

# ATTACHMENT 02

## SECTION 221124 - DOMESTIC-WATER PACKAGED BOOSTER PUMPS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. The Contractor shall provide labor, materials, equipment, appliances, services and transportation, and perform operations in connection with construction and installation of the Work.
- B. The extent of the work involved will be to provide a complete domestic water pressure booster system to provide adequate water pressure in the building.
- C. The booster system shall include, but not be limited to, pumps and control panel, header piping, valves, pressure tank, and prewiring of controls to pumps.
- D. Related Sections include the following:
  - 1. Division 22 Section "Domestic Water Pumps" for domestic water circulation pumps.

#### 1.3 SUBMITTALS

- A. Product Data: For each packaged booster pump specified. Include certified performance curves with operating points plotted on curves; and rated capacities of selected models, furnished specialties, and accessories.
- B. Shop Drawings: For packaged booster pumps and accessories. Include plans, elevations, sections, details, and attachments to other work.
- C. Operation and Maintenance Data: For each packaged booster pump to include in emergency, operation, and maintenance manuals.

#### 1.4 QUALITY ASSURANCE

- A. Product Options: Drawings indicate size, profiles, and dimensional requirements of packaged booster pumps and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements."
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. ASME Compliance: Comply with ASME B31.9 for piping.
- D. Packaged booster pumps shall be listed and labeled as pumping systems by testing agency acceptable to authorities having jurisdiction.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Retain shipping flange protective covers and protective coatings during storage.
- B. Protect bearings and couplings against damage.
- C. Comply with pump manufacturer's written rigging instructions for handling.

## 1.6 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
  - 1. VC Systems
  - 2. Tiger Flow
  - 3. Bell and Gosset

### 2.2 VARIABLE SPEED PUMP STATION DUPLEX SYSTEM

- A. General: Furnish and install one VC Systems "VFD Series", as indicated on the drawings, variable speed, duplex domestic water booster system. The system shall be rated for a total capacity of \_\_100\_GPM for each pump at a system pressure of \_\_81\_\_TDH when supplied with a minimum suction supply pressure of \_\_30\_\_PSIG. The system shall be UL Listed as a packaged pumping system, and shall bear the UL Listed Mark.
- B. Pumps and Motors: Pumps shall be VC Systems, ductile iron, 304 S/S fitted, close-coupled, end suction centrifugal pumps with 304 stainless steel cast impeller & bronze shaft sleeve. Motor shall be a Baldor JM frame, ODP, Premium Efficiency motor for \_\_3500\_RPM at \_\_460\_volts/ \_\_60\_hz/ \_\_3\_\_phase, & suitable for "Inverter Duty". Motors shall be supplied with cast iron bearing housings and with a 1.15 service factor. Pumps shall be selected for non-overloading service through the entire curve.
  - 1. Pump No. 1: \_\_140\_\_ GPM at \_\_81'\_\_ TDH with \_\_5\_\_ HP
  - 2. Pump No. 2: \_\_140\_\_ GPM at \_\_81'\_\_ TDH with \_\_5\_\_ HP
- C. Isolation Valves: Furnish isolation valves on the inlet and outlet of each pump to provide for service of any individual pump without shut-down of entire system. Valves shall be butterfly valves with full lug epoxy coated body, stainless steel stem, EPDM seat and nylon coated ductile iron OR stainless steel disc for prevention of wear and corrosion control. Each valve shall be supplied with a lever handle and locking plate.
- D. Check Valves: Furnish pump check valves of the globe style, non-slam "quiet" type with cast iron body and stainless steel trim...plug, spring, bushing & seat. Valves shall be 125# flanged, for liquid duty at 200 psi maximum working pressure. Supply one check valve on the discharge of each pump.
- E. Thermal Safety Valves: Furnish and supply a non-electric, modulating thermal safety valve for the discharge of each pump. This valve shall be of stainless steel construction with stainless steel trim, suitable for 400 psi working pressure. Valve shall be of two piece construction and require no electrical connection. Valve operates from 95 deg. to 105deg. F.
- F. Headers and Piping: Furnish and install header piping of 304 stainless steel with 150# flanged connections and double ended system connections for field connection in either direction. The entire pumping system shall be flanged design, except for the transition from threaded pumps to the system piping. This transition shall be done with stainless steel nipples and cast iron companion flanges. The system headers shall be sized to match the system piping or a maximum velocity of 10 FPS.
- G. Vibration Isolation: The pumping system shall be mounted directly on rubber-in-shear vibration mounts and supplied with single sphere flexible connector at each system connection.
  - 1. Furnish and install one Model VQV-2 duplex VFD motor control center. The control shall be mounted in a NEMA 4, UL Type, powder coated enclosure with door gasket for protection against the pump room environment. Each controller shall be supplied with the following standard features:
    - a. Main disconnect switch with door interlocking handle & door lockout

- b. Main, Class J, high speed electronic fuses in accordance with NFPA 70
- c. HOA switch and green "Run" Pilot Light for each pump on panel door
- d. Control power transformer with primary and secondary fusing
- e. Automatic and Manual alternation
- f. Numbered control terminal strip
- g. Automatic and manual alternation
- h. Low suction pressure alarm & cut-off with T.D. off , automatic reset
- i. Low system pressure alarm with T.D. , automatic reset
- j. High system pressure alarm & cut-off with T.D. off, manual reset
- k. Common audible alarm horn with silence pushbutton
- l. Common red alarm pilot light & legend
- m. Common NO & NC auxiliary dry alarm contacts for remote monitor
- n. PLC logic controller with non-volatile EEPROM memory
- o. Dual stainless steel pressure transducers for system & suction pressure
- p. Omron PID set point controller with LED readout
- q. 4 line LCD operator interface & 2 line LED display on front of controller
- r. Displays shall display:

- 1) System pressure
- 2) Suction pressure
- 3) Set point pressure
- 4) Motor speed (RPM)
- 5) Motor output current (AMPS)
- 6) Motor output voltage
- 7) Drive faults
- 8) Active alarm status

H. Variable Frequency Drives: (ABB): Furnish a VFD for each motor, suitable for use with the Baldor motor. The drives shall be a microprocessor controlled PWM output drive for variable torque duty and supplied for the maximum full load amps produced by the motor. The drive shall be Series ACH550, UL Listed, and in a NEMA 1 self contained enclosure. Each drive shall be furnished with a removable, digital keypad, to allow the operator flexibility and control. The keypad shall have a 32 character, English alpha-numeric display. The keypad shall allow the operator to individually control each motor manually from digital keypad, without entering the control panel. Provide with main disconnect.

I. Sequencing and Logic Controls:

1. Logic controller shall contain a logic program that will monitor system operation and add or subtract pumps as required to meet changing demands. Field adjustable time delays shall be provided to prevent false starting of pumps. Controller shall employ cascaded sequence logic to provide smooth transitions and reduce overall pressure disturbance when pumps are added or removed from operation. All start sequences shall be interlocked using a technique that prevents simultaneous starting or stopping of the pumps. Each pump shall also be equipped with a stop delay time to prevent short cycling of pumps. Stop delay timers shall stop in the reverse order in which they started. Control logic shall prevent multiple pumps from stopping simultaneously.
2. Pressure shall be controlled using a closed loop control strategy. A proportional integral derivative (PID) control algorithm will continuously monitor system pressure, process error, and current operating speed and calculate a new speed that will correct pressure deviations without overshoot. PID control system shall be provided with field configurable outputs, 100ms sampling, advanced PID, or fuzzy self tuning. PID functions shall conform to UL, CSA and CSE standards. Flow meters are not acceptable for pump staging, as they cannot detect normal pump wear and adjust as needed, and specified hear. Pump system shall be supplied with "Sleep Mode" when periods of no flow are detected.

- J. Operator Interface: Provide a 4-line LCD display and a 2-line LED display on the front of the enclosure to display system operating pressures, percent of drive speed, current pressure control setting, and alarm messages. System supply, system discharge pressure, pressure control setting and pump motor speed shall be clearly displayed at all times in engineering units. All user adjustable settings may be accessed and changed from the integral keypad. Provide a troubleshooting screen that allows a service technician to view the status of all hardwired inputs and outputs to the logic controller. In addition provide troubleshooting access to current timer values so that the operator can view "live" operation of all timed functions. The "Operator Interface" shall be powered from 24VDC power supply.
- K. Fabrication: The pumping system shall be provided as a complete packaged system mounted on a minimum 4" fabricated channel base suitable for mounting directly on vibration isolation without distortion. The system shall be piped, wired and supplied with control tubing to allow field installation with only two system connections, one electrical connection, and one run of tubing to drain for the thermal system.
- L. Testing and Start Up: The entire system shall be cleaned and shop coated with industrial shop enamel and run tested prior to shipment. Systems providing hydrostatic pressure test and electrical circuit check will not be acceptable. The control settings shall be set in accordance with specified set points and verified at field start up. The start-up shall be done by a factory authorized representative with report to the owner's representative. The package shall be UL Listed as a system for its intended use as required by OSHA and National Electric Code (NEC) Article 90-7.
- M. Warranty: The pumping system shall be warranted from manufacturing defects and defects in materials and workmanship for a period of 18 months from shipment or 12 months from start-up, whichever occurs first.

### 2.3 EXAMINATION

- A. Examine roughing-in for packaged booster pumps to verify actual locations of connections before booster pump installation.

### 2.4 CONCRETE BASES

- A. Install concrete bases of dimensions indicated for packaged booster pumps. Refer to Division 22 Section "Common Work Results for Plumbing."
  - 1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around full perimeter of base.
  - 2. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
  - 3. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be imbedded.
  - 4. Install anchor bolts to elevation required for proper attachment to supported equipment.
- B. Cast-in-place concrete materials and placement requirements are specified in Division 03.

### 3.1 EXECUTION

- C. Install packaged booster pumps level on concrete bases with access for periodic maintenance including removal of pumps, motors, impellers, couplings, and accessories.
  - 1. Do not dismantle packaged booster pumps or remove individual components.
- D. Vibration isolation devices are specified in Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- E. Support connected domestic water piping so weight of piping is not supported by packaged booster pumps.
- F. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

- G. Connect domestic water piping to packaged booster pumps. Install suction and discharge pipe equal to or greater than size of unit suction, discharge headers, and piping.
1. Install flexible connectors on piping connections to unit suction, discharge headers, and piping. Install flexible connectors same size as piping.
  2. Install shutoff valves on piping connections to each booster pump suction, discharge headers, and piping. Install ball, butterfly, or gate valves same size as suction, discharge headers, and piping. General-duty valves are specified in Division 22 Section "General-Duty Valves for Plumbing Piping."
  3. Install union or flanged connections on pump suction, discharge headers, and piping at connection to domestic water piping.
  4. Install piping adjacent to packaged booster pumps to allow service and maintenance.
- H. Engage a factory-authorized service representative to perform the following startup service:
1. Complete installation and startup checks according to manufacturer's written instructions.
  2. Check piping connections for tightness.
  3. Clean strainers if any.
  4. Verify that pump controls are correct for required application.
- I. Perform the following startup checks for each pump of packaged booster pump unit before starting:
1. Verify bearing lubrication.
  2. Prime pumps by opening suction valves and closing discharge valves, and prepare pumps for operation.
  3. Start motors.
  4. Open discharge valves slowly.
  5. Adjust settings.
- J. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting packaged booster pumps to suit actual occupied conditions. Provide up to two visits to Project outside normal occupancy hours for this purpose.

### **3.2 LABELING AND IDENTIFICATION**

- A. Install identifying equipment markers and equipment signs on booster pumps. Labeling and identification materials specified in Division 22 Section "Identification for Plumbing Piping and Equipment."

### **3.2 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged booster pumps. Refer to Division 01 Section "Demonstration and Training."

### **END OF SECTION 221124**

# ATTACHMENT 03

## SECTION 28 31 11 - DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Fire-alarm control unit.
  - 2. Manual fire-alarm boxes.
  - 3. System smoke detectors.
  - 4. Heat detectors.
  - 5. Notification appliances.
  - 6. Magnetic door holders.
  - 7. Remote annunciator.
  - 8. Addressable interface device.
  - 9. Digital alarm communicator transmitter.
  - 10. System printer.
  - 11. Fire alarm wire and cable.

#### 1.3 DEFINITIONS

- A. LED: Light-emitting diode.
- B. NICET: National Institute for Certification in Engineering Technologies.

#### 1.4 SYSTEM DESCRIPTION

- A. Noncoded addressable system, with automatic sensitivity control of certain smoke detectors and multiplexed signal transmission, dedicated to fire-alarm service only.

#### 1.5 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Fire-alarm control unit and raceways shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.
  - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

#### 1.6 SUBMITTALS

- A. Shop Drawings: For fire-alarm system. Include plans, elevations, sections, details, and attachments to other work. Submit simultaneously with Product Data. Include the following as a minimum shop drawing requirement.
  - 1. [Submit to authorities having jurisdiction for approval, submittals reviewed and marked "No Exceptions Taken" by Architect.]
  - 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.

- c. Licensed or certified by authorities having jurisdiction.
  3. Comply with recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72.
  4. Include voltage drop calculations for notification appliance circuits.
  5. Include battery-size calculations.
  6. 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.
  7. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale and coordinating installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.
  8. Include voice/alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
  9. Include 1/8-inch scale floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits.
  10. Show details of graphic maps. This map shall be mounted above each annunciator.
  11. Provide written Warranty as follows
    - a. The Fire System shall have a 1 year warranty starting for the date of Beneficial Occupancy.
    - b. Batteries shall have a full 1-year warranty and a 10-year pro rata warranty starting for the date of Beneficial Occupancy.
- B. Quality Assurance/Control Submittals:
1. Product Data: For each type of product indicated.
  2. Qualification Data: For Qualified Installer, and Persons preparing Shop Drawings. Submit simultaneously with Product Data.
  3. Seismic Qualification Certificates: For fire-alarm control unit, accessories, and components, from manufacturer.
    - a. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
    - b. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
    - c. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
  4. Field quality-control reports.
- C. Closeout Submittals:
1. 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," include the following:
    - a. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
    - b. Provide "Record of Completion Documents" according to NFPA 72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.
    - c. Record copy of site-specific software.
    - d. Provide "Maintenance, Inspection and Testing Records" according to NFPA 72 article of the same name and include the following:
      - 1) Frequency of testing of installed components.
      - 2) Frequency of inspection of installed components.
      - 3) Requirements and recommendations related to results of maintenance.
      - 4) Manufacturer's user training manuals.

- e. Manufacturer's required maintenance related to system warranty requirements.
  - f. Abbreviated operating instructions for mounting at fire-alarm control unit.
2. Software and Firmware Operational Documentation:
    - a. Software operating and upgrade manuals.
    - b. Program Software Backup: On magnetic media or compact disk, complete with data files.
    - c. Device address list.
    - d. Printout of software application and graphic screens.
  3. Extra Materials: Receipt for extra materials.

## 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.
  1. Installation shall be by personnel certified by NICET as fire-alarm Level II technician.
- B. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer.
- C. Fire Alarm Wire and Cable Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  1. Flame-Spread Index: 25 or less.
  2. Smoke-Developed Index: 50 or less.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

## 1.8 SOFTWARE SERVICE AGREEMENT

- A. Comply with UL 864.
- B. Technical Support: Beginning with Substantial Completion, provide software support for two years.
- C. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.
  1. Provide 30 days' notice to Owner to allow scheduling and access to system.

## 1.9 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 Remote Indicating Lamp Units: Quantity equal to 10 percent of amount installed, but no fewer than 1 unit.
  2. Lamps for Strobe Units: Quantity equal to 10 percent of amount installed, but no fewer than 1 unit.
  3. Smoke Detectors, Fire Detectors: Quantity equal to 10 percent of amount of each type installed, but no fewer than 1 unit of each type.
  4. Detector Bases: Quantity equal to 2 percent of amount of each type installed, but no fewer than 1 unit of each type.
  5. Keys and Tools: One extra set for access to locked and tamperproofed components.

6. Audible and Visual Notification Appliances: One of each type installed.
7. Fuses: Two of each type installed in the system.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Edwards; a UTC Fire & Security Company.
  2. Fike Corporation.
  3. Cornell
  4. Simplex, Grinnell
  5. NOTIFIER; a Honeywell company; only NESCO-affiliated distributors.
  6. Siemens
- B. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. The "Substitution Request Form" and complete technical data for evaluation must accompany requests for A/E's approval. All materials for evaluation must be received by the Project Manager and Specification Department at least 10 days prior to bid due date. Additional approved manufacturers will be issued by Addendum.

### **2.2 SYSTEMS OPERATIONAL DESCRIPTION**

- A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:
1. Manual stations.
  2. Heat detectors.
  3. Smoke detectors.
  4. Duct smoke detectors.
  5. Automatic sprinkler system water flow.
  6. Heat detectors in elevator shaft and pit.
  7. Fire-extinguishing system operation, including kitchen hoods.
  8. Fire standpipe system.
- B. Fire-alarm signal shall initiate the following actions:
1. Continuously operate alarm notification appliances.
  2. Identify alarm at fire-alarm control unit and remote annunciators.
  3. Transmit an alarm signal to the remote alarm receiving station.
  4. Release fire and smoke doors held open by magnetic door holders.
  5. Activate voice/alarm communication system.
  6. Switch designated heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
  7. Close smoke dampers in air ducts of designated air-handling duct systems.
  8. Transmit an alarm signal to building management system per air-handling systems zone.
  9. Recall elevators to primary or alternate recall floors by designated detectors.
  10. Activate elevator shunt-trip circuit breakers by designated detectors.
  11. Activate kitchen equipment shunt-trip circuit breakers on fire-extinguishing system operation.
  12. Activate emergency lighting control for theatrical lighting system.
  13. Activate emergency shutoffs for gas and fuel supplies.
  14. Record events in the system memory.
  15. Record events by the system printer.
- C. Supervisory signal initiation shall be by one or more of the following devices and actions:
1. Valve supervisory switch.

2. Low-air-pressure switch of a dry-pipe sprinkler system.
  3. Elevator shunt-trip supervision.
  4. Kitchen equipment shunt-trip supervision.
- D. 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. Fire-pump power failure, including a dead-phase or phase-reversal condition.
  10. Low-air-pressure switch operation on a dry-pipe or preaction sprinkler system.
- E. System Trouble and Supervisory Signal Actions: Initiate notification appliance and annunciate at fire-alarm control unit and remote annunciators. Record the event on system printer.

### 2.3 FIRE-ALARM CONTROL UNIT

- 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.
    - a. 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.
    - b. Include a real-time clock for time annotation of events on the event recorder and printer.
  2. Addressable initiation devices that communicate device identity and status.
    - a. Smoke sensors shall additionally communicate sensitivity setting and allow for adjustment of sensitivity at fire-alarm control unit.
    - b. Temperature sensors shall additionally test for and communicate the sensitivity range of the device.
  3. Addressable control circuits for operation of mechanical equipment.
- B. 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 40 characters, minimum.
  2. Keypad: Arranged to permit entry and execution of programming, display, and control commands and to indicate control commands to be entered into the system for control of smoke-detector sensitivity and other parameters.
- C. Circuits:
1. Initiating Device, Notification Appliance, and Signaling Line Circuits: NFPA 72, Class B.
    - a. Initiating Device Circuits: Style A.
    - b. Notification Appliance Circuits: Style Y.
    - c. Signaling Line Circuits: Style 4.
    - d. Install no more than 70 percent rated capacity of addressable devices on each signaling line circuit.

- e. Install no more than 70 percent rated capacity of notification appliances on each notification appliance circuit.
- 2. Serial Interfaces: Two RS-232 ports for service modem and printer.
- D. Elevator Recall:
  - 1. Smoke detectors at the following locations shall initiate automatic elevator recall.
    - a. Elevator lobby detectors except the lobby detector on the designated floor.
    - b. Smoke detector in elevator machine room.
    - c. Smoke detectors in elevator hoistway.
  - 2. Elevator lobby detectors located on the designated recall floors shall be programmed to move the cars to the alternate recall floor.
  - 3. Heat detectors in alarm installed in an elevator shaft and elevator machine room shall shut down elevators associated with the location without time delay. Detector shall be mounted within 12 inches of sprinkler head and within 12 inches of top of shaft and in elevator pit.
- E. Door Controls: Door hold-open devices that are controlled by smoke detectors at doors in smoke barrier walls shall be connected to fire-alarm system.
- F. Remote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and change those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory, and print out the final adjusted values on system printer.
- G. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.
- H. Voice/Alarm Signaling Service: Central emergency communication system with redundant microphones, preamplifiers, amplifiers, and tone generators provided as a special module that is part of fire-alarm control unit.
  - 1. Indicated number of alarm channels for automatic, simultaneous transmission of different announcements to different zones or for manual transmission of announcements by use of the central-control microphone. Amplifiers shall comply with UL 1711 and be listed by an NRTL.
    - a. Allow the application of and evacuation signal to indicated number of zones and, at same time, allow voice paging to the other zones selectively or in any combination.
    - b. Programmable tone and message sequence selection.
    - c. Standard digitally recorded messages for "Evacuation" and "All Clear." Coordinate message with local A.H.J.
    - d. Generate tones to be sequenced with audio messages of type recommended by NFPA 72 and that are compatible with tone patterns of notification appliance circuits of fire-alarm control unit.
  - 2. Status Annunciator: Indicate the status of various voice/alarm speaker zones and the status of firefighters' two-way telephone communication zones. Coordinate exact location of firefighters two-way telephone with local fire department.
  - 3. Preamplifiers, amplifiers, and tone generators shall automatically transfer to backup units, on primary equipment failure.
- I. Printout of Events: On receipt of signal, print alarm, supervisory, and trouble events. Identify zone, device, and function. Include type of signal (alarm, supervisory, or trouble) and date and time of occurrence. Differentiate alarm signals from all other printed indications. Also print system reset event, including same information for device, location, date, and time. Commands initiate the printing of a list of existing alarm, supervisory, and trouble conditions in the system and a historical log of events.

- J. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, supervisory and digital alarm communicator transmitters 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.
- K. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.
  - 1. Backup Battery: Premium, valve-regulated, recombinant-sealed, lead-calcium battery; spill proof; with a warranty per PART 1 above. Provide a single-stage, constant-voltage-current, limited battery charger, comply with battery manufacturer's written instructions for battery terminal voltage and charging current recommendations for maximum battery life.
  - 2. Backup Power Supply Capacity: Comply with NFPA 72, but not less than 24 hours normal and 30 minutes alarm operation.
- L. 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.

## 2.4 MANUAL FIRE-ALARM BOXES

- A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be 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.
  - 1. Single-action mechanism, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
  - 2. Station Reset: Key- or wrench-operated switch.
  - 3. Weatherproof Protective Shield: Factory-fabricated clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm.

## 2.5 SYSTEM SMOKE DETECTORS

- A. General Requirements for System Smoke Detectors:
  - 1. Comply with UL 268; operating at 24-V dc, nominal.
  - 2. Detectors shall be four-wire type.
  - 3. 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.
  - 4. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
  - 5. Integral Visual-Indicating Light: LED type indicating detector has operated and power-on status.
  - 6. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by fire-alarm control unit.
    - a. Rate-of-rise temperature characteristic shall be selectable at fire-alarm control unit for 15 or 20 deg F per minute.
    - b. Fixed-temperature sensing shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control unit to operate at 135 or 155 deg F .
    - c. Provide multiple levels of detection sensitivity for each sensor.
- B. Photoelectric Smoke Detectors:
  - 1. 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.

2. 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.).
- C. Duct Smoke Detectors: Photoelectric type complying with UL 268A.
  1. 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.
  2. 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.).
  3. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with the supplied detector.
  4. Each sensor shall have multiple levels of detection sensitivity.
  5. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.

## 2.6 HEAT DETECTORS

- A. General Requirements for 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 that exceeds 15 deg F per minute unless otherwise indicated.
  1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
  2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
- 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. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
  3. Devices to be mounted in kitchen and mechanical rooms.

## 2.7 NOTIFICATION APPLIANCES

- A. General Requirements for Notification Appliances: Connected to notification appliance signal circuits, zoned as indicated, with screw terminals for system connections, and shall be mounted on recessed outlet box.
  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.
  2. Combination Devices: Factory-integrated voice/alarm and visible devices in a single-mounting assembly, equipped for mounting as indicated and with screw terminals for system connections.

- B. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464. Horns shall produce a sound-pressure level of 90 dBA, measured 10 feet from the horn, using the coded signal prescribed in UL 464 test protocol.
- C. Visible Notification Appliances: Xenon strobe lights comply with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch-high letters on the lens.
1. Rated Light Output: 110 cd, unless indicated otherwise.
  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 in a temporal pattern, synchronized with other units.
  5. Strobe Leads: Factory connected to screw terminals.
  6. Mounting Faceplate: Factory finished, red.
- D. Weatherproof Bells: Electric-vibrating, 24-V dc, under-dome type; with provision for housing operating mechanism behind bell. Bells shall produce a sound-pressure level of 94 dBA, measured 10 feet from bell. 10-inch size, unless otherwise indicated.
- E. Voice/Alarm Notification Appliances:
1. Appliances shall comply with UL 1480 and shall be listed and labeled by an NRTL.
    - a. Cone-Type Loudspeakers:
      - 1) High-Range Units: Rated 2 to 8 W.
        - a) Minimum Axial Sensitivity: 93 dB at 10 feet at rated output.
      - 2) Low-Range Units: Rated 1/4 to 2 W.
        - a) Minimum Axial Sensitivity: 84 dB at 10 feet at rated output.
      - 3) Frequency Response: Within plus or minus 3 dB from 400 to 4,000 Hz.
      - 4) Minimum Dispersion Angle: 100 degrees, minus 6 dB at 2,000 Hz.
      - 5) Matching Transformer: Full-power rated with four taps. Maximum insertion loss of 0.5 dB.
      - 6) Mounting: Flush or semirecessed, wall and ceiling mounted, unless noted otherwise.
        - a) Flush-Ceiling-Mounting Units: In steel back boxes. Metal ceiling grille with white baked enamel.
        - b) In exposed structure areas provide a metal backbox painted to match structure, support to structure with uni-strut as required.
    - b. Horn-Type Loudspeakers:
      - 1) Type: Single- and multiple-horn units, double-reentrant design, with minimum full-range power rating of 15 W.
      - 2) Minimum Axial Sensitivity: 102 dB at 10 feet at rated output.
      - 3) Frequency Response: Within plus or minus 3 dB from 400 to 4,000 Hz.
      - 4) Minimum Dispersion Angle: 70 degrees, minus 6 dB at 2,000 Hz.
      - 5) Matching Transformer: Full-power rated with four standard taps. Maximum insertion loss of 0.5 dB.
      - 6) Mounting: Integral bracket.
        - a) Multiple-horn Units: Factory installed to prefabricated 10- by 10- by 6-inch nominal steel enclosure suitable for pendent mounting.
        - b) In gym area provide documentation of speaker coverage.

**2.8 NOTIFICATION APPLIANCE CIRCUIT POWER SUPPLY UNITS**

- A. General Requirements for Notification Appliance Circuit Power Supply Unit:
  - 1. Power-limited design, complying with UL 864 and listed and labeled by an NRTL.
- B. Notification Appliance Circuits: NFPA 72, Class B, Style Y.
  - 1. Install no more than 70 percent rated capacity of notification appliances on each notification appliance circuit.
- C. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, trouble signals, and supervisory signals shall be powered by 24-V dc source.
  - 1. Alarm current draw of entire notification appliance circuit power supply unit shall not exceed 80 percent of the power-supply module rating.
  - 2. Provide 120V circuit from an emergency power panel to each remote power supply.
- D. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.
  - 1. Backup Battery: Premium, valve-regulated, recombinant-sealed, lead-calcium battery; spill proof; with a full 1-year warranty and a pro rata 19-year warranty. With single-stage, constant-voltage-current, limited battery charger, comply with battery manufacturer's written instructions for battery terminal voltage and charging current recommendations for maximum battery life.
  - 2. Backup Power Supply Capacity: Comply with NFPA 72, but not less than 24 hours normal and 30 minutes alarm operation.

**2.9 MAGNETIC DOOR HOLDERS**

- A. Products: Subject to compliance with requirements, provide one of the following products:
  - 1. Dorma-USA: EM508-24120
  - 2. Edwards Signaling: 1508-AQN5
  - 3. GE Security: 1508-AQN5
  - 4. Honeywell Notifier: FM996
  - 5. LCN Closers: SEM 7830/ SEM 1960
  - 6. Rixson Specialty Door Controls: 996/ 991
  - 7. Sargent Lock: 1560
  - 8. Siemens: SDH-3
- B. Description: Units are equipped for wall mounting complete with matching doorplate.
  - 1. Electromagnet: Requires no more than 3 W to develop 25-lbf holding force.
  - 2. Wall-Mounted Units: Flush mounted with maximum 1.625-inch deep pin-pivoted door armature. Provide ball-jointed catches and extension links on door armatures as required for proper operation.
  - 3. Rating: 120-V ac.
- C. Material and Finish: Brushed or painted aluminum.

**2.10 REMOTE ANNUNCIATOR**

- A. Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.
  - 1. Mounting: Flush cabinet, NEMA 250, Type 1.

- B. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.
  - 1. Graphic Map:
    - a. Graphic: Full color image printed on the reverse side of a 10 mil polycarbonate Lexan laminated to a 1/8-inch rigid backing with a removable adhesive for future replacement.
    - b. Frame: Black anodized aluminum frame with concealed security hanging system to prevent unauthorized removal.
    - c. Location of fire-alarm control unit, main graphic map and other graphic maps shall be shown in red with "YOU ARE HERE" printed in red. Detection devices, nomenclature, and building detail shall be color coded as selected by Owner and Architect/Engineer.
    - d. Mounting: Adjacent to remote annunciator.

## 2.11 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 the following:
  - 1. Elevator controller to initiate elevator recall.
  - 2. Circuit-breaker shunt trip for power shutdown.
  - 3. Theatrical lighting controller for panic lighting.
  - 4. Heating, ventilating, and air-conditioning equipment controllers for power shutdown.
  - 5. Smoke dampers for closing.
  - 6. Magnetic door holders, electric locks, coiling doors and grilles for releasing.
  - 7. Building management system for equipment shutdown and alarm notification.
  - 8. Gas and fuel solenoid valves for emergency shut-off.
- C. Voltage Sensing Relay: Capable of detecting presence of 120 V ac for supervision of control power for shunt-trip circuit breakers.

## 2.12 DIGITAL ALARM COMMUNICATOR TRANSMITTER

- A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632 and be listed and labeled by an NRTL.
- B. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from fire-alarm control unit and automatically capture two telephone lines and dial a preset number for a remote central station. When contact is made with central station, signals shall be transmitted. If service on either line is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal and transmit the signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. Transmitter shall automatically report telephone service restoration to the central station. If service is lost on both telephone lines, transmitter shall initiate the local trouble signal.
- C. Local functions and display at the digital alarm communicator transmitter shall include the following:
  - 1. Verification that both telephone lines are available.
  - 2. Programming device.
  - 3. LED display.
  - 4. Manual test report function and manual transmission clear indication.
  - 5. Communications failure with the central station or fire-alarm control unit.

D. Digital data transmission shall include the following:

1. Address of the alarm-initiating device.
2. Address of the supervisory signal.
3. Address of the trouble-initiating device.
4. Loss of ac supply or loss of power.
5. Low battery.
6. Abnormal test signal.
7. Communication bus failure.

E. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

**2.13 SYSTEM PRINTER**

- A. Printer shall be listed and labeled by an NRTL as an integral part of fire-alarm system, and installed in the FACP.

**2.14 PATHWAYS**

- A. Conduit and Boxes: Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems."

1. Outlet boxes shall be no smaller than 2 inches wide, 3 inches high, and 2-1/2 inches deep.

**2.15 FIRE ALARM WIRE AND CABLE**

- A. General Wire and Cable Requirements: NRTL listed and labeled as complying with NFPA 70, Article 760.
- B. Signaling Line Circuits: Twisted, shielded pair, not less than No. 18 AWG.
- C. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.
1. Low-Voltage Circuits: No. 16 AWG, minimum.
  2. Line-Voltage Circuits: No. 12 AWG, minimum.
  3. Multiconductor Armored Cable: NFPA 70, Type MC, copper conductors, Type TFN/THHN conductor insulation, copper drain wire, copper armor with red identifier stripe, NRTL listed for fire alarm and cable tray installation, plenum rated, and complying with requirements in UL 2196 for a 2-hour rating.

**2.16 IDENTIFICATION PRODUCTS**

- A. Comply with UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.
- B. Comply with requirements in Division 26 Section "Identification for Electrical Systems."

**2.17 DEVICE GUARDS**

- A. Description: Welded wire mesh of size and shape for the manual station, smoke detector, gong, or other device requiring protection.
1. Factory fabricated and furnished by manufacturer of device.
  2. Finish: Paint of color to match the protected device.

**PART 3 - EXECUTION****3.1 INSTALLATION OF PATHWAYS**

- A. Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems." for installation of conduits and wireways.

**3.2 FIRE ALARM WIRING INSTALLATION**

- A. Comply with NECA 1 and NFPA 72.
- B. Wiring Method: Install wiring in a dedicated raceway system according to Division 26 Section "Raceway and Boxes for Electrical Systems," except within consoles, cabinets, desks, and counters. This system shall not be used for any other wire or cable. Conceal raceways except in unfinished spaces.
- 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 another 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.
- F. Wiring to Remote Alarm Transmitting Device: 1-inch conduit between the fire alarm control panel and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

**3.3 EQUIPMENT INSTALLATION**

- A. Comply with NECA 305.
- B. Comply with NFPA 72 for installation of fire-alarm equipment.
- C. Equipment Mounting: Install wall-mounted equipment, with tops of cabinets not more than 72 inches above the finished floor.
  - 1. Comply with requirements for seismic-restraint devices specified in Division 26 Section "Vibration and Seismic Controls for Electrical Systems."
- D. HVAC: Locate detectors not closer than 3 feet from air-supply diffuser on return-air opening.
- E. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct.
  - 1. Provide for air-handling units with capacity of 2000 cfm or greater.
  - 2. Provide for variable air volume type fan-powered terminal units served by return air plenums with capacity of 2000 cfm or greater.
  - 3. Provide within 5 feet of smoke dampers.

- F. Heat Detectors in Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location.
- G. Remote Status and Alarm Indicators: Install near each smoke detector and each sprinkler water-flow switch and valve-tamper switch that is not readily visible from normal viewing position.
  - 1. Install flush in ceiling below duct smoke detectors, unless otherwise indicated.
  - 2. Install in public space near device they monitor. Do not install in normally unoccupied spaces.
- H. Audible Alarm-Indicating Devices: Install not less than 6 inches below the ceiling. Install bells, wall speakers, and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille.
- I. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches below the ceiling.
- J. Notification Appliance Circuit Power Supply Units: Provide quantity of units required for notification appliances indicated.
  - 1. Provide system smoke detector at each group of units.
  - 2. Provide 120 V, 20 A circuit to each unit from an emergency panel.
- K. Mechanical Equipment Rooms and Kitchens: Provide 190 deg F fixed heat detectors.
- L. Device Location-Indicating Lights: Locate in public space near the device they monitor.
- M. Fire-Alarm Control Unit: Surface mounted, with tops of cabinets not more than 72 inches above the finished floor.
- N. Annunciator: Install with top of panel not more than 72 inches above the finished floor.
- O. Wire Guards: Install wire guards on fire alarm devices located in gymnasias, multi-purpose rooms, stages, and shop areas.
- P. Sprinkler Bell: Install weatherproof bell at fire department connections.
- Q. Digital Alarm Communicator Transmitter: Where digital alarm communicator transmitter is not installed in fire-alarm control unit, provide 1-inch conduit between fire-alarm control unit and digital alarm communicator transmitter.
- R. Additional mounting heights are specified in Division 26 Section "Wiring Devices."

### 3.4 CONNECTIONS

- A. For fire-protection systems related to overhead coiling fire doors and coiling counter fire doors in fire-rated walls and partitions and in smoke partitions, comply with requirements in Division 08 Section "Overhead Coiling Fire Doors" and Division 08 Section "Coiling Counter Fire Doors." 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. Smoke dampers in air ducts of designated air-handling duct systems.
  - 2. Air-handling unit controllers of designated air-handling systems.
  - 3. Variable air volume type fan-powered box controllers of designated air-handling systems.
  - 4. Release magnetic door holders.
  - 5. Activate circuit breaker shunt-trip to elevator controller.

6. Activate circuit breaker shunt-trip to designate kitchen equipment.
7. Alarm-initiating connection to building management system of designated air-handling duct system.
8. Alarm-initiating connection to elevator recall system and components.
9. Alarm-initiating connection to activate theatrical lighting control.
10. Alarm-initiating connection to activate emergency shutoffs for gas and fuel supplies.
11. Alarm-initiating connection to overhead coiling fire doors and coiling counter fire doors.
12. Supervisory connections at valve supervisory switches.
13. Supervisory connections at low-air-pressure switch of each dry-pipe sprinkler system.
14. Supervisory connections at elevator shunt trip breaker.
15. Supervisory connections at kitchen equipment shunt trip breakers.

### 3.5 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.

### 3.6 FIRESTOPPING

- A. Comply with requirements in Division 07 Section "Firestopping."

### 3.7 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.

### 3.8 FIELD QUALITY CONTROL

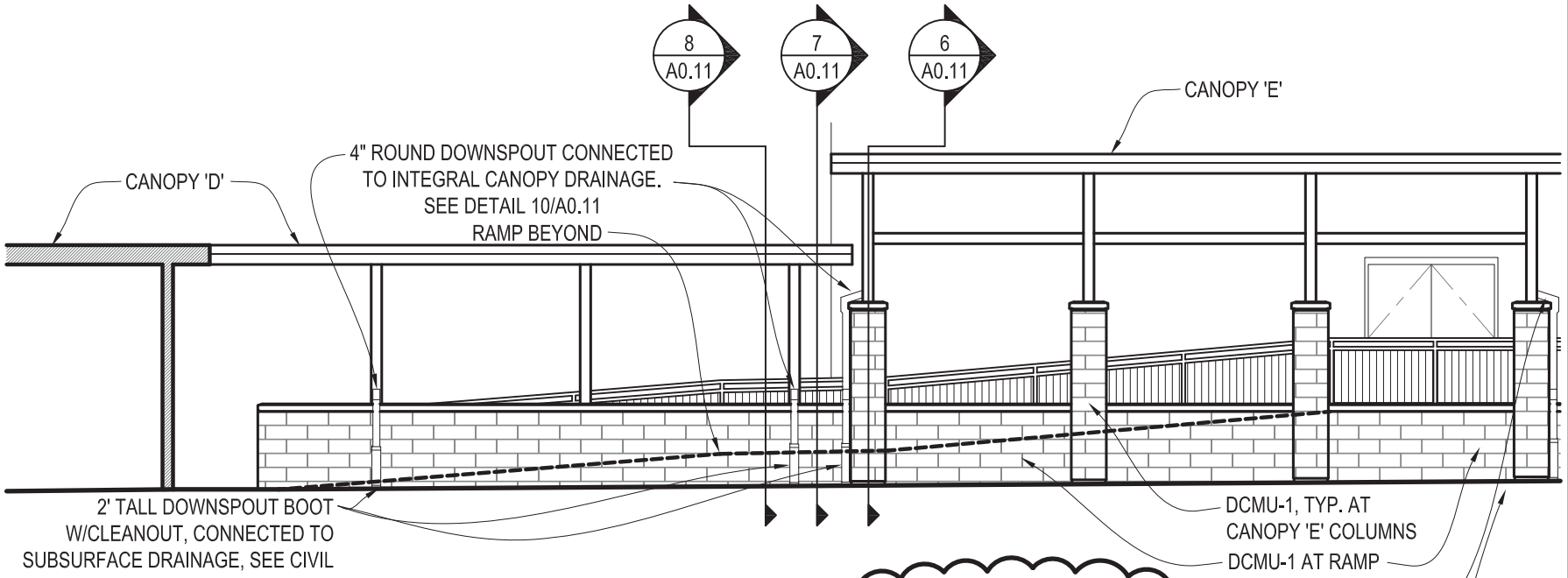
- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- B. Tests and Inspections:
  1. Visual Inspection: Conduct visual inspection prior to testing.
    - a. Inspection 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.
    - b. 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.
  2. System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
  3. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
- C. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.
- D. Fire-alarm system will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

- F. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.
- G. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

**3.9 DEMONSTRATION**

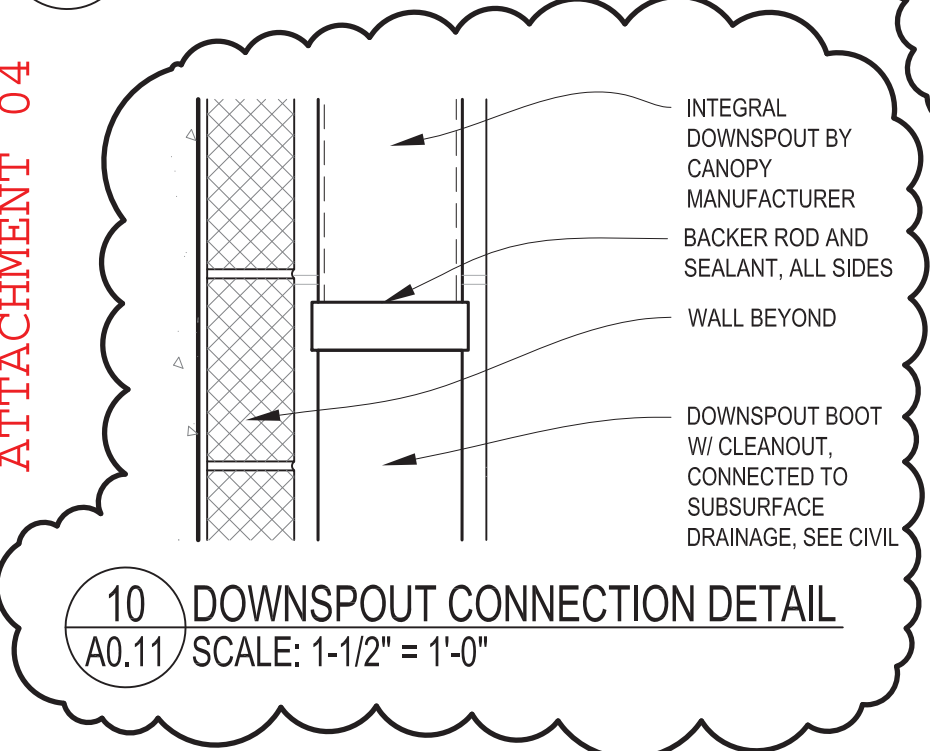
- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

**END OF SECTION 283111**



**4** CANOPY ELEVATION - PLAY AREA  
 A0.11 SCALE: 1/8" = 1'-0"

INTEGRAL DOWNSPOUT (BY CANOPY MANUFACTURE) EXTENDING TO DOWNSPOUT BOOTH. SEE DETAIL 10/A0.11  
 2'-0' TALL DOWNSPOUT BOOT W/ CLEANOUT, CONNECTED TO SUBSURFACE DRAINAGE, SEE CIVIL



**10** DOWNSPOUT CONNECTION DETAIL  
 A0.11 SCALE: 1-1/2" = 1'-0"

ATTACHMENT 05



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NEW 3 SECTION ELEMENTARY SCHOOL  
 AT FISK-HOWARD SCHOOL  
 RECOVERY SCHOOL DISTRICT  
 211 S. LOPEZ STREET NEW ORLEANS, LOUISIANA 70119

DATE ISSUED: 7 DECEMBER, 2012  
 REVISED: ACCENDUM 02, 23 JANUARY, 2013  
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 REVISED:  
 DRAWN BY: RPB  
 CHECKED BY: DGR  
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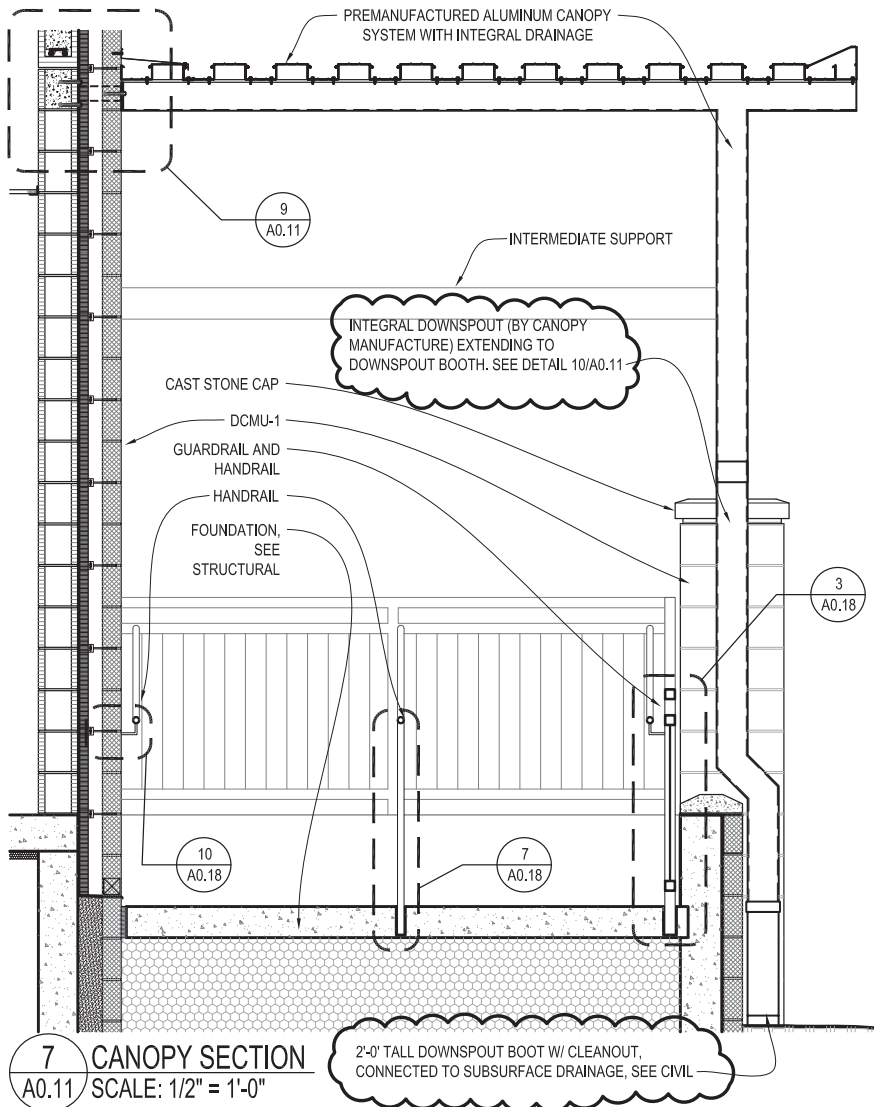
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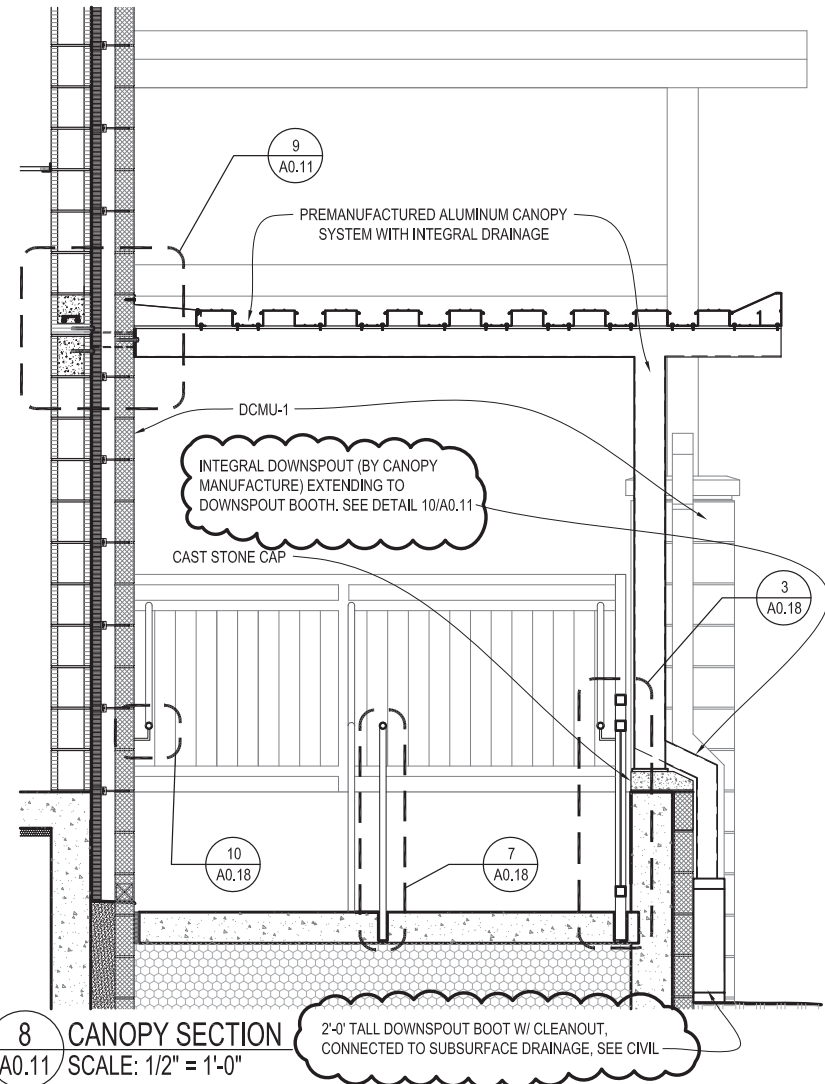
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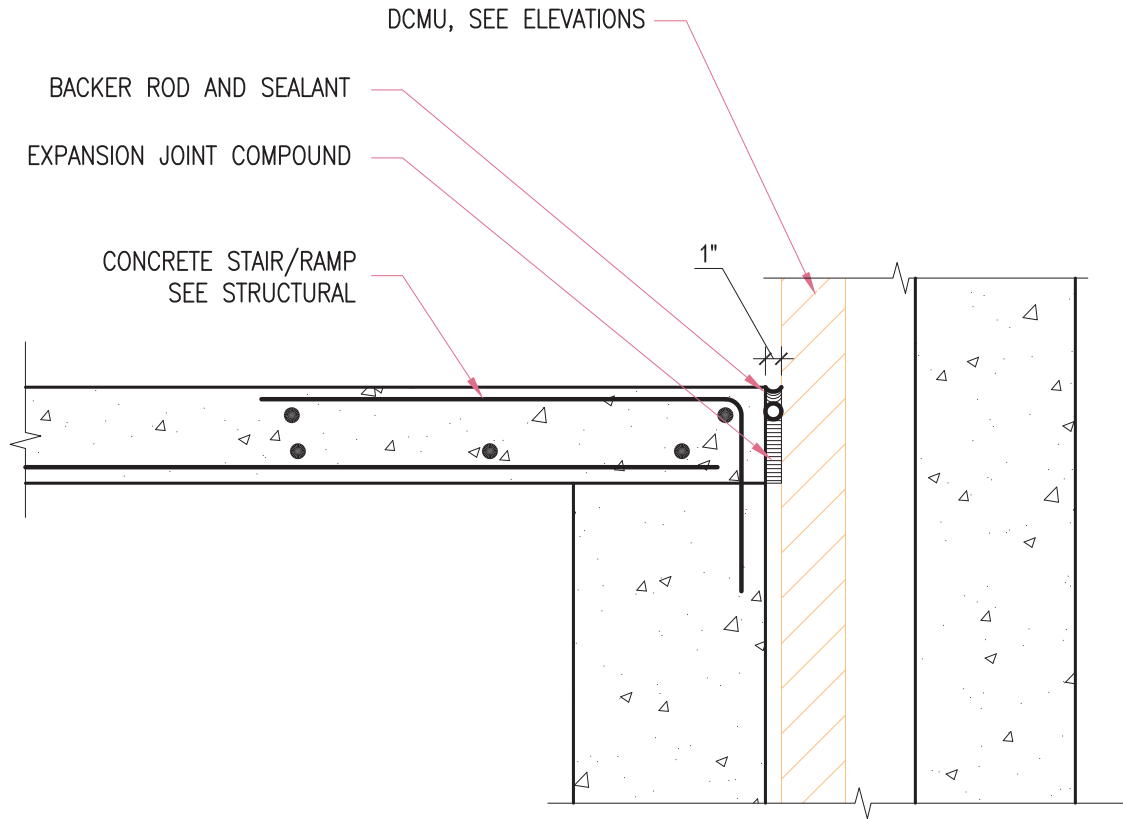


**7 CANOPY SECTION**  
 A0.11 SCALE: 1/2" = 1'-0"



**8 CANOPY SECTION**  
 A0.11 SCALE: 1/2" = 1'-0"

# ATTACHMENT 06



15 BUILDING ISOLATION JOINT, TYP.  
A0.18 SCALE: 1/4" = 1'-0"

11085

TITLE:  
TYP. STAIR AND RAMP  
SECTIONS AND DETAILS

SHEET: SK-1/A0.18

DATE ISSUED: 7 DECEMBER 2012  
REVISED: ADDENDUM 02-23 JANUARY 2013  
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RECOVERY SCHOOL DISTRICT

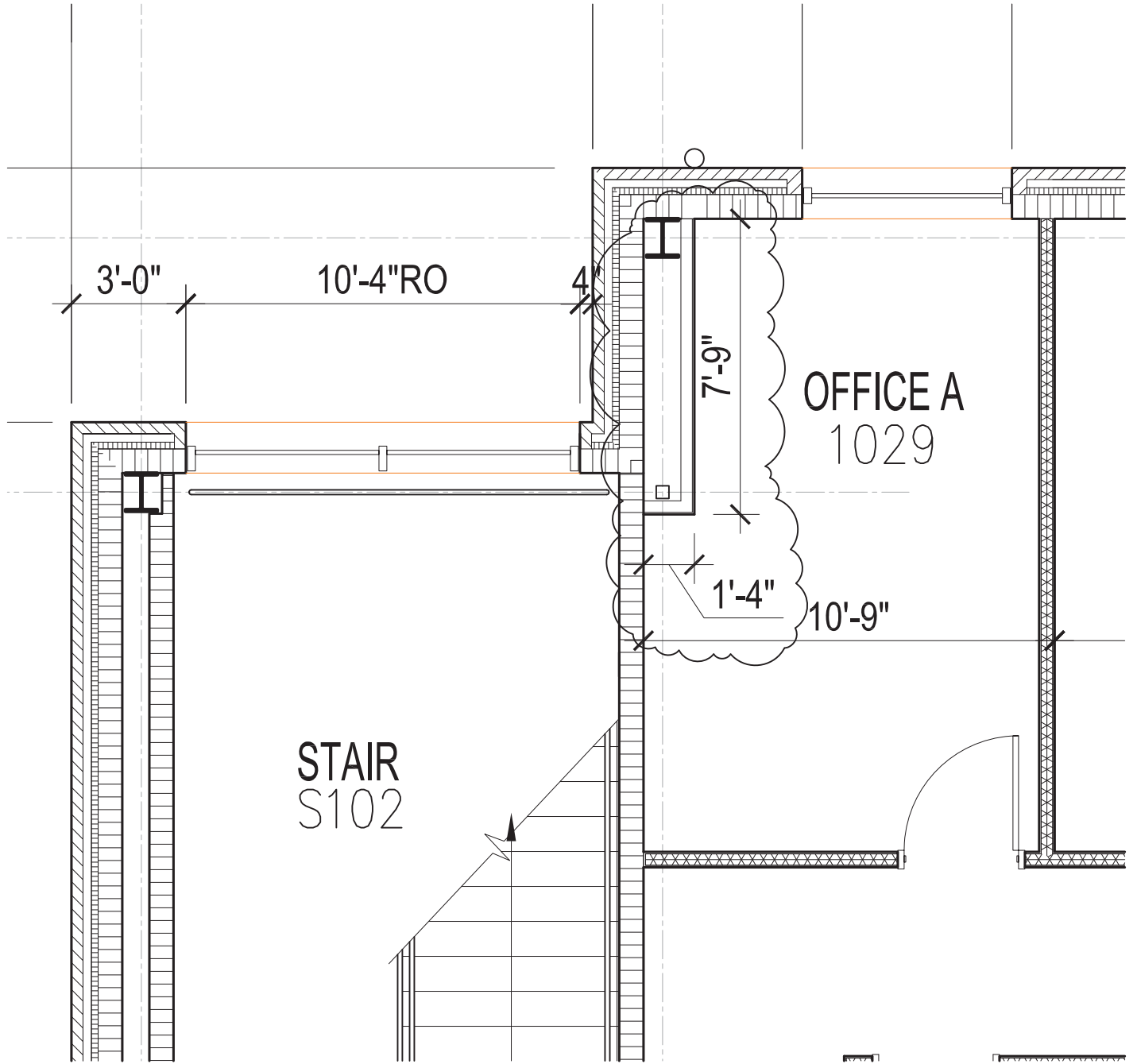
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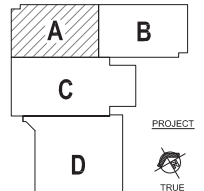


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ATTACHMENT 07



**A** PARTIAL PLAN - UNIT A - FIRST FLOOR  
 A1.11A SCALE: 1/4" = 1'-0"



KEY PLAN

11085

TITLE:  
 PARTIAL PLAN  
 UNIT A - 1ST FLOOR

SHEET: SK-1/A1.11A BID DOCUMENTS

DATE ISSUED: 7 DECEMBER 2012  
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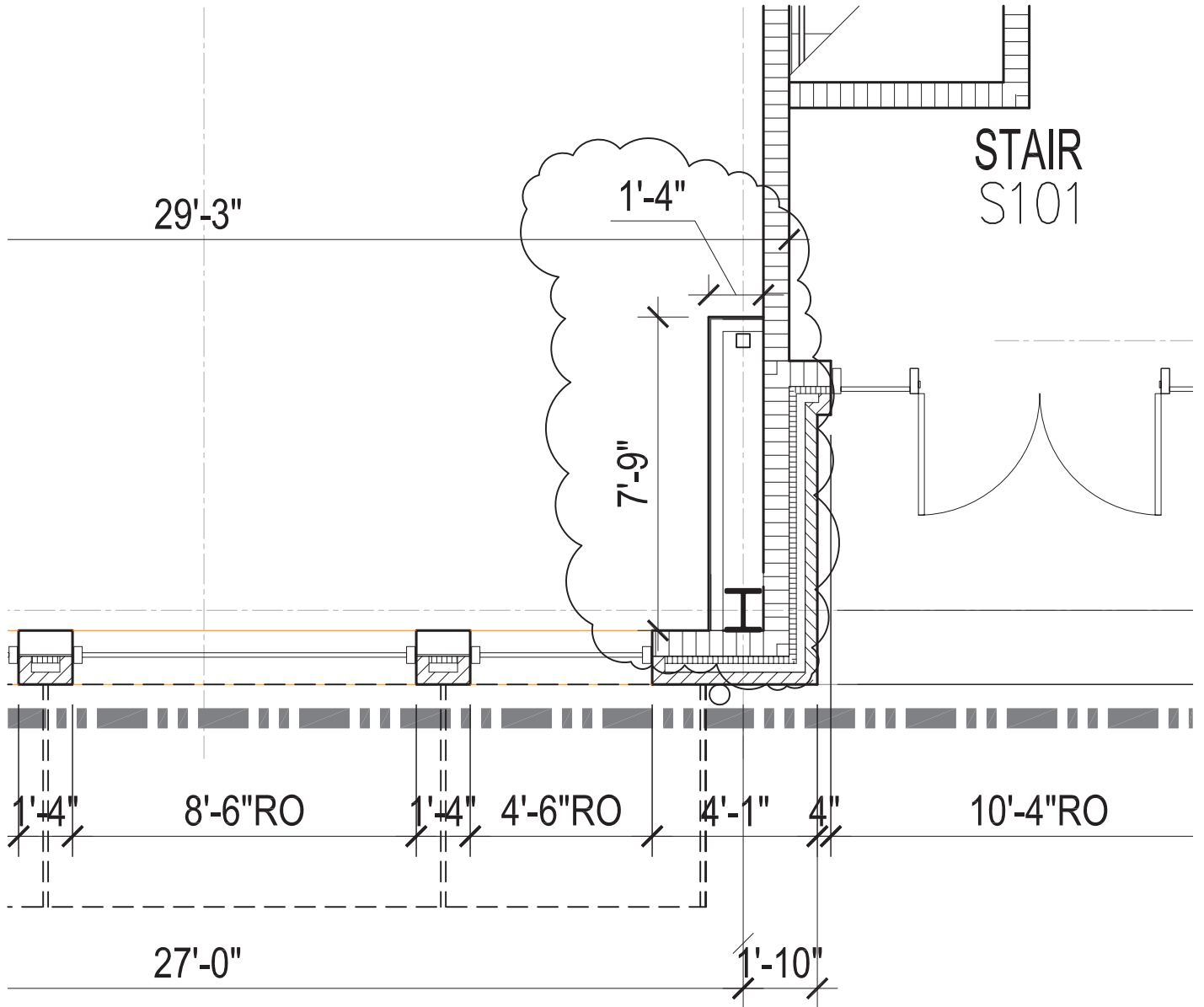
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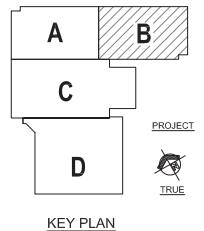


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# ATTACHMENT 08



A PARTIAL PLAN - UNIT B - FIRST FLOOR  
A1.12A SCALE: 1/4" = 1'-0"



**11085**

TITLE:  
PARTIAL PLAN  
UNIT B - 1ST FLOOR

SHEET: **SK-1/A1.12A** BID DOCUMENTS

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 AT FISK-HOWARD SCHOOL  
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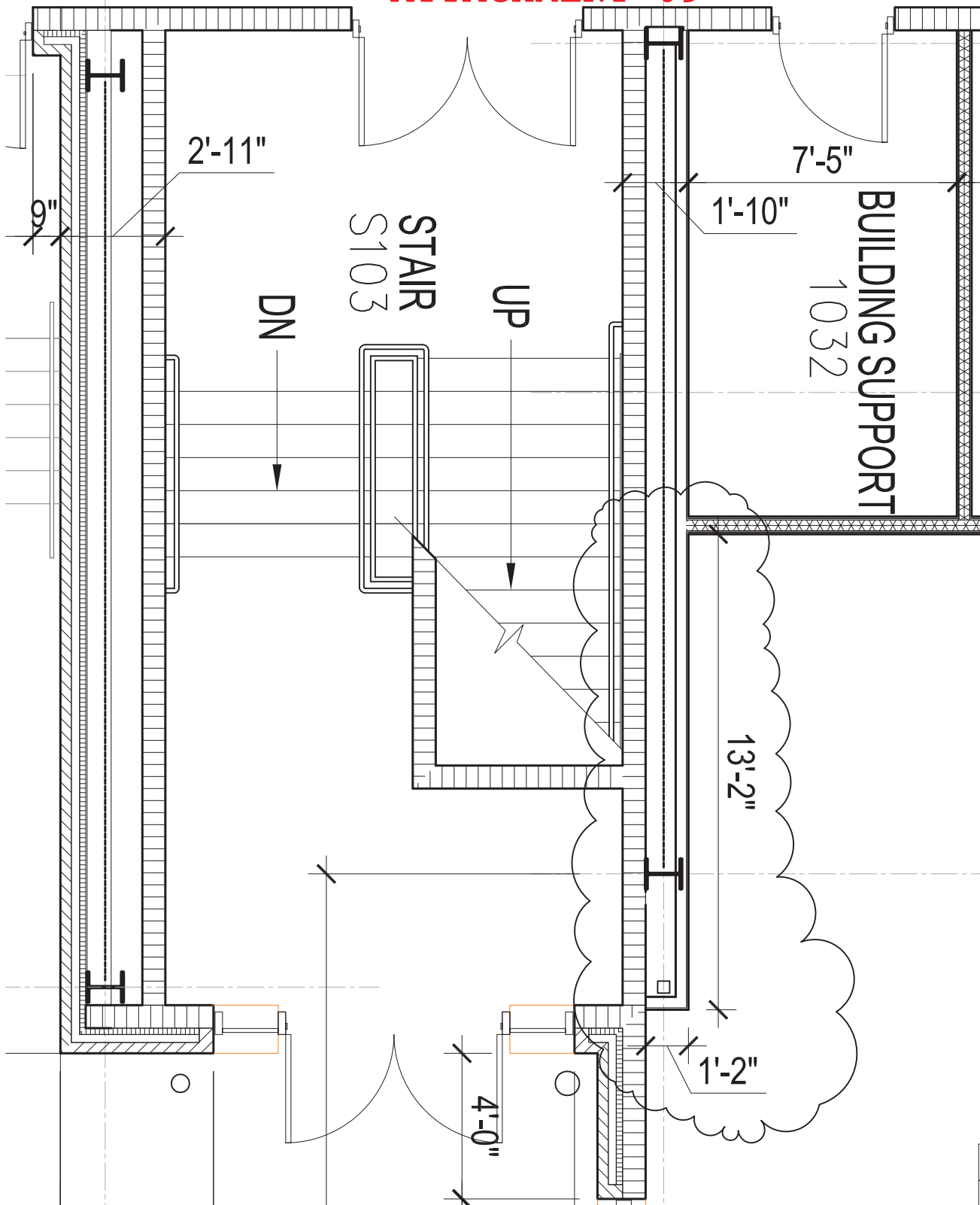
VergesRome

Architects

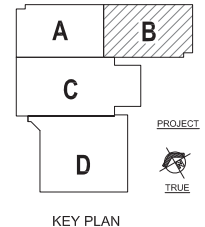
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**A** PARTIAL PLAN - UNIT B - FIRST FLOOR  
 A1.12A SCALE: 1/4" = 1'-0"

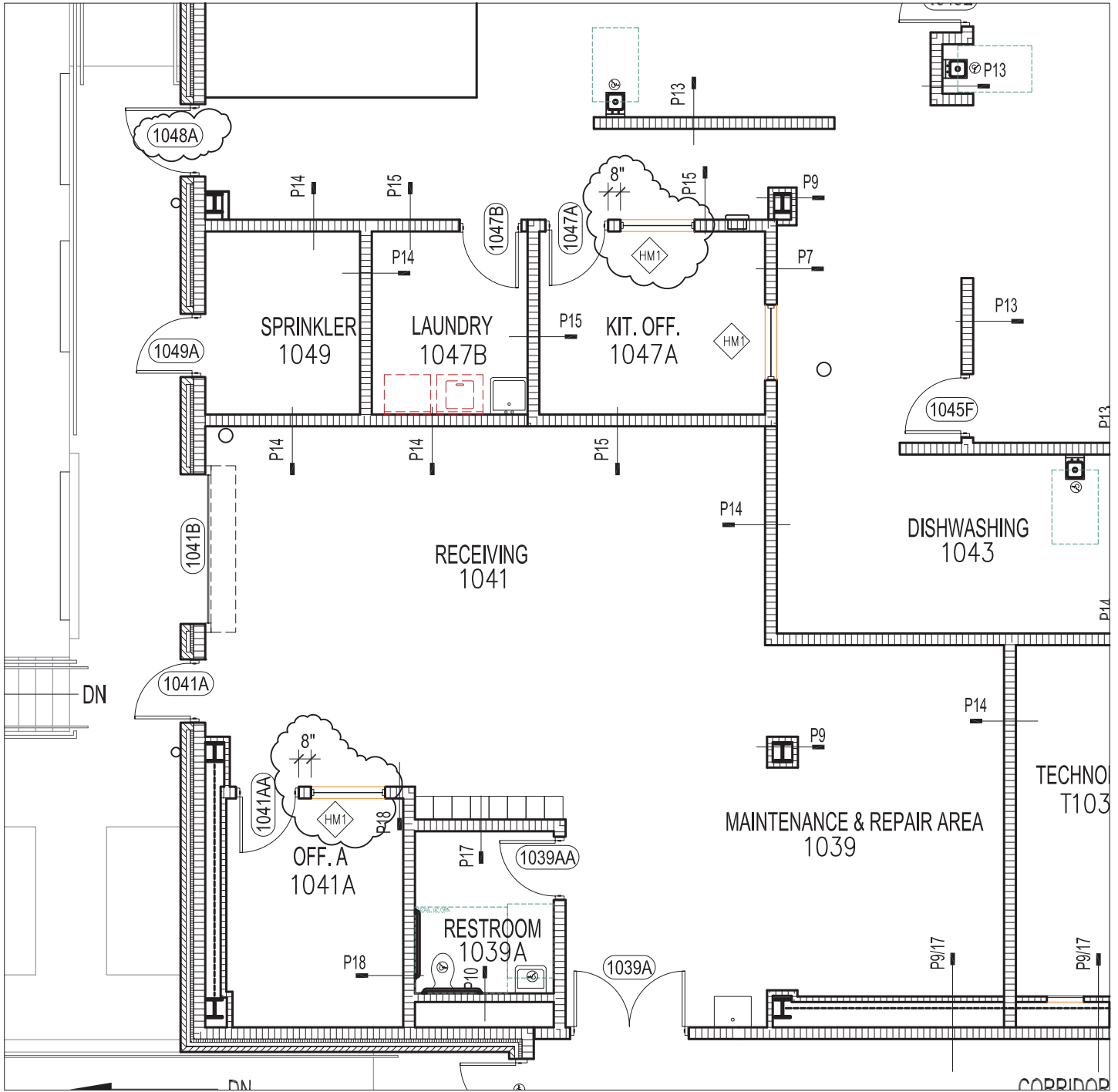


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 SHEET: SK-2/A1.12A  
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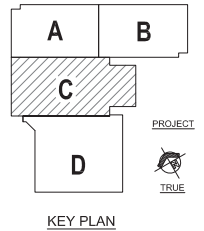
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# ATTACHMENT 10



A
**PARTIAL PLAN - UNIT C - FIRST FLOOR**  
A1.13
**SCALE: 1/8" = 1'-0"**

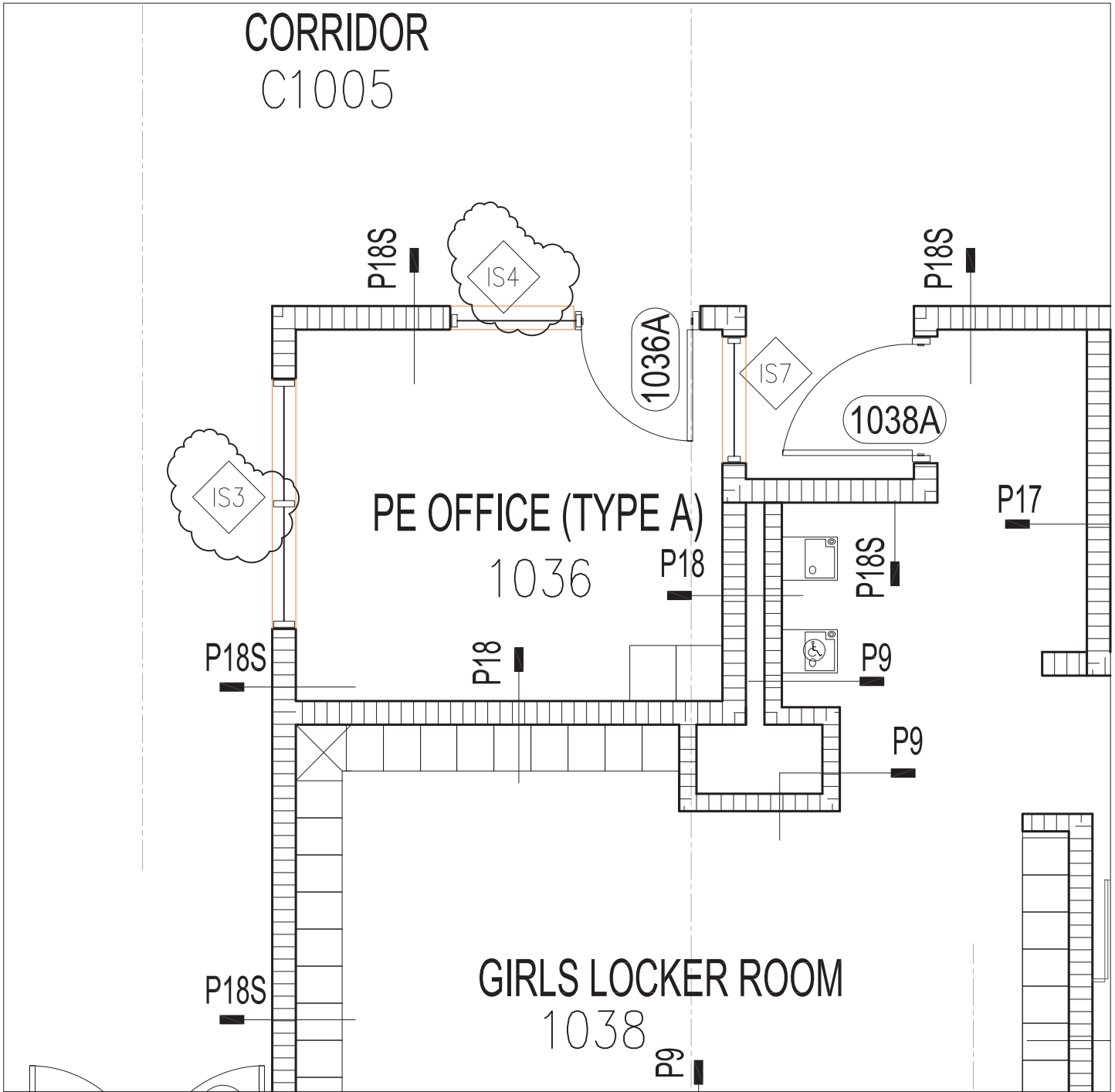


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 TITLE: PARTIAL PLAN UNIT C - 1ST FLOOR  
 SHEET: **SK-1/A1.13** BID DOCUMENTS

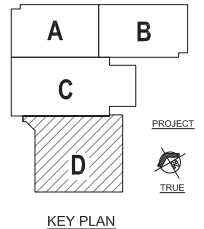
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ATTACHMENT 11



**A** PARTIAL PLAN - UNIT D - FIRST FLOOR  
A1.14 SCALE: 1/8" = 1'-0"



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TITLE:  
PARTIAL PLAN  
UNIT D - 1ST FLOOR

SHEET: SK-1/A1.14

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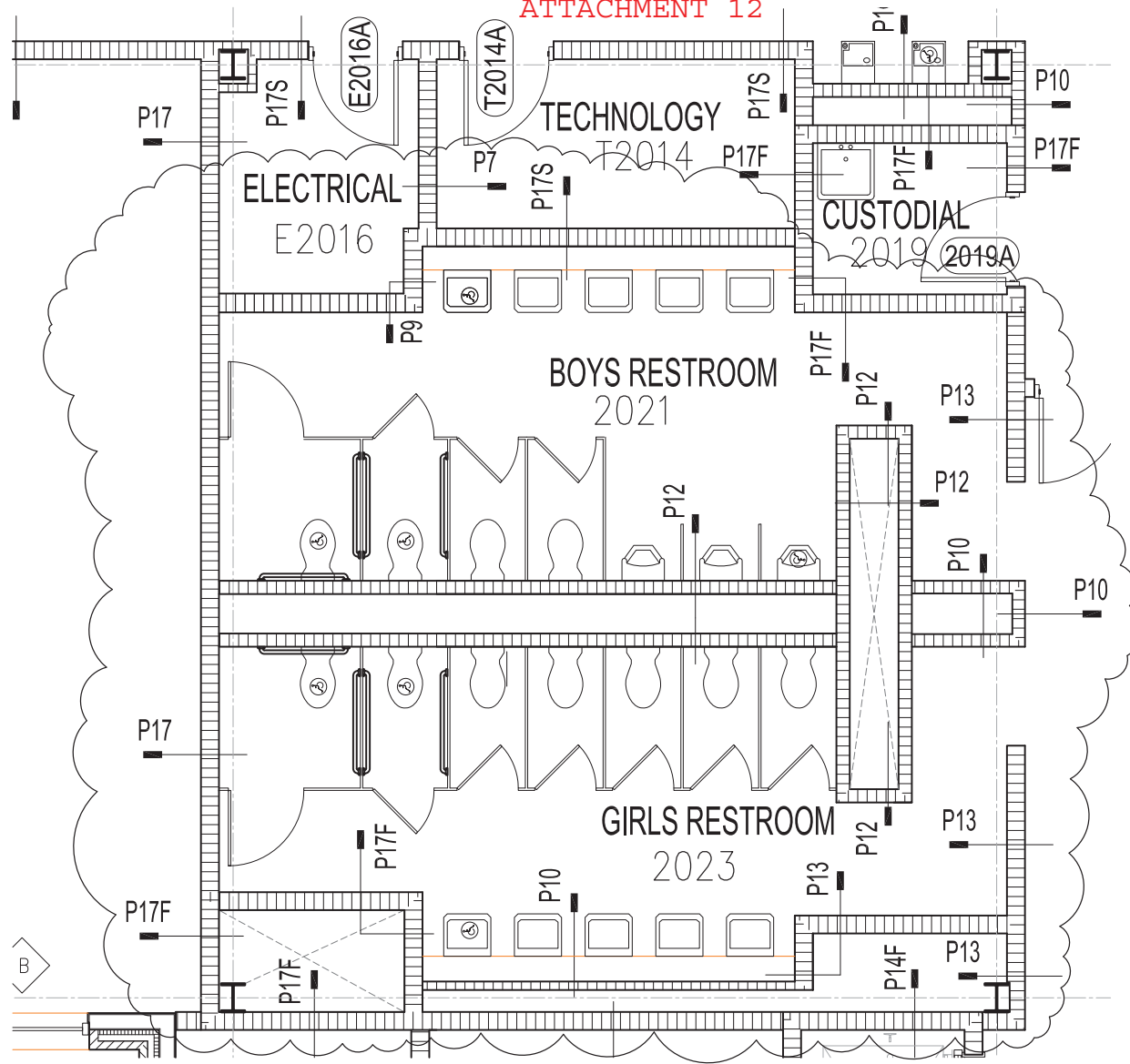
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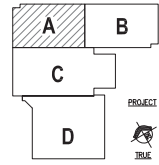
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ATTACHMENT 12



**A** PARTIAL PLAN - UNIT A - SECOND FLOOR  
 A1.21 SCALE: 1/4" = 1'-0"



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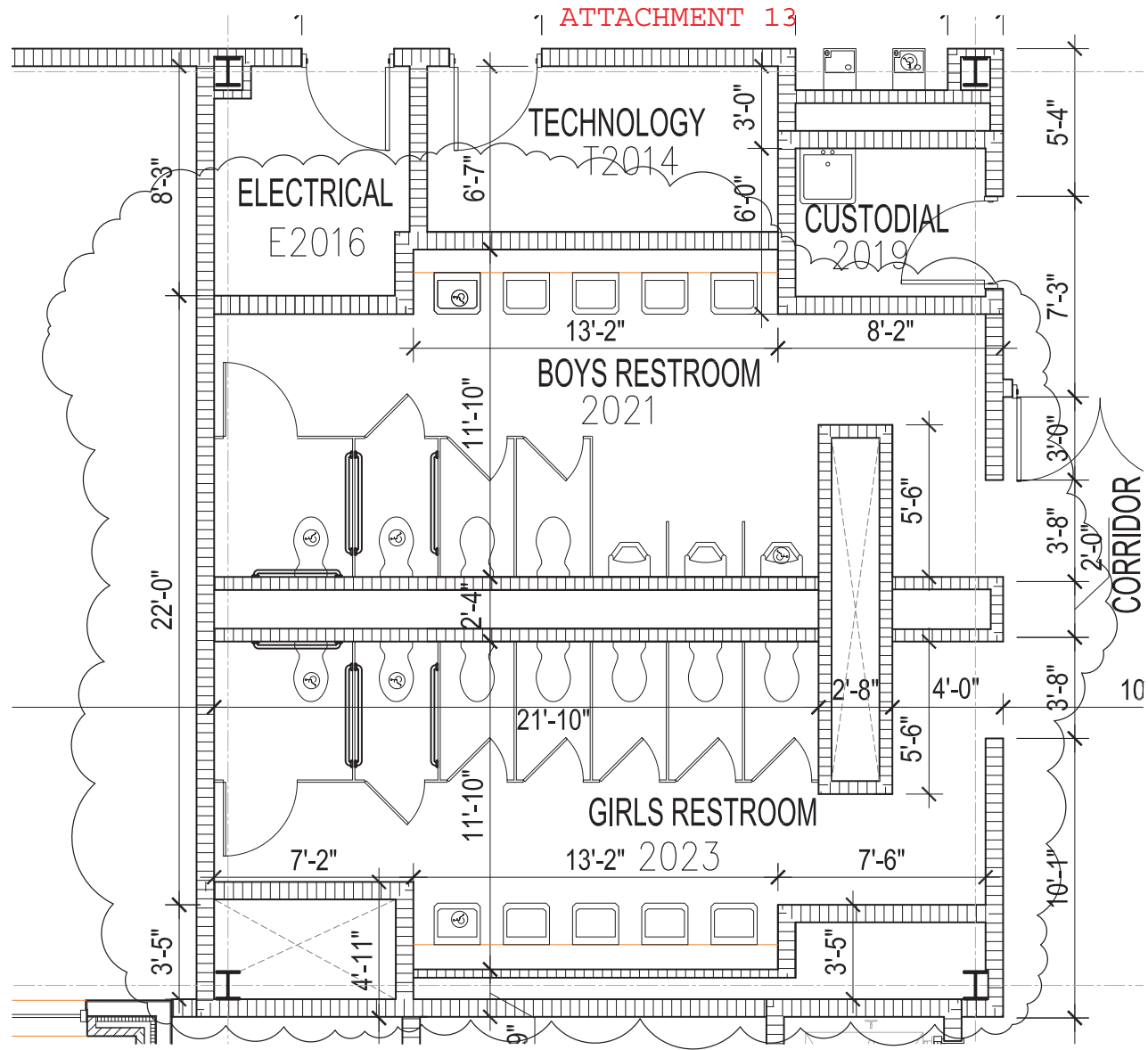
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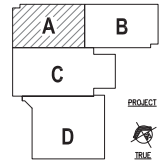
SHEET:

SK-1/A1.21

ATTACHMENT 13



**A** PARTIAL PLAN - UNIT A - SECOND FLOOR  
A1.21A SCALE: 1/4" = 1'-0"



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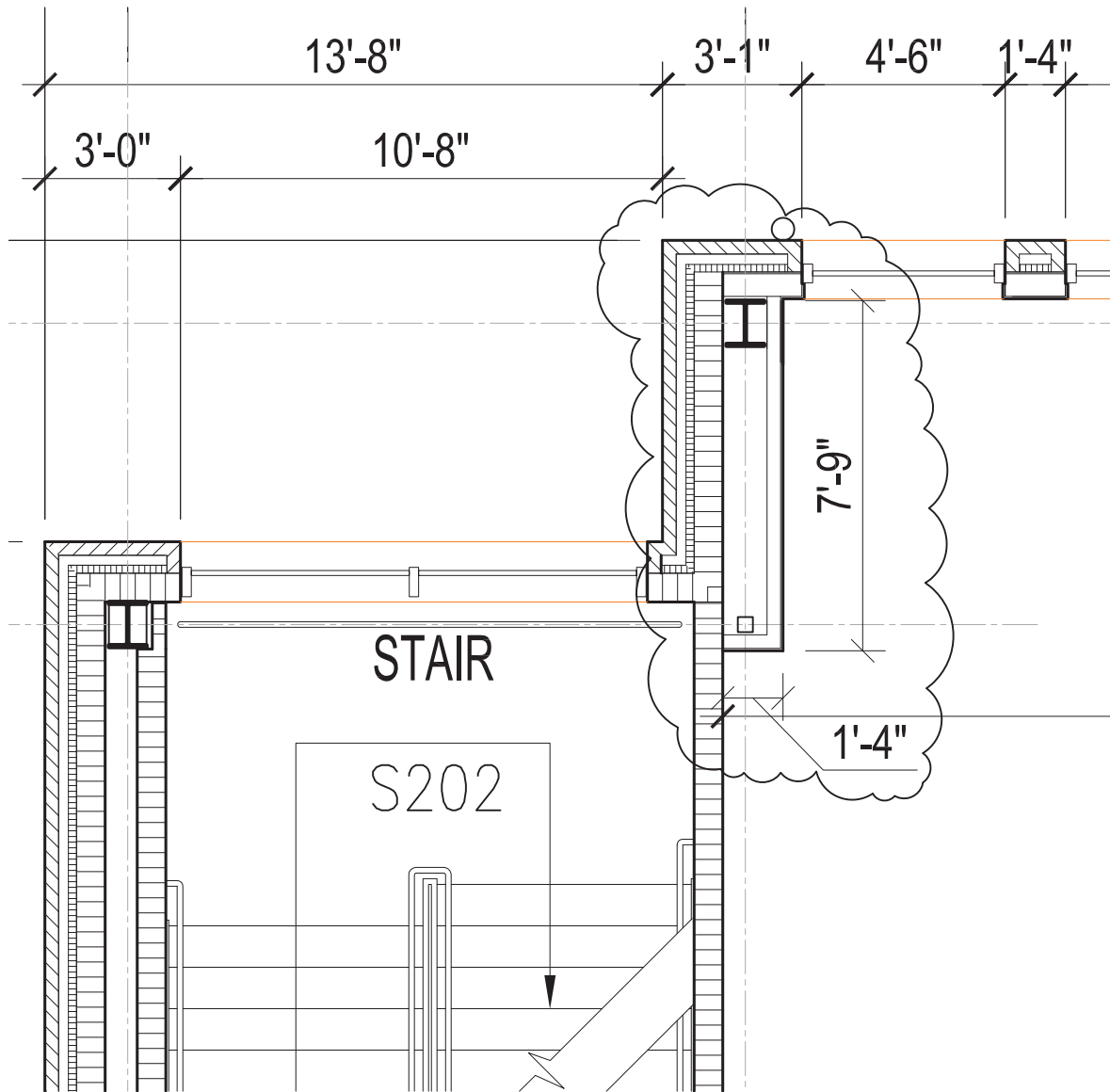
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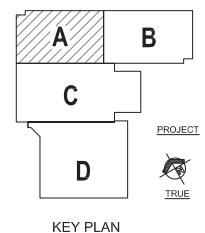
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UNIT A - 2ND FLOOR  
SHEET:

SK-1/A1.21A

# ATTACHMENT 14



A PARTIAL PLAN - UNIT A - SECOND FLOOR  
A1.21A SCALE: 1/4" = 1'-0"

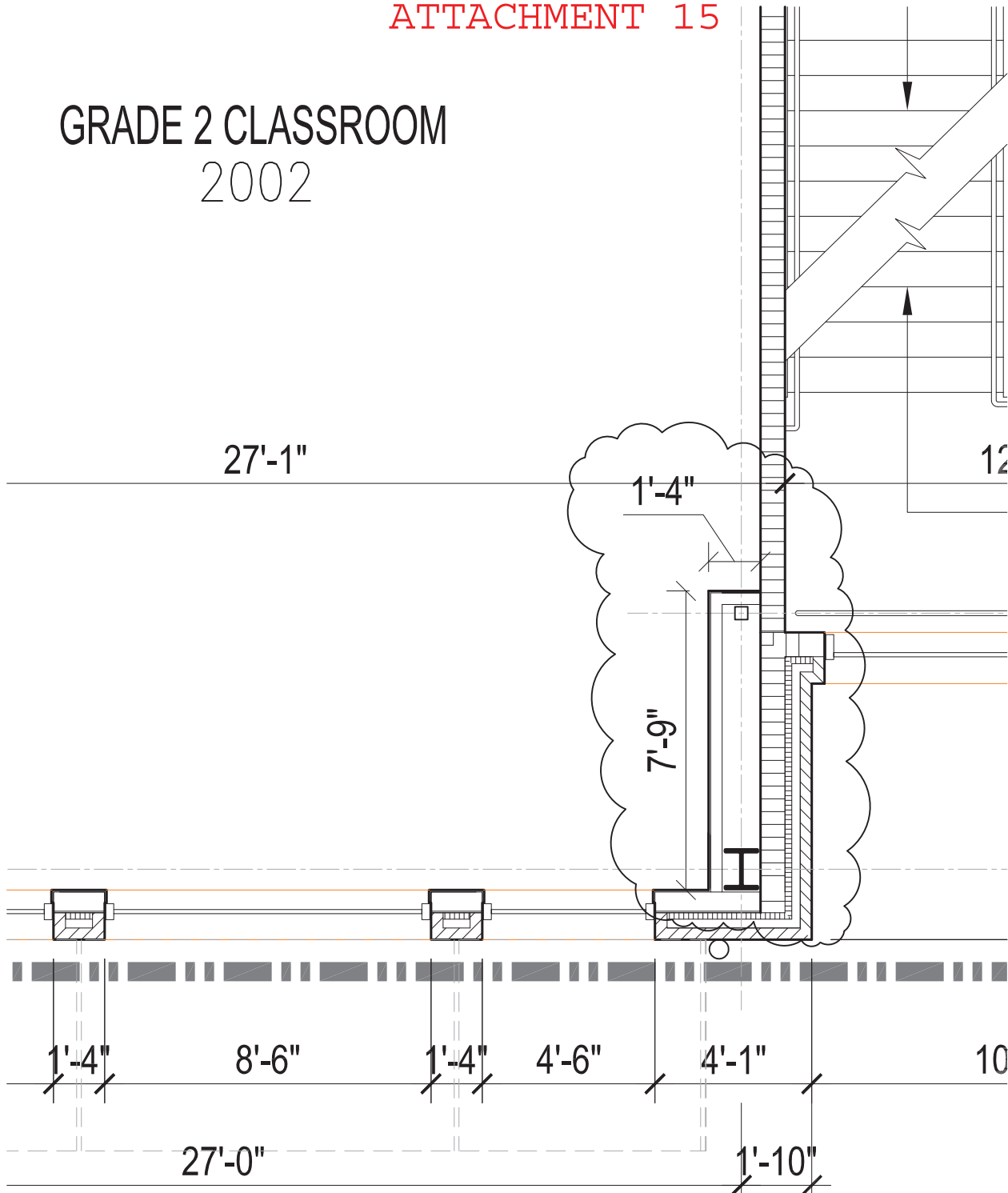


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 SHEET: SK-2/A1.21A BID DOCUMENTS

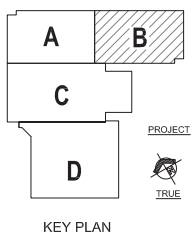
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GRADE 2 CLASSROOM  
2002



**A** PARTIAL PLAN - UNIT B - SECOND FLOOR  
A1.22A SCALE: 1/4" = 1'-0"

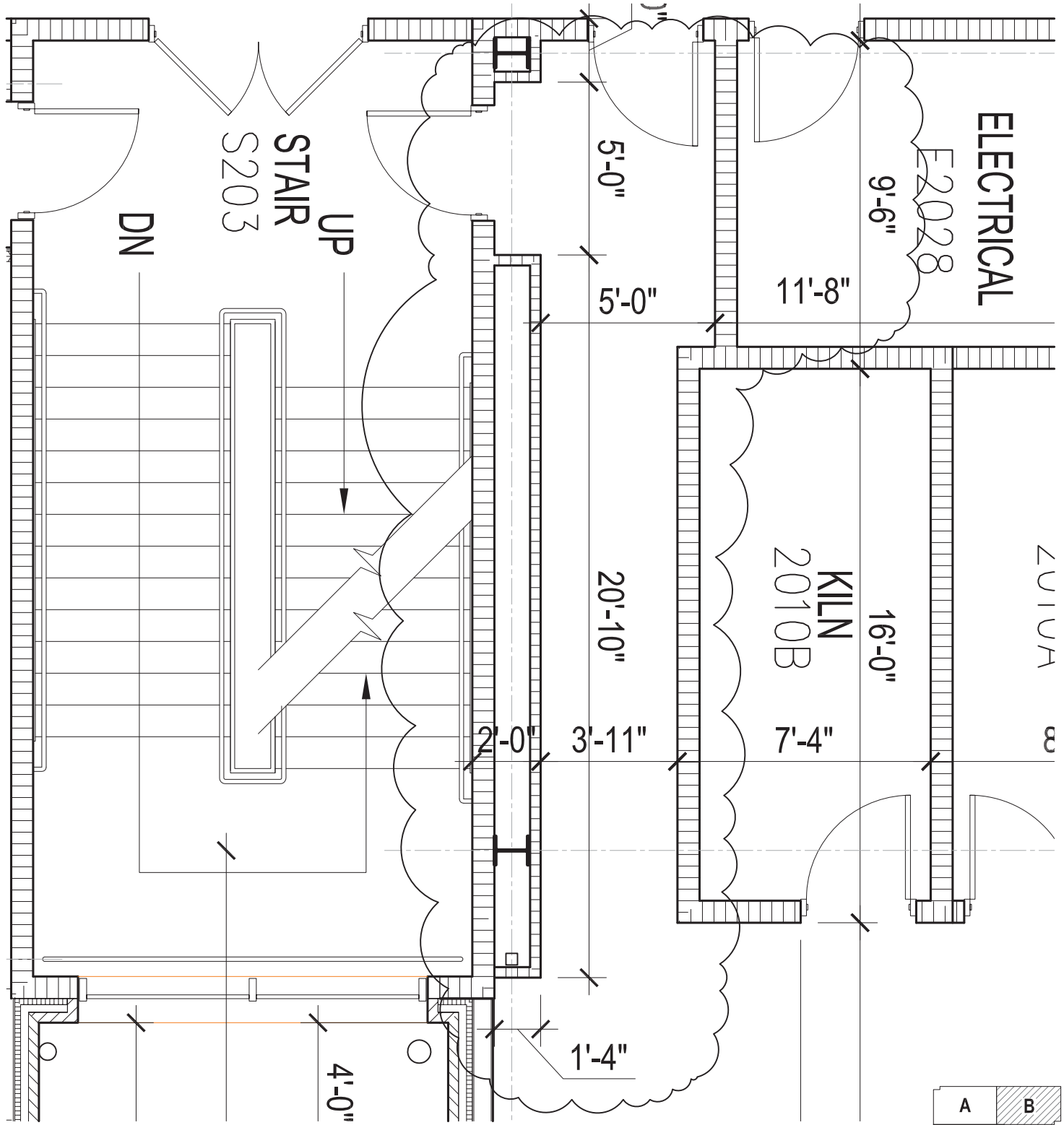


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TITLE: PARTIAL PLAN  
UNIT B - 2ND FLOOR  
SHEET: SK-1/A1.22A BID DOCUMENTS

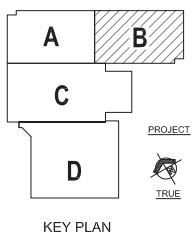
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ATTACHMENT 16



**A PARTIAL PLAN - UNIT B - SECOND FLOOR**  
**A1.22A SCALE: 1/4" = 1'-0"**

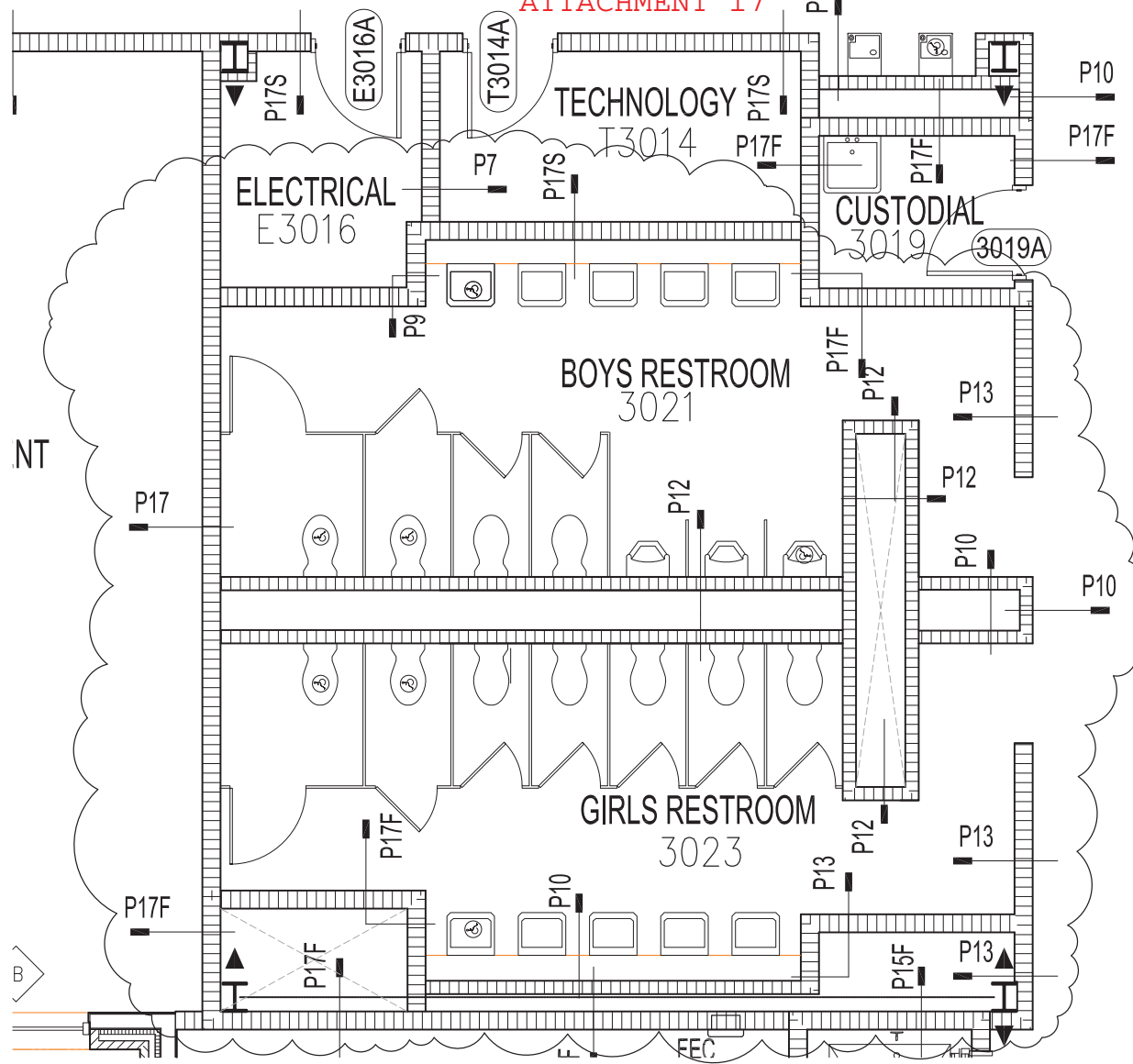


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 SHEET: SK-2/A1.22A  
 DATE ISSUED: 7 DECEMBER 2012  
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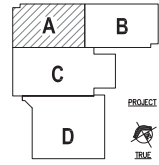
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ATTACHMENT 17



**A** PARTIAL PLAN - UNIT A - THIRD FLOOR  
 A1.31 SCALE: 1/4" = 1'-0"



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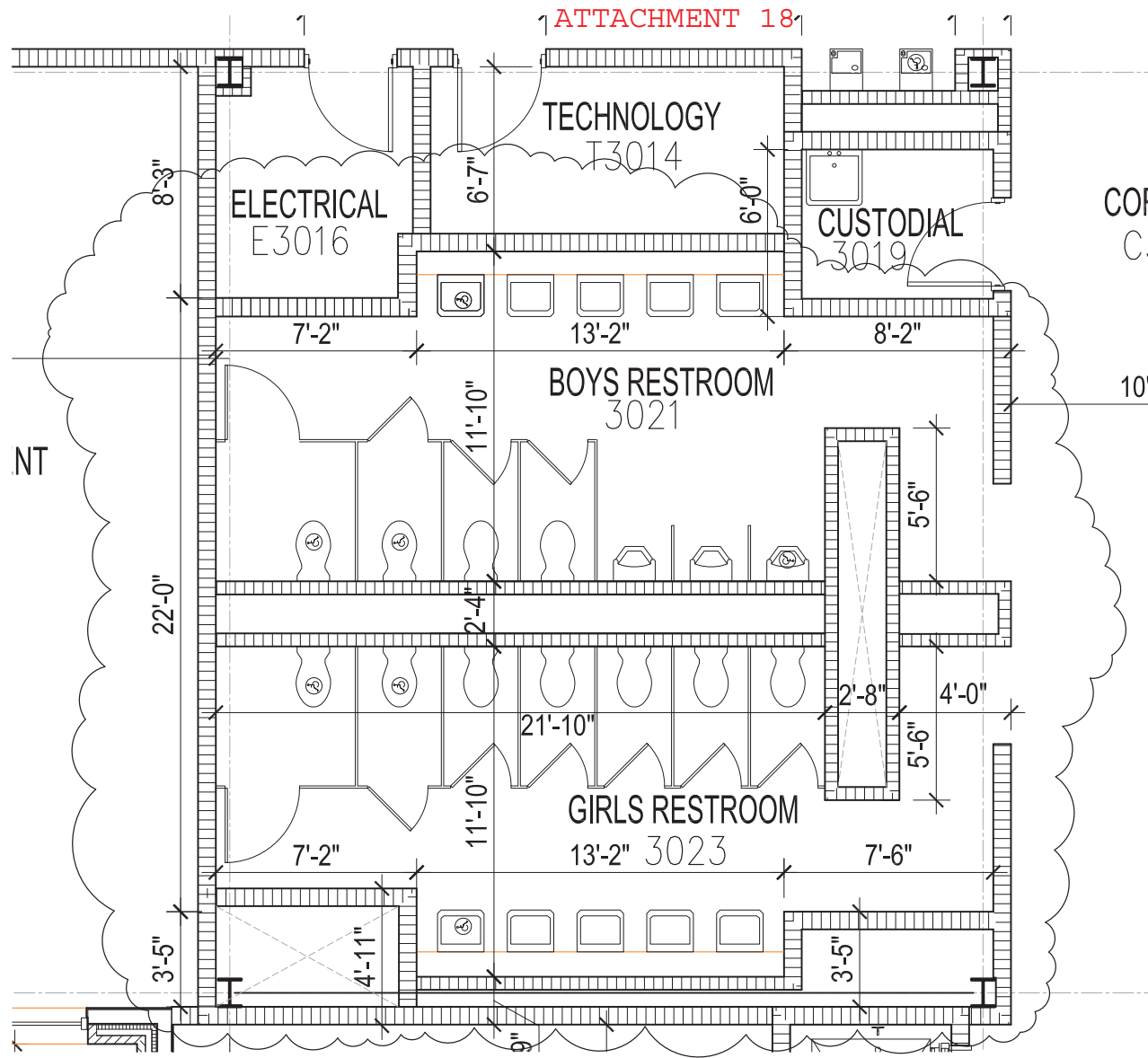
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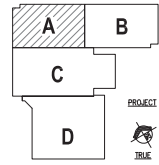
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 UNIT A - 3RD FLOOR

SHEET:

SK-1/A.1.31



**A PARTIAL PLAN - UNIT A - THIRD FLOOR**  
 A1.31A SCALE: 1/4" = 1'-0"



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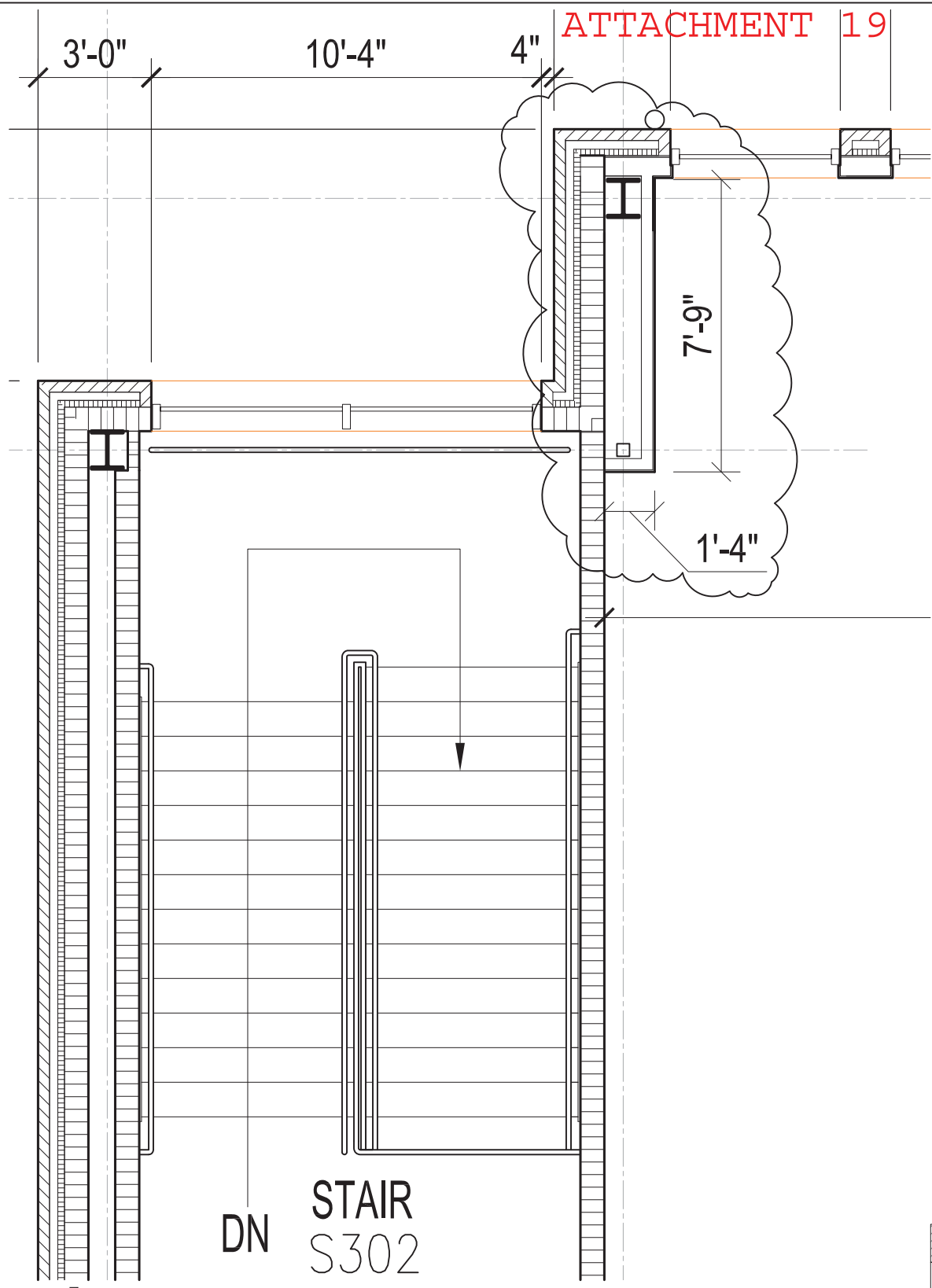
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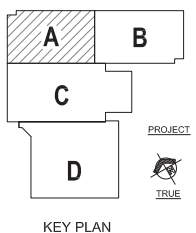
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TITLE:  
**PARTIAL PLAN  
 UNIT A - 3RD FLOOR**

SHEET:  
**SK-1/A1.31A**



**A** PARTIAL PLAN - UNIT A - THIRD FLOOR  
 A1.31A SCALE: 1/4" = 1'-0"



11085  
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 SHEET: SK-2/A1.31A BID DOCUMENTS

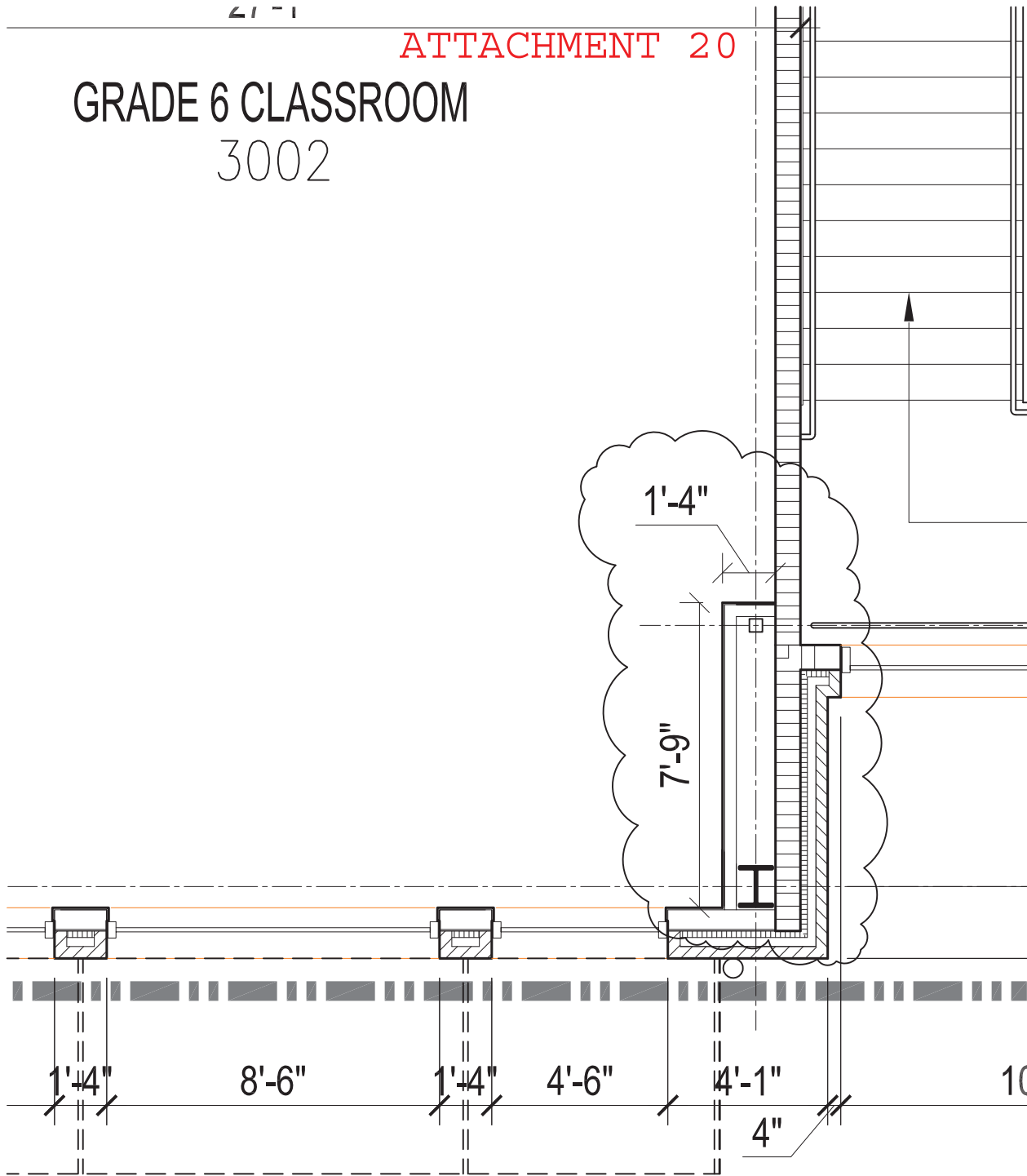
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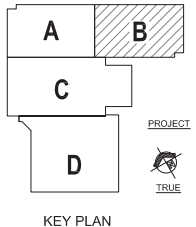
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**A** PARTIAL PLAN - UNIT B - THIRD FLOOR  
 A1.32A SCALE: 1/4" = 1'-0"

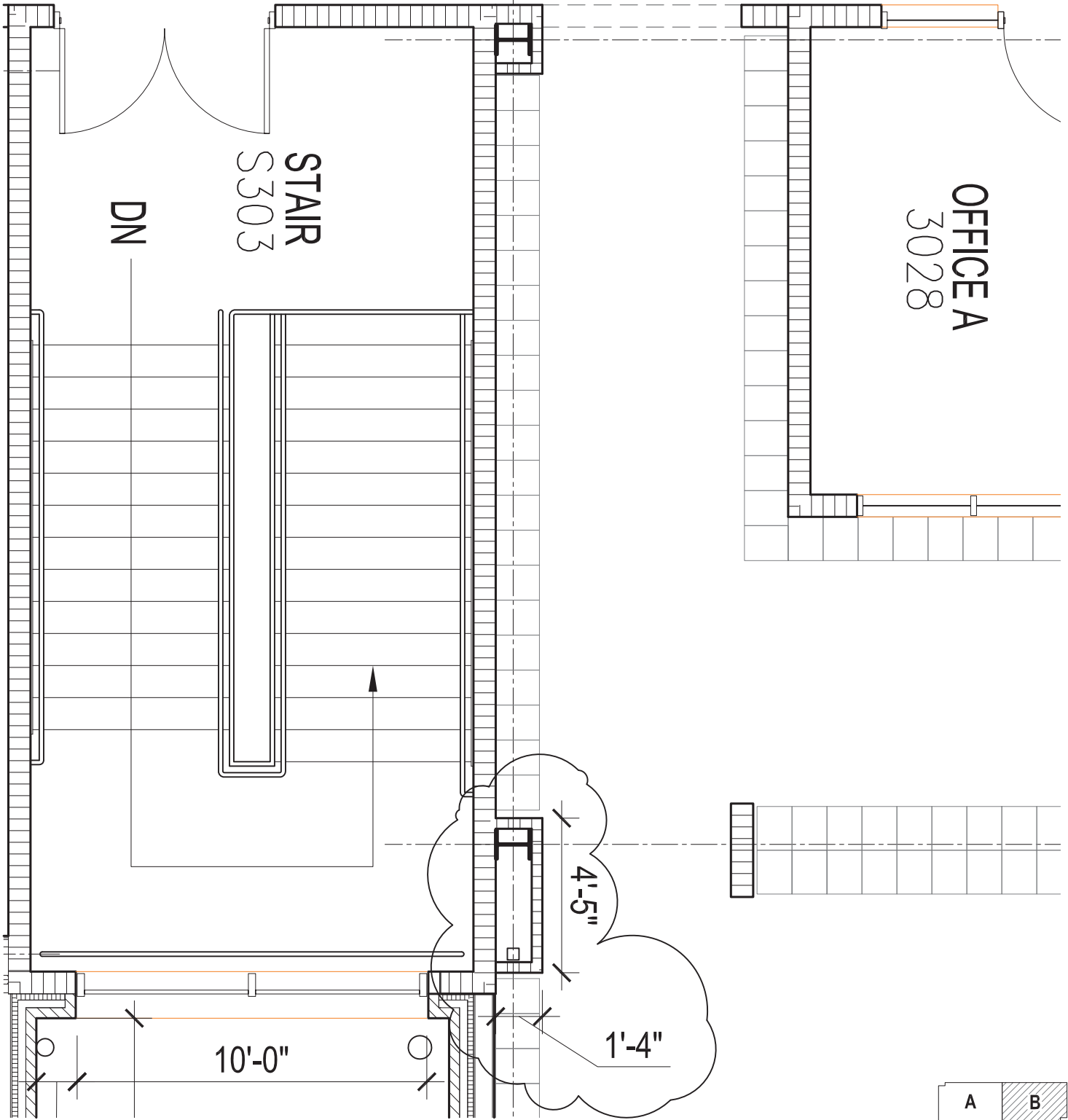


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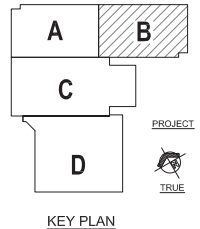
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ATTACHMENT 21



**A** PARTIAL PLAN - UNIT B - THIRD FLOOR  
 A1.32A SCALE: 1/4" = 1'-0"



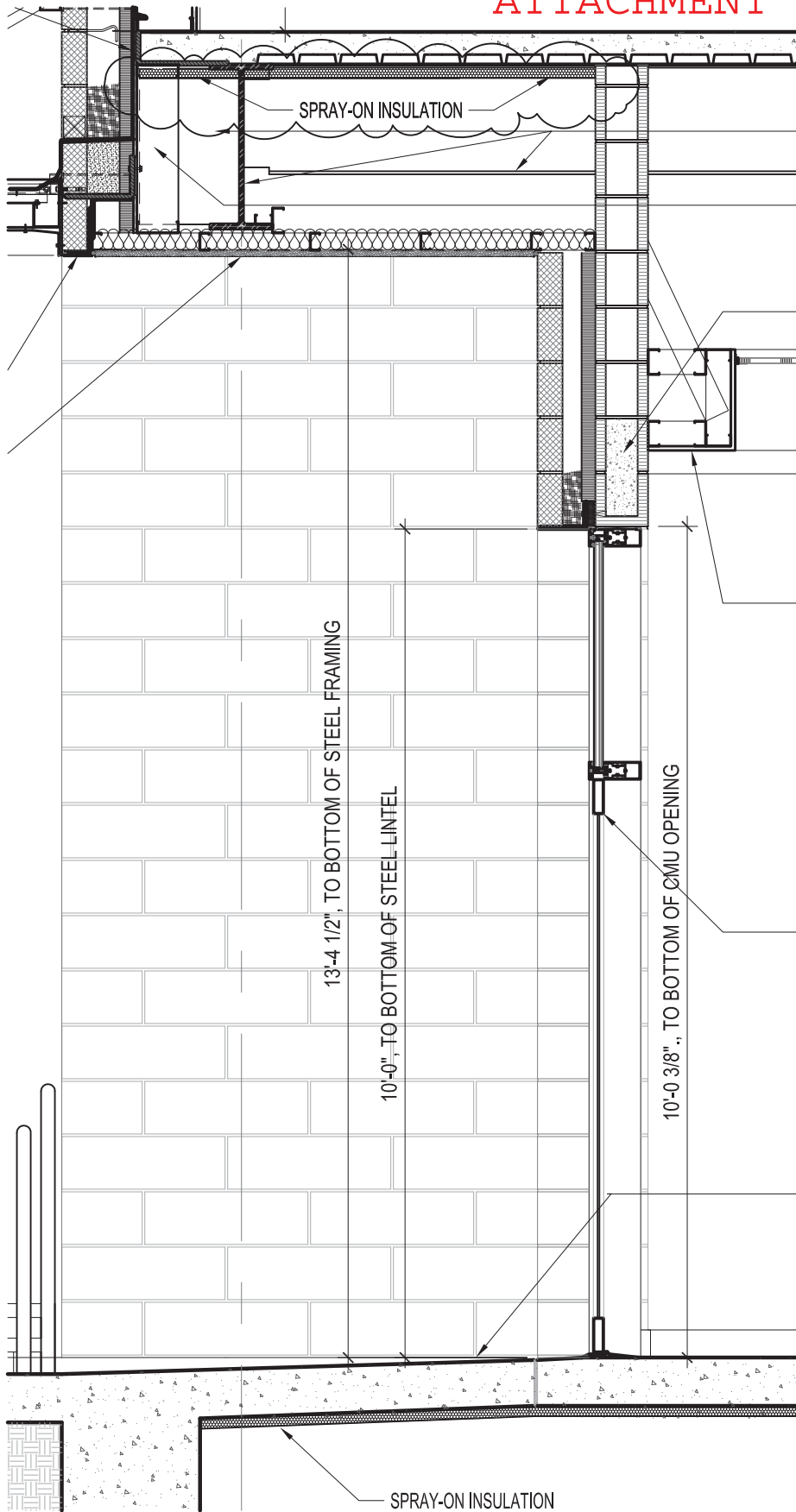
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 UNIT B - 3RD FLOOR  
 SHEET: SK-2/A1.32A BID DOCUMENTS

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# ATTACHMENT 22



SECOND FLOOR  
EL. 116'-0"

STRUCTURAL STEEL FRAMING

INFILL - EXTERIOR  
SHEATHING ON 8" METAL  
STUDS

CMU BOND BEAMS REFER TO  
STRUCTURAL DRAWINGS FOR TYPES,  
EXTENTS AND LOCATIONS

FINISH CEILING REFER TO  
REFLECTED CEILING PLAN

1 WALL SECTION - UNIT A  
A3.10 SCALE: 1/2" = 1'-0"

STOREFRONT DOOR SYSTEM

FINISH FLOOR AND BASE  
REFER TO ROOM FINISH  
SCHEDULE

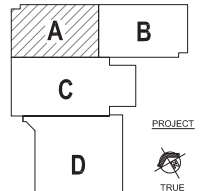
FIRST FLOOR  
EL. 100'-0"

SPRAY-ON INSULATION

13'-4 1/2", TO BOTTOM OF STEEL FRAMING

10'-0", TO BOTTOM OF STEEL LINTEL

10'-0 3/8", TO BOTTOM OF CMU OPENING



KEY PLAN

11085

TITLE:  
WALL SECTION  
UNIT A

SHEET: SK-1/A3.10 BID DOCUMENTS

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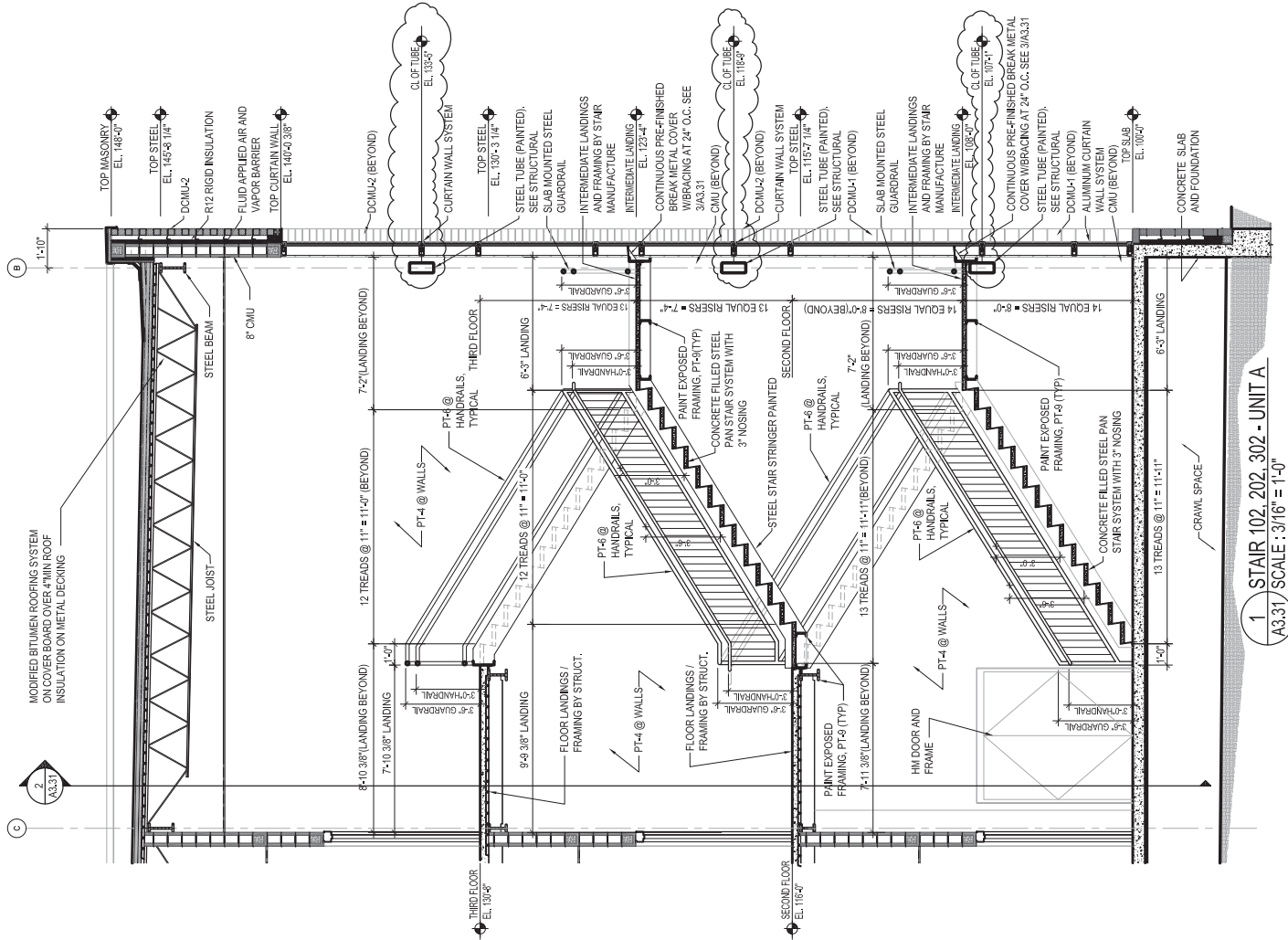
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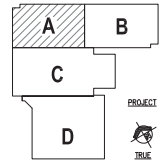


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ATTACHMENT 23



1 STAIR 102, 202, 302 - UNIT A  
A3.31 SCALE : 3/16" = 1'-0"



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TITLE:  
STAIR SECTION  
UNIT A

SHEET:

SK-1/A3.31



ATTACHMENT 25



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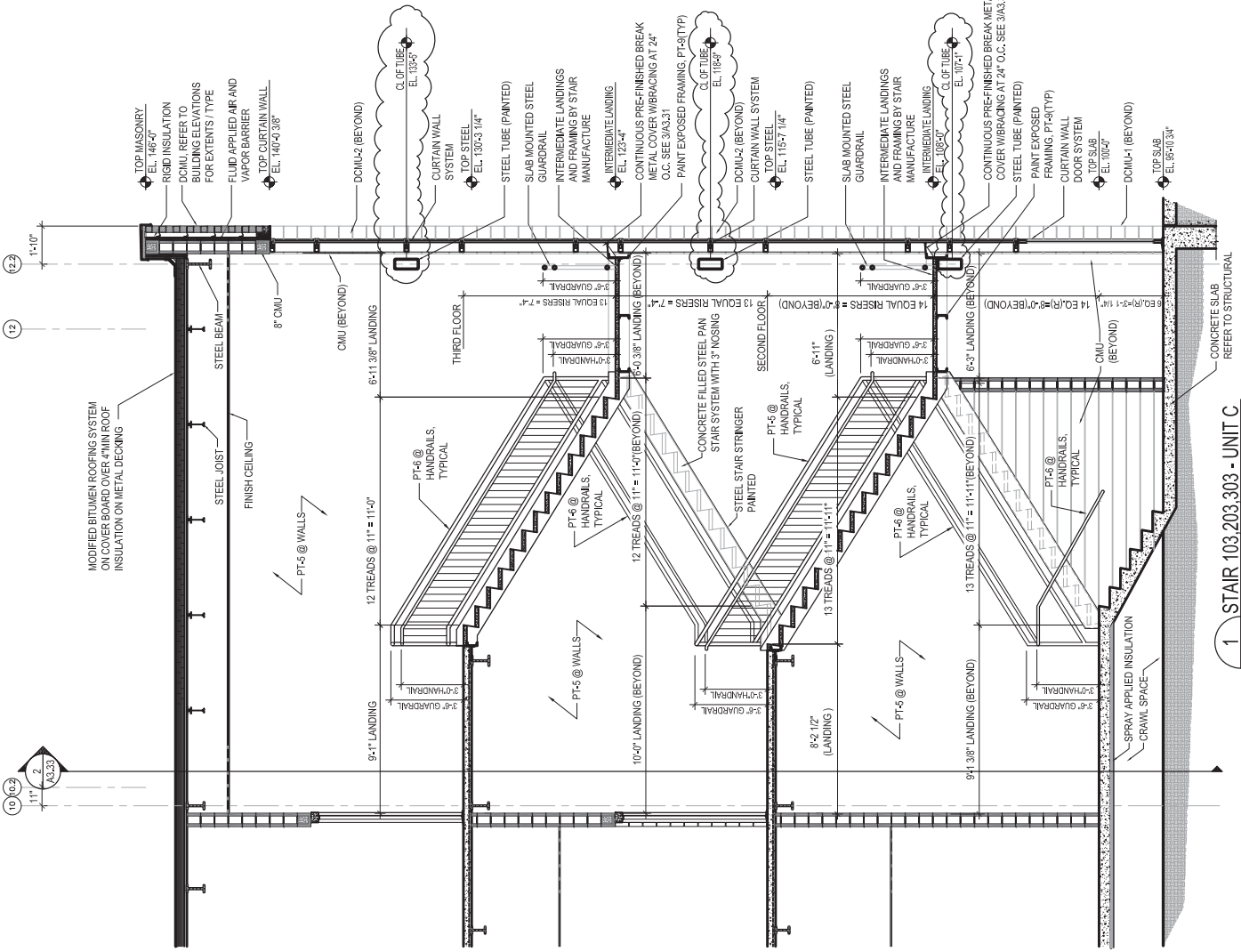
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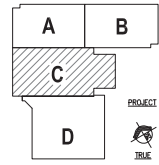
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11085  
TITLE: STAIR SECTION UNIT C  
SHEET: SK-1/A3.33



1 STAIR 103.203.303 - UNIT C  
A3.33 / SCALE: 3/16" = 1'-0"



KEY PLAN

ATTACHMENT 26



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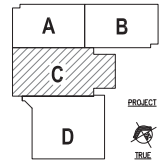
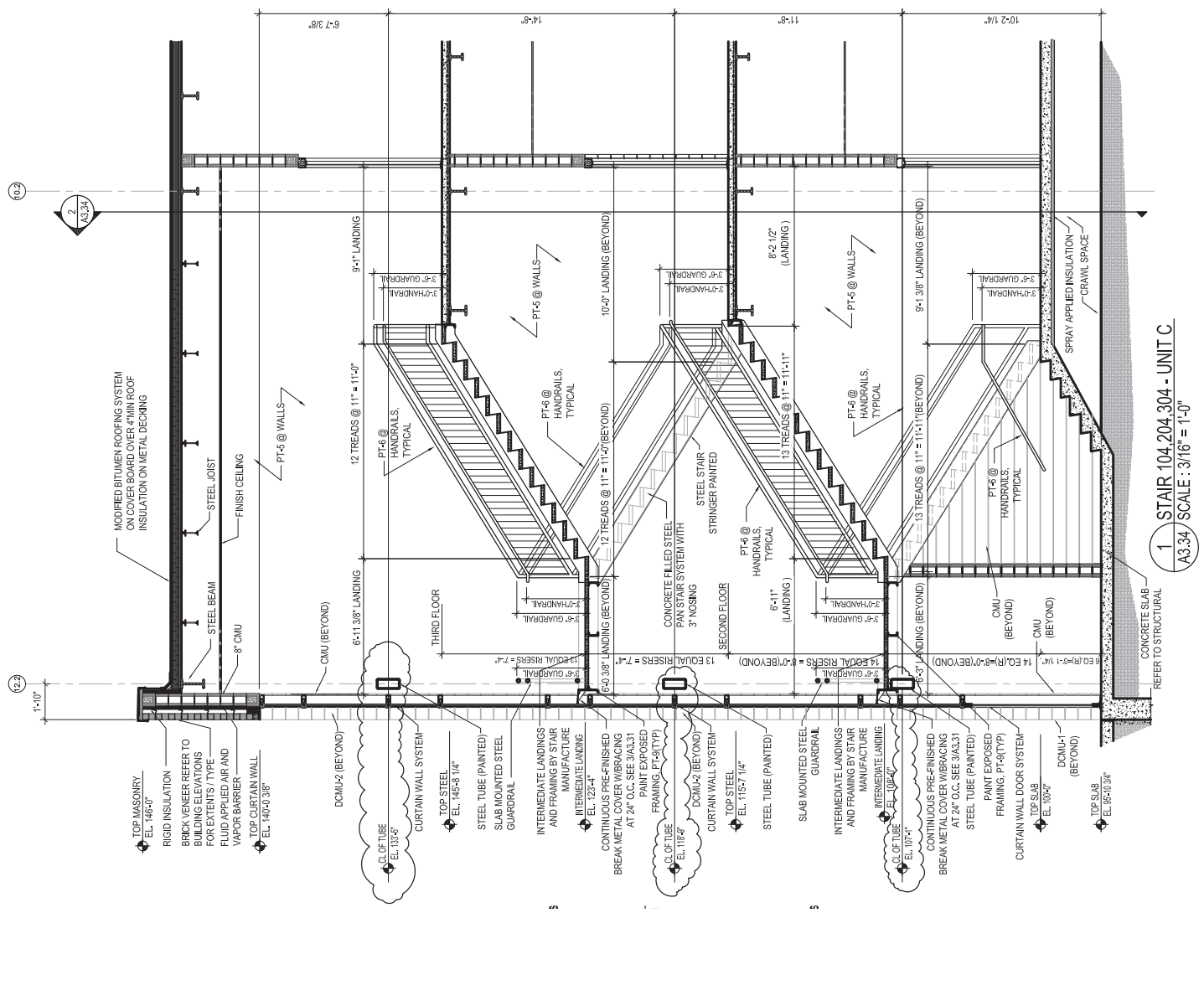
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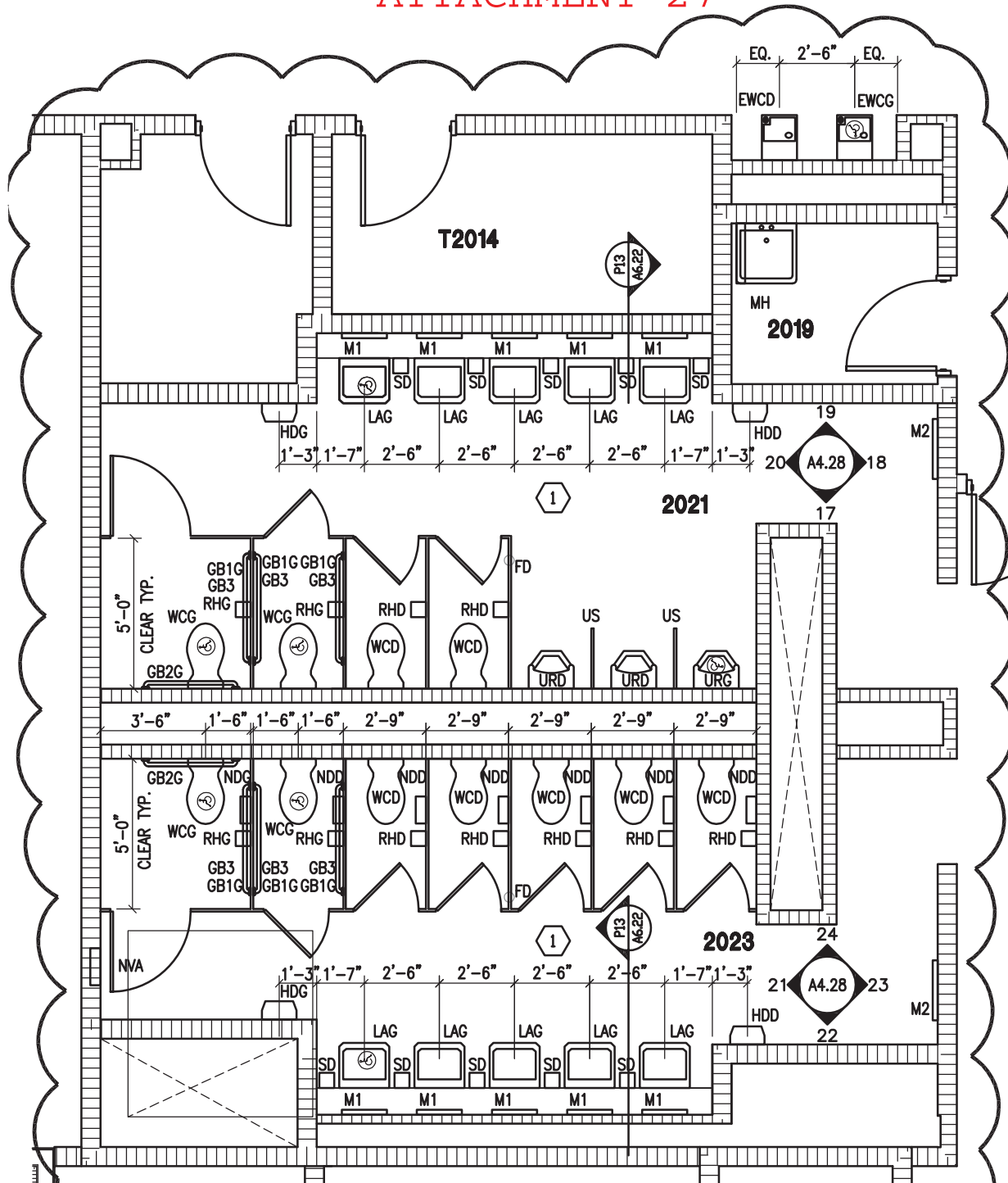
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SK-1/A3.34

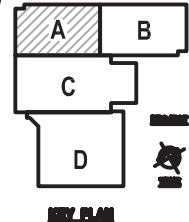


KEY PLAN

# ATTACHMENT 27



4 ENLARGED TOILET PLAN  
 A4.02 SCALE: 1/4" = 1'-0" UNIT A SECOND FLOOR



11085  
 TITLE: ENLARGED PLANS  
 SHEET: SK-1/A4.02  
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 RECOVERY SCHOOL DISTRICT  
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 NEW ORLEANS, LOUISIANA 70119

VergesRome

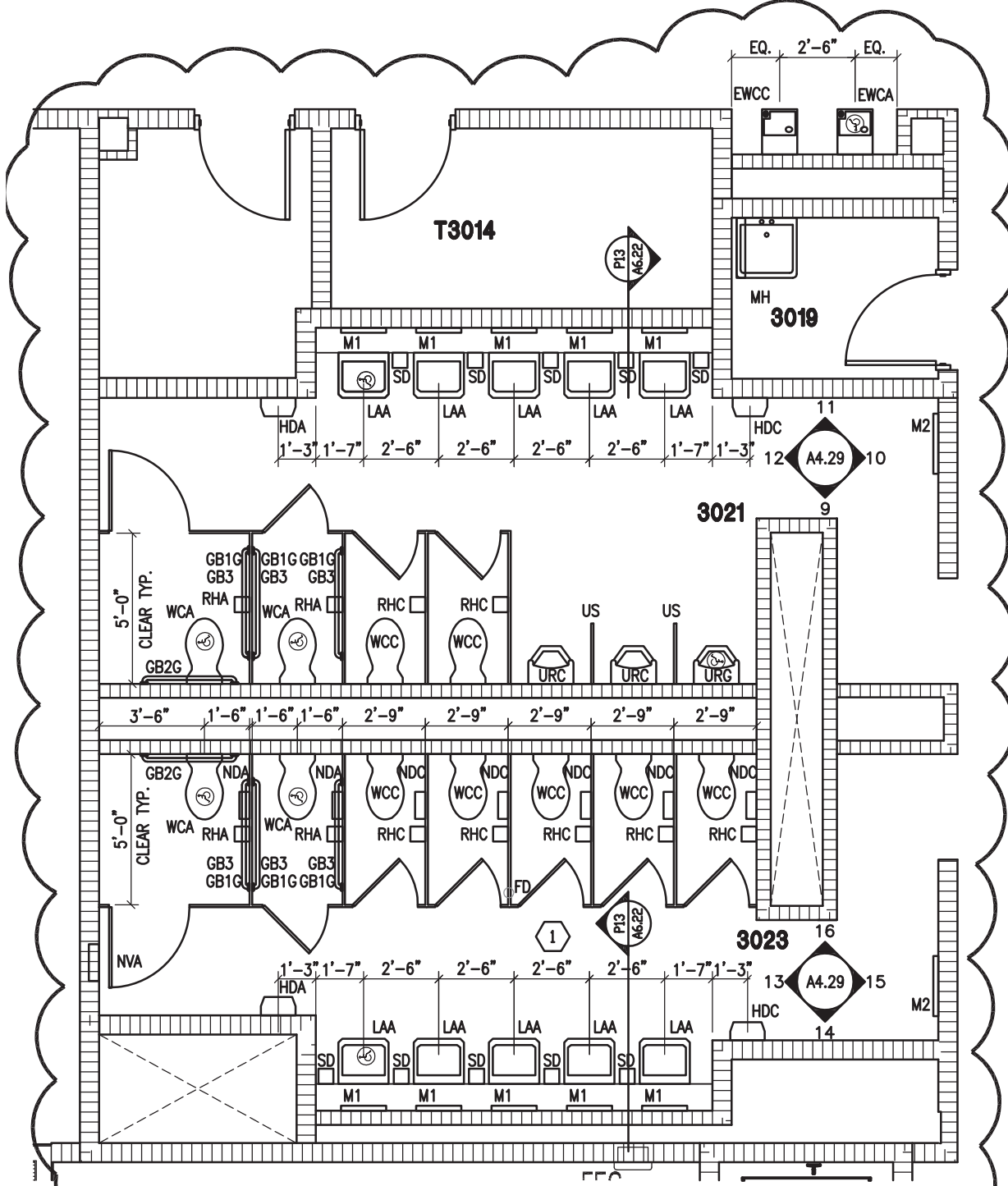
Architects

FANNING HOWEY

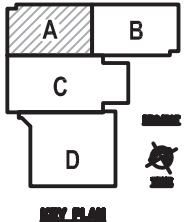
A Joint Venture

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# ATTACHMENT 28



5 ENLARGED TOILET PLAN  
A4.02 SCALE: 1/4" = 1'-0" UNIT A THIRD FLOOR

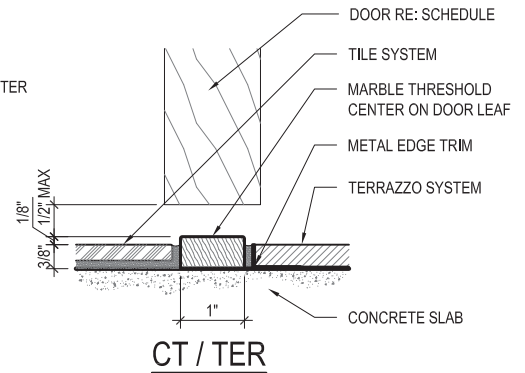
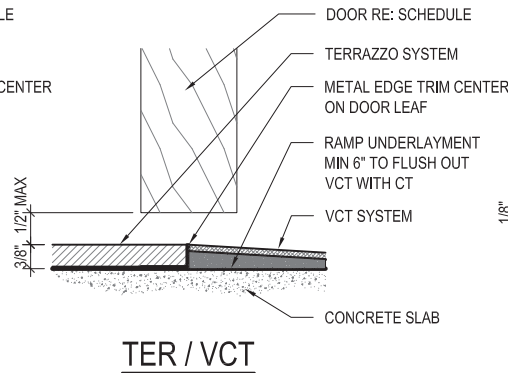
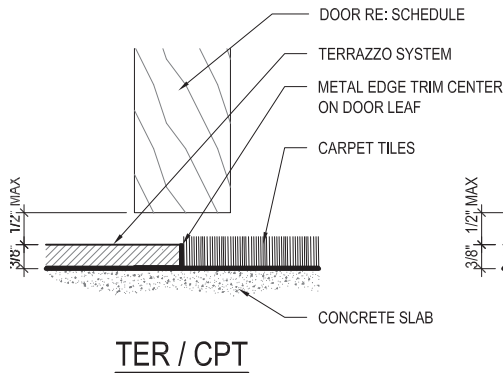
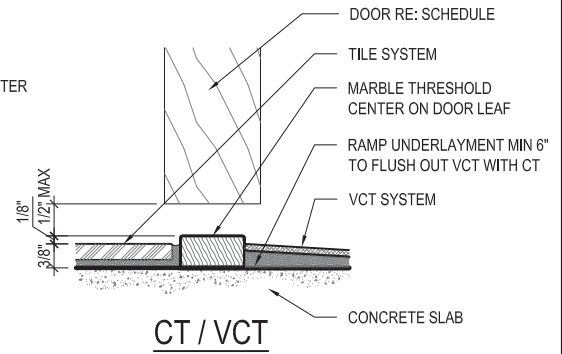
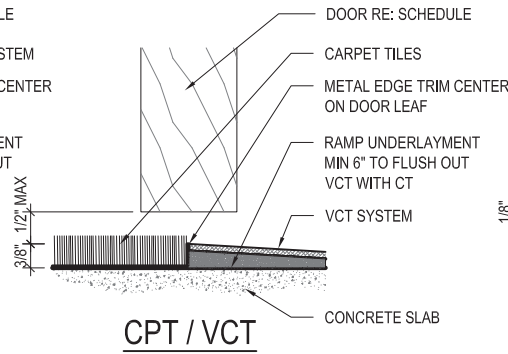
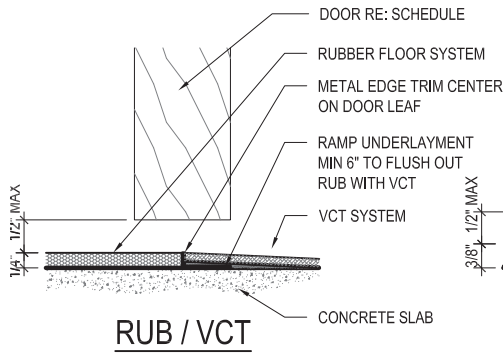
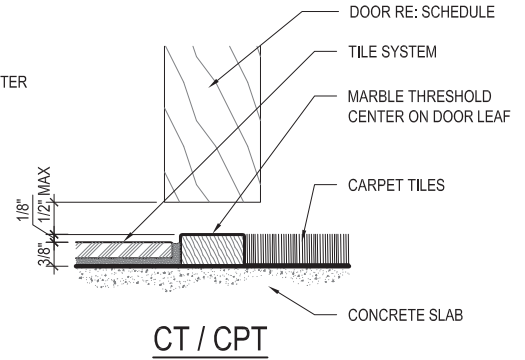
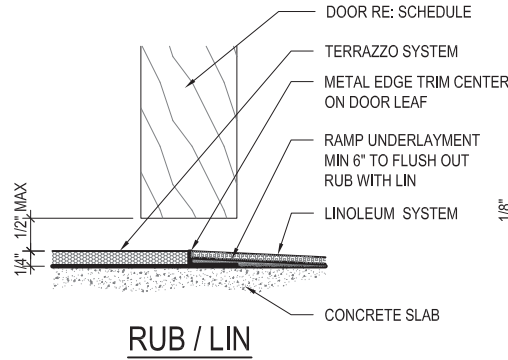


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 TITLE: ENLARGED PLANS  
 SHEET: SK-2/A4.02  
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# ATTACHMENT 29



## 2 TYPICAL FLOOR FINISH TRANSITIONS A6.03 SCALE: NTS

11085  
 TITLE: CLARIFICATION  
 DETAIL "2"  
 SHEET: SK-1/A6.03 BID DOCUMENTS

DATE ISSUED: 7 DECEMBER 2012  
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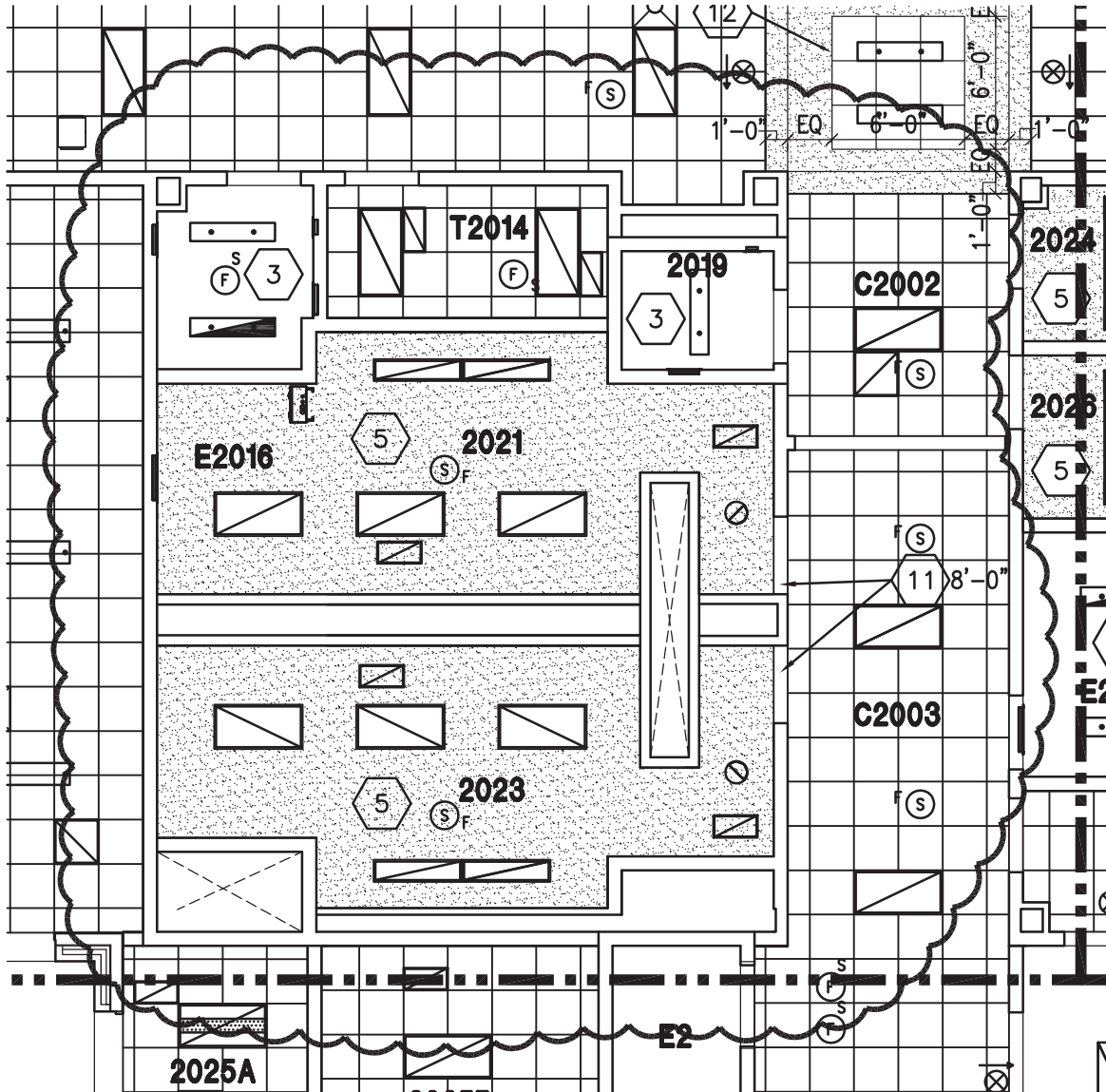
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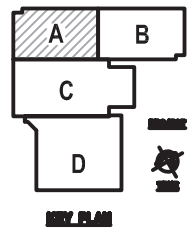
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# ATTACHMENT 30



## UNIT A - SECOND FLOOR REFLECTED CEILING PLAN

1/8" = 1'-0"



11085  
 TITLE:  
 UNIT A SECOND FLOOR  
 REFLECTED CEILING PLAN  
 SHEET:  
**SK-1/A7.05**

DATE ISSUED: 7 DECEMBER 2012  
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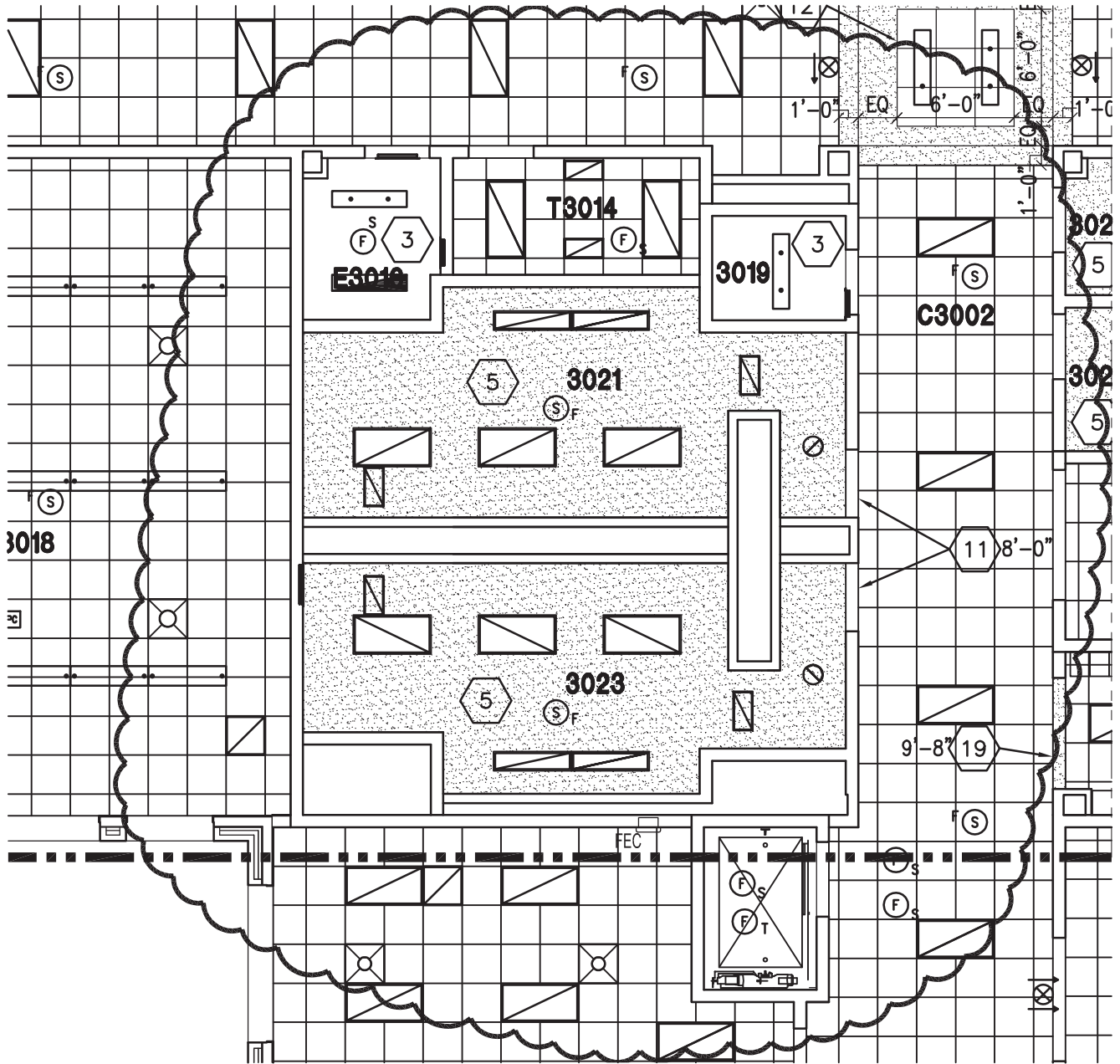
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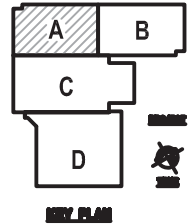
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# ATTACHMENT 31



## UNIT A - THIRD FLOOR REFLECTED CEILING PLAN

1/8" = 1'-0"



11085  
 TITLE:  
 UNIT A THIRD FLOOR  
 REFLECTED CEILING PLAN  
 SHEET:  
**SK-1/A7.09**

DATE ISSUED: 7 DECEMBER 2012  
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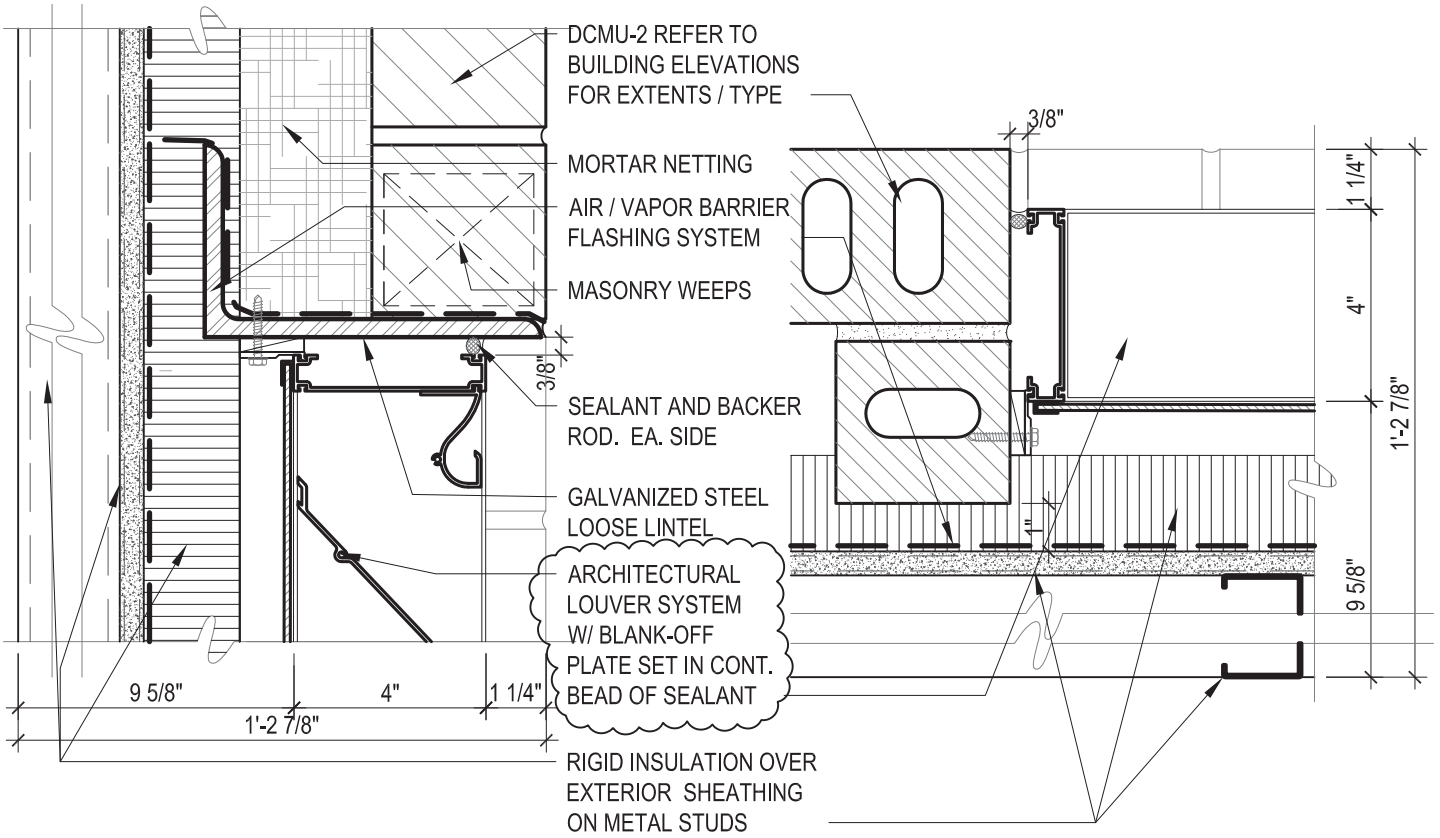
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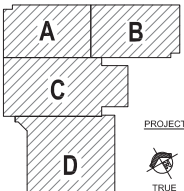


# ATTACHMENT 33



**U** ARCH. LOUVERS-HEAD  
 A8.12 SCALE: 3" = 1'-0"

**T** ARCH. LOUVERS-JAMB  
 A8.12 SCALE: 3" = 1'-0"



KEY PLAN

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REVISED: ADDENDUM 02-23 JANUARY 2013

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REVISED:

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CHECKED BY: RPB

PHASE:

TITLE: REVISED DETAIL "T" & "U"

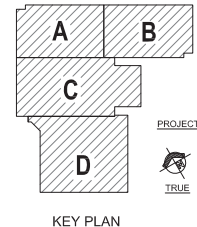
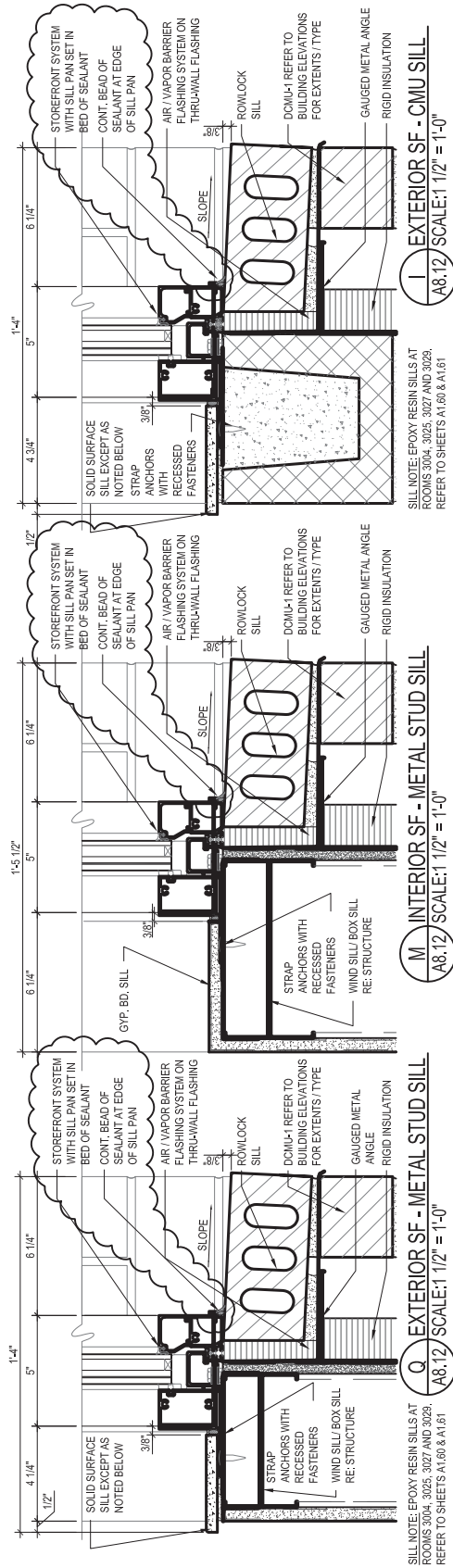
SHEET: SK-1/A8.12 BID DOCUMENTS

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 TITLE: REVISED  
 DETAIL "Q", "M" & "I"  
 SHEET: SK-2/A8.12

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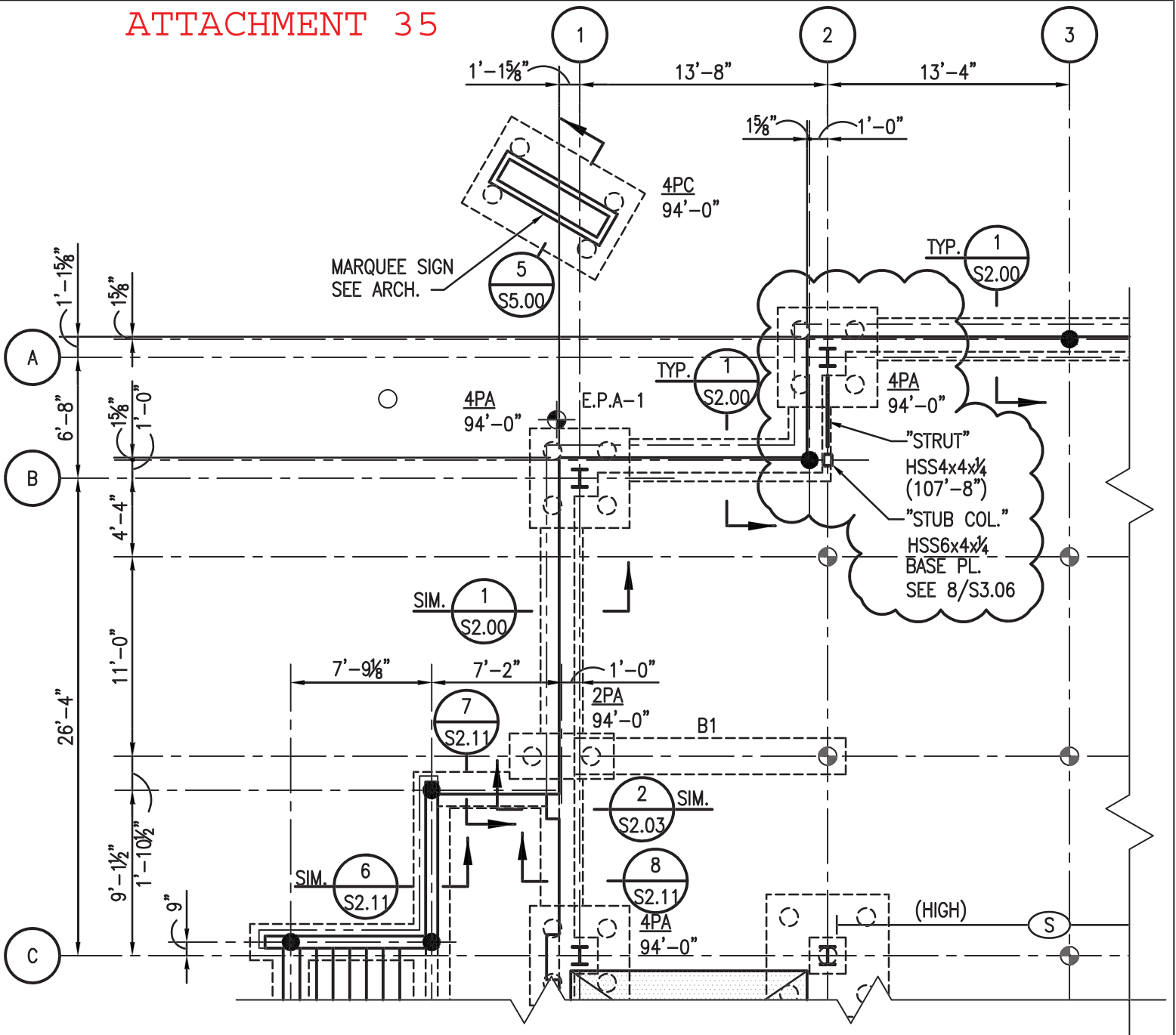
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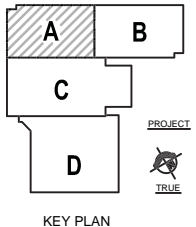
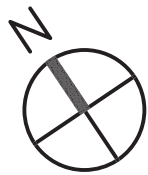
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ATTACHMENT 35



PLAN NOTES: UNLESS NOTED OTHERWISE:  
 1. SEE 1/S1.01 FOR PLAN NOTES.

**1** PART FOUNDATION AND FIRST FLOOR  
 S1.01 FRAMING PLAN 1/8"=1'-0"

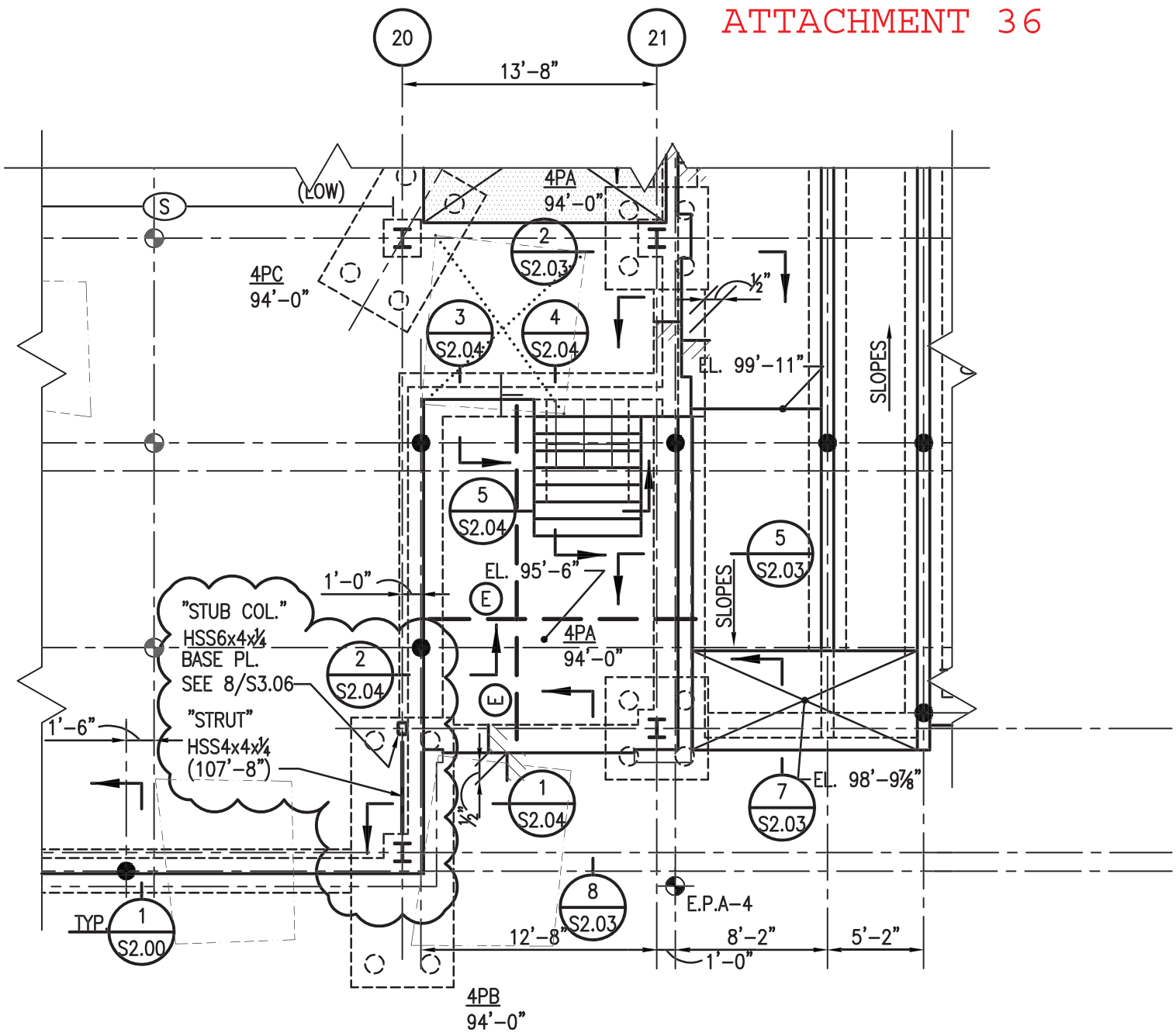


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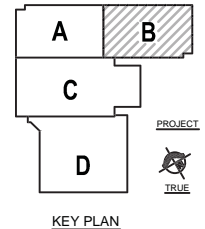
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**1** PART FOUNDATION AND FIRST FLOOR  
 S1.02 FRAMING PLAN 1/8"=1'-0"



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 TITLE: REVISED PART 3RD FLOOR FRAMING PLAN  
 SHEET: SK-1/S1.02 BID DOCUMENTS

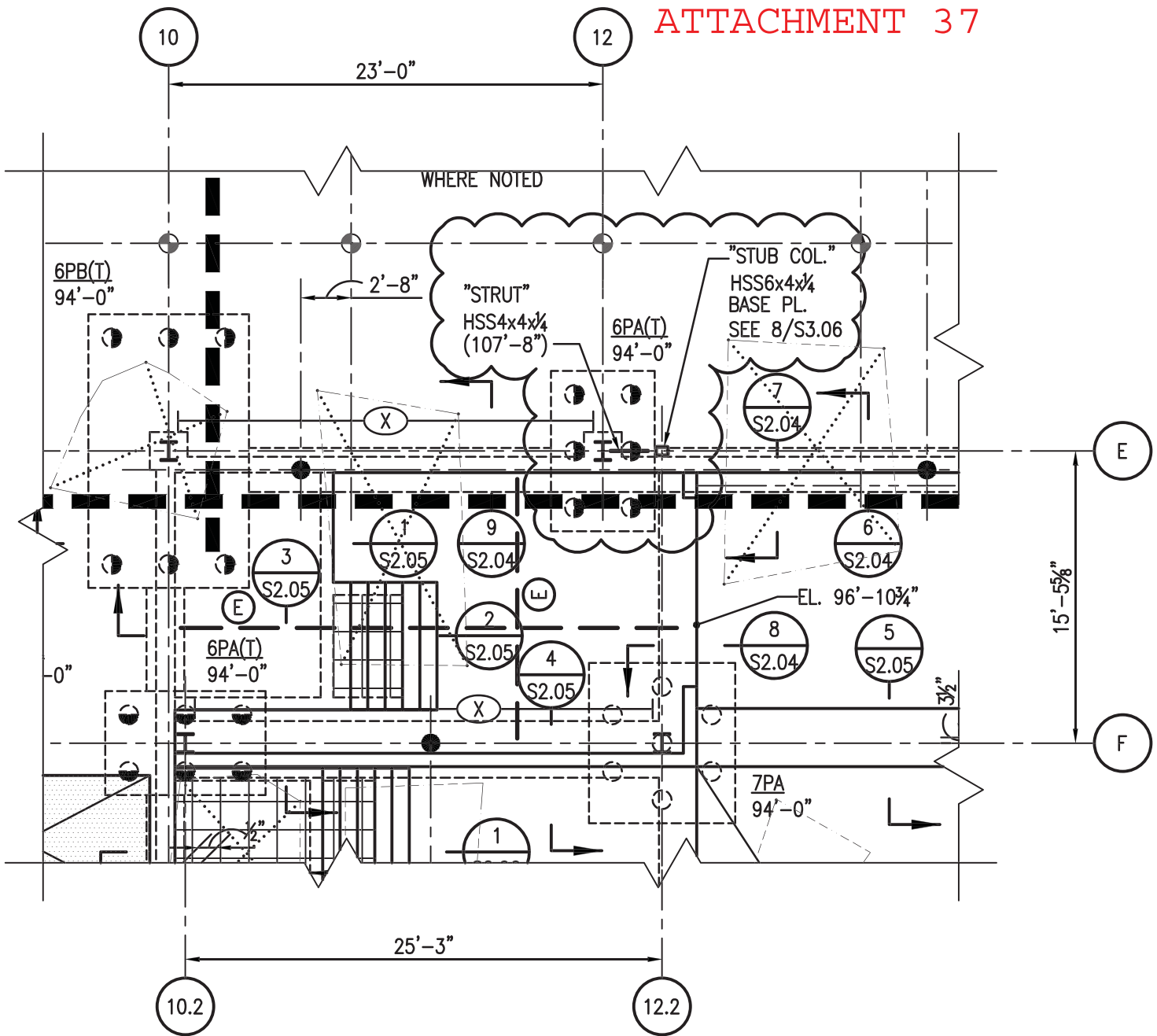
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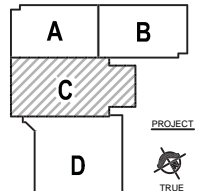
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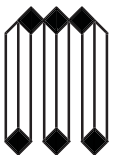
PLAN NOTES: UNLESS NOTED OTHERWISE:

1. SEE 1/S1.01 FOR PLAN NOTES.

1 PART FOUNDATION AND FIRST FLOOR FRAMING PLAN 1/8"=1'-0"



KEY PLAN



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SHEET: SK-2/S1.02 BID DOCUMENTS

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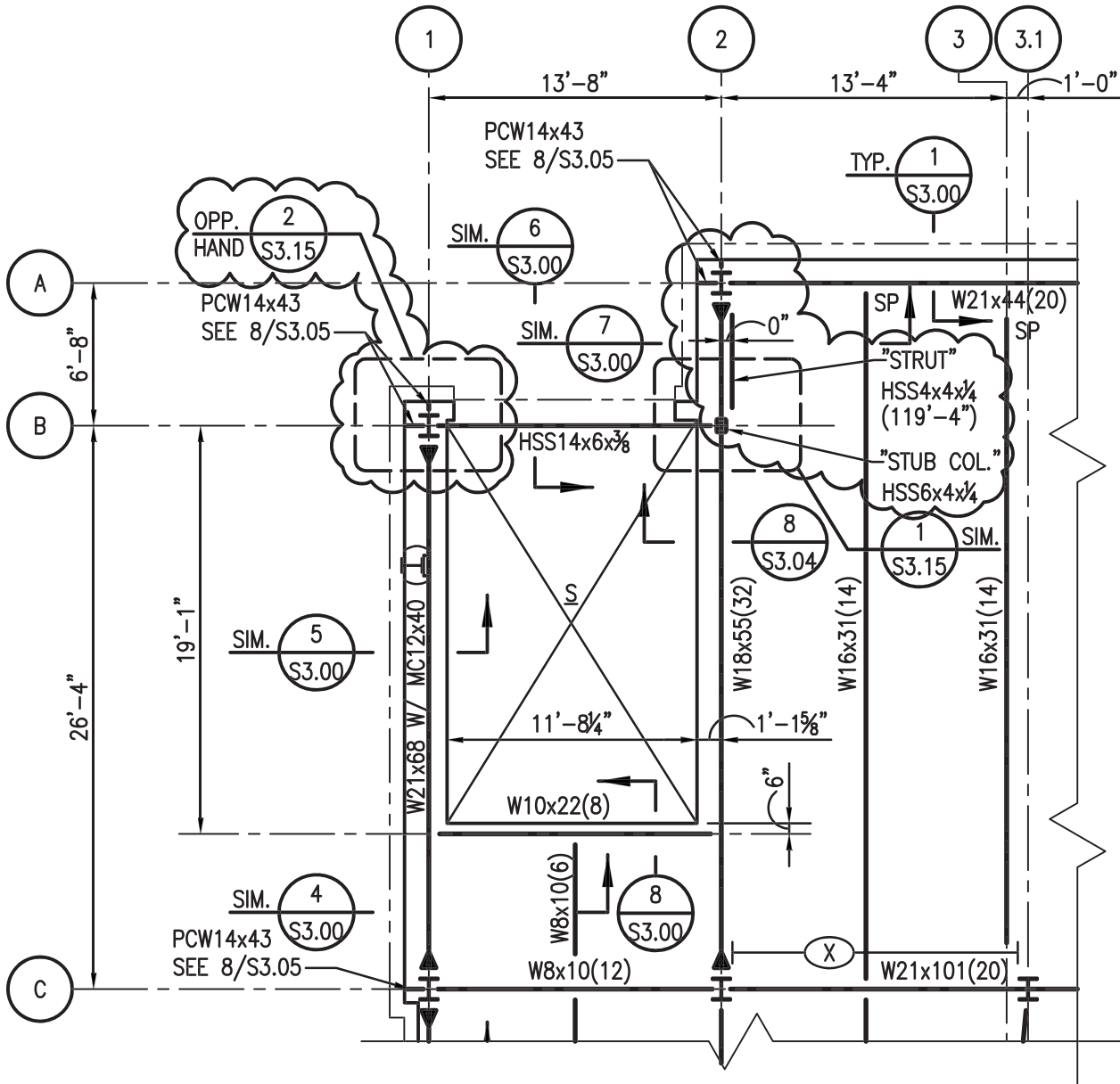
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# ATTACHMENT 38



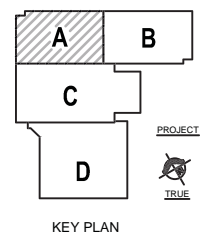
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 1. SEE 1/S1.05 FOR PLAN NOTES.

## 1 PART SECOND FLOOR FRAMING PLAN

S1.05 1/8"=1'-0"



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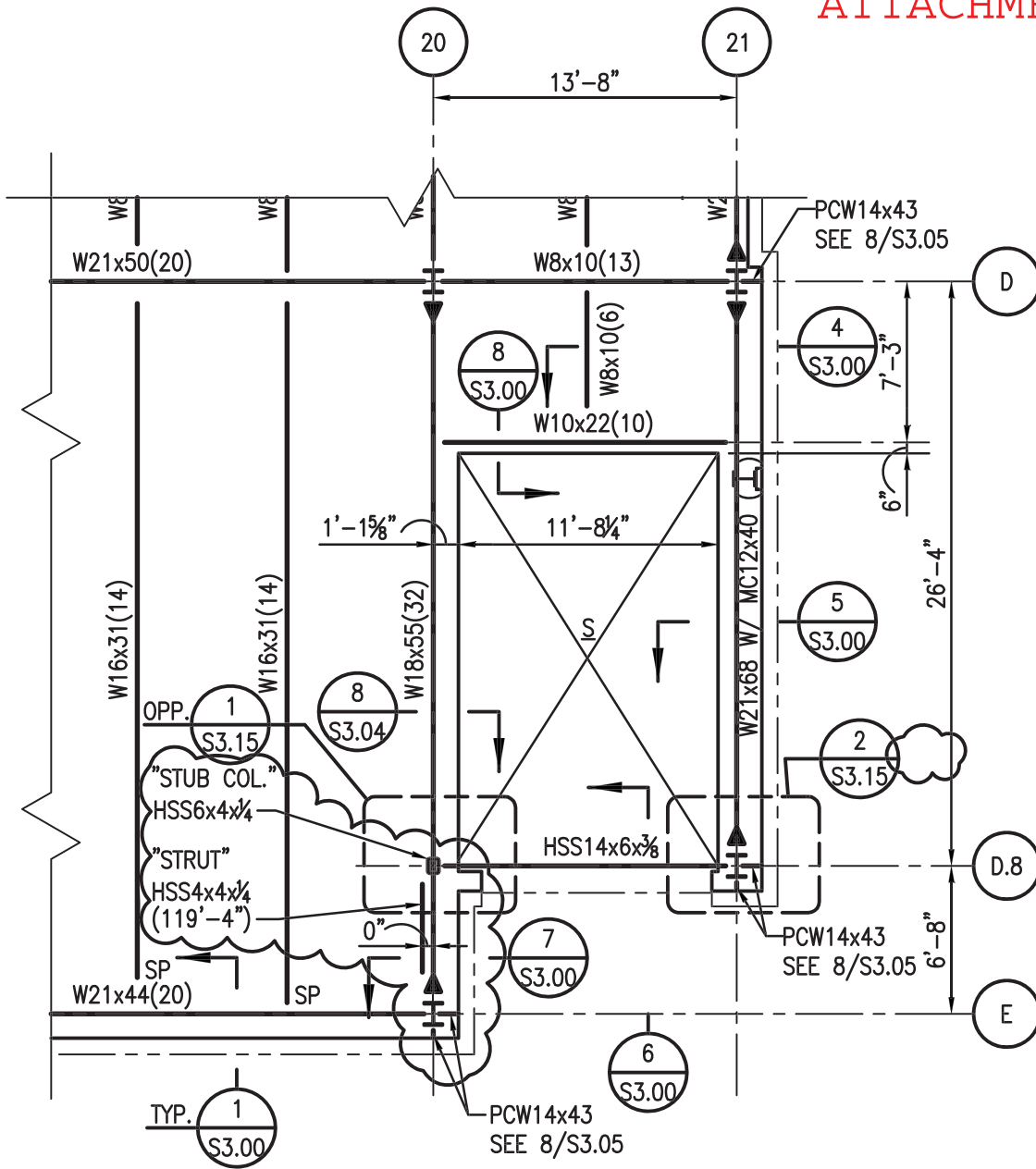


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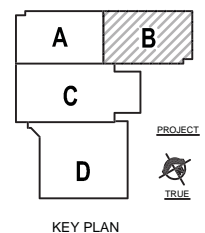


PLAN NOTES: UNLESS NOTED OTHERWISE:  
 1. SEE 1/S1.05 FOR PLAN NOTES.

**1 PART SECOND FLOOR FRAMING PLAN**  
 S1.06 1/8"=1'-0"



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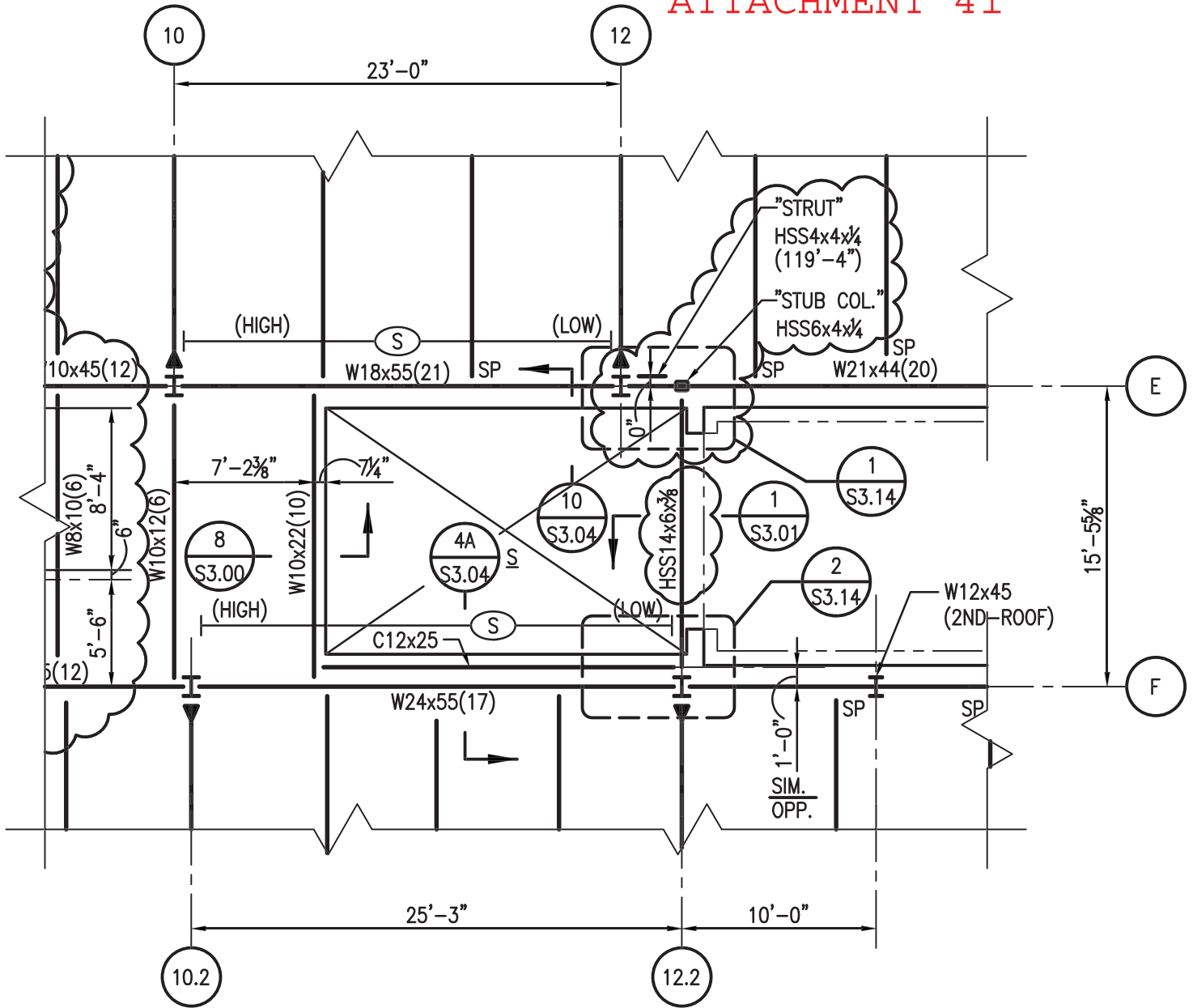


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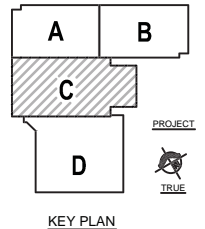


PLAN NOTES: UNLESS NOTED OTHERWISE:  
 1. SEE 1/S1.05 FOR PLAN NOTES.

**1** PART SECOND FLOOR FRAMING PLAN  
 S1.07 1/8"=1'-0"



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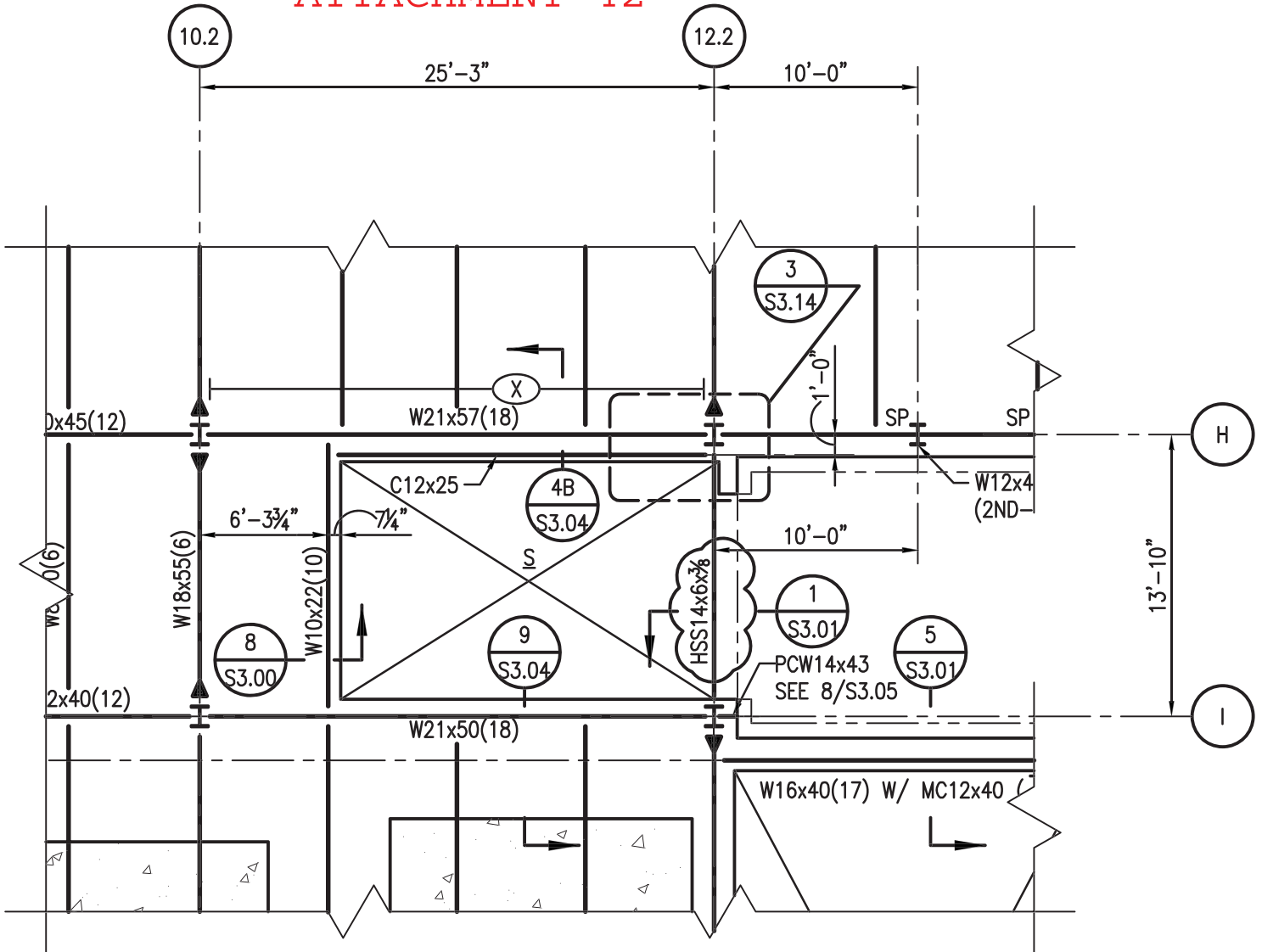


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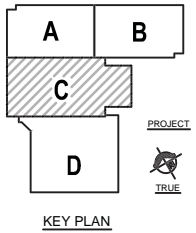
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ATTACHMENT 42



PLAN NOTES: UNLESS NOTED OTHERWISE:  
1. SEE 1/S1.05 FOR PLAN NOTES.

**1** PART SECOND FLOOR FRAMING PLAN  
S1.07 1/8"=1'-0"



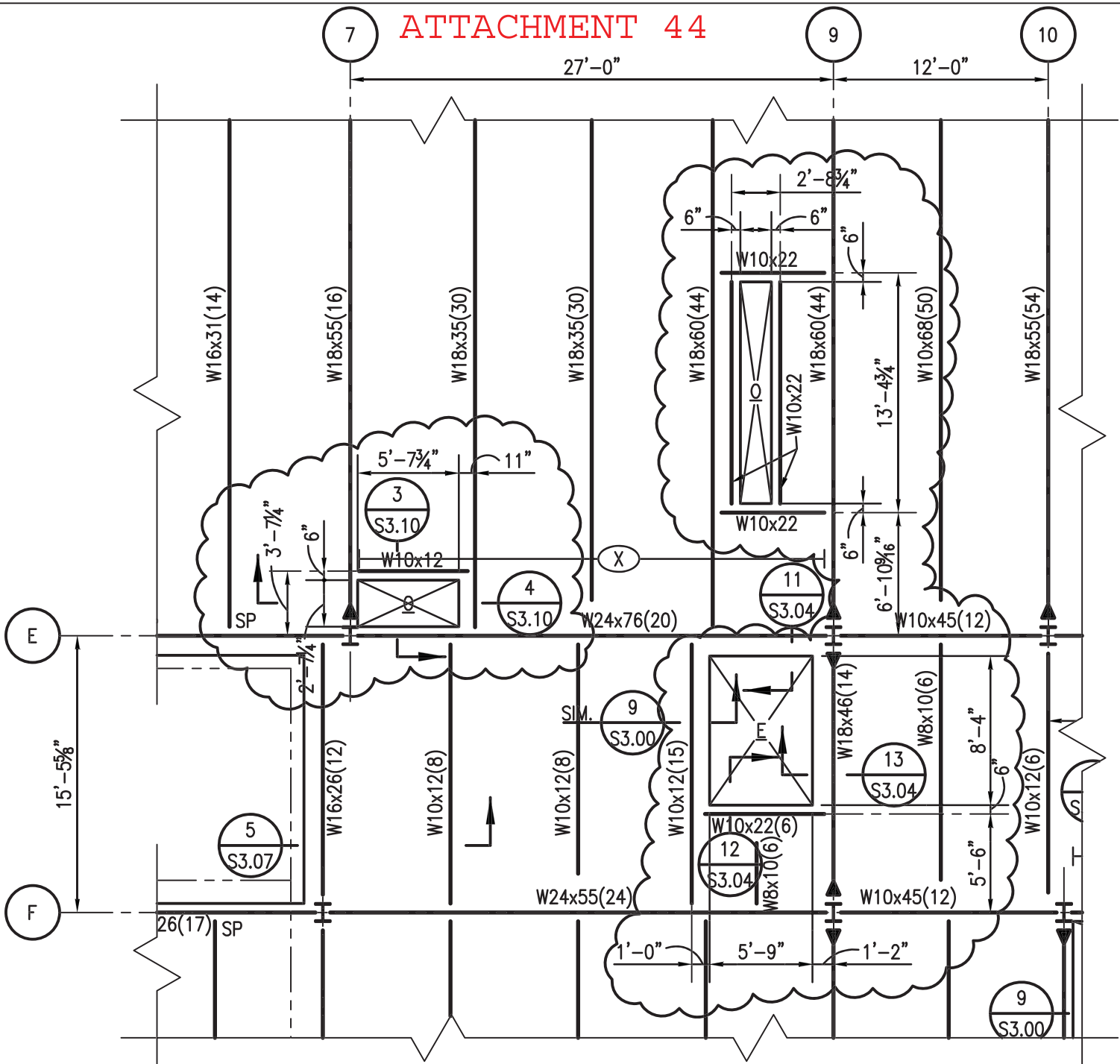
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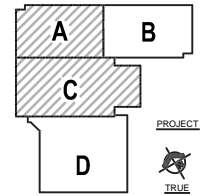


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1. SEE SHEET 1/S1.09 FOR PLAN NOTES

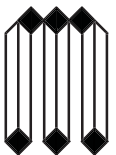
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S1.09

PART THIRD FLOOR FRAMING PLAN

1/8" = 1'-0"



KEY PLAN



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TITLE:  
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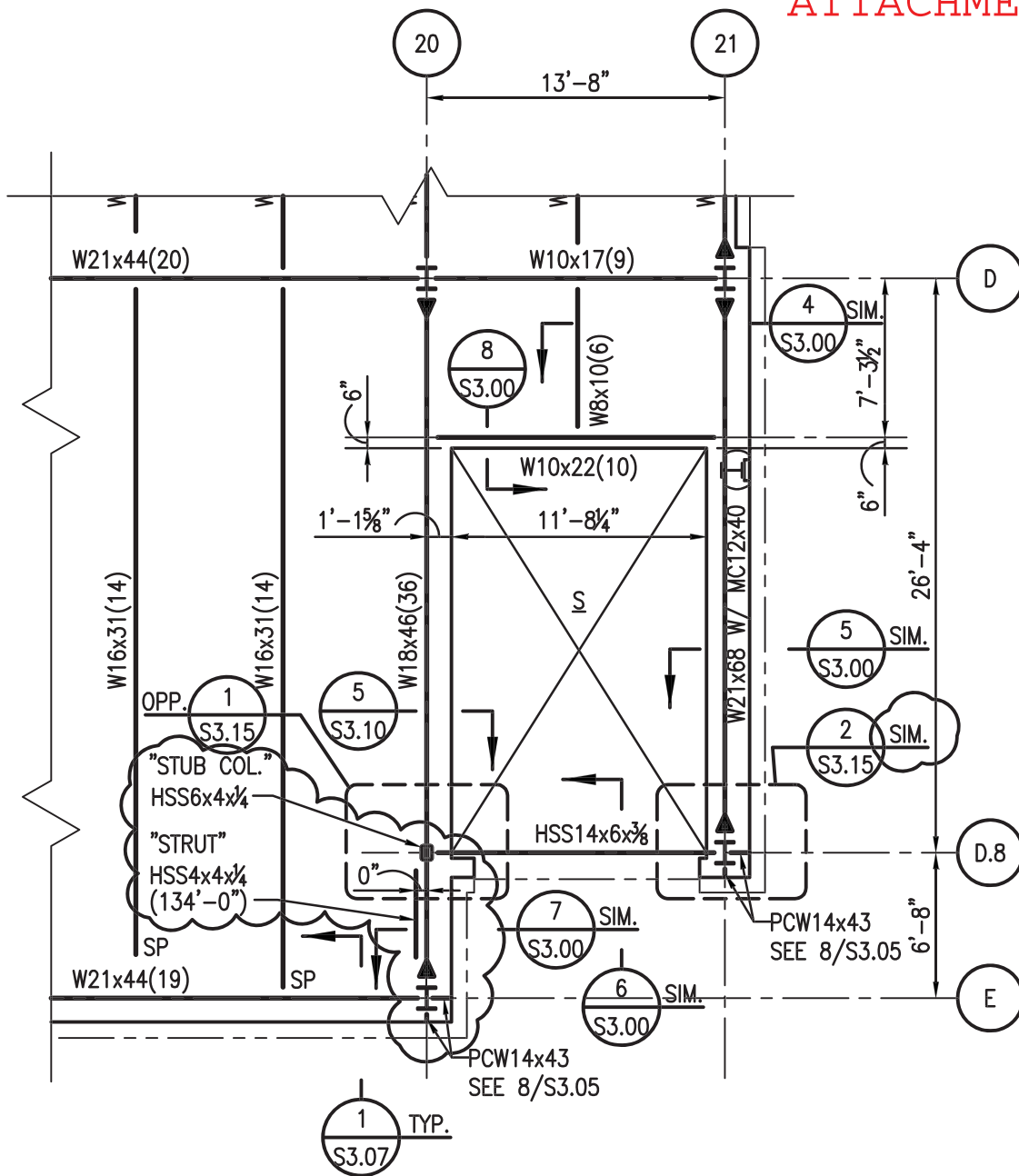
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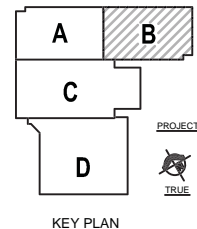


PLAN NOTES: UNLESS NOTED OTHERWISE:  
 1. SEE 1/S1.09 FOR PLAN NOTES.

**1 PART THIRD FLOOR FRAMING PLAN**  
 S1.10 1/8"=1'-0"



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KEY PLAN

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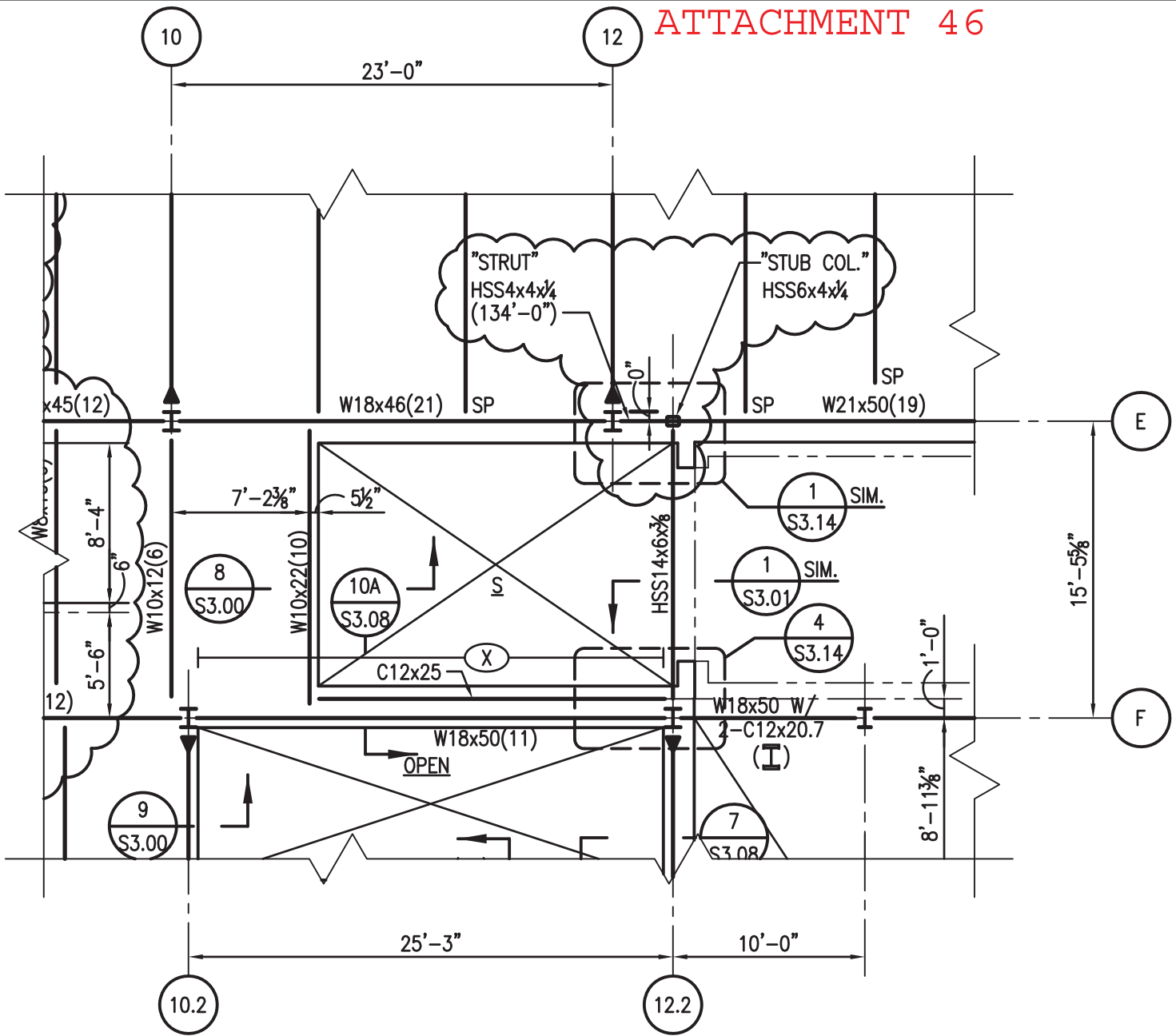
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 FLOOR FRAMING PLAN

SHEET: SK-1/S1.10 BID DOCUMENTS

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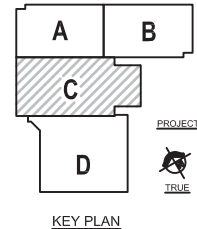
NEW 3 SECTION ELEMENTARY SCHOOL  
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PLAN NOTES: UNLESS NOTED OTHERWISE:  
 1. SEE 1/S1.09 FOR PLAN NOTES.

**1** PART THIRD FLOOR FRAMING PLAN  
 S1.10 1/8"=1'-0"



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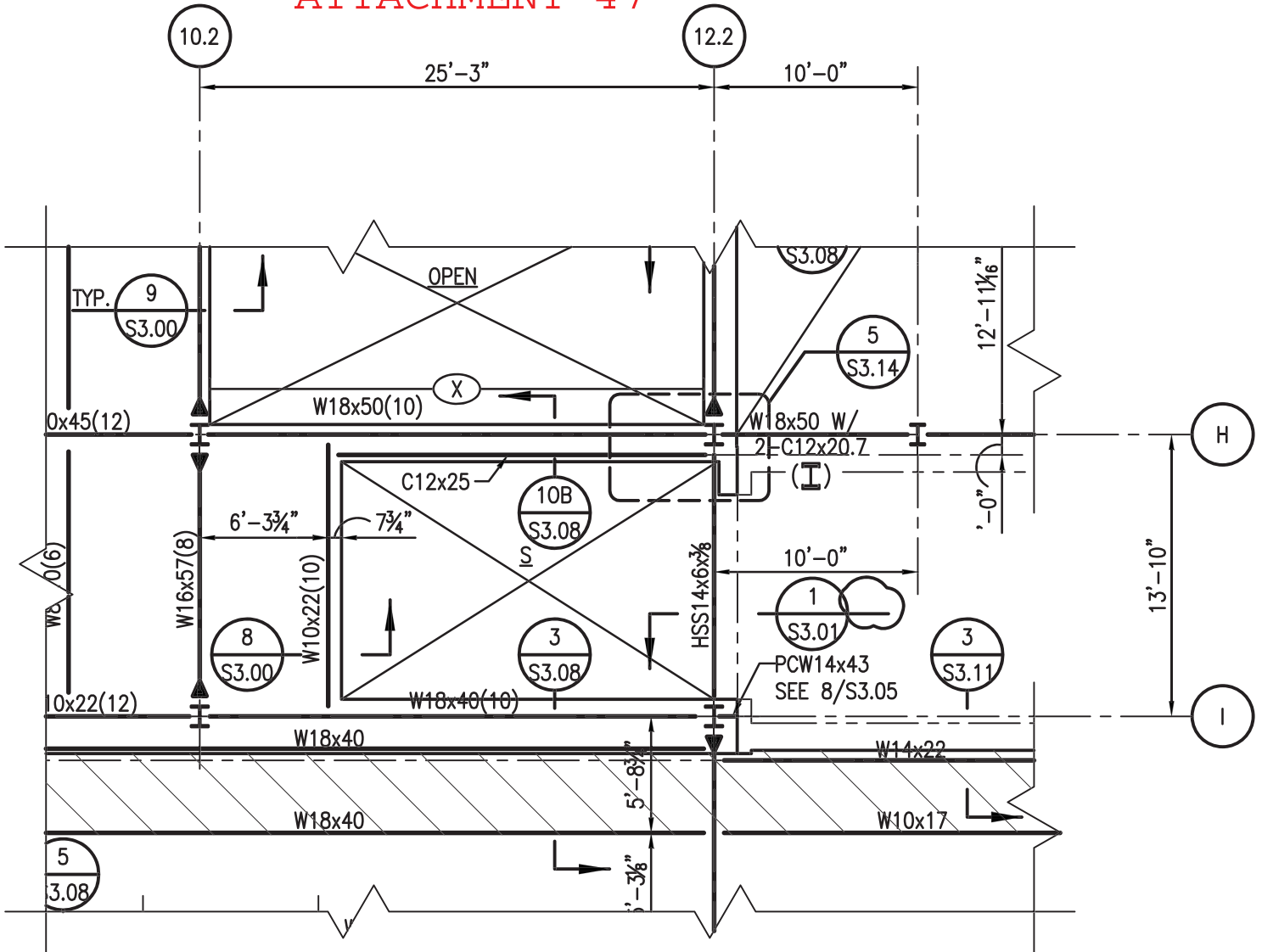
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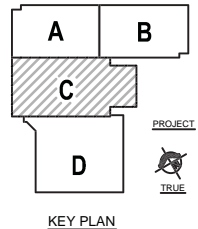


PLAN NOTES: UNLESS NOTED OTHERWISE:  
 1. SEE 1/S1.09 FOR PLAN NOTES.

1 PART THIRD FLOOR FRAMING PLAN  
 S1.11 1/8"=1'-0"



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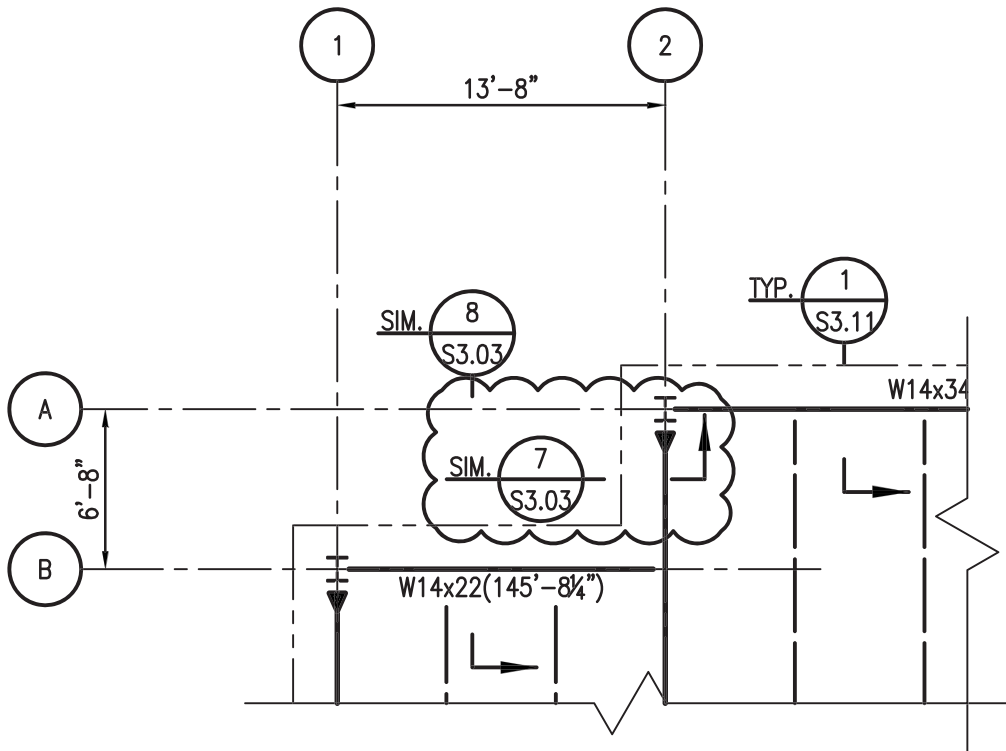
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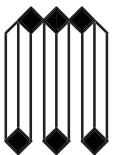
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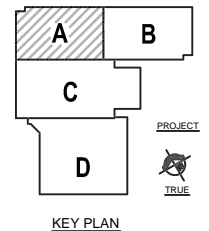


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 1. SEE SHEET 1/S1.13 FOR PLAN NOTES

**1** PART ROOF FRAMING PLAN  
 S1.13 1/8" = 1'-0"



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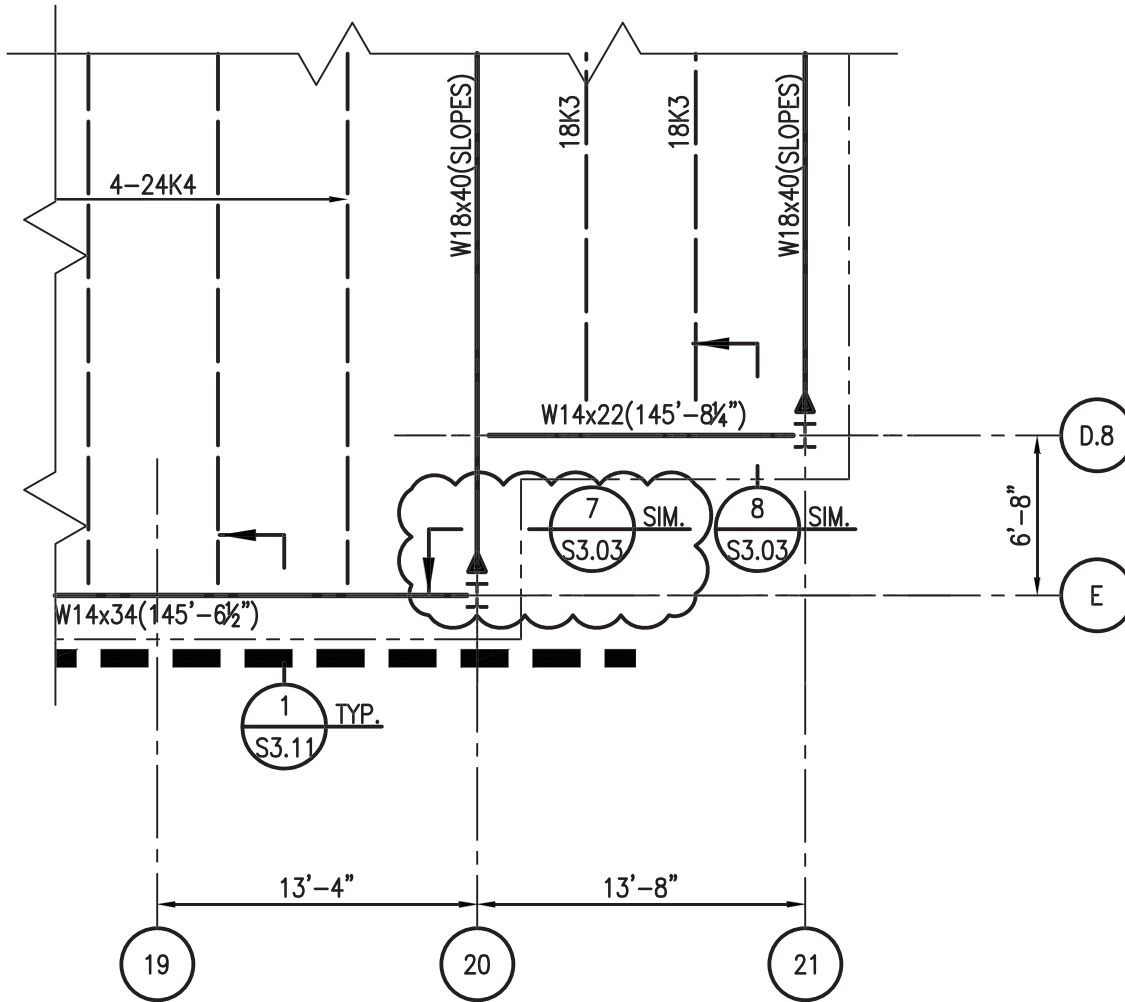
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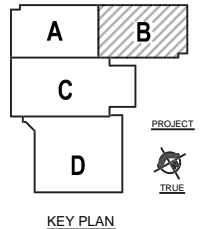


PLAN NOTES: UNLESS NOTED OTHERWISE:  
 1. SEE SHEET 1/S1.13 FOR PLAN NOTES

**1** PART ROOF FRAMING PLAN  
 S1.14 1/8" = 1'-0"



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TITLE:  
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 ROOF FRAMING PLAN

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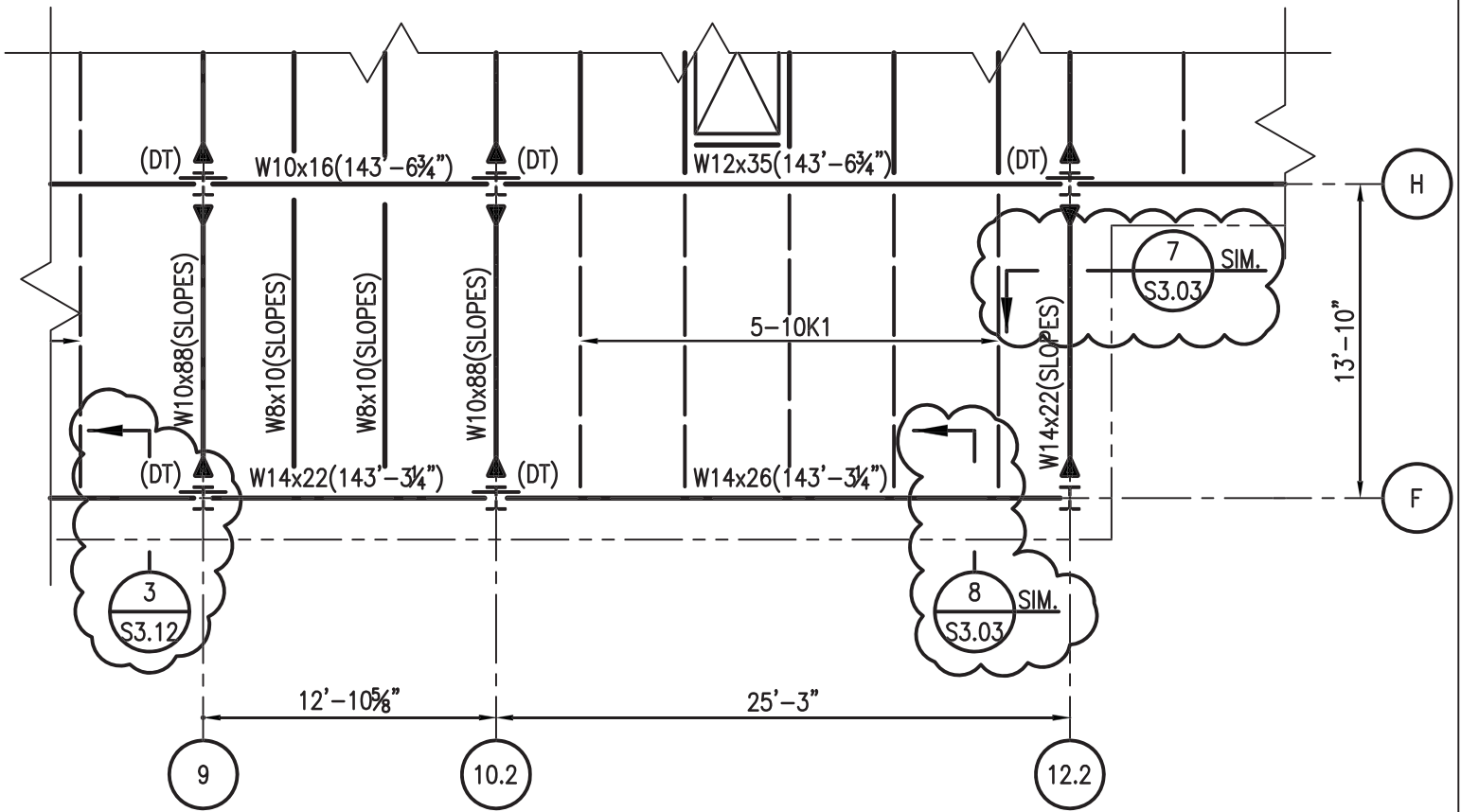
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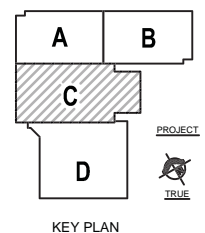


**PLAN NOTES: UNLESS NOTED OTHERWISE:**  
 1. SEE SHEET 1/S1.13 & 1/S1.15 FOR PLAN NOTES

1
PART ROOF FRAMING PLAN  
S1.15
1/8" = 1'-0"




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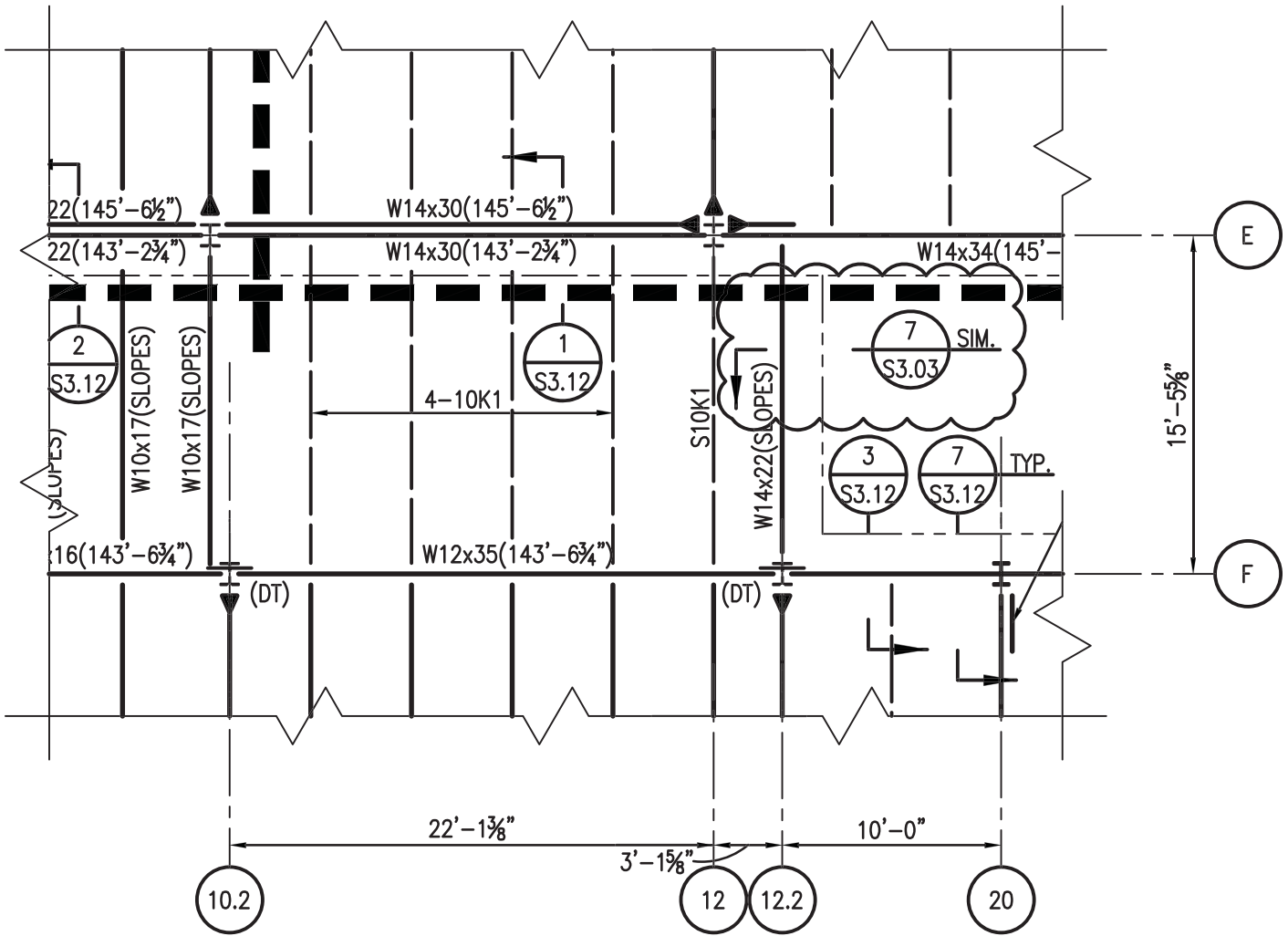


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 TITLE: REVISED PART ROOF FRAMING PLAN  
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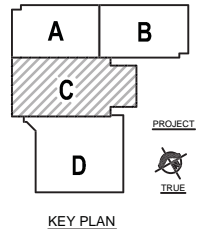
  
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**PLAN NOTES: UNLESS NOTED OTHERWISE:**  
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1
PART ROOF FRAMING PLAN  
1/8" = 1'-0"

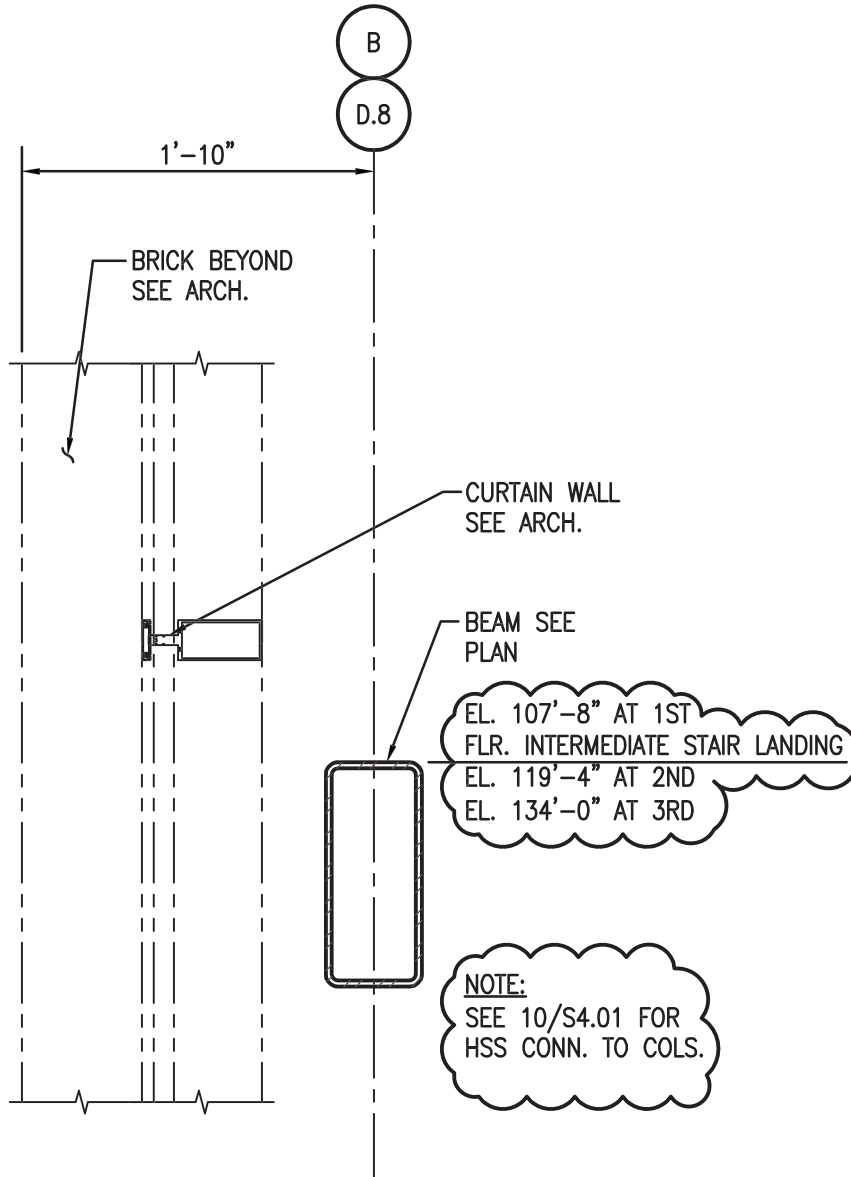


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 SHEET: SK-2/S1.15 BID DOCUMENTS

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ATTACHMENT 52



**6** SECTION-1ST FLOOR INTERMEDIATE STAIR LANDING, 2ND & 3RD FLOOR 1"=1'-0"  
 S3.00

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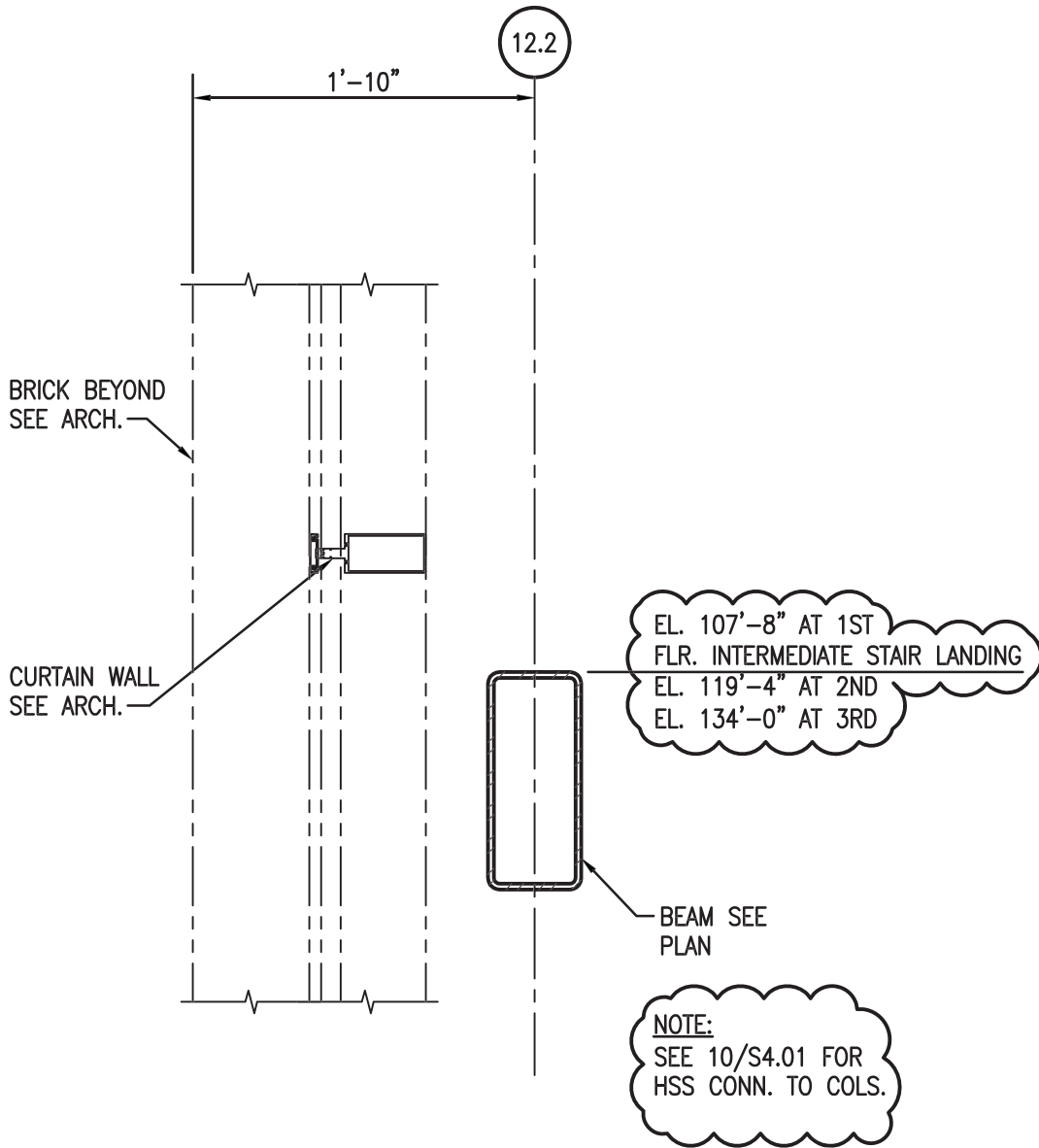
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# ATTACHMENT 53



1 SECTION-1ST FLOOR INTERMEDIATE STAIR  
S3.01 LANDING, 2ND & 3RD FLOOR 1"=1'-0"



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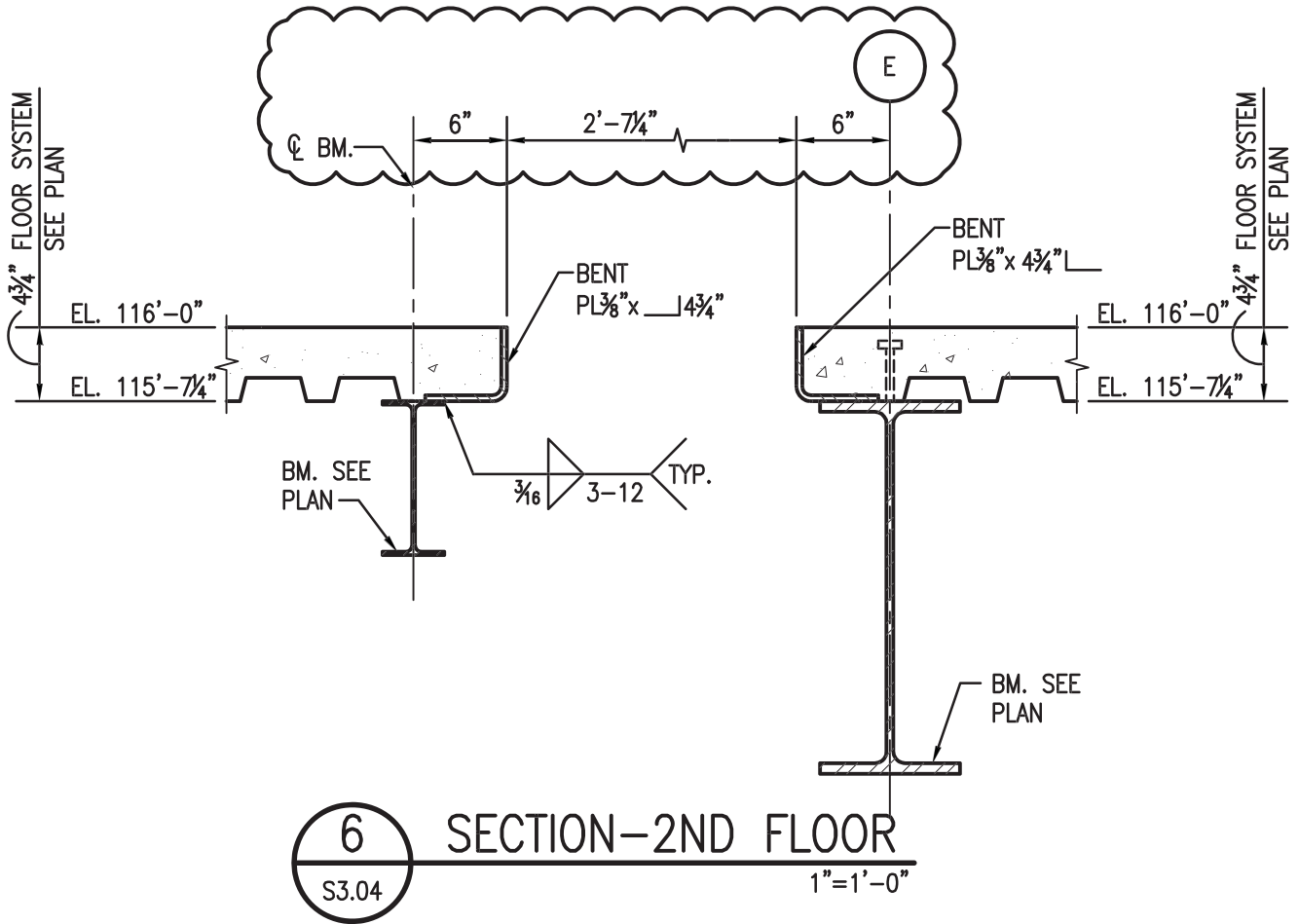
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# ATTACHMENT 54



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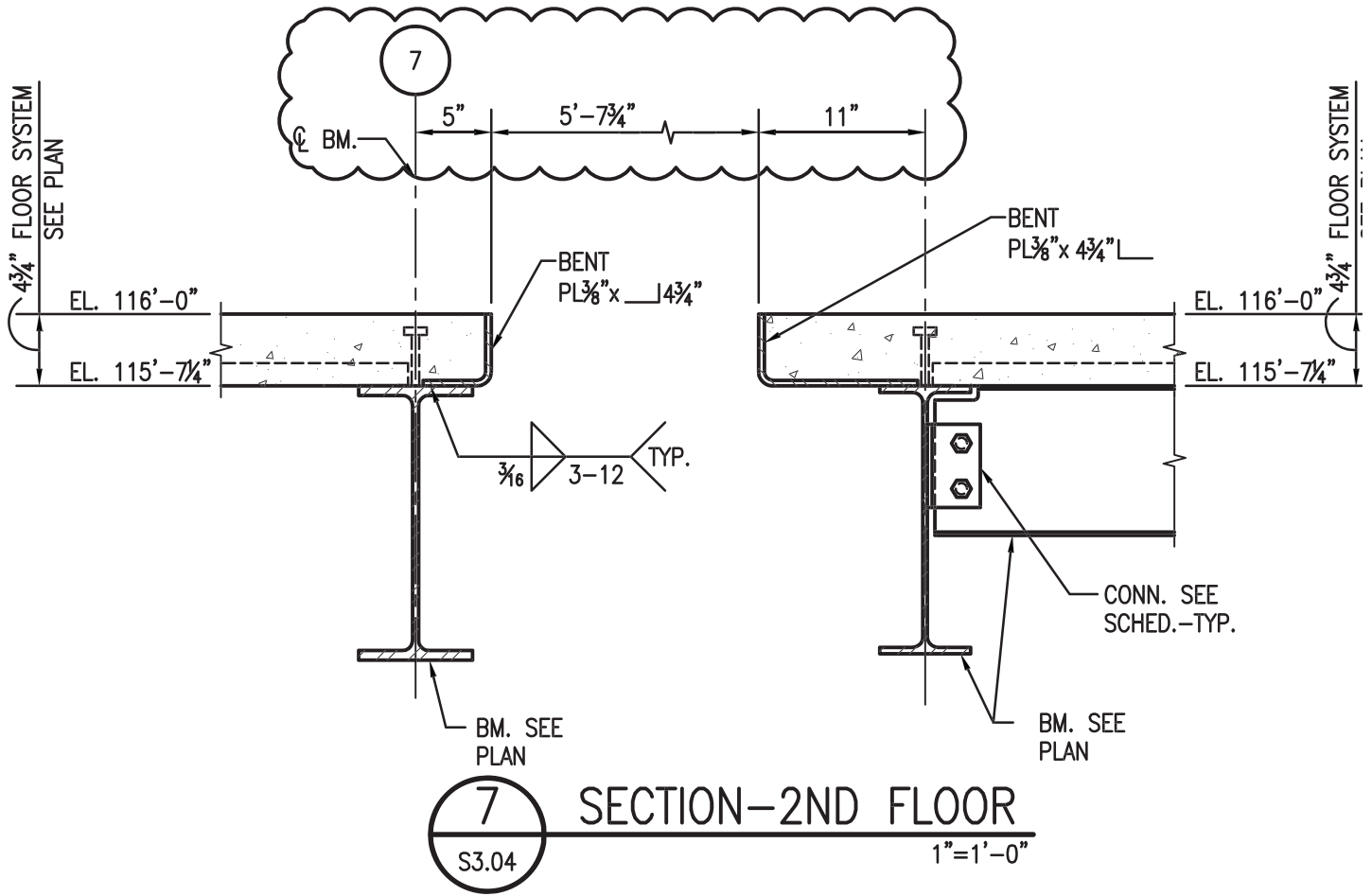
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# ATTACHMENT 55



11085

TITLE:  
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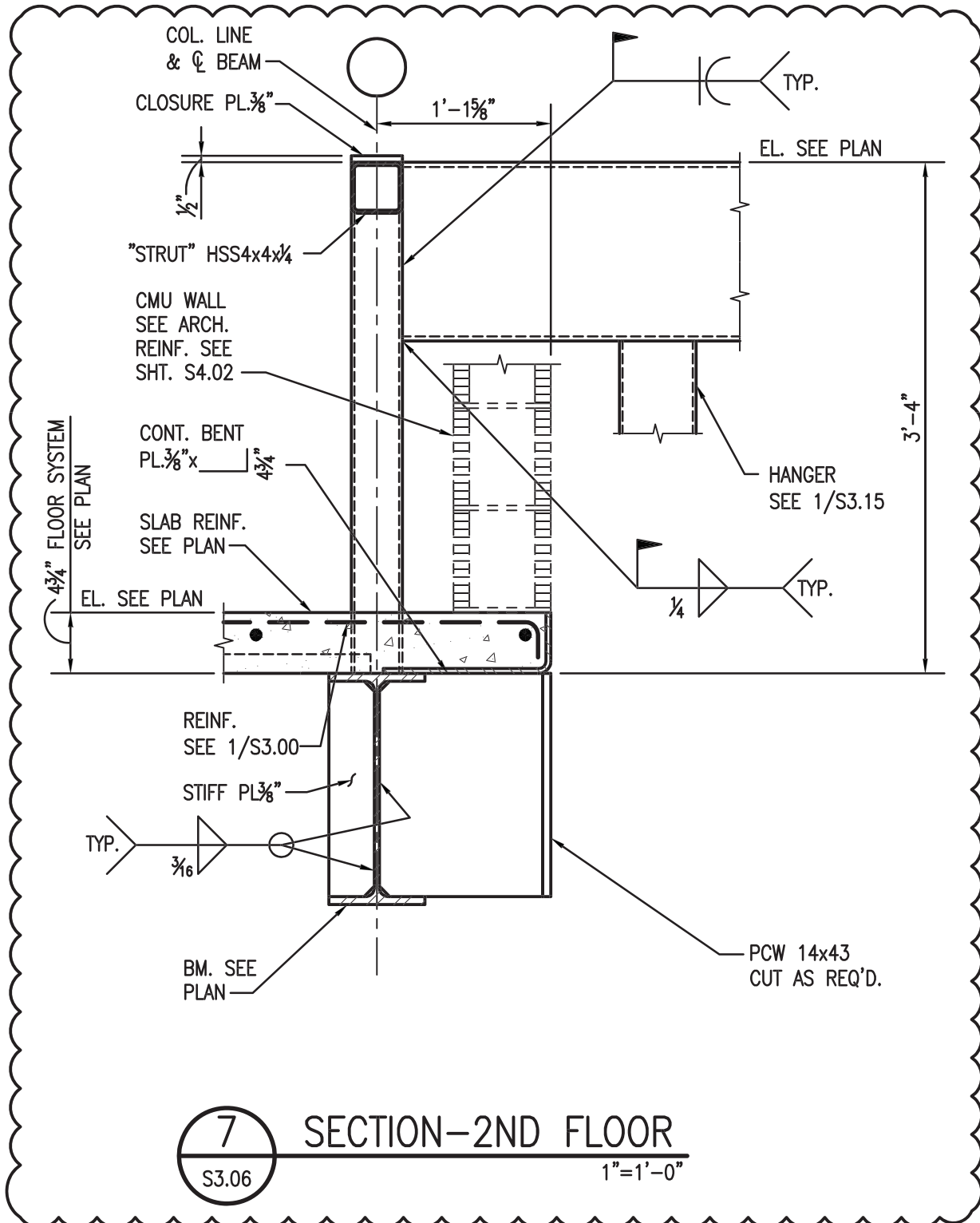
NEW 3 SECTION ELEMENTARY SCHOOL  
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# ATTACHMENT 56



7
SECTION-2ND FLOOR  
S3.06
1"=1'-0"



11085

TITLE: REVISED DETAIL

SHEET: SK-1/S3.06 BID DOCUMENTS

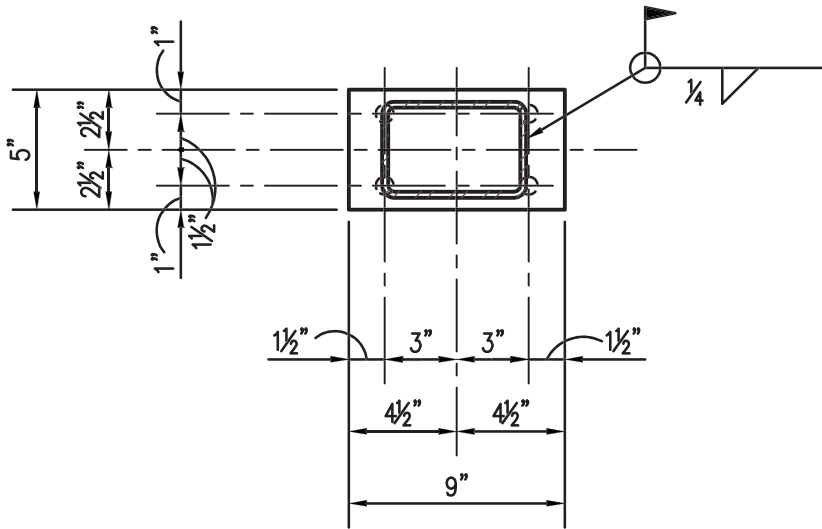
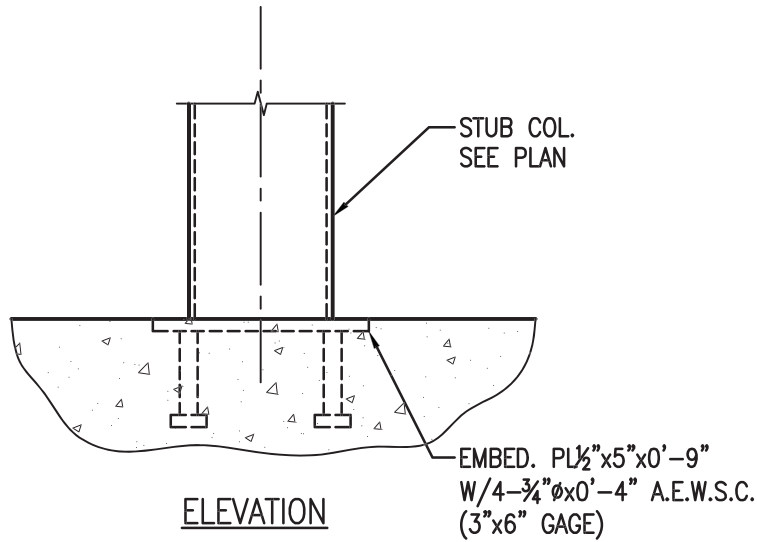
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ATTACHMENT 57



8 DETAIL-BASE PLATE  
S3.06 1 1/2"=1'-0"



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TITLE:  
ADDED DETAIL

SHEET: SK-2/S3.06 BID DOCUMENTS

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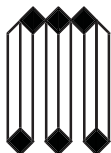
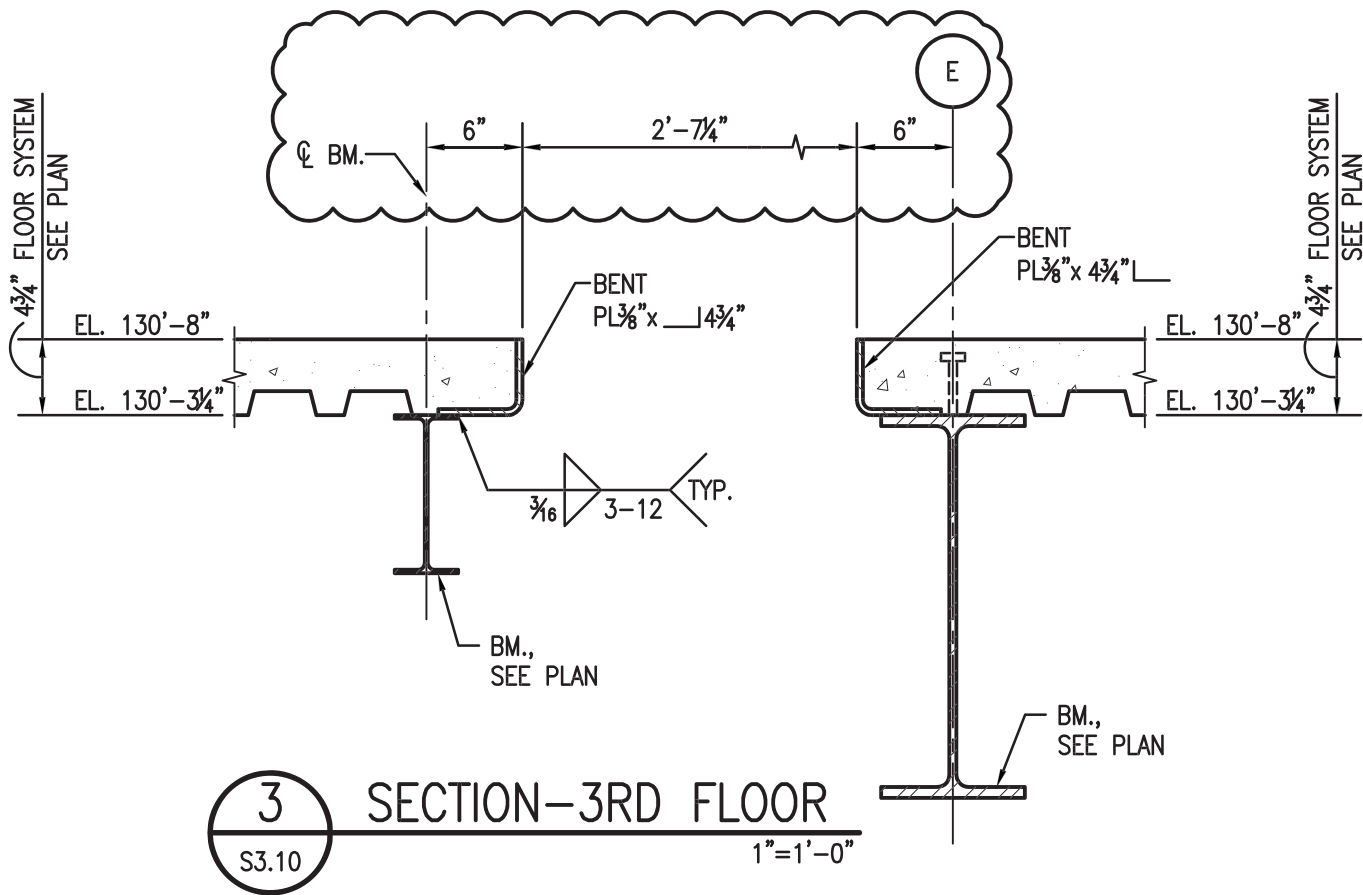
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AT FISK-HOWARD SCHOOL  
RECOVERY SCHOOL DISTRICT

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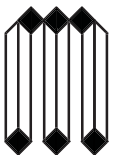
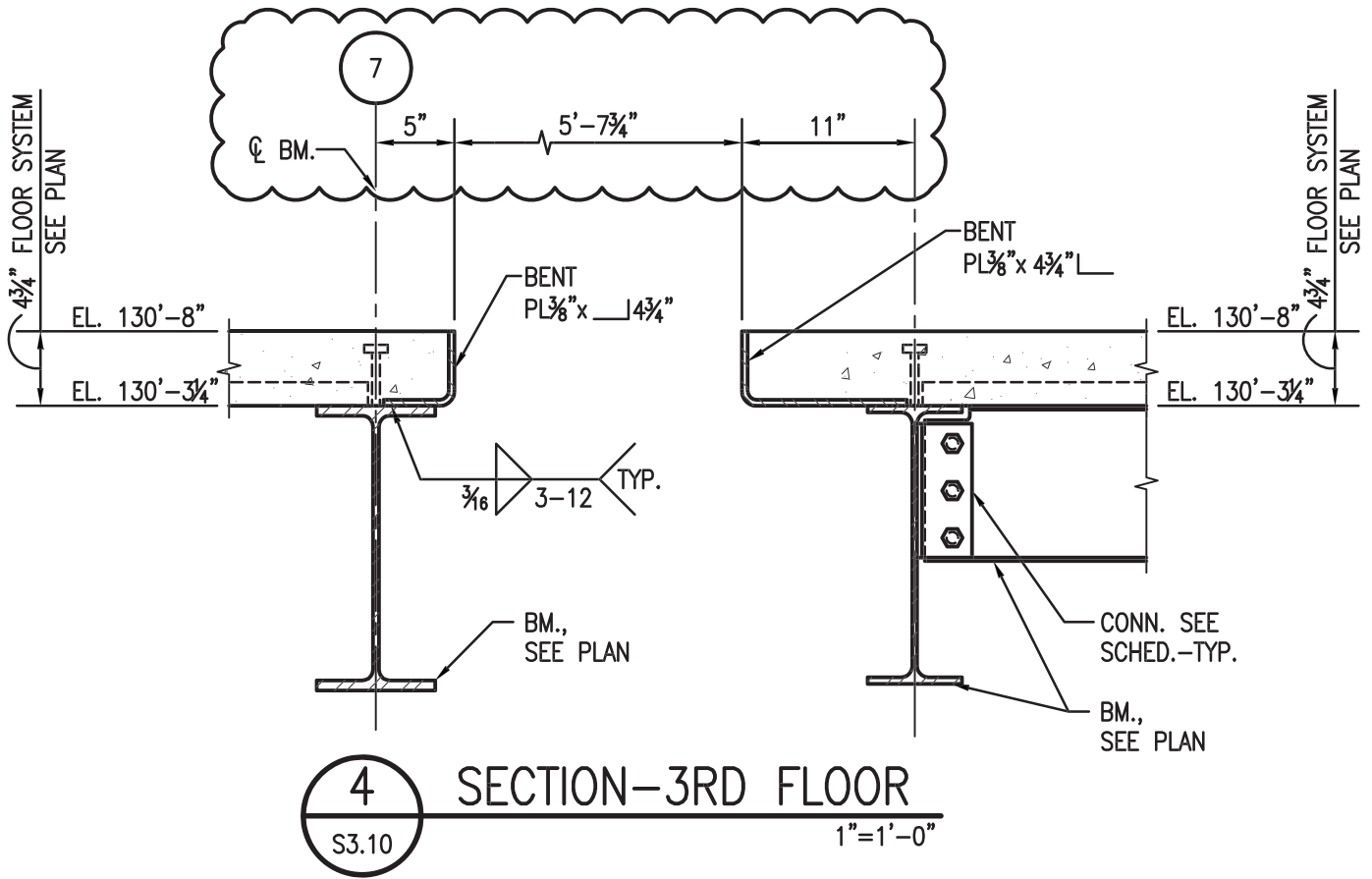
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# ATTACHMENT 59



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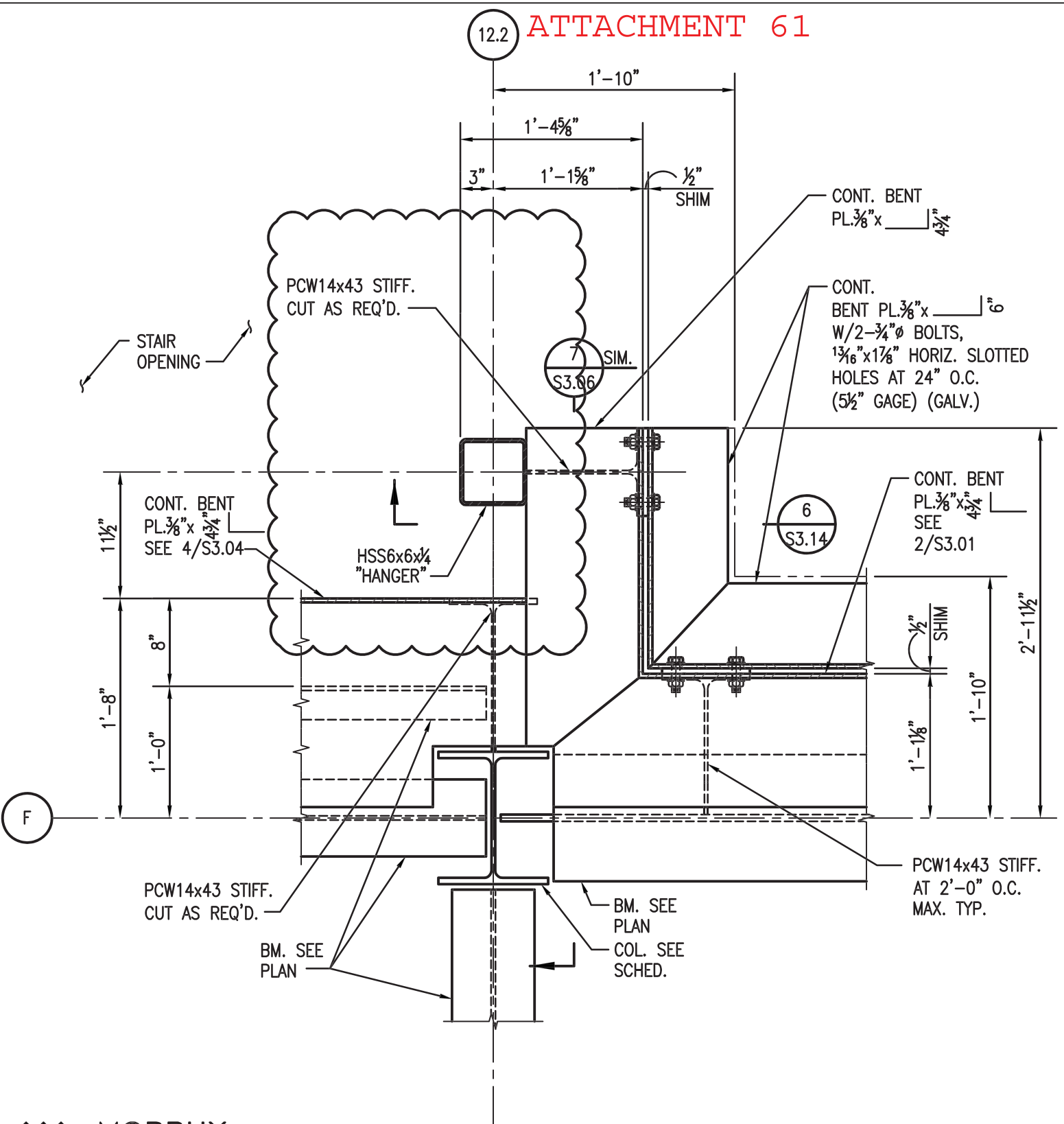
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12.2 ATTACHMENT 61



2 DETAIL  
S3.14 1"=1'-0"

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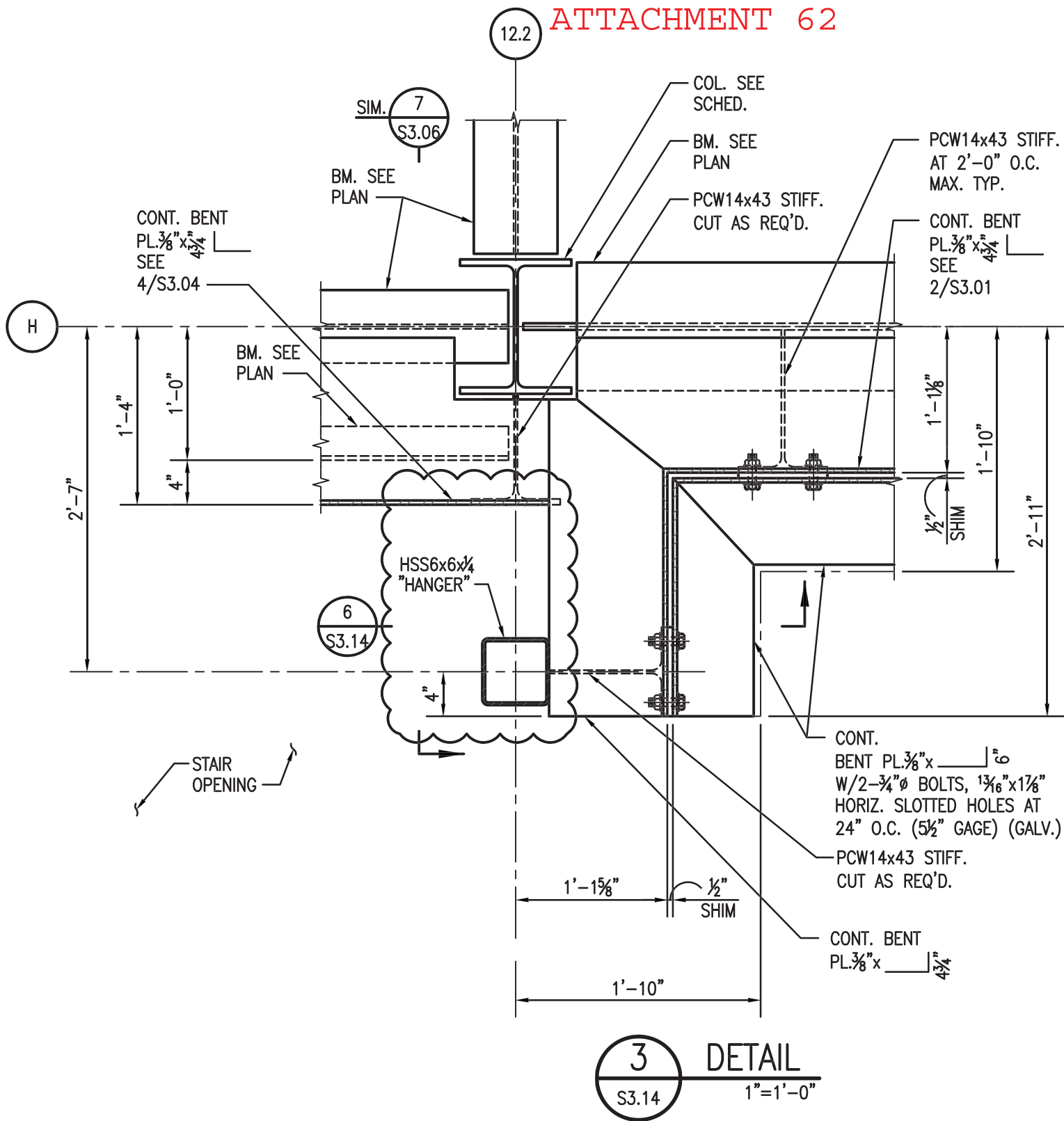
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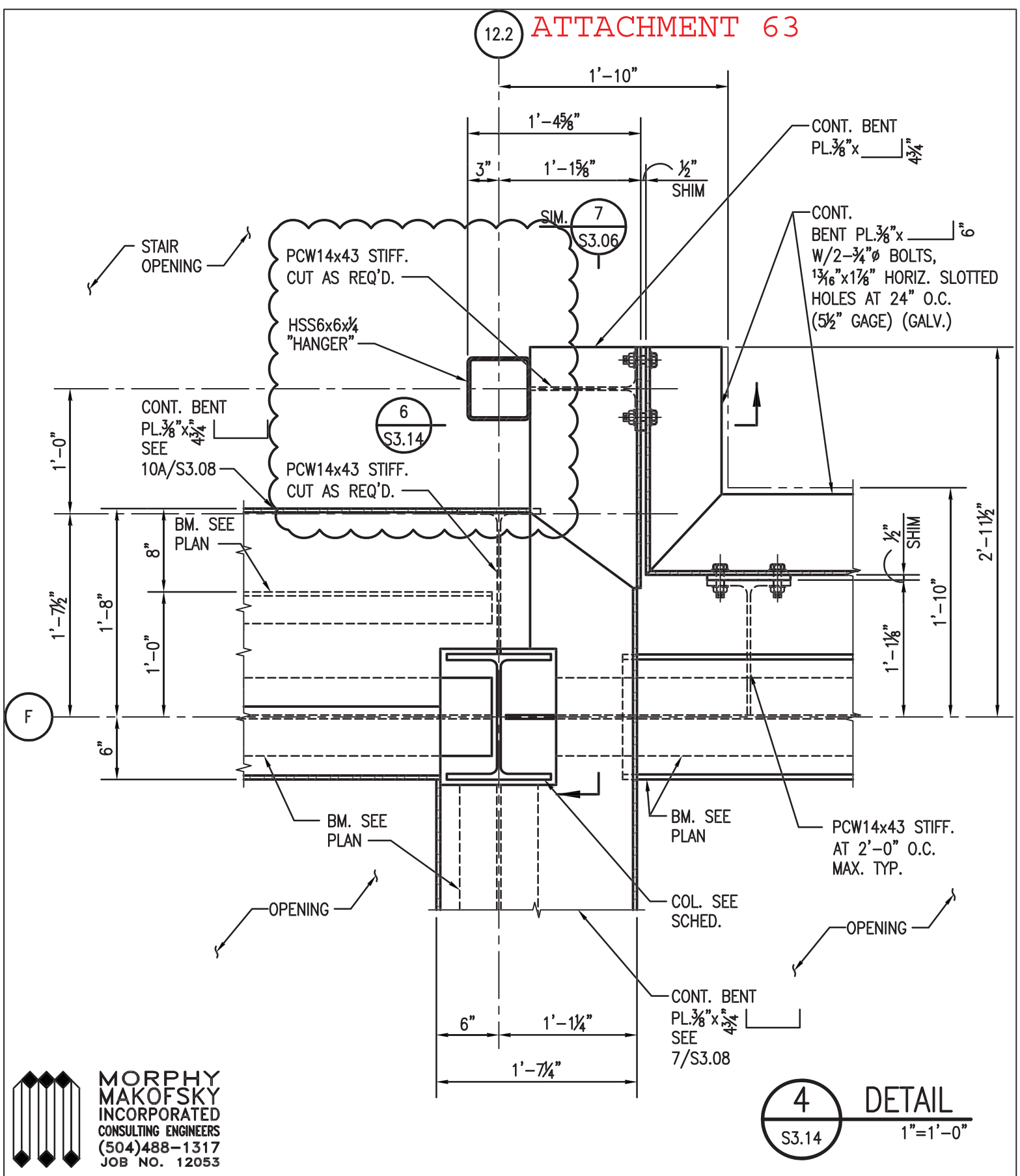
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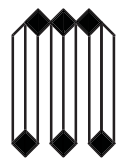
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4 DETAIL  
S3.14 1'-1'-0"



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11085  
TITLE: ADDED DETAIL  
SHEET: SK-4/S3.14 BID DOCUMENTS

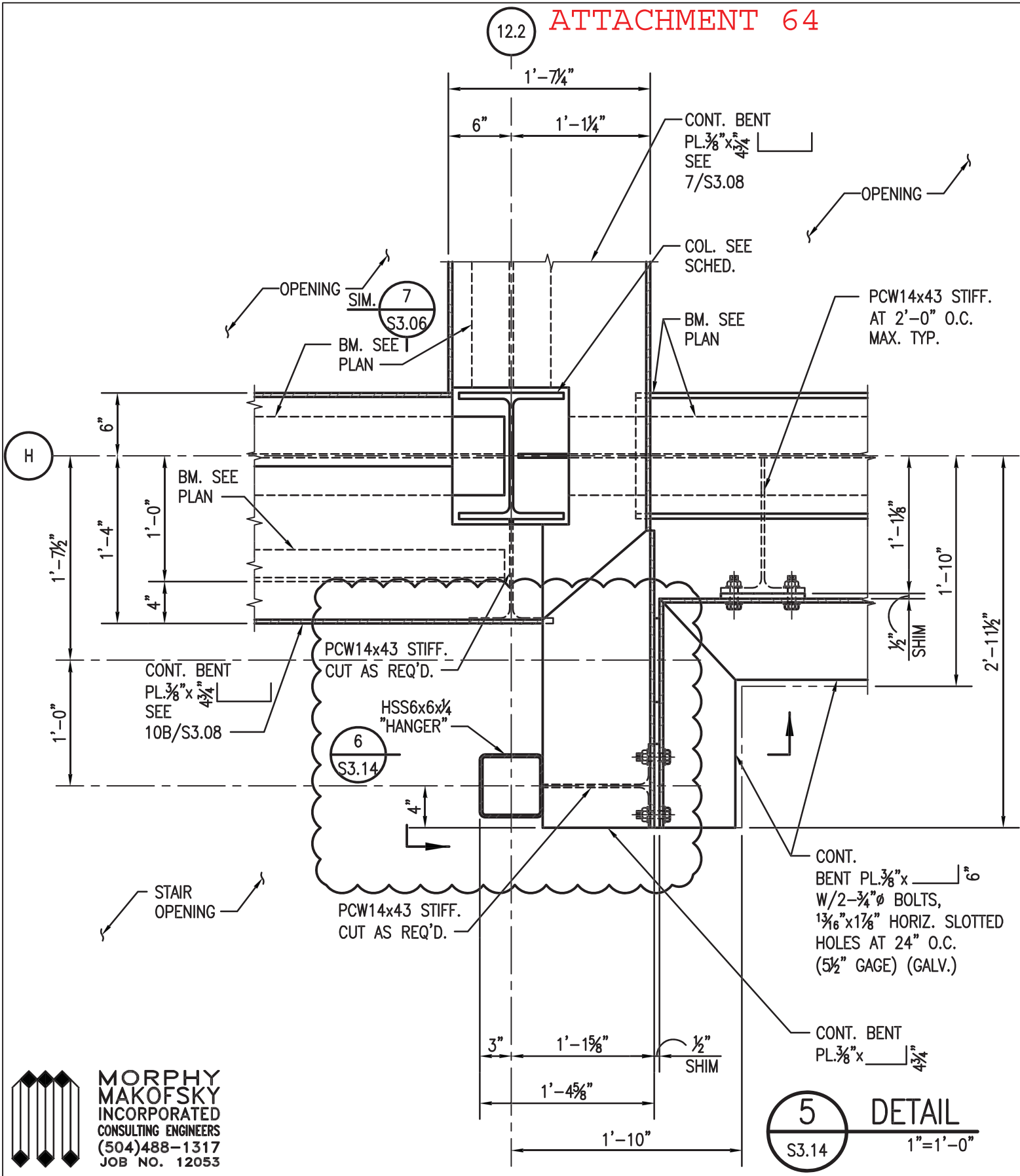
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**5** DETAIL  
 S3.14 1"=1'-0"

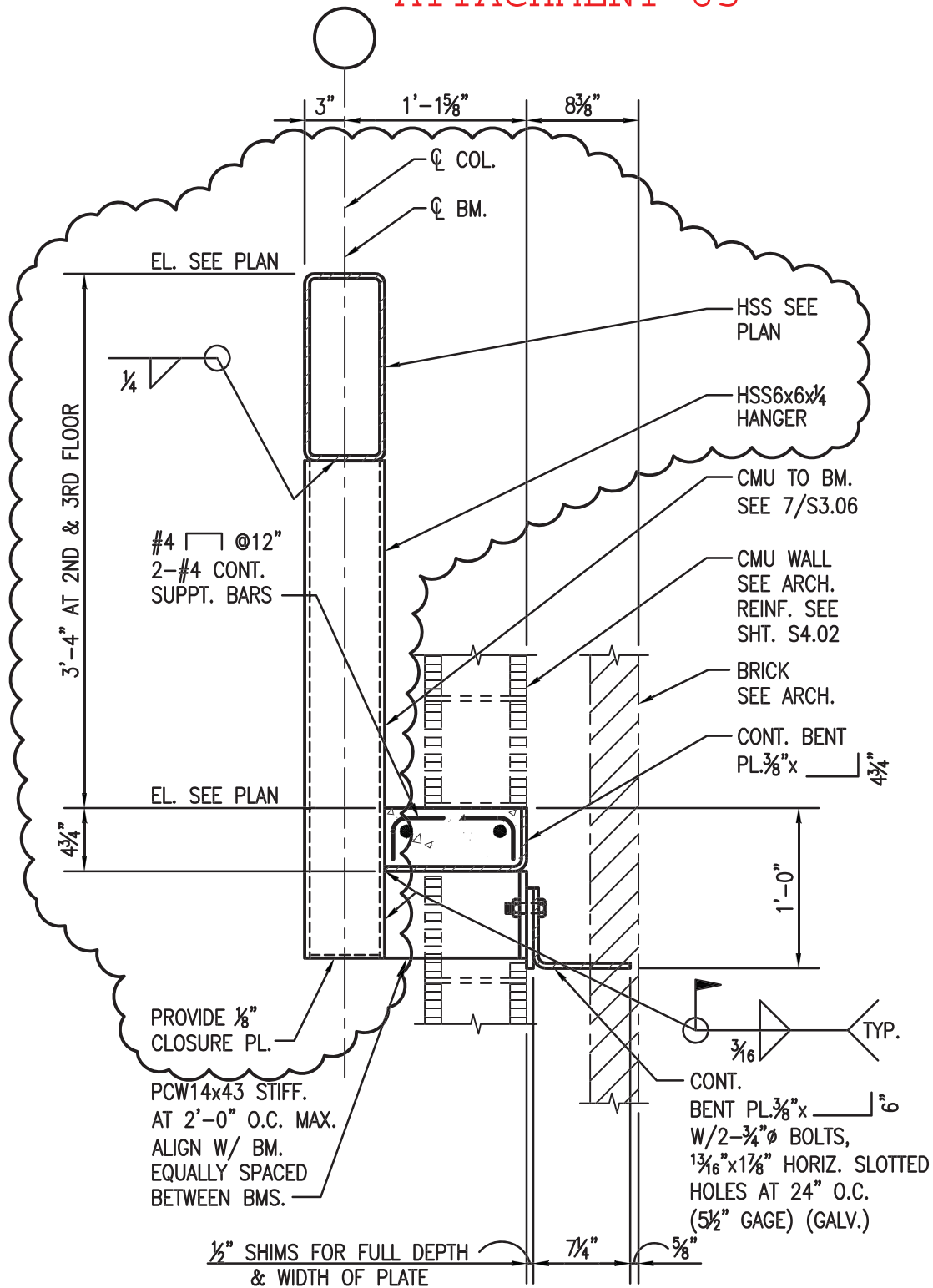
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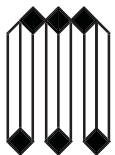
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# ATTACHMENT 65



6
DETAIL  
S3.14
1"=1'-0"



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NEW 3 SECTION ELEMENTARY SCHOOL  
 AT FISK-HOWARD SCHOOL  
 RECOVERY SCHOOL DISTRICT

211 S. LOPEZ STREET

NEW ORLEANS, LOUISIANA 70119

VergesRome

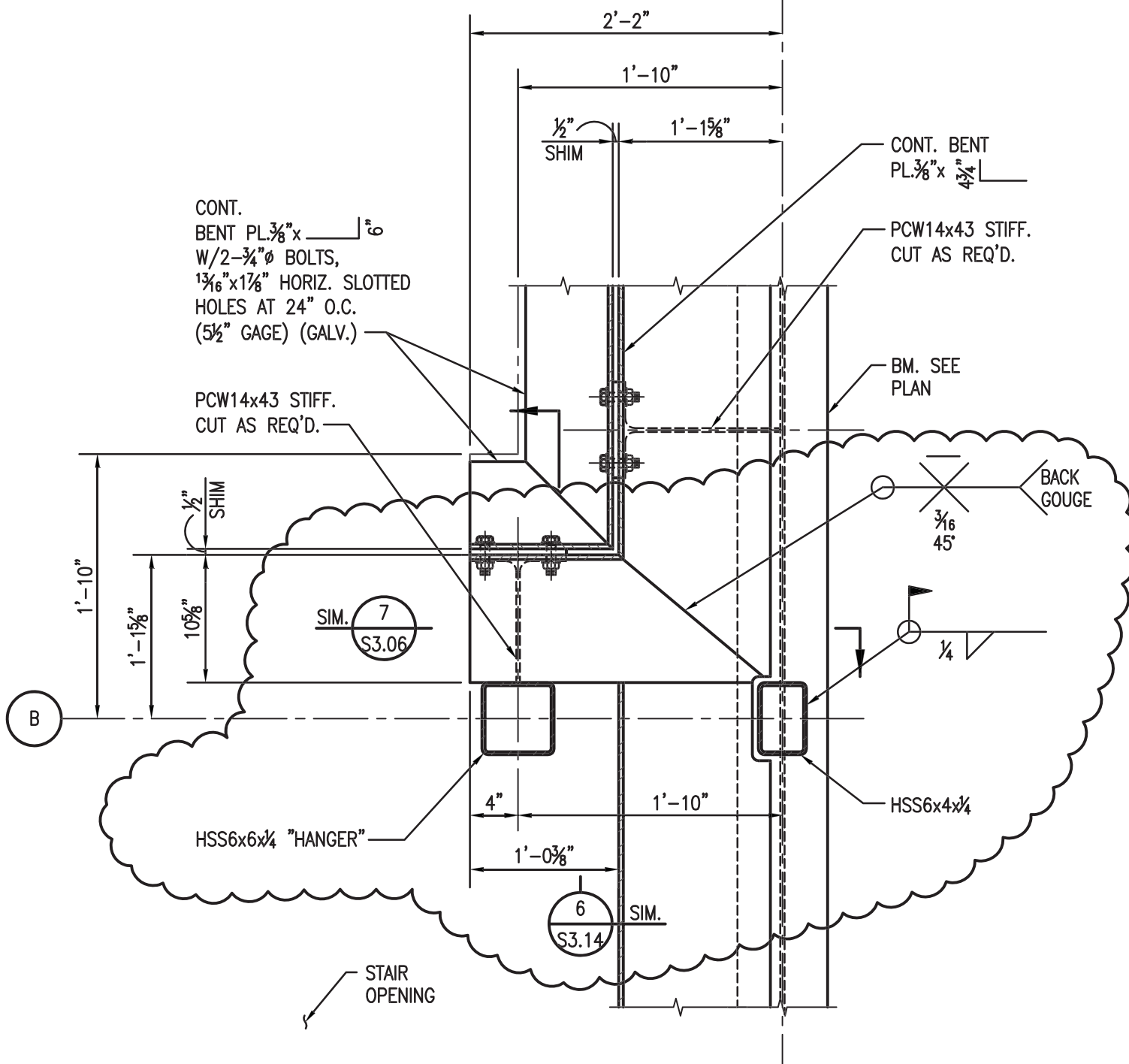
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FANNING HOWEY

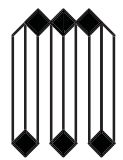
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2  
20



1 PLAN DETAIL  
S3.15 1"=1'-0"



**MORPHY  
MAKOFSKY  
INCORPORATED**  
CONSULTING ENGINEERS  
(504)488-1317  
JOB NO. 12053

11085  
TITLE: REVISED DETAIL  
SHEET: SK-1/S3.15 BID DOCUMENTS

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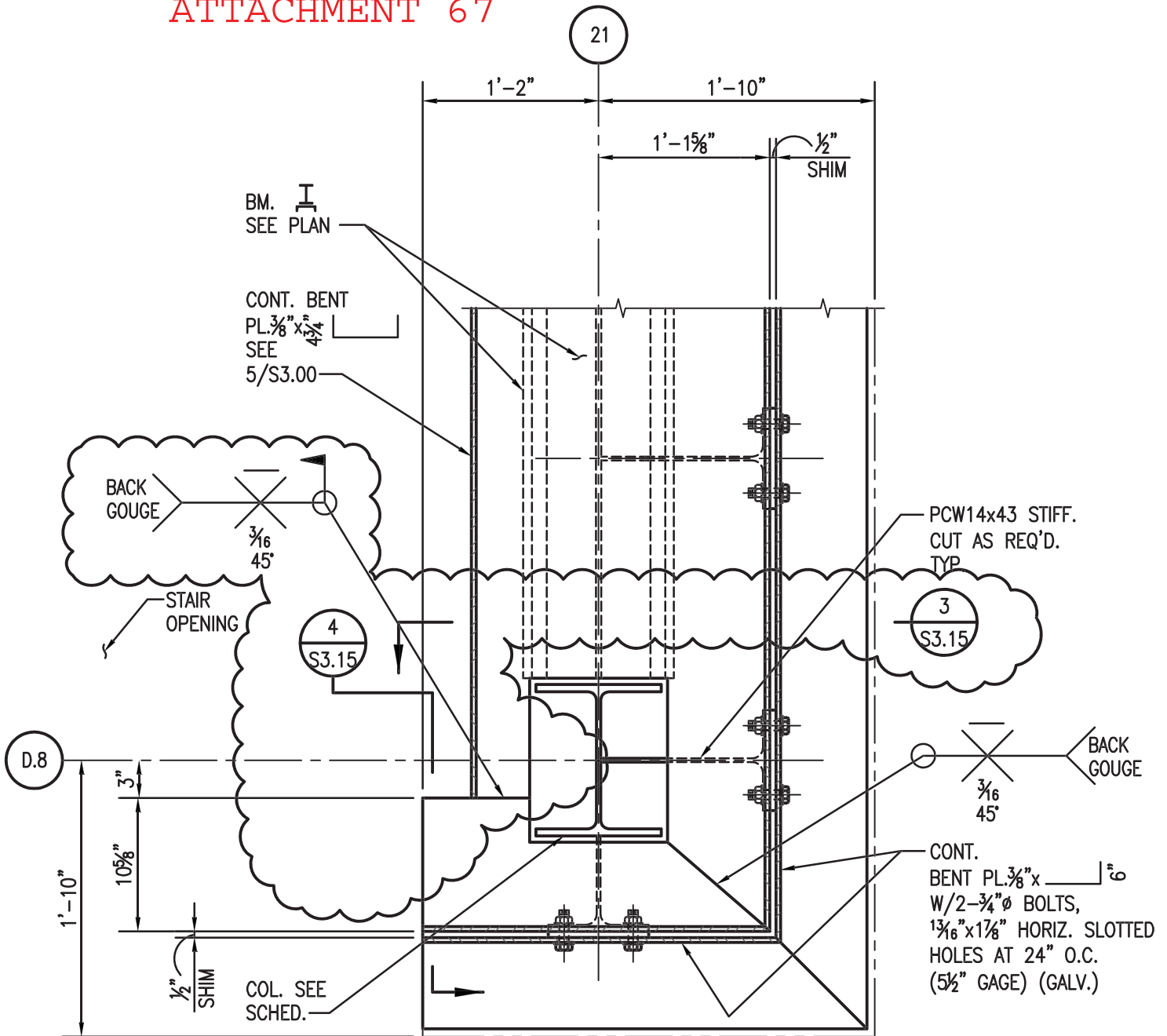
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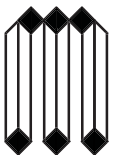
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# ATTACHMENT 67



**2 PLAN DETAIL**  
S3.15 1"=1'-0"



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JOB NO. 12053

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TITLE:  
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SHEET: SK-2/S3.15 BID DOCUMENTS

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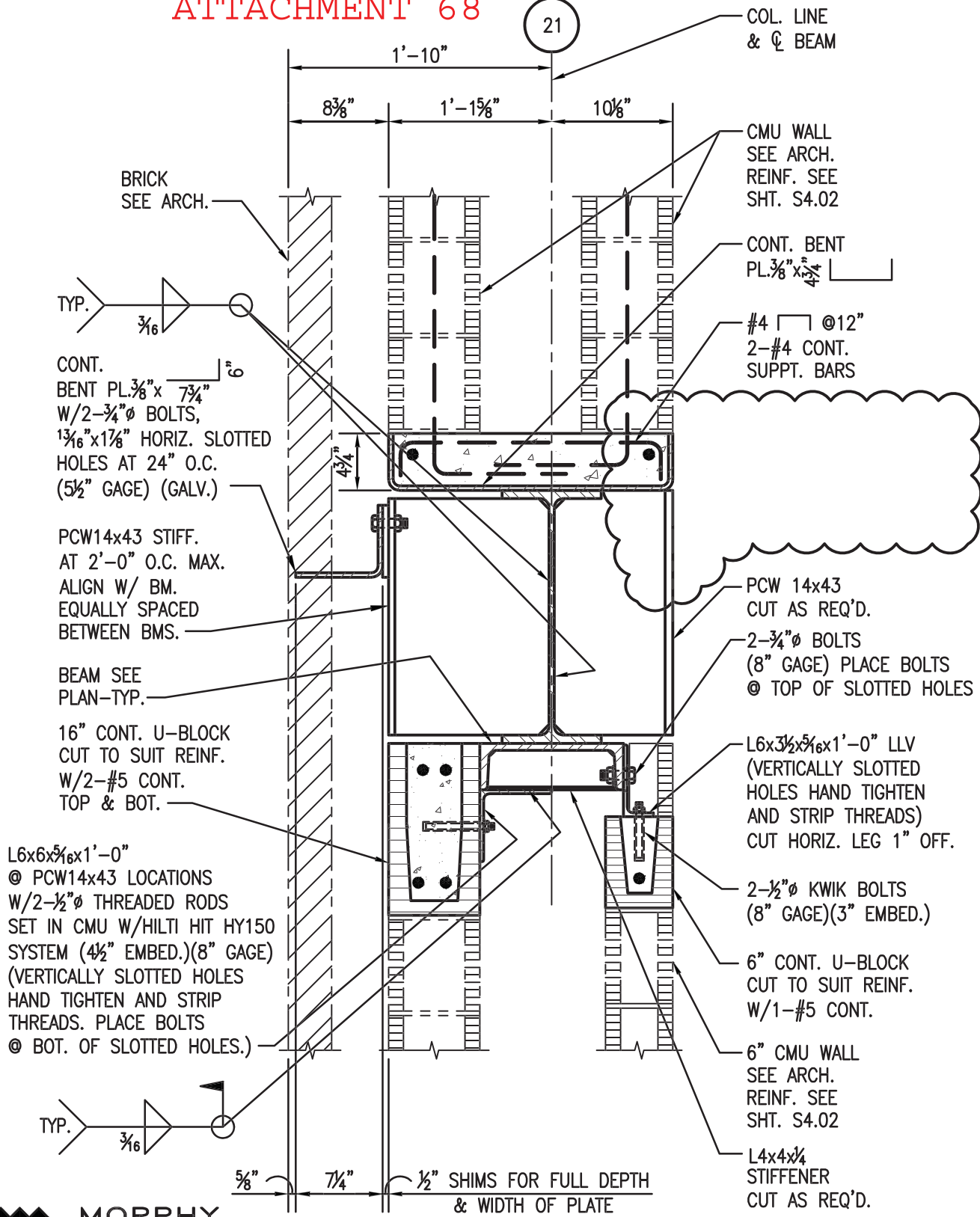
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# ATTACHMENT 68

21



**3** SECTION-3RD FLOOR  
S3.15 1"=1'-0"

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JOB NO. 12053

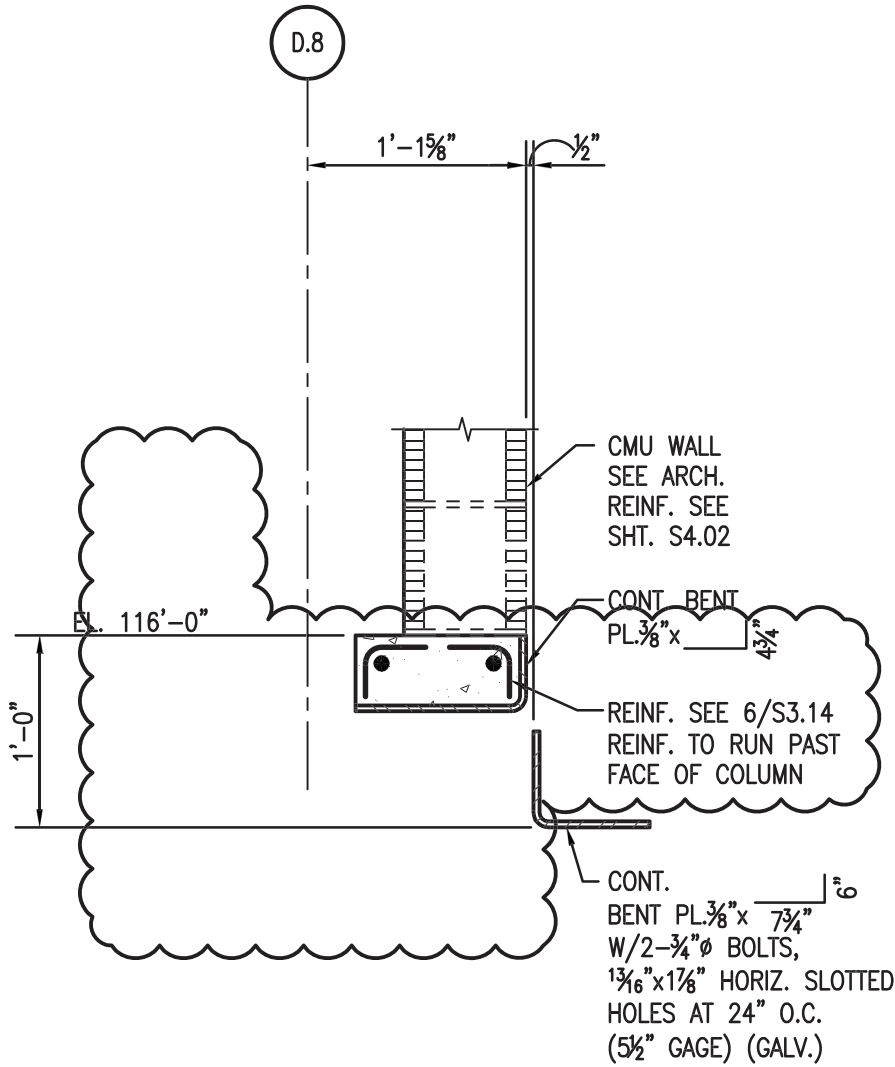
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# ATTACHMENT 69



4 SECTION-2ND FLOOR  
S3.15

1" = 1'-0"



11085

TITLE:  
REVISED SECTION

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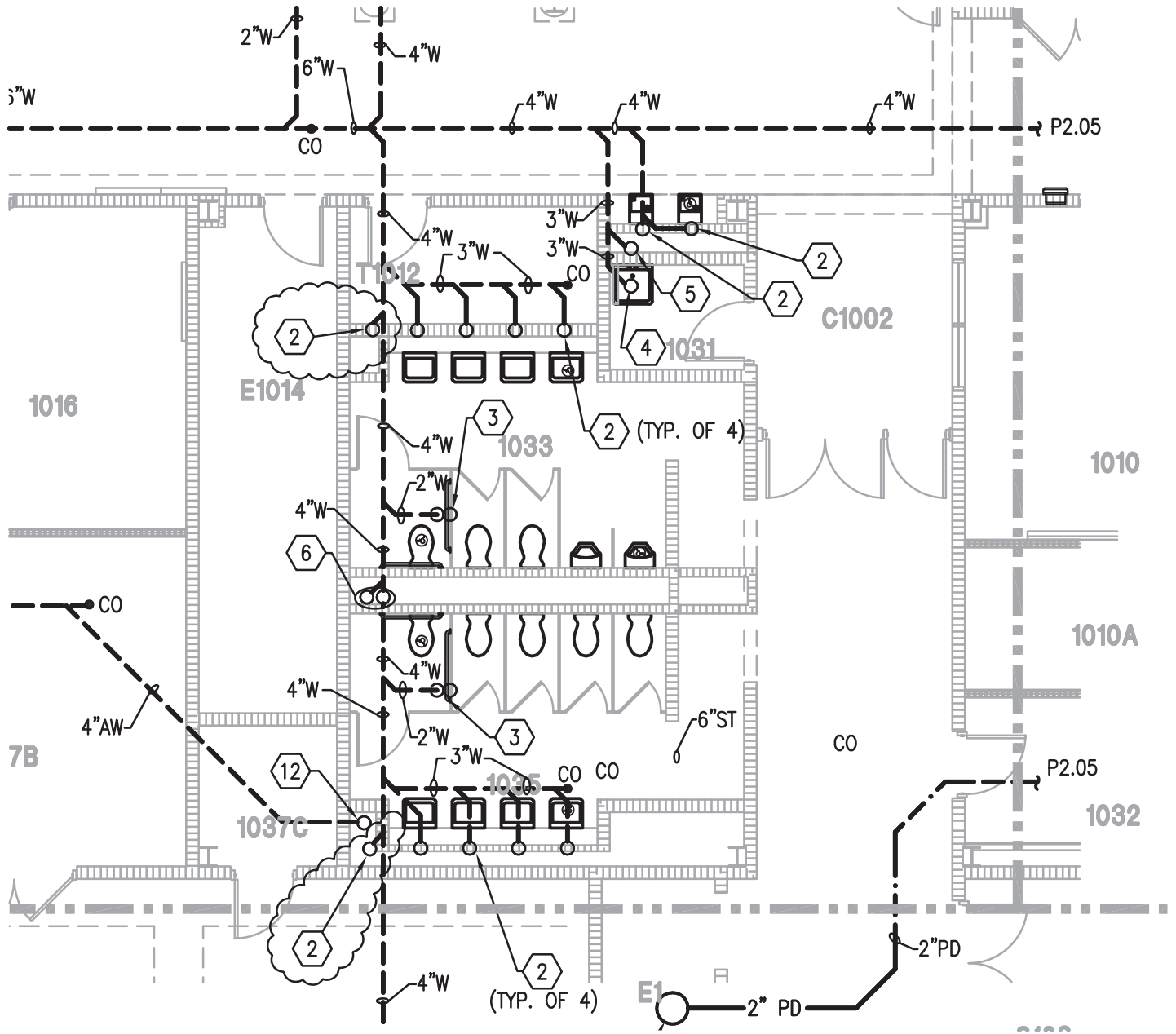
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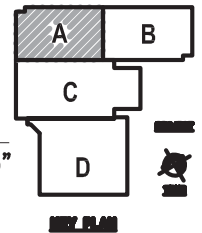


# ATTACHMENT 70



## FOUNDATION UNIT A PLUMBING PLAN

1/8" = 1'-0"



**11085**  
 TITLE:  
**Foundation unit A  
 Plumbing Plan**  
 SHEET:  
**SK-1/P2.01**

DATE ISSUED: 7 DECEMBER, 2012  
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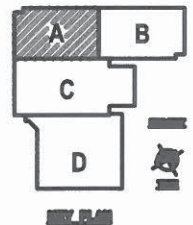
# ATTACHMENT 71

## NATURAL GAS LOAD SCHEDULE

<u>ITEM</u>	<u>QTY</u>	<u>BTU/HR EA.</u>	<u>TOTAL BTU/HR</u>	<u>PRESSURE</u>
BOILER	2	1,000,000	2,000,000	11-14"W.C.
DOMESTIC WATER HEATER	2	500,000	1,000,000	7-11"W.C.
KITCHEN	MISC. EQUIP.	1,180,000	1,180,000	7"11"W.C.
KITCHEN MAKE UP AIR UNIT	1	200,000	200,000	7-11"W.C.
SCIENCE ROOMS	5 OUTLETS	10,000	50,000	7"W.C.
EMERGENCY GAS GENERATOR	1	4,615,000	4,615,000	15"-20"W.C.
<b>TOTAL:</b>			<b>9,045,000 BTU/HR @ 5PSI AT GAS METER</b>	

## 1ST FLOOR UNIT A PLUMBING PLAN

1/8" = 1'-0"



**11085**

TITLE:  
**1ST Floor unit A  
Plumbing Plan**

SHEET:  
**SK-1/P2.02**

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AT FISK-HOWARD SCHOOL**

**RECOVERY SCHOOL DISTRICT**

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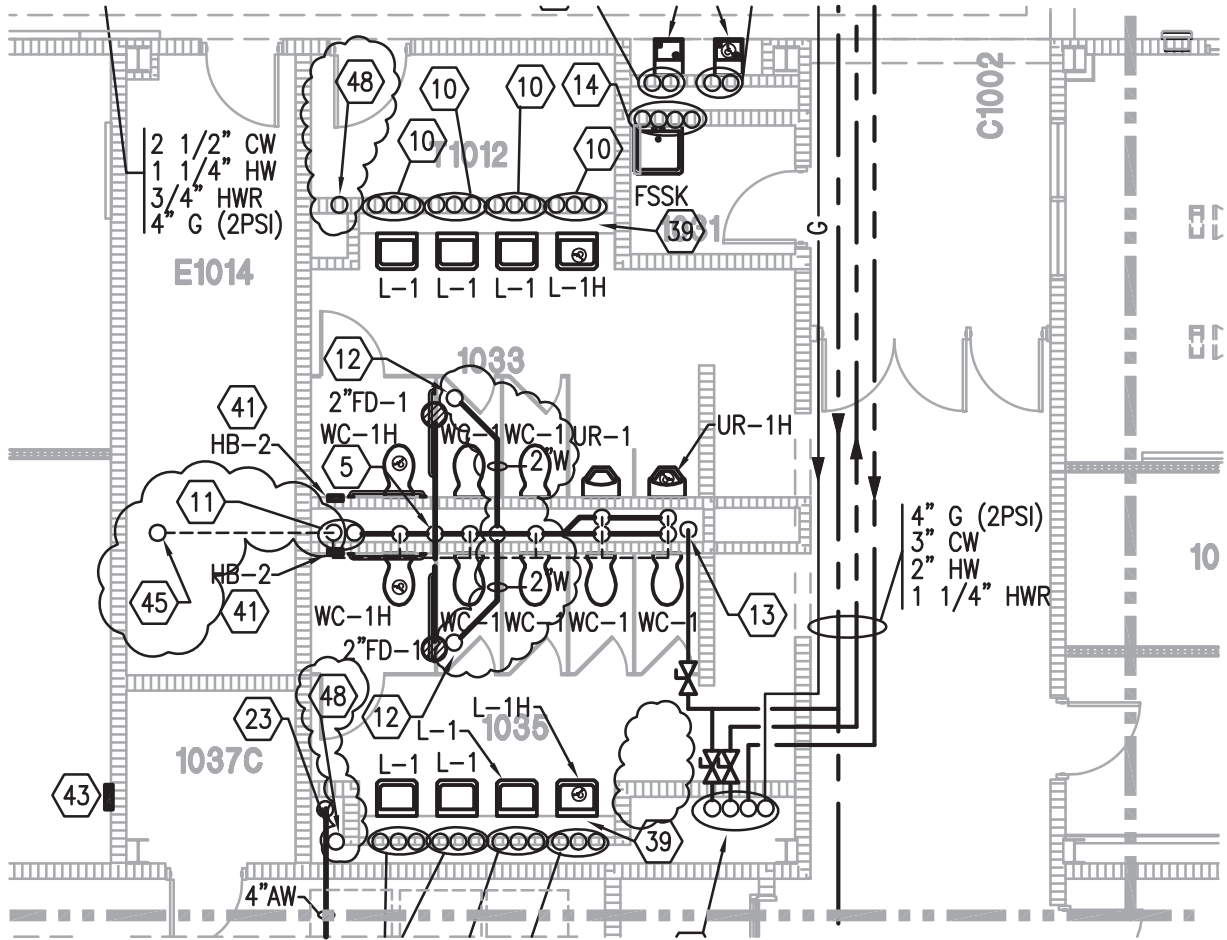
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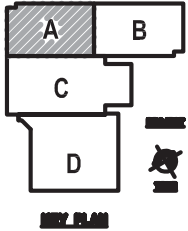
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# ATTACHMENT 72



11 4" WASTE STACK FROM ABOVE AND DOWN; 3" VENT STACK FROM BELOW.

- 45 3" VENT STACK UP.
- 46 1 1/2" VENT FROM BELOW.
- 47 4" WASTE FROM ABOVE.
- 48 2" WASTE UP AND DOWN.



## 1ST FLOOR UNIT A PLUMBING PLAN

1/8" = 1'-0"

**11085**

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SHEET: **SK-2/P2.02**

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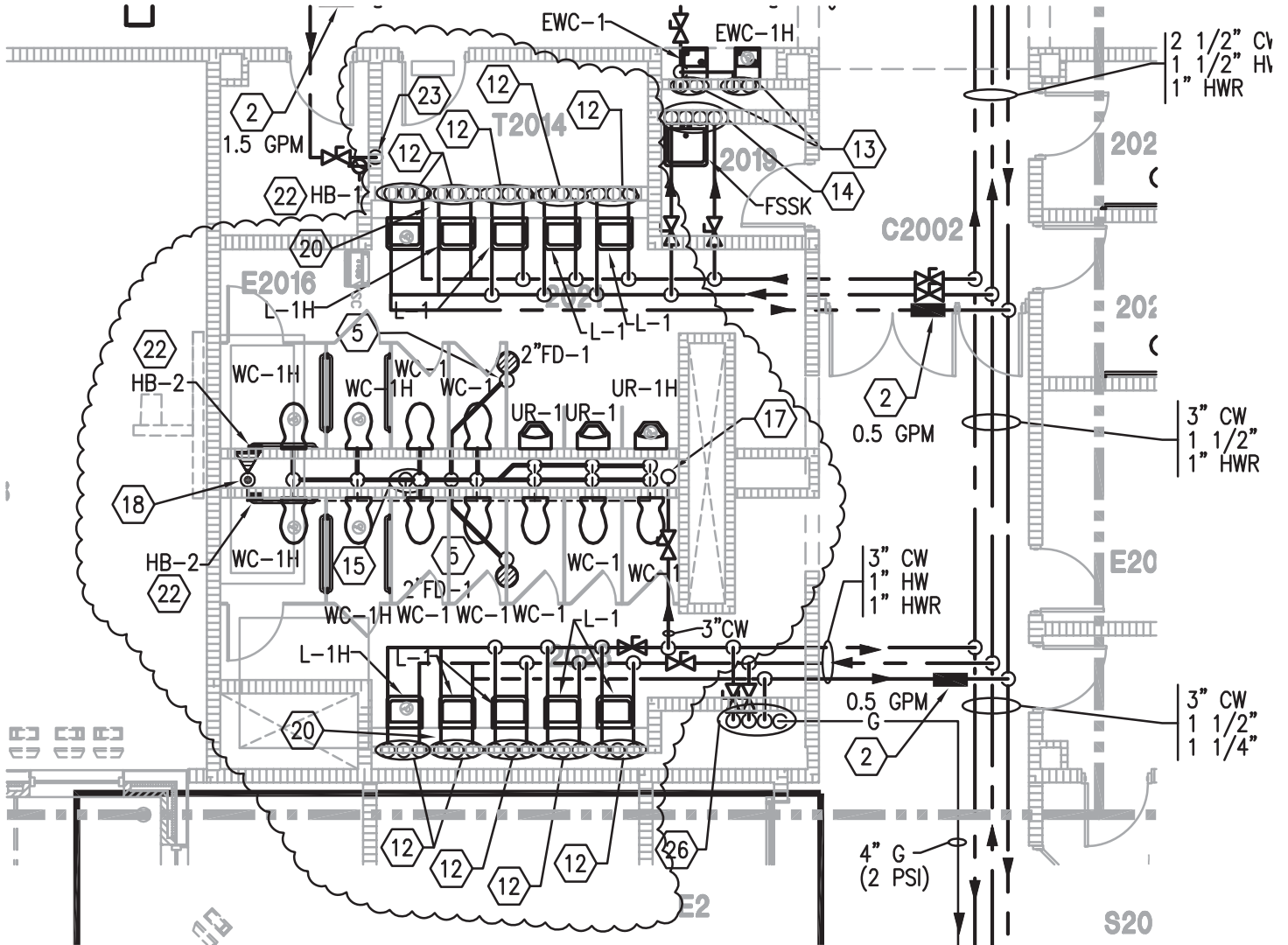
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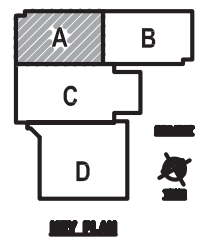
# ATTACHMENT 73



- 15 4" WASTE STACK FROM ABOVE AND DOWN.
- 16 2" 3/4" HOT AND COLD WATER UP; 2" WASTE
- 17 3" COLD WATER UP AND DOWN. EXTEND AND AS REQUIRED. PROVIDE WATER HAMMER ARRES SERVICE IN AN ACCESSIBLE LOCATION BEFORE I PROVIDE SHUT OFF VALVE WITH ACCESS PANEL
- 18 3" VENT STACK FROM BELOW AND UP.

## 2ND FLOOR UNIT A PLUMBING PLAN

1/8" = 1'-0"



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SHEET: **SK-1/P2.03**

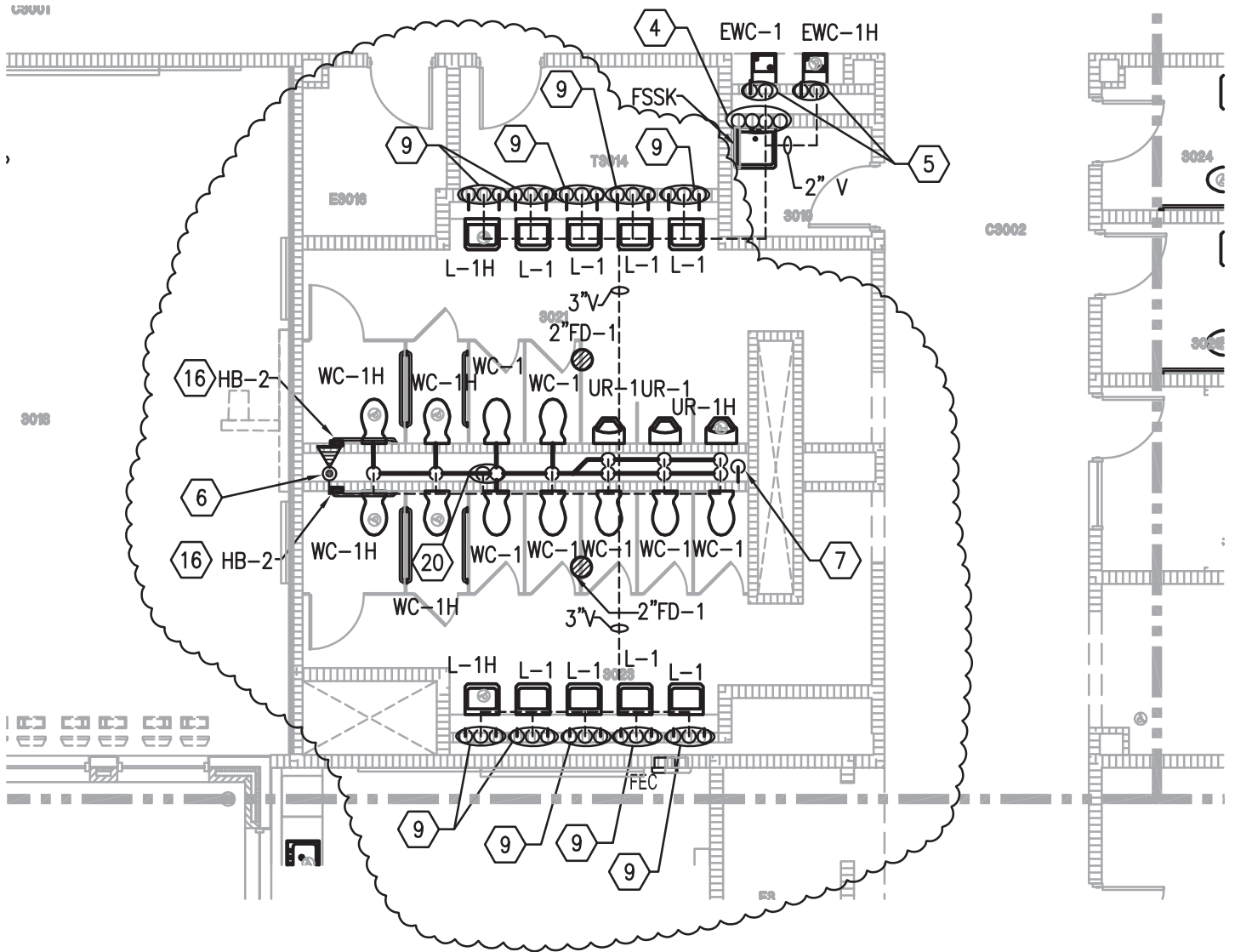
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# ATTACHMENT 74

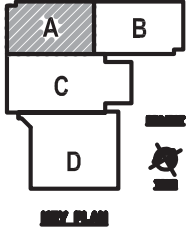


6 3" VENT STACK FROM BELOW AND UP TO 4" VENT THRU ROOF.

20 4" WASTE STACK DOWN.

## 3RD FLOOR UNIT A PLUMBING PLAN

1/8" = 1'-0"



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 CHECKED BY: MJ  
 PHASE: \_\_\_\_\_

TITLE:  
**3rd Floor unit A  
 Plumbing Plan**

SHEET:  
**SK-1/P2.04**

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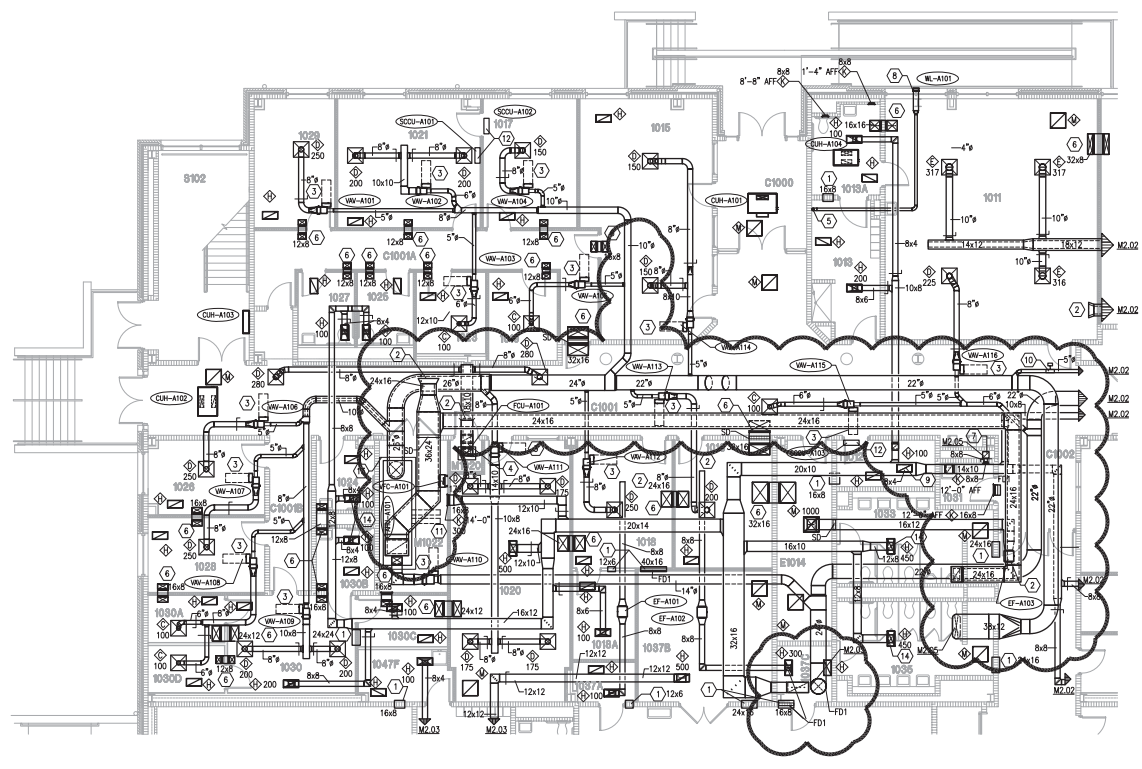
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HVAC CONTRACTOR IS REQUIRED TO COORDINATE DIFFUSER AND GRILLE LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS

MAIN SUPPLY AIR DUCTWORK TO BE MEDIUM PRESSURE RATED PER SMACNA REQUIREMENTS FROM DOAS UNIT. DUCTWORK BRANCHES FROM MAIN SHALL BE LOW PRESSURE RATED PER SMACNA REQUIREMENTS.

VAV BOXES SHALL BE INSTALLED SUCH THAT NO PIPING, DUCTWORK, ETC SHALL BE INSTALLED WITHIN 36" OF THE CONTROL PANEL. THE UNIT SHALL NOT BE INSTALLED DIRECTLY ABOVE A LIGHT FIXTURE, OR A CEILING TILE WITH A SPEAKER OR FIRE SPRINKLER HEAD. COORDINATE WITH ALL OTHER TRADES.

ALL HVAC GRILLES, REGISTERS, AND DIFFUSERS TO HAVE MEANS OF BALANCING. PROVIDE DAMPER IN ACCESSIBLE LOCATION. IF NO LOCATION IS AVAILABLE, PROVIDE THROUGH GRILLE BALANCING DAMPER.



1ST FLOOR VENTILATION PLAN - UNIT "A"

1/8" = 1'-0"

**VENTILATION PLAN NOTES:**

- 1 WALL OPENING LOCATED ABOVE THE CEILING.
- 2 END OF DUCT OPEN TO PLENUM SPACE ABOVE CEILING. PROVIDE BIRDSCREEN OVER OPENING.
- 3 DASHED LINE INDICATES APPROXIMATE CLEARANCE IN FRONT OF CONTROL PANEL TO VARIABLE VOLUME TERMINAL.
- 4 18x10 LINED SUPPLY AIR DUCT ON TOP OF 18x10 LINED RETURN AIR DUCT.
- 5 INSTALL 4" DIAMETER SHEET METAL DUCT FROM DRYER AND ROUTE DOWN TO CRAWL SPACE. CONTINUE OVER TO EXTERIOR WALL LOUVER. INSTALL BOOSTER FAN AND PRESSURE SWITCH PER MANUFACTURER INSTRUCTIONS. INSTALL CLEANOUT AT ALL ELBOWS IN DUCT.
- 6 ACCOUSTICALLY LINED AIR TRANSFER SOUND TRAP. EXTEND DUCTWORK UP TO PROVIDE NO LINE-OF-SIGHT FROM OPENING TO OPENING. REFER TO DETAIL.
- 7 EXHAUST DUCT FROM FIRST FLOOR TO THIRD FLOOR.
- 8 WALL LOUVER. SEE ARCHITECTURAL EXTERIOR ELEVATIONS. SHEET METAL PLENUM MOUNTED BEHIND WALL LOUVER. TRANSITION BOTTOM OF DUCT AT A SLOPE DOWNWARD TO WALL LOUVER. SEAL ALL SEAMS AND EDGES WATER-TIGHT. WRAAP PLENUM WITH INSULATION. DRIP PAN INSTALLED UNDER WALL LOUVER DUCTWORK. DRIP PAN SHALL EXTEND A MINIMUM OF 8" ON EACH SIDE OF THE DUCT. SEAL TIGHT TO THE WALL. DUCTWORK TO BE WRAPPED WITH INSULATION.
- 9 BALANCING DAMPER IN VERTICAL DUCT TO DIFFUSER.
- 10 DUCT STATIC PRESSURE SENSOR.
- 11 CLEARANCE REQUIRED FOR AIR HANDLING UNIT COIL PULLS.
- 12 MOUNT MINI-SPLIT EVAPORATOR UNIT ON WALL PER MANUFACTURER'S REQUIRED CLEARANCES. COORDINATE LOCATION WITH ALL TRADES. ROUTE REFRIGERANT PIPING UP TO ROOF. COORDINATE EXACT LOCATION WITH ALL TRADES.
- 13 3-1/2" HIGH CONCRETE HOUSEKEEPING PAD.
- 14 DIFFUSER TO HAVE THRU FACE VOLUME DAMPER.

ROOM LEGEND		UNIT A	
ROOM NO.	ROOM NAME	AREA	CLNG HT
1011	SPECIAL NEEDS CLASSROOM	849 SF	10'-0"
1013	CHANGING ROOM	149 SF	10'-0"
1013A	RESTROOM	87 SF	10'-0"
1015	RECEPTION	484 SF	10'-0"
1016	SPEECH	205 SF	10'-0"
1017	PRINCIPAL (OFFICE C)	201 SF	10'-0"
1018	OP/PT	209 SF	10'-0"
1018A	STORAGE	91 SF	10'-0"
1019	S.R.T.	100 SF	10'-0"
1020	FACILITY/LOUNGE	496 SF	10'-0"
1021	CONFERENCE	301 SF	10'-0"
1023	S.R.T.	99 SF	10'-0"
1024	RESTROOM	65 SF	10'-0"
1025	WOMEN	67 SF	10'-0"
1026	OFFICE A	142 SF	10'-0"
1027	MEN	68 SF	10'-0"
1028	OFFICE A	144 SF	10'-0"
1029	OFFICE A	170 SF	10'-0"
1030	HEALTH CLINIC	225 SF	10'-0"
1030A	COY/EXAM RM	60 SF	10'-0"
1030B	RESTROOM	60 SF	10'-0"
1030C	STORAGE	75 SF	10'-0"
1030D	COY/EXAM RM	60 SF	10'-0"
1031	CUSTOMAL	44 SF	EXPOSED
1033	BOYS RESTROOM	214 SF	10'-0"
1035	GRLS RESTROOM	215 SF	10'-0"
1037A	SOUND	40 SF	10'-0"
1037B	STORAGE	290 SF	10'-0"
1037C	ELEVATOR EQUIPMENT	51 SF	EXPOSED
1047F	STORAGE	75 SF	10'-0"
C1000	VESTIBULE	150 SF	10'-0"
C1001	CORRIDOR	1402 SF	12'-0"
C1001A	CORRIDOR	323 SF	10'-0"
C1001B	CORRIDOR	107 SF	10'-0"
C1002	CORRIDOR	126 SF	10'-0"
E1014	ELECTRICAL	181 SF	EXPOSED
M1020	MECHANICAL	16 SF	EXPOSED
M1022	MECHANICAL	171 SF	EXPOSED
S102	STAR	352 SF	VARIES
T1012	TECHNOLOGY	92 SF	10'-0"

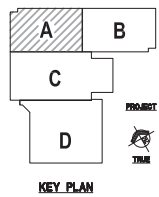
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KEY PLAN

**VERIFICATION NOTE**

CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CLEARANCES AND ALL EXISTING FIELD CONDITIONS BEFORE STARTING CONSTRUCTION. COMMENCEMENT OF WORK CONSTITUTES ACCEPTANCE OF CONDITIONS.

SHOULD DIFFERENT CONDITIONS BE ENCOUNTERED, CONTACT THE ARCHITECT BEFORE PROCEEDING WITH WORK.

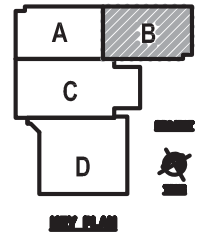
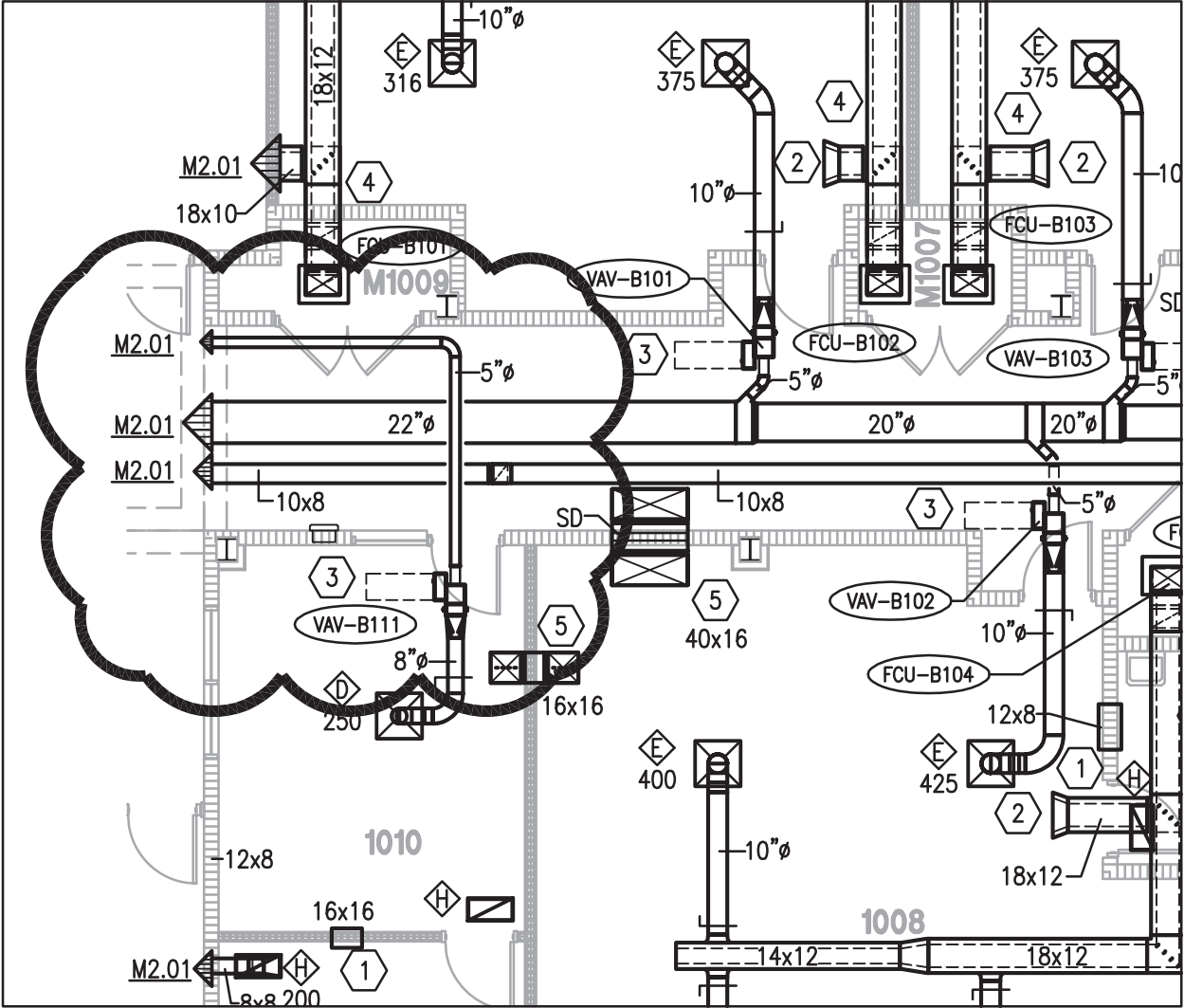
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TITLE:  
**1ST FLOOR UNIT A VENTILATION PLAN**

SHEET:  
**M2.01**

# ATTACHMENT 76



11085

TITLE:  
1ST FLOOR UNIT B  
VENTILATION PLAN

SHEET:  
SK-1/M2.02

DATE ISSUED: 7 DECEMBER, 2012  
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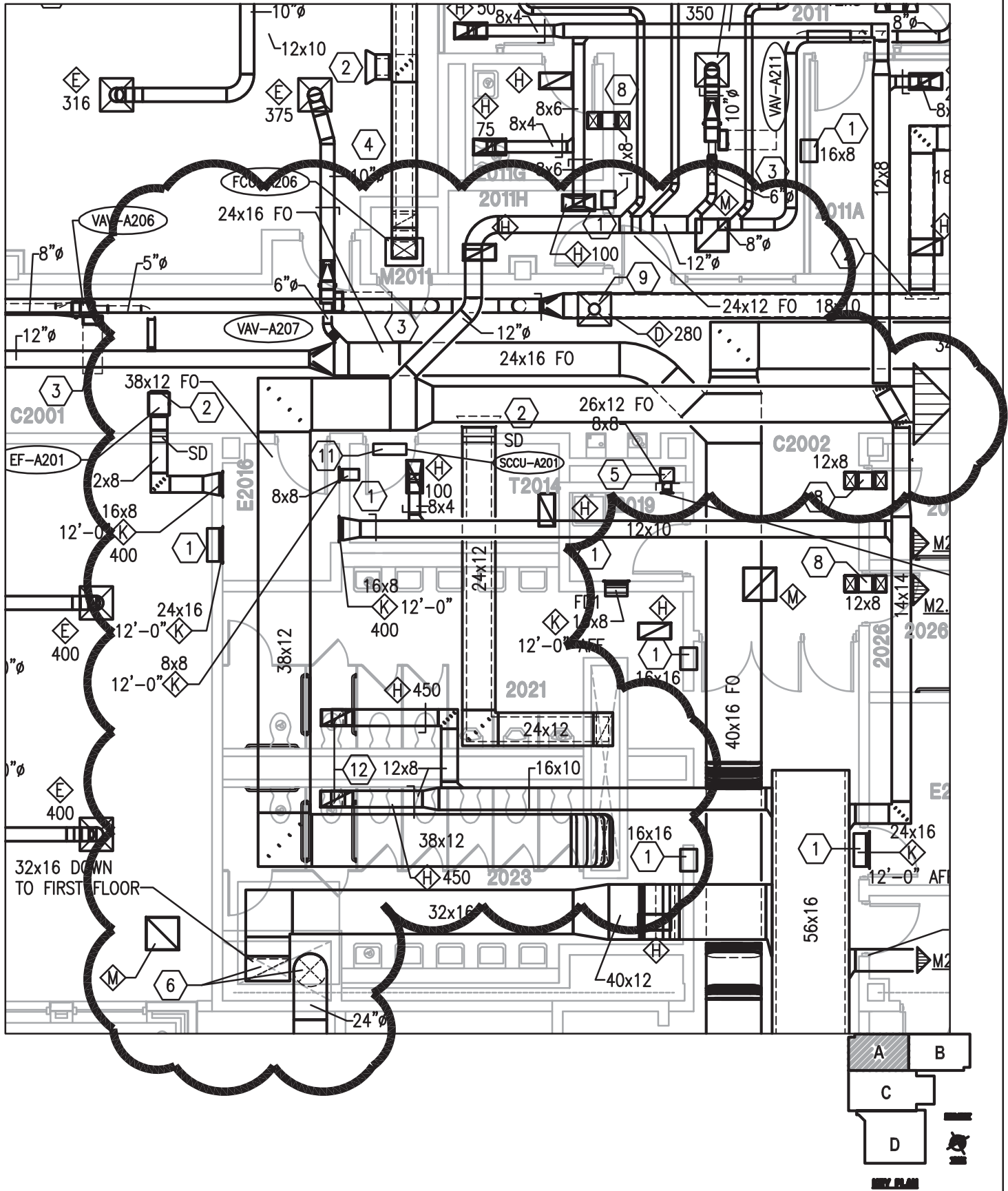
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# ATTACHMENT 77



11085

TITLE:  
2ND FLOOR UNIT A  
VENTILATION PLAN

SHEET:  
SK-1/M2.05

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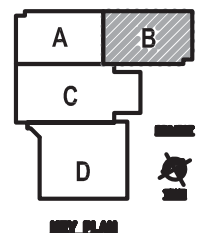
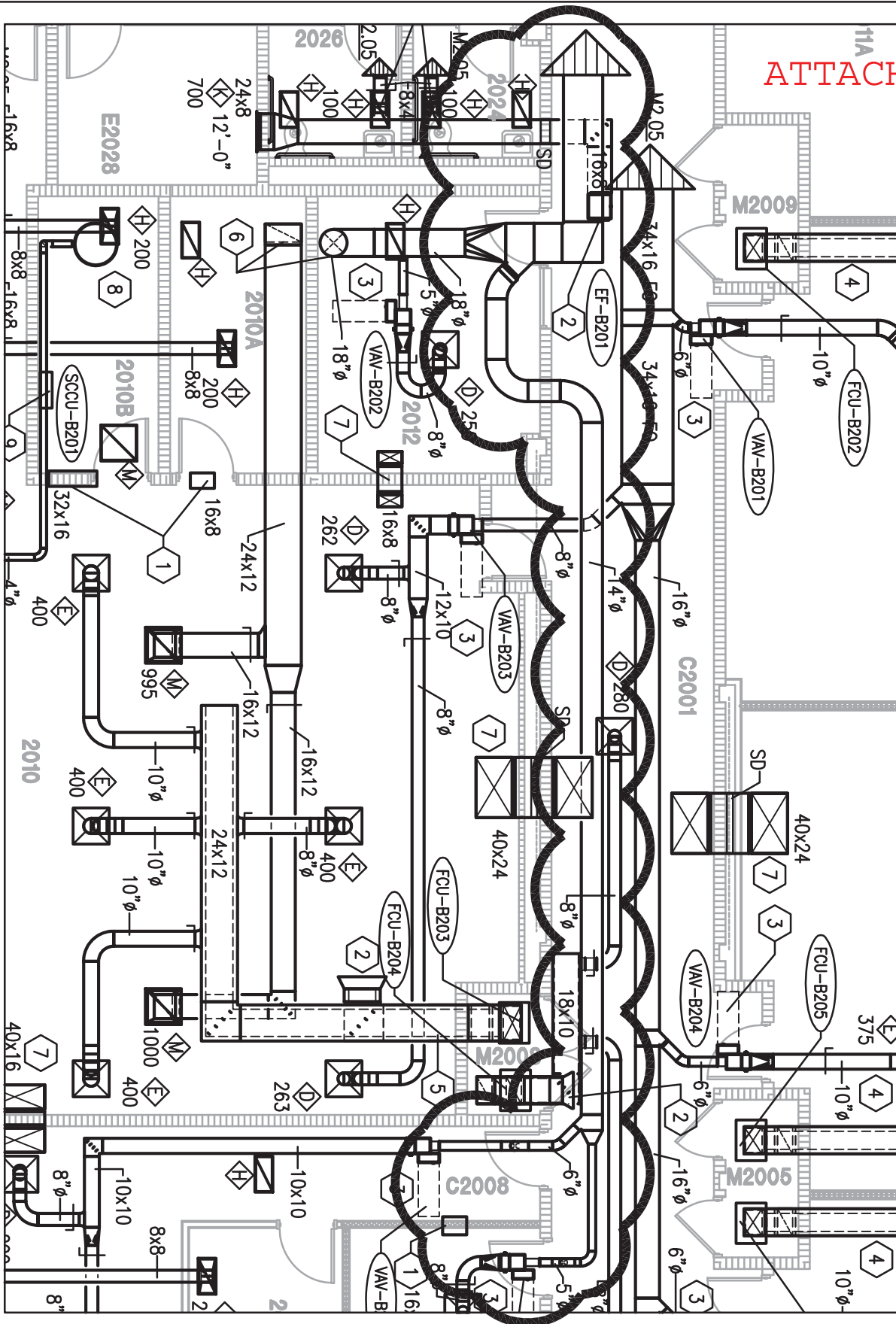
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TITLE:  
2ND FLOOR UNIT C  
VENTILATION PLAN

SHEET:  
SK-1/M2.06

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FAN COIL UNIT SCHEDULE																			
MARK	FANS				COILS														
	SUPPLY				COOLING COIL (EWT 44')					HEATING COIL (EWT 150')									
	CFM	EXT. S.P.	HP	ELEC.	EAT	LAT	SENS. MBH	GPM	WPD	EAT	LAT	MBH	GPM	WPD					
FCU-A101	560	0.5	1/3	277/1	75.0 62.5	57.7	-	10.5	1.50	0.7	70.0	118.0	29.0	1.93	0.8				
FCU-B101	950	0.5	1/2	277/1	75.0 62.5	57.8	-	17.6	2.51	1.1	70.0	114.5	45.6	3.04	2.2				
FCU-B102	950	0.5	1/2	277/1	75.0 62.5	57.8	-	17.6	2.51	1.1	70.0	114.5	45.6	3.04	2.2				
FCU-B103	950	0.5	1/2	277/1	75.0 62.5	57.8	-	17.6	2.51	1.1	70.0	114.5	45.6	3.04	2.2				
FCU-B104	1200	0.5	1/2	277/1	75.0 62.5	58.5	-	21.4	3.05	1.5	70.0	111.6	53.8	3.59	3.0				
FCU-B105	1200	0.5	1/2	277/1	75.0 62.5	58.5	-	21.4	3.05	1.5	70.0	111.6	53.8	3.59	3.0				
FCU-B106	560	0.5	1/3	277/1	75.0 62.5	57.7	-	10.5	1.50	0.7	70.0	118.0	29.0	1.93	0.8				
FCU-B107	950	0.5	1/2	277/1	75.0 62.5	57.8	-	17.6	2.51	1.1	70.0	114.5	45.6	3.04	2.2				
FCU-B108	1200	0.5	1/2	277/1	75.0 62.5	58.5	-	21.4	3.05	1.5	70.0	111.6	53.8	3.59	3.0				
FCU-B109	1200	0.5	1/2	277/1	75.0 62.5	58.5	-	21.4	3.05	1.5	70.0	111.6	53.8	3.59	3.0				
FCU-B110	950	0.5	1/2	277/1	75.0 62.5	57.8	-	17.6	2.51	1.1	70.0	114.5	45.6	3.04	2.2				
FCU-B111	950	0.5	1/2	277/1	75.0 62.5	57.8	-	17.6	2.51	1.1	70.0	114.5	45.6	3.04	2.2				
FCU-A201	1200	0.5	1/2	277/1	75.0 62.5	58.5	-	21.4	3.05	1.5	70.0	111.6	53.8	3.59	3.0				
FCU-A202	1200	0.5	1/2	277/1	75.0 62.5	58.5	-	21.4	3.05	1.5	70.0	111.6	53.8	3.59	3.0				
FCU-A203	950	0.5	1/2	277/1	75.0 62.5	57.8	-	17.6	2.51	1.1	70.0	114.5	45.6	3.04	2.2				
FCU-A204	950	0.5	1/2	277/1	75.0 62.5	57.8	-	17.6	2.51	1.1	70.0	114.5	45.6	3.04	2.2				
FCU-A205	1200	0.5	1/2	277/1	75.0 62.5	58.5	-	21.4	3.05	1.5	70.0	111.6	53.8	3.59	3.0				
FCU-A206	950	0.5	1/2	277/1	75.0 62.5	57.8	-	17.6	2.51	1.1	70.0	114.5	45.6	3.04	2.2				
FCU-B201	560	0.5	1/3	277/1	75.0 62.5	57.7	-	10.5	1.50	0.7	70.0	118.0	29.0	1.93	0.8				
FCU-B202	950	0.5	1/2	277/1	75.0 62.5	57.8	-	17.6	2.51	1.1	70.0	114.5	45.6	3.04	2.2				
FCU-B203	1600	0.5	1	277/1	75.0 62.5	58.0	-	29.4	4.20	1.8	70.0	118.3	83.3	5.55	2.5				
FCU-B204	560	0.5	1/3	277/1	75.0 62.5	57.7	-	10.5	1.50	0.7	70.0	118.0	29.0	1.93	0.8				
FCU-B205	950	0.5	1/2	277/1	75.0 62.5	57.8	-	17.6	2.51	1.1	70.0	114.5	45.6	3.04	2.2				
FCU-B206	950	0.5	1/2	277/1	75.0 62.5	57.8	-	17.6	2.51	1.1	70.0	114.5	45.6	3.04	2.2				
FCU-B207	1200	0.5	1/2	277/1	75.0 62.5	58.5	-	21.4	3.05	1.5	70.0	111.6	53.8	3.59	3.0				
FCU-B208	1200	0.5	1/2	277/1	75.0 62.5	58.5	-	21.4	3.05	1.5	70.0	111.6	53.8	3.59	3.0				
FCU-B209	950	0.5	1/2	277/1	75.0 62.5	57.8	-	17.6	2.51	1.1	70.0	114.5	45.6	3.04	2.2				
FCU-B210	950	0.5	1/2	277/1	75.0 62.5	57.8	-	17.6	2.51	1.1	70.0	114.5	45.6	3.04	2.2				

FAN COIL UNIT SCHEDULE																			
MARK	FANS				COILS														
	SUPPLY				COOLING COIL (EWT 44')					HEATING COIL (EWT 150')									
	CFM	EXT. S.P.	HP	ELEC.	EAT	LAT	SENS. MBH	GPM	WPD	EAT	LAT	MBH	GPM	WPD					
FCU-A301	1200	0.5	1/2	277/1	75.0 62.5	58.5	-	21.4	3.05	1.5	70.0	111.6	53.8	3.59	3.0				
FCU-A302	1200	0.5	1/2	277/1	75.0 62.5	58.5	-	21.4	3.05	1.5	70.0	111.6	53.8	3.59	3.0				
FCU-A303	950	0.5	1/2	277/1	75.0 62.5	57.8	-	17.6	2.51	1.1	70.0	114.5	45.6	3.04	2.2				
FCU-A304	950	0.5	1/2	277/1	75.0 62.5	57.8	-	17.6	2.51	1.1	70.0	114.5	45.6	3.04	2.2				
FCU-A305	1200	0.5	1/2	277/1	75.0 62.5	58.5	-	21.4	3.05	1.5	70.0	111.6	53.8	3.59	3.0				
FCU-A306	950	0.5	1/2	277/1	75.0 62.5	57.8	-	17.6	2.51	1.1	70.0	114.5	45.6	3.04	2.2				
FCU-A307	560	0.5	1/3	277/1	75.0 62.5	57.7	-	10.5	1.50	0.7	70.0	118.0	29.0	1.93	0.8				
FCU-B301	950	0.5	1/2	277/1	75.0 62.5	57.8	-	17.6	2.51	1.1	70.0	114.5	45.6	3.04	2.2				
FCU-B302	950	0.5	1/2	277/1	75.0 62.5	57.8	-	17.6	2.51	1.1	70.0	114.5	45.6	3.04	2.2				
FCU-B303	950	0.5	1/2	277/1	75.0 62.5	57.8	-	17.6	2.51	1.1	70.0	114.5	45.6	3.04	2.2				
FCU-B304	950	0.5	1/2	277/1	75.0 62.5	57.8	-	17.6	2.51	1.1	70.0	114.5	45.6	3.04	2.2				
FCU-B305	560	0.5	1/3	277/1	75.0 62.5	57.7	-	10.5	1.50	0.7	70.0	118.0	29.0	1.93	0.8				
FCU-B306	1200	0.5	1/2	277/1	75.0 62.5	58.5	-	21.4	3.05	1.5	70.0	111.6	53.8	3.59	3.0				
FCU-B307	1200	0.5	1/2	277/1	75.0 62.5	58.5	-	21.4	3.05	1.5	70.0	111.6	53.8	3.59	3.0				
FCU-B308	950	0.5	1/2	277/1	75.0 62.5	57.8	-	17.6	2.51	1.1	70.0	114.5	45.6	3.04	2.2				
FCU-B309	950	0.5	1/2	277/1	75.0 62.5	57.8	-	17.6	2.51	1.1	70.0	114.5	45.6	3.04	2.2				
FCU-C301	1600	0.5	1	277/1	75.0 62.5	58.0	-	29.4	4.20	1.8	70.0	118.3	83.3	5.55	2.5				
FCU-C302	560	0.5	1/3	277/1	75.0 62.5	57.7	-	10.5	1.50	0.7	70.0	118.0	29.0	1.93	0.8				
FCU-C303	1200	0.5	1/2	277/1	75.0 62.5	58.5	-	21.4	3.05	1.5	70.0	111.6	53.8	3.59	3.0				
FCU-C304	560	0.5	1/3	277/1	75.0 62.5	57.7	-	10.5	1.50	0.7	70.0	118.0	29.0	1.93	0.8				

- NOTES:
1. REFER TO SPECIFICATION SECTION 238219.
  2. HEATING COIL TO BE PLACED IN REHEAT POSITION.
  3. REFER TO PLANS & SCHEMATIC SHEETS FOR UNIT LAYOUT DETAILS.
  4. DISCONNECT TO BE PROVIDED BY DIVISION 26.
  5. COOLING COIL SHALL BE SELECTED WITH NO GLYCOL.

- NOTES:
1. REFER TO SPECIFICATION SECTION 238219.
  2. HEATING COIL TO BE PLACED IN REHEAT POSITION.
  3. REFER TO PLANS & SCHEMATIC SHEETS FOR UNIT LAYOUT DETAILS.
  4. DISCONNECT TO BE PROVIDED BY DIVISION 26.
  5. COOLING COIL SHALL BE SELECTED WITH NO GLYCOL.

AIR-COOLED CONDENSING UNIT SCHEDULE							
MARK	MBH	NOMINAL TONS	SUCTION TEMP	AMBIENT TEMP	KW	SERVICE	NOTES
ACCU-A101	12.0	1.0	45	105	1.0	208/1	1,2,3,4,5,6
ACCU-A102	12.0	1.0	45	105	1.0	208/1	1,2,3,4,5,6
ACCU-A103	12.0	1.0	45	105	1.0	208/1	1,2,3,4,5,6
ACCU-A201	12.0	1.0	45	105	1.0	208/1	1,2,3,4,5,6
ACCU-A301	12.0	1.0	45	105	1.0	208/1	1,2,3,4,5,6
ACCU-B201	22.5	2.0	45	105	1.8	208/1	1,2,3,4,5,6
ACCU-D101	60.7	5.0	45	105	6.5	480/3	1,2,3,4,6
ACCU-D102	12.0	1.0	45	105	1.0	208/1	1,2,3,4,5,6
ACCU-D103	12.0	1.0	45	105	1.0	208/1	1,2,3,4,5,6

- NOTES:
1. UNIT SHALL BE ROOF MOUNTED ON EQUIPMENT RAILS AND VIBRATION ISOLATORS.
  2. REFER TO PROJECT MANUAL SECTION 236200.
  3. INCLUDE THE FOLLOWING ACCESSORIES: HIGH AMBIENT UNLOADER PRESSURE/STAT, PROTECTIVE COIL GUARDS, PHASE LOSS/VOLTAGE PROTECTION, HAIL GUARD, AND VIBRATION ISOLATORS.
  4. UNIT SHALL INCLUDE LOW AMBIENT EVAPORATOR DEFROST CONTROL.
  5. OUTDOOR UNIT TO POWER INDOOR UNIT.
  6. ALL INTERCONNECTIONS LINE AND LOW VOLTAGE CABLING BETWEEN OUTDOOR AND INDOOR UNITS SHALL BE BY DIVISION 23, INCLUDING CONDUIT AND CONDUCTORS.

AIR HANDLING UNIT SCHEDULE																								
MARK	FANS				COILS											NOTES	WEIGHT							
	SUPPLY				COOLING COIL (EWT 44')					HEATING COIL (EWT 150')														
	CFM	MAX O.A.	EXT. S.P.	TOTAL S.P.	HP	TYPE	ELEC.	EAT	LAT	COOLING LOAD SENS.	TOTAL	GPM	WTR	WPD	APD			EAT	LAT	MBH	GPM	WTD	WPD	APD
AHU-A101	7,000	2,100	2.25	5.15	(2) 10.0	PLENUM	460/3	73.5 61.4	51.6 51.4	167.7	197.6	27.7	14.3	2.8	1.60	68.6	100.6	244.9	16.0	31.6	0.20	0.43	1,2,3,4,5,6	2,846 LBS
XXXX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
AHU-D201	22,000	4,400	1.50	3.52	(2) 15.0	PLENUM	460/3	74.0 61.8	51.8 51.4	533.3	644.5	90.9	14.2	8.1	0.90	70.0	100.8	742.1	48.1	30.8	2.60	0.24	1,2,3,4,5,6	7,021 LBS
AHU-D202	13,000	5,850	2.25	3.89	15.0	FC	460/3	72.9 61.0	52.1 51.5	292.8	345.3	49.1	14.1	12.2	0.61	68.9	101.3	459.9	29.5	31.2	1.40	0.27	1,2,3,4,5	4,405 LBS
AHU-D203	9,000	3,870	2.25	3.89	15.0	FC	460/3	72.9 61.1	52.1 51.5	205.1	242.4	34.4	14.1	7.0	0.63	68.9	100.7	313.2	20.4	30.7	1.10	0.26	1,2,3,4,5	3,355 LBS

- NOTES:
1. REFER TO SPECIFICATION SECTION 237313.
  2. REFER TO VAV TERMINAL UNIT SCHEDULE FOR OUTSIDE AIR VALUES.
  3. REFER TO PLANS & SCHEMATIC SHEETS FOR UNIT LAYOUT DETAILS.
  4. VARIABLE FREQUENCY CONTROLLER (VFC) SHALL BE PROVIDED ON SUPPLY FAN.
  5. REFER TO ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR VFC'S.
  6. PROVIDE CONVENIENCE OUTLET AND LIGHTS ON SEPARATE CIRCUIT.
  7. UNIT SHALL BE SUPPLIED WITH FACTORY MOUNTED BELLMOUTH FITTING



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NEW 3 SECTION ELEMENTARY SCHOOL  
AT FISK-HOWARD SCHOOL  
RECOVERY SCHOOL DISTRICT

NEW ORLEANS, LOUISIANA 70119  
211 S. LOPEZ STREET

DATE ISSUED: 7 DECEMBER 2012  
REVISOR: ADDENDUM 02.23 JANUARY 2013  
REVISOR:  
REVISOR:  
REVISOR:  
DRAWN BY: LCB  
CHECKED BY:

BID DOCUMENTS

11085

TITLE:  
HVAC SCHEDULES

# ATTACHMENT 81

## VARIABLE FREQUENCY CONTROLLER SCHEDULE

MARK	HP	ELEC SERV	MARK SERVING	EQUIPMENT SERVING	NOTES
VFC-A101	20.0 HP	460/3	AHU-A101	SUPPLY FAN	1,2,3,4,6
XXX	XX	XX	XX	XX	XX
VFC-D201	30.0 HP	460/3	AHU-D201	SUPPLY FAN	1,2,3,4,5
VFC-D202	15.0 HP	460/3	AHU-D202	SUPPLY FAN	1,2,3,4
VFC-D203	15.0 HP	460/3	AHU-D203	SUPPLY FAN	1,2,3,4
VFC-D204	15.0 HP	460/3	P-D201	CHILLED WATER PUMP	1,2,3,4
VFC-D205	15.0 HP	460/3	P-D202	CHILLED WATER PUMP	1,2,3,4
VFC-D206	15.0 HP	460/3	P-D203	CHILLED WATER PUMP	1,2,3,4
VFC-D207	7.5 HP	460/3	P-D204	HEATING WATER PUMP	1,2,3,4
VFC-D208	7.5 HP	460/3	P-D205	HEATING WATER PUMP	1,2,3,4

### NOTES

1. REFER TO CONTRACTOR SCOPE REQUIREMENTS FOR RESPONSIBILITY.
2. DIVISION 26 CONTRACTOR TO PROVIDE POWER WIRING TO VFC AND FROM VFC TO MOTOR.
3. TEMPERATURE CONTROL CONTRACTOR SHALL PROVIDE ALL TEMPERATURE CONTROL WIRING.
4. REFER TO PROJECT MANUAL SECTION 232923.
5. VFC TO CONTROL TWO (2) 15 HP PLENUM SUPPLY FANS.
6. VFC TO CONTROL TWO (2) 10 HP PLENUM SUPPLY FANS.

MODIFIED VFC SCHEDULE TO REFLECT REMOVAL OF AHU-A201 AND  
MODIFICATION OF AHU-A101

11085

TITLE:  
HVAC SCHEDULES

SHEET:  
SK-1/M5.03

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NEW 3 SECTION ELEMENTARY SCHOOL  
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# ATTACHMENT 82

VAV #/NAME	250	125	8.2	0.8	5"	1.0	21	20.6
VAV-A107	250	125	8.2	0.8	5"	1.0	21	20.6
VAV-A108	200	100	7.2	0.7	5"	1.0	16	20.7
VAV-A109	400	200	18.8	1.3	6"	1.0	18	28.9
VAV-A110	2100	0	-	-	-	-	-	-
VAV-A111	700	350	31.3	2.3	8"	1.0	18	27.2
VAV-A112	250	125	8.2	0.8	5"	1.0	21	20.6
VAV-A113	200	100	7.2	0.7	5"	1.0	16	20.7
VAV-A114	300	150	9.3	1.0	5"	1.0	24	18.7
VAV-A115	100	0	-	-	-	-	-	-
VAV-A116	225	0	-	-	-	-	-	-
VAV-B101	375	0	-	-	-	-	-	-
VAV-B102	425	0	-	-	-	-	-	-

VAV-A203	375	0	-	-	-	-	-	-
VAV-A204	375	0	-	-	-	-	-	-
VAV-A205	375	0	-	-	-	-	-	-
VAV-A206	100	0	-	-	-	-	-	-
VAV-A207	375	0	-	-	-	-	-	-
VAV-A208	NOT REQUIRED							
VAV-A209	150	75	6.2	0.5	5"	1.0	11	24.8
VAV-A210	150	75	6.2	0.5	5"	1.0	11	24.8
VAV-A211	350	175	17.0	1.1	6"	1.0	16	30.9
VAV-A212	150	75	6.2	0.5	5"	1.0	11	24.8
VAV-A213	250	125	8.2	0.8	5"	1.0	21	30.6

### GENERAL NOTES:

- UNIT MANUFACTURER SHALL PROVIDE REQUIRED HANGING BRACKETS TO PROPERLY SUPPORT UNIT.
- HEATING COIL DESIGN BASED ON HIGH EFFICIENCY HOT WATER COIL

MODIFIED VAV SCHEDULE TO REMOVE VAV-A208 AND MODIFY FLOW THROUGH VAV-A110

11085

TITLE:  
HVAC SCHEDULES

SHEET:  
SK-2/M5.03

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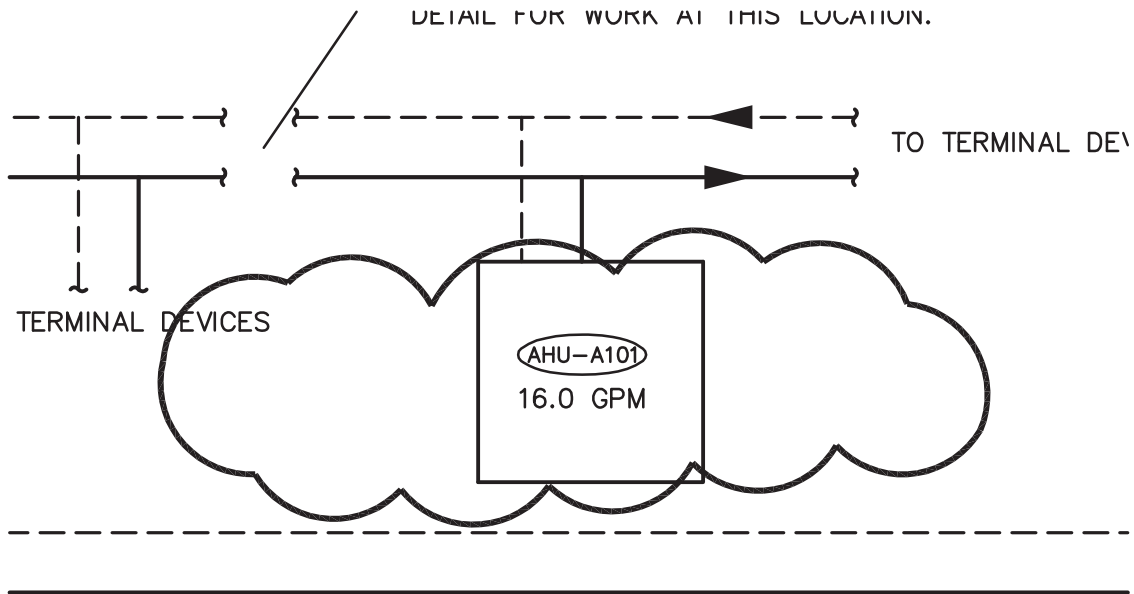
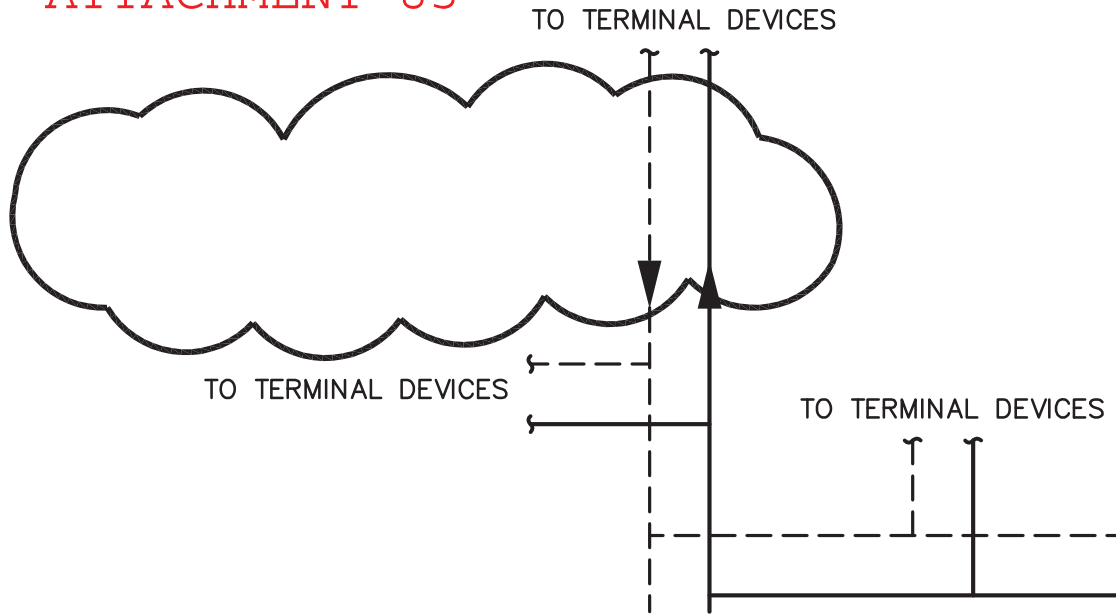
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# ATTACHMENT 83



REMOVE AHU-A201 FROM SCHEMATIC. CHANGE FLOW ON AHU-A101 TO 16.0 GPM.

11085

TITLE:  
HVAC HEATING WATER  
PIPING SCHEMATIC

SHEET:  
SK-4/M5.07

DATE ISSUED: 7 DECEMBER, 2012  
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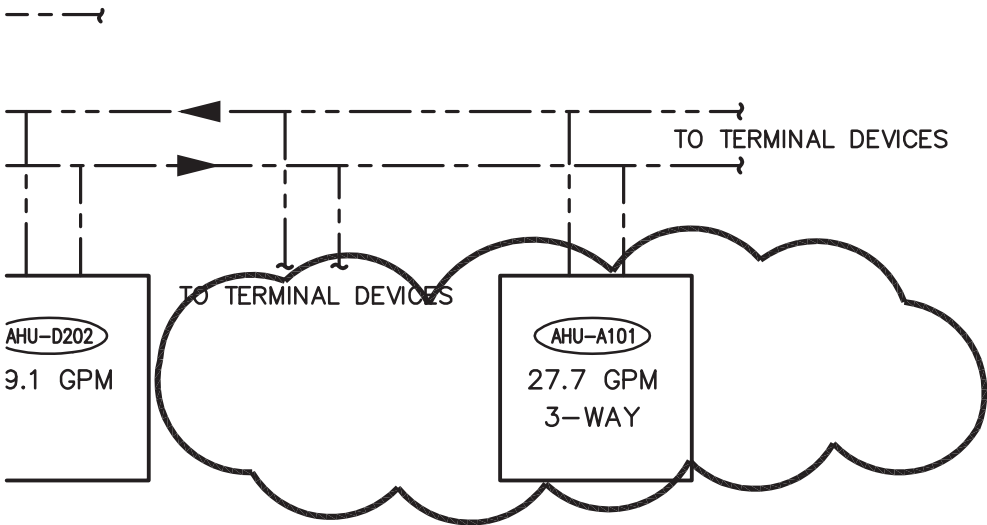
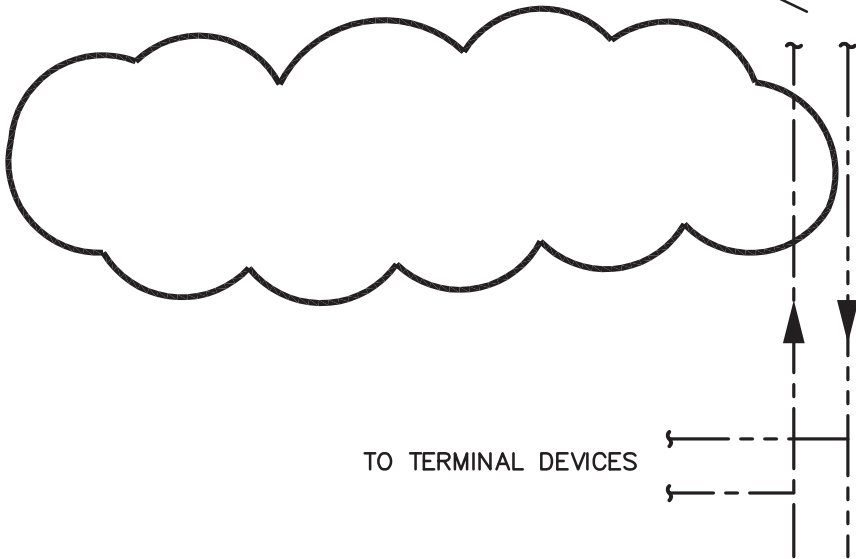
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SEE DIFFERENTIAL PRESSURE TRANSMITTER  
DETAIL FOR WORK AT THIS LOCATION.



REMOVE AHU-A201 FROM SCHEMATIC. CHANGE FLOW ON AHU-A101 TO 27.7 GPM.

11085

TITLE:  
HVAC CHILLED WATER  
PIPING SCHEMATIC

SHEET:  
SK-1/M5.08

DATE ISSUED: 7 DECEMBER, 2012  
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# ATTACHMENT 85

MAXIMUM ALLOWABLE FAN SOUND LEVELS								
MARK	TYPE	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz
AHU-A101	SUPPLY	87	82	84	90	89	89	85
XXX	X	X	X	X	X	X	X	X
AHU-D201	SUPPLY	89	79	81	88	86	85	82
AHU-D202	SUPPLY	94	93	91	87	89	82	77
AHU-D203	SUPPLY	90	92	90	91	85	79	75
DOAU-C301	SUPPLY	91	91	98	104	98	96	92
DOAU-C301	EXHAUST	81	85	90	83	76	72	69
DOAU-D201	SUPPLY	88	88	97	100	93	91	87
DOAU-D201	EXHAUST	81	84	94	87	79	78	75
DOAU-D202	SUPPLY	96	89	84	88	80	76	73
DOAU-D202	EXHAUST	81	81	80	76	79	77	73
FCU 560 CFM	SUPPLY	68	68	60	59	55	49	46
FCU 950 CFM	SUPPLY	73	73	70	68	64	58	55
FCU 1200 CFM	SUPPLY	73	73	70	68	64	58	55

L  
E

MAXIMUM SOUND LEVEL SCHEDULE, REMOVE AHU-A201. MODIFY SOUND LEVELS FOR AHU-A101.

**11085**

TITLE:  
MECHANICAL DETAILS  
AND SCHEDULES

SHEET:  
**SK-1/M5.09**

DATE ISSUED: 7 DECEMBER, 2012  
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 PHASE:

BID  
DOCUMENTS

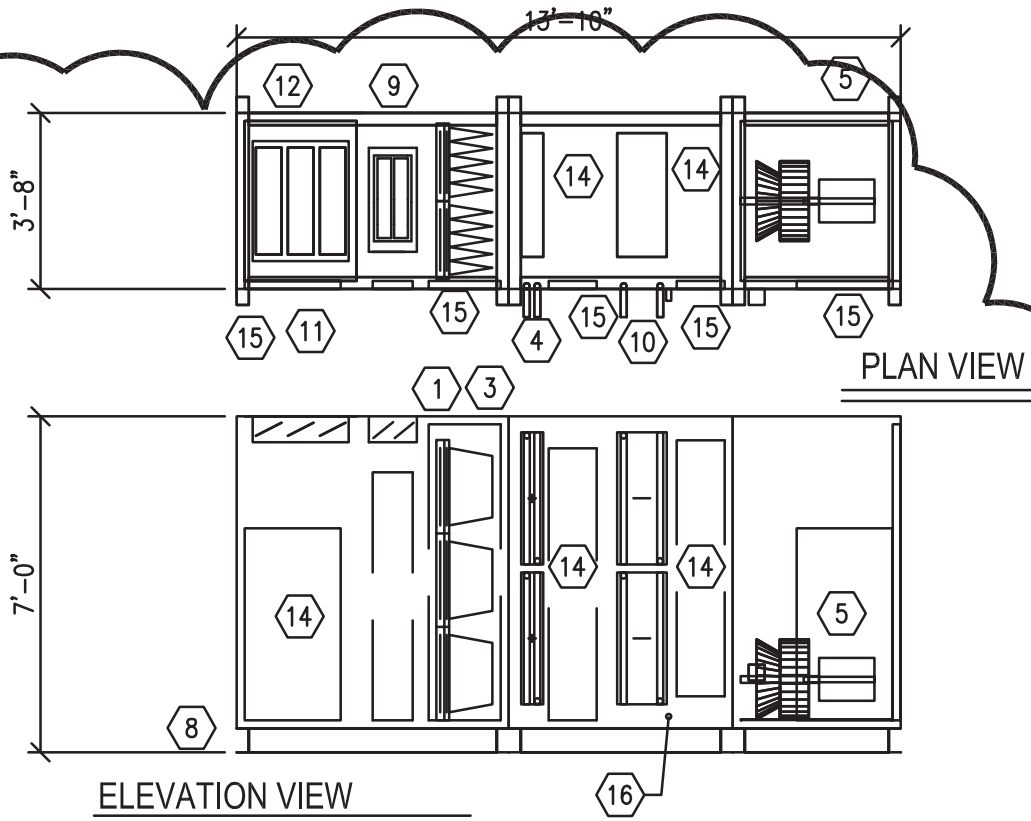
211 S. LOPEZ STREET

NEW 3 SECTION ELEMENTARY SCHOOL  
AT FISK-HOWARD SCHOOL  
RECOVERY SCHOOL DISTRICT

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PLAN VIEW

ELEVATION VIEW

AHU-A101

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

3

MODIFIED AHU-A101 PLAN/ELEVATION VIEW.

11085

TITLE:  
AHU/DOAU  
DETAILS

SHEET:  
SK-1/M5.10

DATE ISSUED: 7 DECEMBER, 2012  
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NEW 3 SECTION ELEMENTARY SCHOOL  
AT FISK-HOWARD SCHOOL

RECOVERY SCHOOL DISTRICT

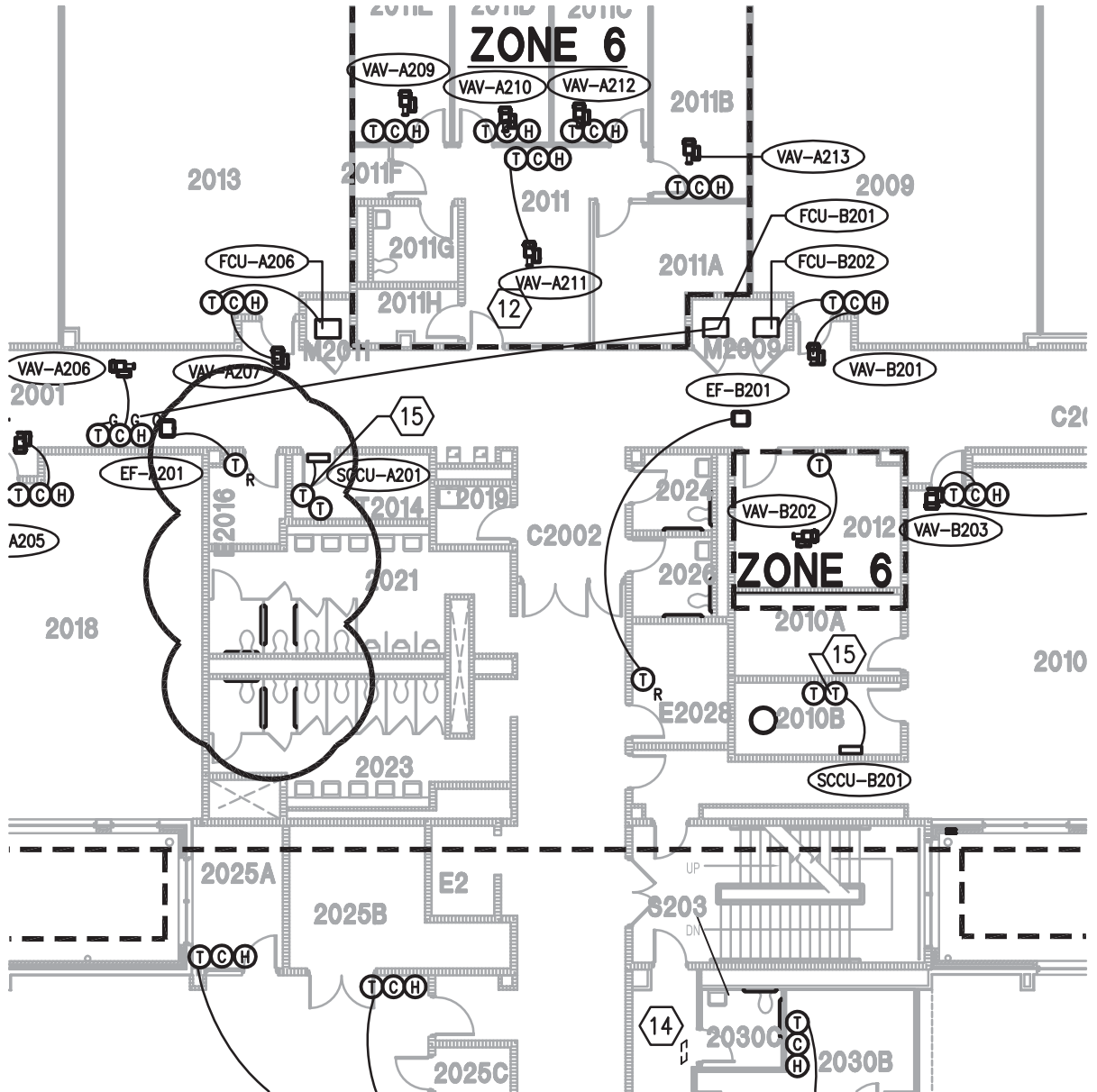
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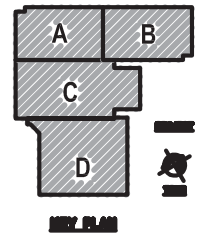


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# ATTACHMENT 87



REMOVED VAV-A208 AND AHU-A201



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TITLE:  
 2ND FLOOR  
 TEMP. CONTROL PLAN

SHEET:  
 SK-2/M6.02

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 DOCUMENTS

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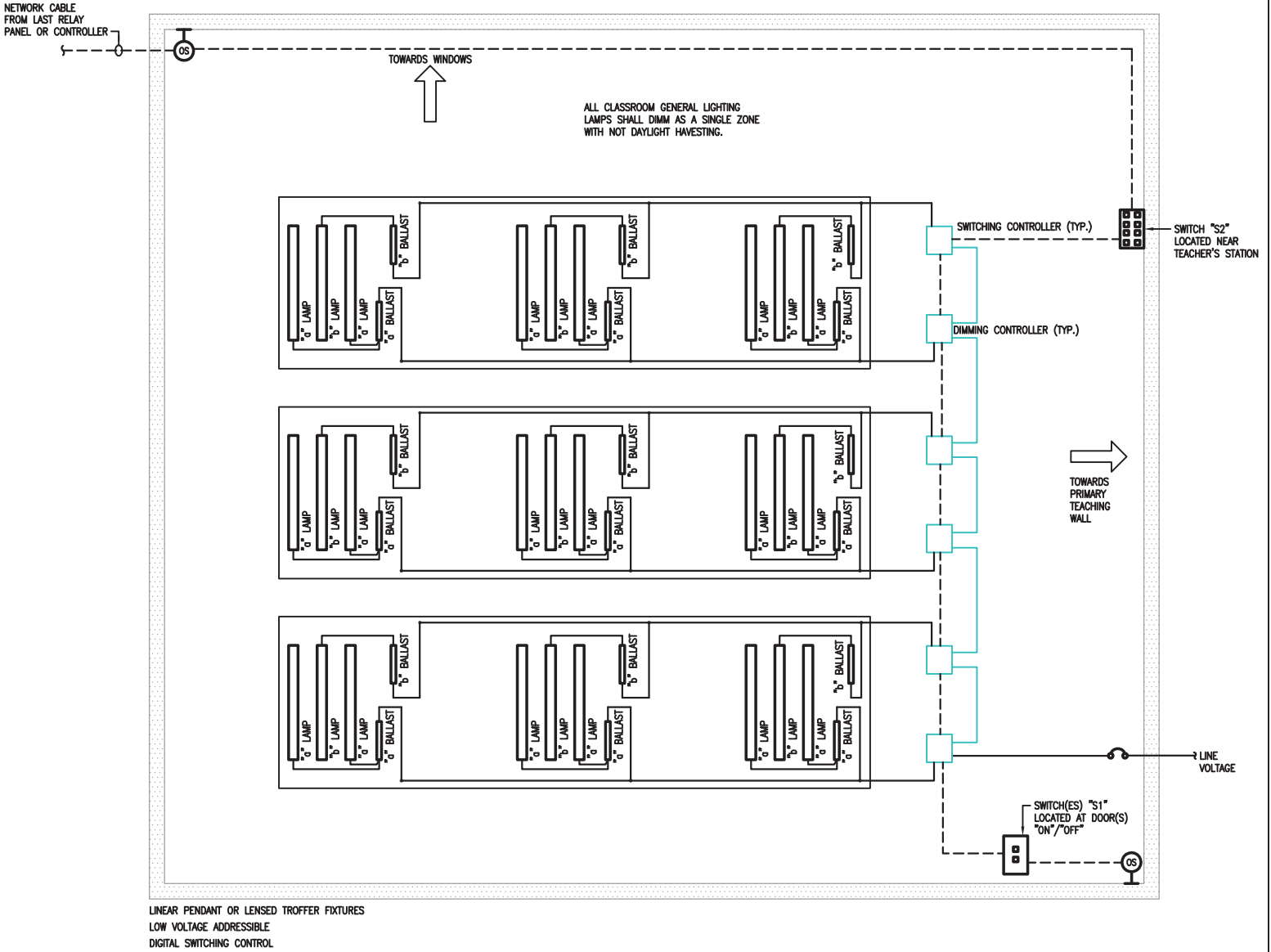
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# ATTACHMENT 88



**1** TYPICAL CLASSROOM WIRING DIAGRAM "NO DAYLIGHT HARVESTING"  
(LOW VOLTAGE CONTROL WITHOUT MARKER BOARD LT)

NO SCALE

11085

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 PHASE:

TITLE:  
ELECTRICAL  
DETAILS

SHEET:  
SK-1/E1.06

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NEW 3 SECTION ELEMENTARY SCHOOL  
AT FISK-HOWARD SCHOOL  
RECOVERY SCHOOL DISTRICT

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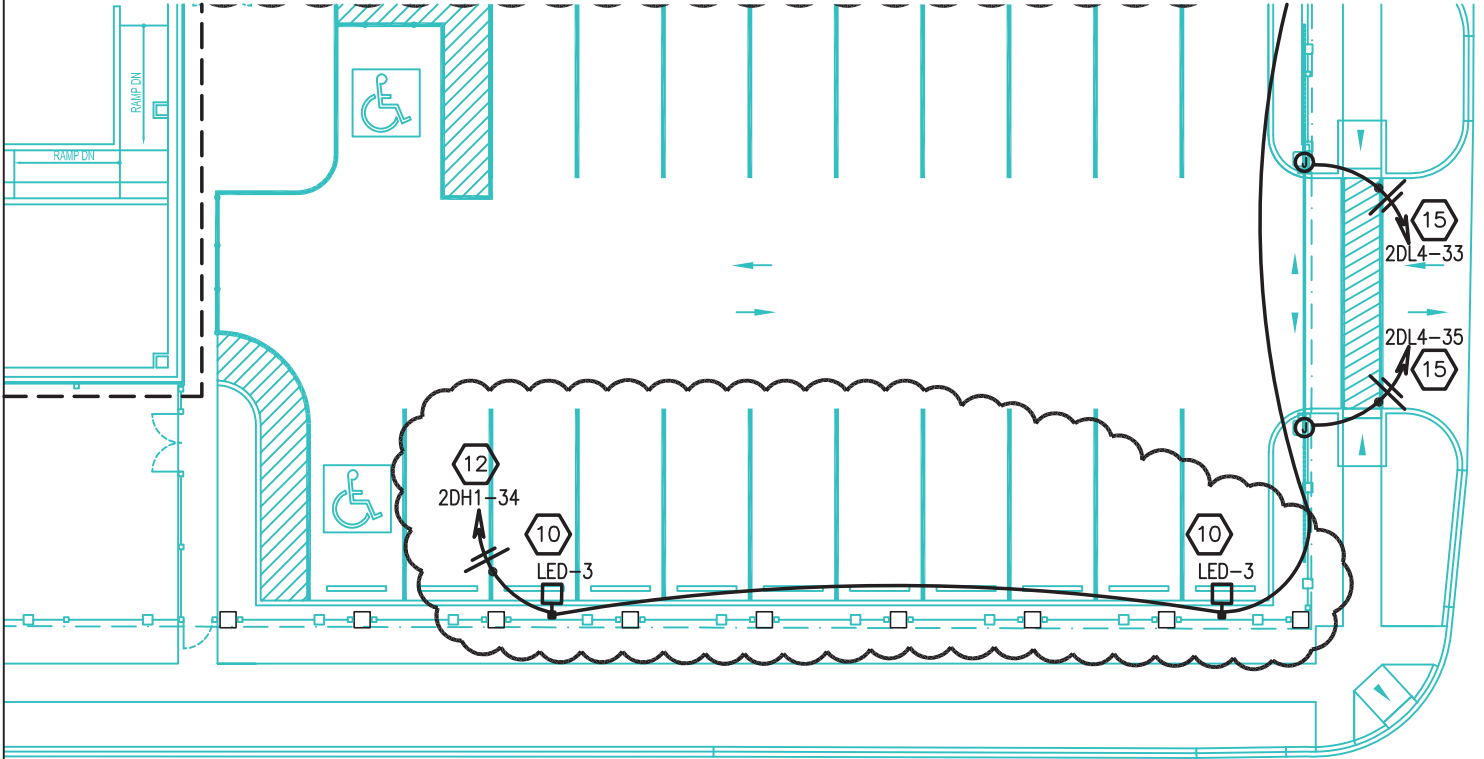


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SITE PLAN NOTES:



10 POLE MOUNTED LIGHT FIXTURES. REFER TO DETAILS 4-E1.03 & 5-E1.04 FOR BASE REQUIREMENTS.



RA STREET

11085

TITLE: ELECTRICAL SITE PLAN

SHEET: SK-2/E2.01

DATE ISSUED: 7 DECEMBER, 2012
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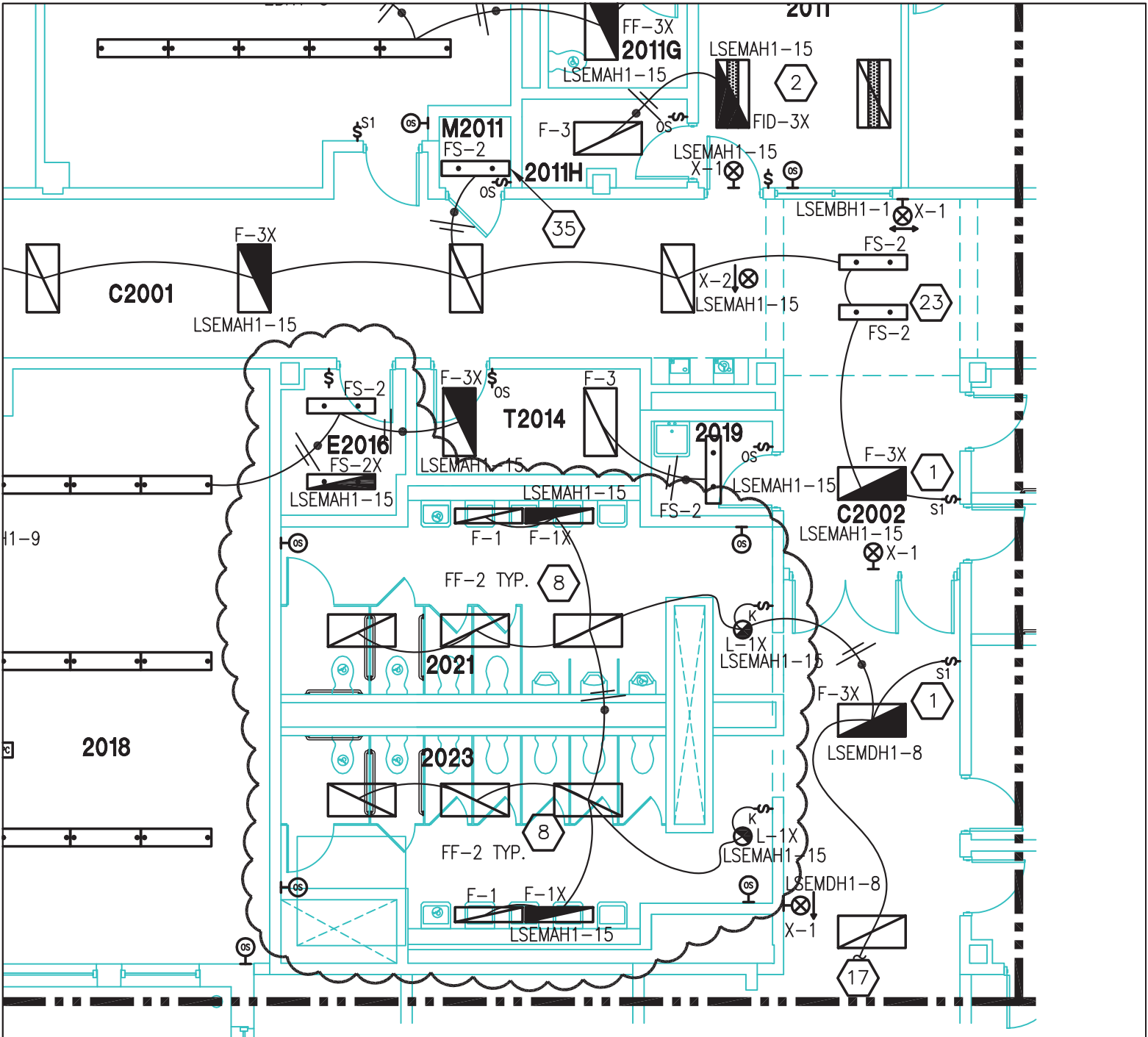
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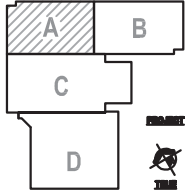
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**ATTACHMENT 90**



**KEY PLAN**

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TITLE:  
 UNIT A SECOND FLOOR  
 LIGHTING PLAN

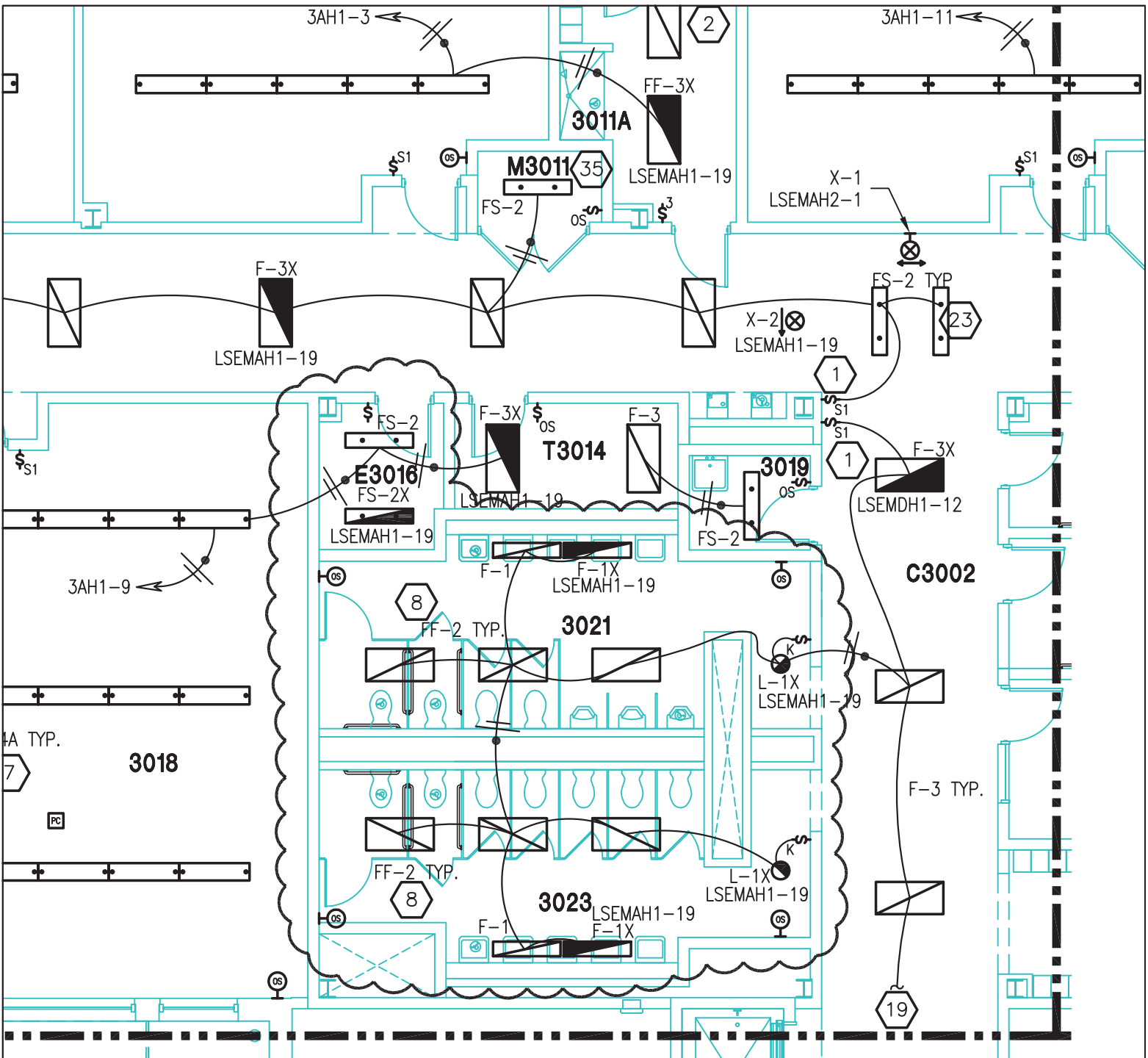
SHEET:  
 SK-2/E4.05

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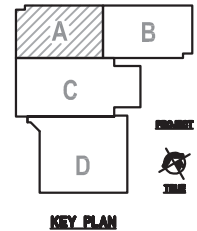
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**ATTACHMENT 91**



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 REVISED:  
 REVISED:  
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 PHASE:

TITLE:  
 UNIT A THIRD FLOOR  
 LIGHTING PLAN

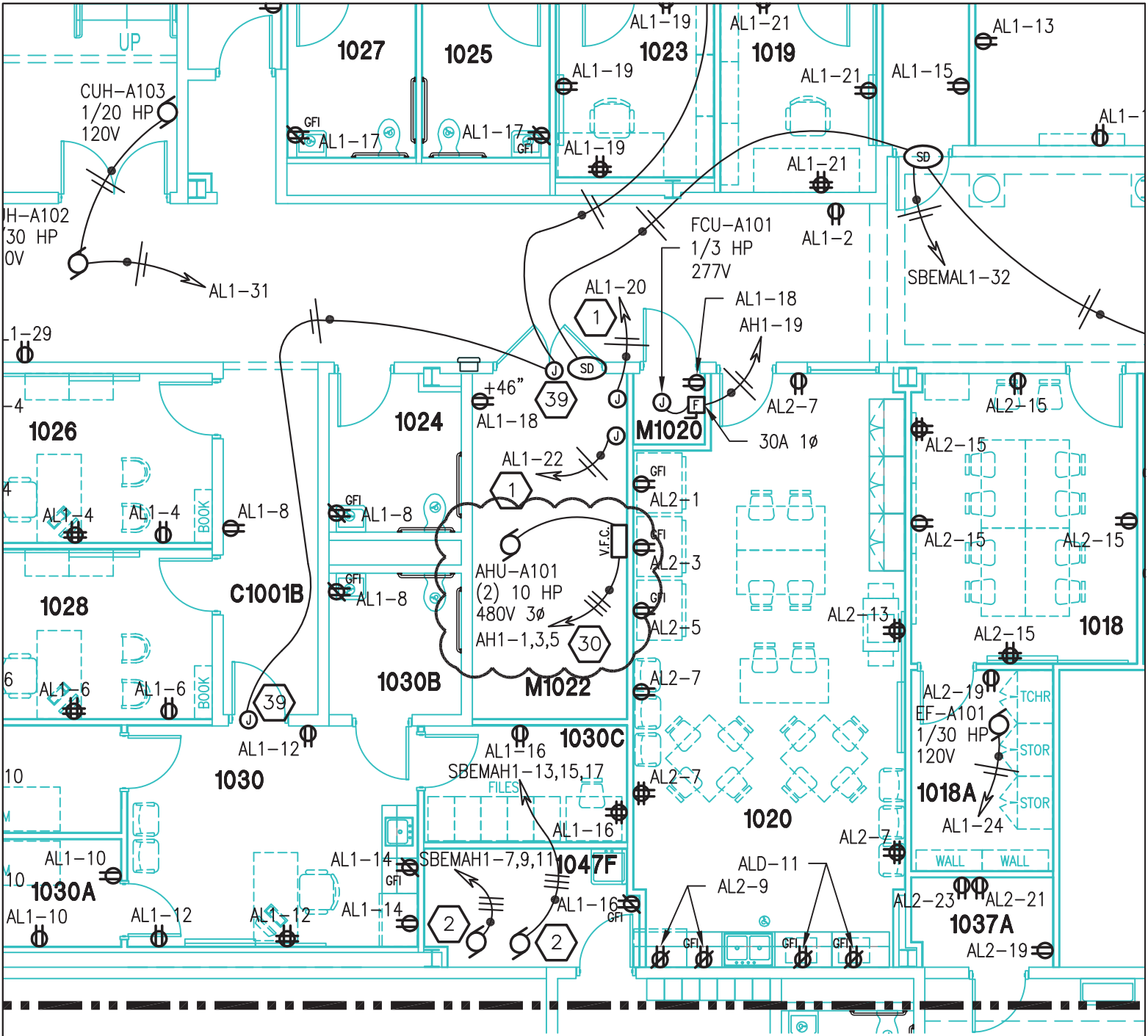
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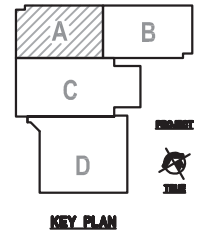
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# ATTACHMENT 92



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 REVISED:  
 DRAWN BY: GLM  
 CHECKED BY: CS  
 PHASE:

TITLE:  
 UNIT A FIRST FLOOR  
 POWER PLAN

SHEET:  
 SK-1/E5.01

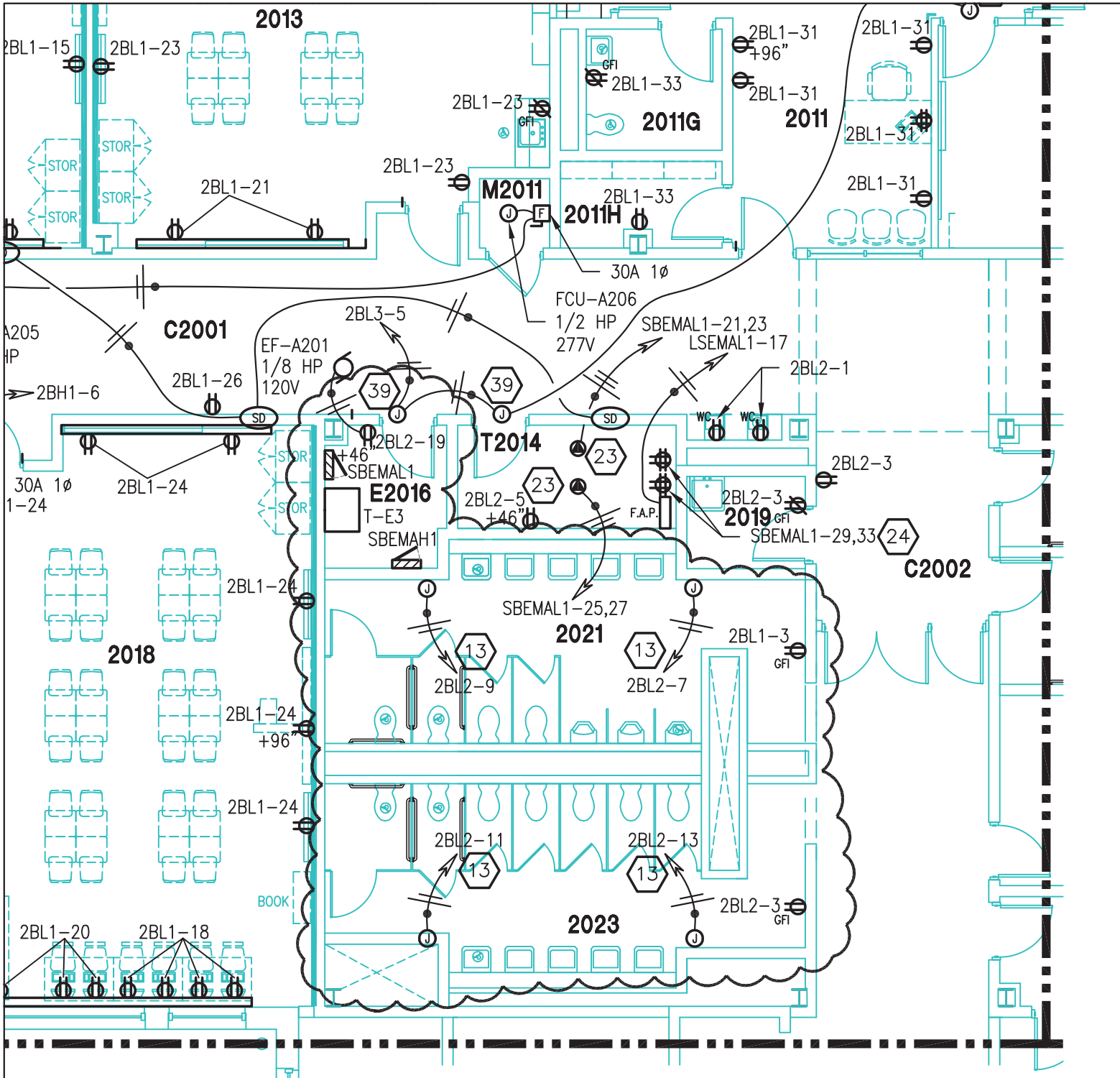
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NEW 3 SECTION ELEMENTARY SCHOOL  
 AT FISK-HOWARD SCHOOL  
 RECOVERY SCHOOL DISTRICT

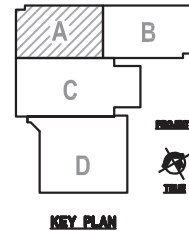
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ATTACHMENT 93



11085	DATE ISSUED: 7 DECEMBER, 2012
TITLE: UNIT A SECOND FLOOR POWER PLAN	REVISED: ADDENDUM 02.23 JANUARY, 2013
SHEET: SK-1/E5.05	REVISED:
BID DOCUMENTS	REVISED:
	DRAWN BY: GLM
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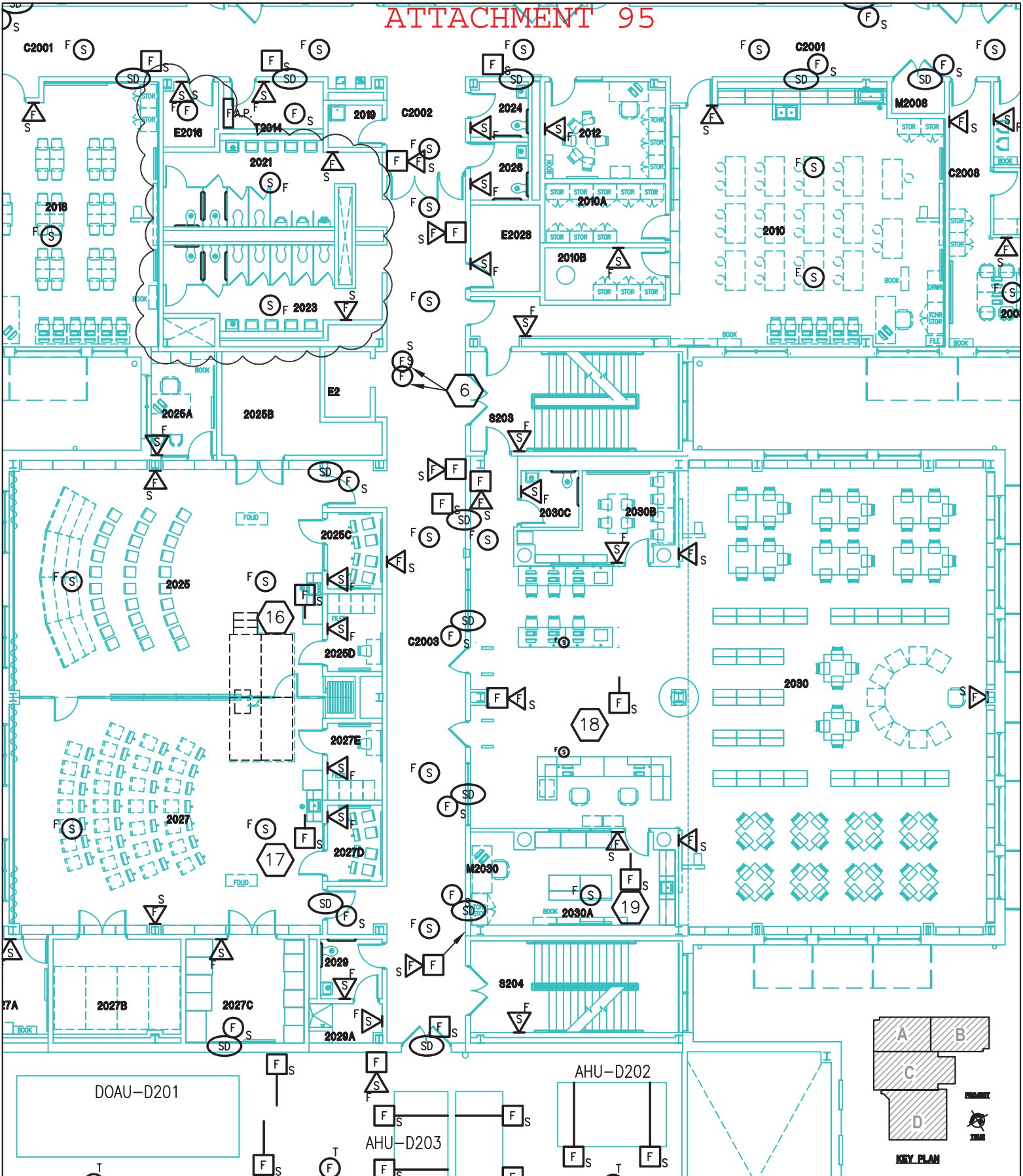
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RECOVERY SCHOOL DISTRICT

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# ATTACHMENT 95



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TITLE:  
SECOND FLOOR  
FIRE ALARM PLAN

SHEET:  
SK-1/E6.04

DATE ISSUED: 7 DECEMBER, 2012  
 REVISED: ADDENDUM 02.23 JANUARY, 2013  
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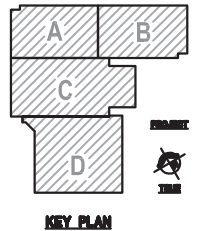
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## NEW 3 SECTION ELEMENTARY SCHOOL AT FISK-HOWARD SCHOOL

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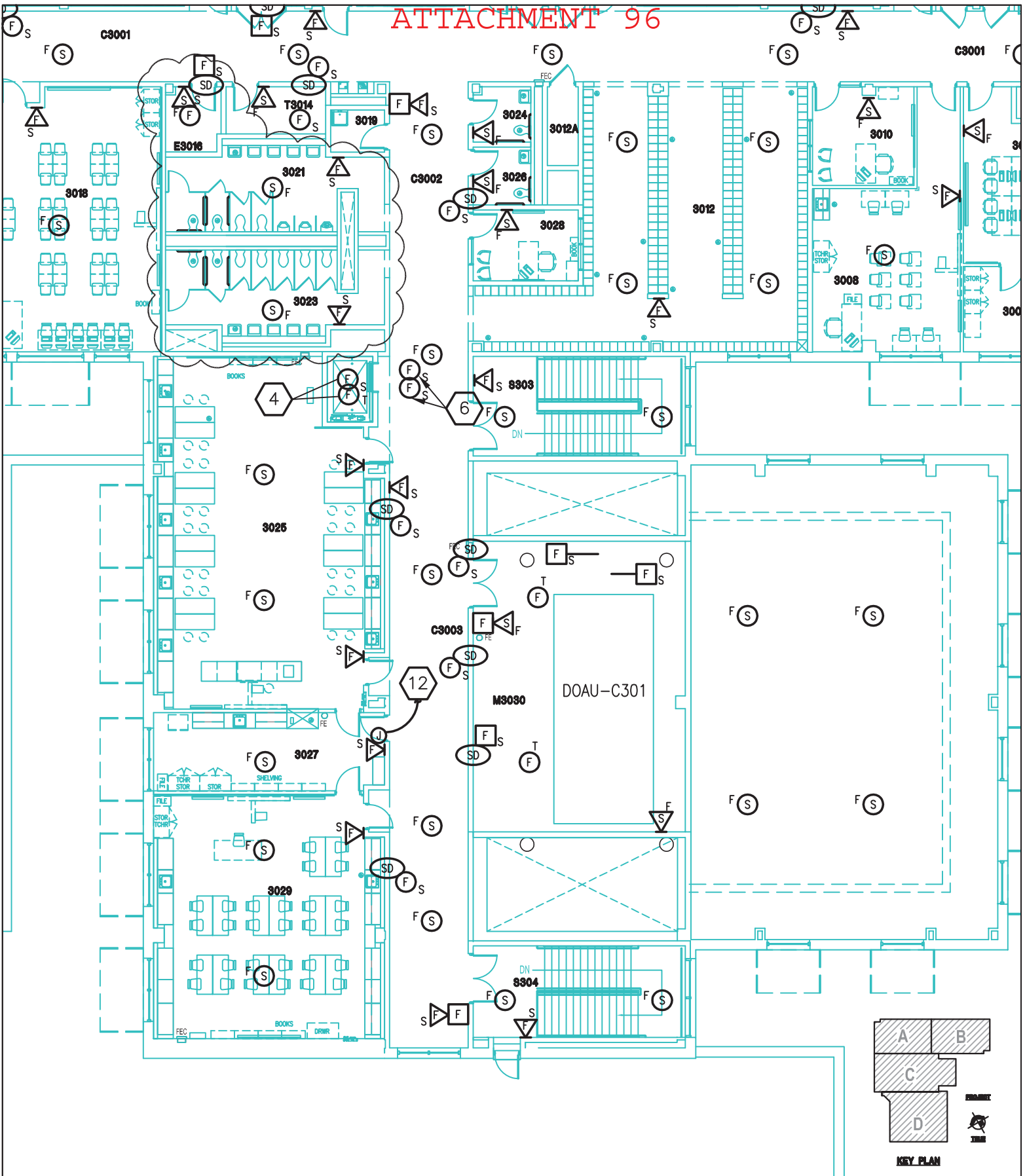
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TITLE:  
THIRD FLOOR  
FIRE ALARM PLAN

SHEET:  
SK-1/E6.05

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 REVISED: ADDENDUM 02.23 JANUARY, 2013  
 REVISED:  
 REVISED:  
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 PHASE:

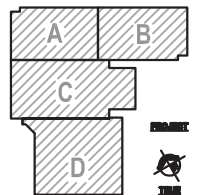
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NEW 3 SECTION ELEMENTARY SCHOOL  
AT FISK-HOWARD SCHOOL

RECOVERY SCHOOL DISTRICT

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KEY PLAN

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# ATTACHMENT 97

## LIGHT FIXTURE SCHEDULE

PLAN TYPE	MANUFACTURER/CATALOG	MOUNTING	LAMPS			APPLIED VOLTAGE	DESCRIPTION
			NO.	WATTS	TYPE/LU		
LED-3	KIM LIGHTING WD18 SERIES GARDCO 140 SERIES LITHONIA AERIS AS1 LED SERIES	POLE	1	75	LED 4000K 530MA	277	AREA LIGHT, TYPE 3 DIST,RECT.HSNG,VENTED FLOW THRU FLAT TOP, FLAT TEMP. GLASS LENS,ARM MOUNT, PAINT FROM STAND. COLORS TBD LATER. MNT TO 18 FT, 5" SQR STRT STEEL POLE. RATED FOR 150MPH WIND GUST. 6346 DLVRD LUMENS. RFR TO DTL 4/E1.03 W/ 2'-6" BASE ABV GRD
LED-4	KIM LIGHTING WD18 SERIES GARDCO 140 SERIES LITHONIA AERIS AS1 LED SERIES	POLE	1	75	LED 4000K 530MA	277	AREA LIGHT, TYPE 3 DIST,RECT.HOUSING, VENTED FLOW THRU FLAT TOP, FLAT TEMP. GLASS LENS,ARM MOUNT, PAINT FROM STAND. COLORS TBD LATER. MOUNT TO 12 FT, 5" SQUARE STRAIGHT STEEL POLE. RATED FOR 150MPH WIND GUST. 6346 DELIVERED LUMENS. REFER TO DETAIL 5/E1.04

11085

TITLE:  
LUMINAIRE  
SCHEDULES

SHEET:  
SK-2/E8.01

DATE ISSUED: 7 DECEMBER, 2012  
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NEW 3 SECTION ELEMENTARY SCHOOL  
 AT FISK-HOWARD SCHOOL  
 RECOVERY SCHOOL DISTRICT

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# ATTACHMENT 99

PANEL ID:	<b>3AL3</b>	LOCATION:	E3016
CONFIGURATION:	208Y/120 V, 3-PHASE, 4-WIRE PLUS GROUND	ENCLOSURE:	NEMA 1
MAIN:	100 A, MLO	TRIM:	SURFACE
SCCR (Amps RMS Symm.):	10,000 A FULLY-RATED	MODIFICATIONS:	

CIRC. NO.	LOAD DESCRIPTION	NOTES	AMPS	POLES	PHASE A	PHASE B	PHASE C	POLES	AMPS	NOTES	LOAD DESCRIPTION	CIRC. NO.
1	RCPT 3020		20	1	1,600							
					600			1	20		RCPT C3001	2
3	RCPT 3020		20	1		1,200					WATER COOLER C3001	4
						1,000		1	20	2		
5	RCPT 3020		20	1			1,600					
							600	1	20		RCPT E3016, T3014	6
7	RCPT 3020		20	1	1,000							
					400			1	20		RCPT 3021, 3023	8
9	RCPT 3018		20	1		1,600						
						1,500		1	20	1	HAND DRYER 3021	10
11	RCPT 3018		20	1			1,200					
							1,500	1	20	1	HAND DRYER 3021	12
13	RCPT 3018		20	1	1,600							
					1,500			1	20	1	HAND DRYER 3023	14
15	RCPT 3018		20	1		1,000						
						1,500		1	20	1	HAND DRYER 3023	16
17	SPARE		20	1			0					
							0	1	20		SPARE	18
19	SPARE		20	1	0							
					0			1	20		SPARE	20
21	SPARE		20	1			0					
							0	1	20		SPARE	22
23	SPARE		20	1			0					
							0	1	20		SPARE	24
25	SPACE				0							
					0						SPACE	26
27	SPACE						0					
							0				SPACE	28
29	SPACE						0					
							0				SPACE	30

CONNECTED LOAD PER PHASE (VA):		6,700	7,800	4,900
TOTAL CONNECTED LOAD (VA):		19,400		
CONNECTED LOAD (AVG. AMPS PER PHASE):		54		
TOTAL DEMAND LOAD (VA):		18,200		
DEMAND LOAD (AVG. AMPS PER PHASE):		51		

**NOTES:**

1. NOTE 1: 2#10, 1#10G, 1/2" C
2. NOTE 2 GFI BREAKER
3. NOTE 3
4. NOTE 4

11085

DATE ISSUED: 7 DECEMBER, 2012

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REVISED: \_\_\_\_\_

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CHECKED BY: CS

PHASE: \_\_\_\_\_

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TITLE: **PANELBOARD SCHEDULES**

SHEET: **SK-2/E8.04**

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## NEW 3 SECTION ELEMENTARY SCHOOL AT FISK-HOWARD SCHOOL

### RECOVERY SCHOOL DISTRICT

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# ATTACHMENT 100

PANEL ID:	<b>AH1</b>	LOCATION:	E1014
CONFIGURATION:	480Y/277 V, 3-PHASE, 4-WIRE PLUS GROUND	ENCLOSURE:	NEMA 1
MAIN:	400 A, MLO	TRIM:	SURFACE
SCCR (Amps RMS Symm.):	14,000 A FULLY-RATED	MODIFICATIONS:	

CIRC. NO.	LOAD DESCRIPTION	NOTES	AMPS	POLES	PHASE	PHASE	PHASE	POLES	AMPS	NOTES	LOAD DESCRIPTION	CIRC. NO.
					A	B	C					
1	AHU-A101 (2) 10 HP	3	30	3	8,400				20		LTS 1015, 1017, 1019, 1021 (UNIT A 1ST FL)	2
					2,505							
3							8,400					
5								8,400			LTS 1011, 1013, 1013A (UNIT A 1ST FL)	6
7	SPARE		20	1	0			2,130			LTS 1020, M1022, 1024 (UNIT A 1ST FL)	8
9	SPARE		20	1		0		3,115			LTS 1016, 1018, 1037B (UNIT A 1ST FL)	10
11	SPARE		20	1		2,900					LTS 1007, 1009 (UNIT B 1ST FL)	12
13	SPARE		20	1				0			LTS 1003, 1005 (UNIT B 1ST FL)	14
15	SPARE		20	1		3,680					LTS 1001 (UNIT B 1ST FL)	16
17	SPARE		20	1				0			LTS C1001, S101 (UNIT B 1ST FL)	18
19	FCU-A101		20	1				3,130			LTS 1002, 1004, 1002A (UNIT B 1ST FL)	20
21	FCU-B101		20	1		838					LTS 1006, 1006A, 1008 (UNIT B 1ST FL)	22
23	FCU-B102, B103		20	1		3,640					LTS 1010, 1010A, 1032 (UNIT B 1ST FL)	24
25	FCU-B104, B105		20	1				1,127			OUTDOOR LEARNING AREA	26
27	FCU-B106, B107		20	1				3,295			ELEVATOR SUMP PUMP	28
29	FCU-B108, B109		20	1				2,535			/	30
31	FCU-B110, B111		20	1				840			/	32
33	SPARE		20	1		2,535					SPARE	34
35	SPARE		20	1		700					SPARE	36
37	SPARE		20	1				0			SPARE	38
39	SPARE		20	1		22,524					SPARE	40
41	SPARE		20	1		0					SPARE	42
CONNECTED LOAD PER PHASE (VA):					51,372	45,380	46,194					

TOTAL CONNECTED LOAD (VA):	142,946
CONNECTED LOAD (AVG. AMPS PER PHASE):	172
TOTAL DEMAND LOAD (VA):	151,380
DEMAND LOAD (AVG. AMPS PER PHASE):	182

**NOTES:**

1. NOTE 1: SUBFEED 175 AMP BREAKER T-4 "DBAL1"
2. NOTE 2: 2#10, 1#10G, 1/2"C
3. NOTE 3 3#10, 1#10G, 3/4"C
4. NOTE 4 3#8, 1#10G, 3/4"C

11085

TITLE:  
PANELBOARD  
SCHEDULES

SHEET:  
SK-3/E8.04

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# ATTACHMENT 101

<b>PANEL ID:</b>	<b>2BH1</b>	<b>LOCATION:</b>	E2028
<b>CONFIGURATION:</b>	480Y/277 V, 3-PHASE, 4-WIRE PLUS GROUND	<b>ENCLOSURE:</b>	NEMA 1
<b>MAIN:</b>	400 A, MLO	<b>TRIM:</b>	SURFACE
<b>SCCR (Amps RMS Symm.):</b>	14,000 A FULLY-RATED	<b>MODIFICATIONS:</b>	

CIRC. NO.	LOAD DESCRIPTION	NOTES	AMPS	POLES	PHASE A	PHASE B	PHASE C	POLES	AMPS	NOTES	LOAD DESCRIPTION	CIRC. NO.
1	LTS 2015, 2017 (UNIT A 2ND FL)		20	1	3,450 2,535			1	20		FCU-A201, A202	2
3	LTS 2013, 2011C-H (UNIT A 2ND FL)		20	1		3,065 2,535		1	20		FCU-A203, A204	4
5	LTS C2001, MECH (UNIT A 2ND FL)		20	1			1,675 2,535	1	20		FCU-A205, A206	6
7	LTS 2020, 2022 (UNIT A 2ND FL)		20	1	3,450 0			1	20		SPARE	8
9	LTS 2018, E2016 (UNIT A 2ND FL)		20	1		2,930 0		1	20		SPARE	10
11	LTS 2019, 2011A, 2011B (UNIT B 2ND FL)		20	1			2,415 0	1	20		SPARE	12
13	LTS 2005, 2007 (UNIT B 2ND FL)		20	1	3,450 2,234			1	20		FCU-B201, B202	14
15	LTS 2001, 2003 (UNIT B 2ND FL)		20	1		3,450 3,128		1	20		FCU-B203, B204	16
17	LTS C2001, MECH (UNIT B 2ND FL)		20	1			1,755 2,535	1	20		FCU-B205, B206	18
19	LTS 2002, 2004 (UNIT B 2ND FL)		20	1	3,450 2,535			1	20		FCU-B207, B208	20
21	LTS 2010, 2008A (UNIT B 2ND FL)		20	1		3,335 2,535		1	20		FCU-B209, B210	22
23	LTS 2010A, 2010B, 2012 (UNIT B 2ND FL)		20	1			1,220 0	1	20		SPARE	24
25	SPARE		20	1	0 0			1	20		SPARE	26
27	SPARE		20	1		0 0		1	20		SPARE	28
29	SPARE		20	1			0 0	1	20		SPARE	30
31	SPARE		20	1	0 0						SPACE	32
33	SPARE		20	1		0 0					SPACE	34
35	SPARE		20	1			0 0				SPACE	36
37	SPACE				0 0						SPACE	38
39	SPACE					0 0					SPACE	40
41	SPACE						0 0				SPACE	42

CONNECTED LOAD PER PHASE (VA):                      64,104      59,584      48,935

TOTAL CONNECTED LOAD (VA):	172,623	<b>NOTES:</b>
CONNECTED LOAD (AVG. AMPS PER PHASE):	208	1. NOTE 1: 3#1/0, 1#6G, 1-1/2"C
TOTAL DEMAND LOAD (VA):	145,409	2. NOTE 2 3#10, 1#10G, 3/4"C
DEMAND LOAD (AVG. AMPS PER PHASE):	175	3. NOTE 3: SUBFEED 175 AMP BREAKER T-2 "2BL1"
		4. NOTE 4

11085

DATE ISSUED: 7 DECEMBER, 2012  
 REVISED: ADDENDUM 02, 23 JANUARY, 2013  
 REVISED:  
 REVISED:  
 REVISED:  
 DRAWN BY: GLM  
 CHECKED BY: CS  
 PHASE:

TITLE:  
**PANELBOARD SCHEDULES**

SHEET:  
**SK-4/E8.04**

BID DOCUMENTS

## NEW 3 SECTION ELEMENTARY SCHOOL AT FISK-HOWARD SCHOOL RECOVERY SCHOOL DISTRICT

