR POWER PLAN - MAIN BUILDING

SCALE: 1/16"=1'-0"



2 MDF ROOM (LOCATED ON SECOND FLOOR)

SCALE: 1/4"=1'-0"

KEYNOTES

1. PROVIDE 2" CONDUIT FOR INTERCOM SYSTEM INTERCONNECTION. REFER TO SHEET E01 FOR MORE INFORMATION.
2. PROVIDE (2) 2" CONDUITS FOR DATA CONNECTION FROM EXISTING MDF ROOM TO NEW IDF CLOSET. ONE 6 STRAND OM3 FIBER,RG11 COAXIAL CONNECTIONS AND 25 PAIR CAT 5e CABLE, AND ONE SPARE CONDUIT WITH NYLON PULL STRING FOR FUTURE USE. REFER TO SHEET E01 FOR CONTINUATION.
3. PROVIDE 2" CONDUIT AND WIRING FOR INTERCONNECTION OF NEW FIRE ALARM PANEL IN NEW MODULAR BUILDING INTO THE SECURITY SYSTEM IN MDF ROOM AND INTO NEW TROUBLE BELL IN THE MAIN OFFICE. REFER TO KEY NOTE 10 ON SHEET E01.
4. ROUTE DATA CONDUITS DOWN TO ACCESSIBLE CEILING BELOW MDF ROOM. COORDINATE THE EXACT LOCATION OF CONDUITS AND FLOOR PENETRATION IN FIELD.
5. DISCONNECT AND REMOVE EXISTING DOORBELL INTERCOM SYSTEM WITH ALL ASSOCIATED COMPONENTS AND WIRING. RE-USE EXISTING RACEWAYS WHERE POSSIBLE. PROVIDE NEW WIRE-MOLD SURFACE RACEWAY, WHERE EXISTING RACEWAYS CANNOT BE USED.
6. ROUTE CONDUITS FOR DATA, INTERCOM, FIRE ALARM, AND AIPHONE, ABOVE THE FIRST FLOOR CORRIDOR CEILING. TRANSITION CONDUIT TO WIREMOLD SURFACE RACEWAY IN CAFETERIA. CONFIRM FINISH COLOR AND ROUTING OF WIREMOLD WITH ARCHITECT PRIOR TO INSTALLATION. ROUTE WIREMOLD DOWN CAFETERIA WALL AND TRANSITION TO RIGID GALVANIZED CONDUITS TO THE BUILDING EXTERIOR. TRANSITION FROM RIGID GALVANIZED CONDUITS TO PULL BOX IN THE GRASSY AREA, AND UNDERGROUND DUCT BANK TO THE MODULAR BUILDING. PROVIDE PULL BOXES AS REQUIRED BY CODE, NOT EXCEEDING (3) 90-DEGREE BENDS. COORDINATE CONDUIT ROUTING WITH EXISTING GAS PIPING. REFER TO SITE PLAN ES01 FOR CONTINUATION.
7. UPGRADE THE EXISTING SECURITY CAMERA SYSTEM TO A NEW DIGITAL VIDEO SURVEILLANCE CAMERA SYSTEM, USING GENETEC SECURITY DESK 5.3 SR4 OR LATER. UPGRADE TO INCLUDE, BUT NOT LIMITED TO SERVERS, HARDWARE, SOFTWARE, CABLING, AND PATHWAYS. PROVIDE DIGITAL ENCODERS AS REQUIRED TO INTEGRATE THE EXISTING ANALOG CAMERAS TO THE NEW IP BASED SYSTEM. DISCONNECT AND REMOVE COMPONENTS OF ANALOG CAMERA SYSTEM BEING REPLACED. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS. COORDINATE PHASING OF WORK AND OUTAGE WITH SCHOOL SCHEDULE. COORDINATE WITH CPS SECURITY.
8. NEW SECURITY STATIONS PROVIDE NEW AX AIPHONE SYSTEM WITH AUDIO, VIDEO, AND DOOR ACCESS. INSTALL NEW AIPHONE CONTROLLER AND CENTRAL EXCHANGE UNIT IN MDF RACK. ALL COMPONENTS OF SYSTEM SHALL BE ROUTED BACK TO CENTRAL EXCHANGE UNIT, INCLUDING MASTER STATION, SUB-MASTER STATION, ENTRY STATIONS, ELECTRIC STRIKES, ETC. PROVIDE DESK MOUNTED UNIT.
9. POWERED DOOR – PROVIDE DEDICATED 120V.–1PH CONNECTION TO SPARE CIRCUIT IN LOCAL BRANCH PANEL FOR POWERED DOOR OPERATOR. VERIFY EXACT CIRCUIT NUMBER IN FIELD.
10. EXISTING INTRUSION DETECTION PANEL SHALL BE REPLACE WITH NEW ADEMCO 128BPT PROVIDE IP COMMUNICATOR HONEY WELL 7847IE. ELECTRICAL CONTRACTOR SHALL REUSE EXISTING HOUSING FOR NEW PANEL AND PROVIDE (2) 18 AWG WIRES IN ONE OF THE 2" CONDUIT GOING TO THE NEW MODULAR BUILDING.
11. DISCONNECT EXISTING INTERCOM AT EXISTING SECURITY DESK AT MAIN ENTRANCE AND REPLACE WITH NEW AX AIPHONE SYSTEM WITH AUDIO, VIDEO AND DOOR ACCESS. INSTALL NEW AIPHONE CONTROLLER AND CENTRAL EXCHANGE UNIT IN MDF RACK. PROVIDE DESK MOUNTED UNIT.
12. PROVIDE NEW SCHOOL INTERCOM MASTER CLOCK MODULE AND PROGRAM EQUIPMENT SYSTEM PER SPECIFICATIONS. SYSTEM SHALL HAVE CAPACITY TO ACCOMMODATE ALL THE EXISTING ZONES. NEW ZONES IN THE MODULAR BUILDING AND SPARE ZONES FOR FUTURE EXPANSIONS. INTERCONNECT ALL EXISTING AND NEW ZONES. PROVIDE ALL WIRING AND COMPONENTS REQUIRED FOR A FUNCTIONAL SYSTEM. EXISTING PA SYSTEM SHALL REMAIN FUNCTIONAL UNTIL THE NEW SYSTEM IS INSTALLED AND FULLY OPERATIONAL. ALL WORK REQUIRED TO TRANSFER NEW SYSTEM SHALL BE COORDINATED WITH THE CPS AND PERFORMED DURING SCHOOL BREAK. EXISTING EQUIPMENT SHALL BE REMOVED AND RETURN TO CPS.
13. 2 EXISTING DVRS SHALL BE REMOVE AND REPLACE WITH 2 DIGITAL ENCODERS. PROVIDE NEW NEW ENCODER FROM AXIS PRODUCT NUMBER P7216.
14. ELECTRICAL CONTRACTOR SHALL PROVIDE 120V–1PH CONNECTION TO SPARE CIRCUIT IN LOCAL BRANCH PANEL FOR ELECTRIC STRIKE. VERIFY EXACT CIRCUIT NUMBER IN FIELD.
15. PROVIDE TROUBLE BELL WITH TEST AND SILENCE SWITCH AND INDICATOR LIGHT FOR MODULAR BUILDING..

GENERAL ELECTRICAL NOTES

1. REMOVE EXISTING INTERCOM DOORBELL SYSTEM. EXISTING SYSTEM SHALL REMAIN OPERATIONAL THROUGHOUT ENTIRE TIME UNTIL NEW SYSTEM IS FULLY INSTALLED AND IN WORKING CONDITIONS.
2. ELECTRICAL CONTRACTOR SHALL INSPECT ALL CAMERAS IN SITE AND ALL BUILDINGS PRIOR TO STARTING WORK AND INFORM PROJECT MANAGER OF FINDINGS.
3. ANY SERVICE INTERRUPTIONS SHALL BE COORDINATED WITH OFFICE OF SAFETY AND SECURITY (OSS) AND ITS DEPARTMENTS. WORK SHALL BE PERFORM DURING SCHOOL BREAKS.
4. REMOVE ALL DVRS LOCATED ON EXISTING IDF ROOM LOCATED IN ANNEX AND PROVIDE NEW DIGITAL ENCODER. RECONNECT ALL DEVICES. ALL EQUIPMENT BEING REMOVE AND BEING REUSED SHALL BE RETURNED TO CPS.

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REFERENCE SCALE IN INCHES

DEPARTMENT OF BUILDINGS APPROVAL

COLUMBIA EXPLORERS ELEMENTARY ACADEMY

4520 S. KEDZIE AVE
CHICAGO, IL 60632
MODULAR BUILDING
CHICAGO PUBLIC SCHOOLS

CITY OF CHICAGO, MAYOR RAHM EMANUEL

THESE DRAWINGS HAVE BEEN PREPARED AT AND / OR UNDER MY SUPERVISION AND TO THE BEST OF MY KNOWLEDGE AND BELIEF CONIFORM AND COMPLY WITH THE REQUIREMENTS OF THE CHICAGO DEPARTMENT OF BUILDING

ILLINOIS
AGUSTIN GOMEZ-LEAL
REGISTERED ARCHITECT
001.014496
EXPIRATION DATE: NOVEMBER 30, 2018

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ISSUANCE

MARK	DESCRIPTION	DATE
1	DESIGN DEVELOPMENT	09/12/17
2	60% CD	10/13/17
3	90% CD	11/03/17
4	100% CD	11/17/17
5	ISSUED FOR BID	1/03/18
6	ISSUED FOR PERMIT	1/10/18
7	ADDENDUM 1 1	01/29/18
8	-	-

DRAWN BY: SXF/EA

CHECKED BY:JR

PLOT DATE.: 10/30/2017

PBC PROJECT NAME: COLUMBIA EXPLORERS

PBC CONTRACT NO.: 19130

CPS PROJECT NO.: 2017 - 20071 - TUS

WGA PROJECT NO.: 17119

WARNING:
ASBESTOS-CONTAINING BUILDING MATERIALS ARE OR MAY BE PRESENT IN THIS BUILDING. AN ASBESTOS MANAGEMENT PLAN IS AVAILABLE IN THE SCHOOL FOR REVIEW UPON REQUEST. NO PERSON MAY DISTURB ASBESTOS-CONTAINING MATERIALS UNLESS THAT PERSON IS A LICENSED ASBESTOS WORKER OR CONDUCTS SUCH WORK IN ACCORDANCE WITH SPECIFICATION(S) CONTAINED IN THE PROJECT DOCUMENTS AND IN COMPLIANCE WITH ILLINOIS DEPARTMENT OF HEALTH RULES AND REGULATIONS.

TITLE:
FIRST FLOOR POWER PLAN - MAIN BUILDING

SHEET
E03

1" = 30'-0" | 1" = 20'-0" | 1/16" - 1'-0" | 1/8" - 1'-0" | 1/4" - 1'-0" | 1/2" - 1'-0" | 3/4" = 1'-0" | 1" = 1'-0" | 1 1/2" = 1'-0" | 3" = 1'-0"