

University of South Carolina
 Purchasing Department
 1600 Hampton Street, 6th floor
 Columbia, SC 29208
 Telephone: (803) 777-4115

Request for Quotation

Page One

THIS IS NOT AN ORDER

Quotation must be received No Later Than:	Send quotation to above address Attention of:	Quotation Number:	Date
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Print company name and address:

Please quote your lowest delivered price of the items(s) listed below. The Purchasing Department reserves the right to reject any or all quotes and to waive any or all technicalities.

1. If an item cannot be furnished, indicate by **NO QUOTE**.
2. All quotes must be signed by the vendor's representative and terms noted, failure to comply with this instruction may result in disqualification of the quote.
3. **FAXED QUOTES ACCEPTABLE.** FAX # (803) 777-2032

Federal I.D. or Social Security No. _____ SC Minority Certification Number (If Applicable) _____

Submitted By (Print Name) _____ Signature _____ Telephone _____

Item No.	Quantity and Unit	Description of Commodity or Services	Unit Price	Total Price

GENERAL CONDITIONS

DEFAULT: In case of default by the Contractor, the University of South Carolina reserves the right to purchase any or all items in default in the open market, charging the Contractor with any additional costs. The defaulting Contractor shall not be considered a responsible bidder until the assessed charge has been satisfied.

All amendments to and interpretation of this RFQ shall be in writing. The procurement officer shall not be legally bound by any amendment or interpretation that is not in writing.

Any contract entered into by the University of South Carolina or its agencies resulting from this quotation shall be subject to cancellation at the end of any fiscal or appropriated year unless otherwise provided by law.

Payment will be made in accordance with Section 11-35-45 of the South Carolina Consolidated procurement Code and Disbursement Regulations. Delay in receiving invoices, as well as errors and omissions on the invoices, will be considered just cause for withholding payment without losing discount privileges. The University reserves the right to withhold payment or make such deductions as may be necessary to protect the University from loss or damage because of defective work, claims, damages or to pay for repair of correction of materials furnished hereunder.

Quoted prices must remain firm for a period of thirty days beyond the Request for Quotation deadline. Unit prices will govern over extended prices unless otherwise stated.

The University of South Carolina shall consider payment discounts in the award of this contract when such discounts are for thirty days or more after final inspection and acceptance of contract requirements. Payment discounts for less than thirty days are encouraged but shall not be a factor in award determination. Please state your discount terms using the above referenced information as the University's position on the matter.

All materials and products offered must be guaranteed to meet and comply with the requirements all the specifications, terms and conditions indicated or referred to.

The award will be made in accordance with Section 11-35-1520 of the South Carolina Consolidated Procurement Code.

The University reserves the right to reject any and all quotations and to cancel the solicitation; waive any and all technicalities; the University reserves the right to reject any quotation in which the delivery time indicated to be of substantial length to cause disruption and/or delay in operation for which the item(s) is/are intended; ambiguous quotations which are uncertain as to terms, delivery, quantity or compliance with specifications may be rejected.

The contractor assumes sole responsibility and shall hold harmless the University of South Carolina, its directors, officers, employees and agents from and against any and all claims, actions or liabilities of any nature which may be asserted against them by third parties in connection with the performance of the bidder, its directors, officers, employees and agents under this agreement. The University of South Carolina agrees to accept responsibility for claims, actions or liabilities resulting from negligent acts of its employees occurring within the scope of their employment which may be asserted against them by third parties in connection with the performance of the University of South Carolina, its members, directors, officers, employees and agents under this agreement.

Contractor agrees not to refer to award of this contract in commercial advertising in such a manner to state or imply that the products or service provided are endorsed or preferred by the user.

Upon award of a contract under this quotation, the person, partnership, association or corporation to whom the award is made must comply with the laws of South Carolina that require such person or entity to be authorized and/or licensed to do business in this State. Notwithstanding the fact that applicable statutes may be exempt or exclude the successful quoter from requirements that it be authorized and/or licensed to do business in this State, by submission of this signed quote, the quoter agrees to subject itself to the jurisdiction and process of the courts of the State of South Carolina as to all matters and disputes arising or to arise under the contract and the performance thereof, including any questions as to the liability for taxes, licenses or fees levied by the State.

Termination: Subject to the provisions below, the contractor may be terminated for any reason by the University providing a thirty-day advance notice in writing is given to the contractor.

Termination for Convenience: In the event that this contract is terminated or cancelled upon request and for the convenience of the University may negotiate reasonable termination costs, if applicable.

Termination for Cause: Termination by the University for cause, default, or negligence on the part of the Contractor shall be excluded from the foregoing provisions; termination costs, if any, shall not apply. The thirty day advance notice requirement is waived and the default provision in this bid shall apply.

HIPAA Law: The Contractor agrees that to the extent that some or all of the activities within the scope of this Contract are subject to the Health Insurance Portability Accountability Act of 1996, P.L. 104-91, as amended ("HIPAA"), or its implementing regulations, it will comply with the HIPAA requirements and will execute such agreements and practices as the University of South Carolina may require to ensure compliance. Additional information may be viewed at: <http://www.sc.edu/hipaa/>

SPECIAL CONDITIONS

LICENSES, PERMITS, INSURANCE: All costs for required licenses, permits and insurance shall be borne by the Bidder.

The University of South Carolina requires all contractual activities to be performed in a manner that is consistent with all applicable federal, state and local laws, regulations, rules, rulings and ordinances. These include, but are not limited to: the Occupational Safety and Health Act, The Environmental Protection Act, The South Carolina Hazardous Waste Management Act.

IMPORTANT – Please Note – Vendors, we MUST have your Federal ID # (company) or Social Security # (individual) before processing any invoices for payment. Failure to provide this information will result in delay of payments until this information is received. Please include this information with your quote.

Scope Of Solicitation

It is the intent of the University of South Carolina to solicit bids from qualified sources of supply to provide mechanical equipment (material only) for the 1600 Hampton Street Annex on the USC Columbia Campus in accordance with all the requirements stated herein.

SCOPE OF WORK

Provide mechanical equipment (material only; no installation required) to the USC Columbia Campus for the 1600 Hampton Street Annex.

NOTE: The mechanical equipment is for the 1600 Hampton Street Annex – Deferred maintenance Renovations construction project number, H27-6107. The specifications and drawings included in this solicitation have been provided by the Architect of record for the renovation project, Jumper Carter Sease Architects.

PRODUCT SPECIFICATIONS (ATTACHED):

SECTION 23 81 26 DUCTLESS SPLIT SYSTEM HEAT PUMP
SECTION 23 81 43 PACKAGED HEAT PUMPS
SECTION 23 82 19 SPLIT SYSTEM HEAT PUMPS

SCHEDULES (ATTACHED)

Note: some lines have "Deleted" written – these are not needed for this solicitation

DUCTLESS SPLIT SYSTEM HEAT PUMP SCHEDULE
PACKAGED HEAT PUMP SCHEDULE
SPLIT SYSTEM HEAT PUMP SCHEDULE

Product Specifications and Drawings are located at the end of this Solicitation.

Award Criteria

AWARD CRITERIA – BIDS (JAN 2006): Award will be made to the lowest responsible and responsive bidder(s).

AWARD TO ONE OFFEROR (JAN 2006): Award will be made to one Offeror.

Shipping / Risk of Loss

F.O.B. Destination. Destination is the shipping dock of the Using Governmental Units' designated receiving site, or other location, as specified herein.

Additional Terms and Conditions

Additional Terms and Conditions submitted with bid may be cause for rejection of bid. Bid as specified.

Warranty – Standard (Jan 2006)

Contractor must provide the manufacturer's standard written warranty upon delivery of product. Contractor warrants that manufacturer will honor the standard written warranty provided.

ADDITIONAL CONDITIONS

PREFERENCES - A NOTICE TO VENDORS (SEP. 2009): On June 16, 2009, the South Carolina General Assembly rewrote the law governing preferences available to in-state vendors, vendors using in-state subcontractors, and vendors selling in-state or US end products. This law appears in Section 11-35-1524 of the South Carolina Code of Laws. A summary of the new preferences is available at www.procurement.sc.gov/preferences. ***ALL THE PREFERENCES MUST BE CLAIMED AND ARE APPLIED BY LINE ITEM, REGARDLESS OF WHETHER AWARD IS MADE BY ITEM OR LOT. VENDORS ARE CAUTIONED TO CAREFULLY REVIEW THE STATUTE BEFORE CLAIMING ANY PREFERENCES. THE REQUIREMENTS TO QUALIFY HAVE CHANGED. IF YOU REQUEST A PREFERENCE, YOU ARE CERTIFYING THAT YOUR OFFER QUALIFIES FOR THE PREFERENCE YOU'VE CLAIMED. IMPROPERLY REQUESTING A PREFERENCE CAN HAVE SERIOUS CONSEQUENCES.*** [11-35-1524(E)(4)&(6)]

PREFERENCES - SC/US END-PRODUCT (SEP 2009): Section 11-35-1524 provides a preference to vendors offering South Carolina end-products or US end-products, if those products are made, manufactured, or grown in SC or the US, respectively. An end-product is the tangible project identified for acquisition in this solicitation, including all component parts in final form and ready for the use intended. The terms "made," "manufactured," and "grown" are defined by Section 11-35-1524(A). By signing your offer and checking the appropriate space(s) provided and identified on the bid schedule, you certify that the end-product(s) is either made, manufactured or grown in South Carolina, or other states of the United States, as applicable. Preference will be applied as required by law. Post award substitutions are prohibited. See "Substitutions Prohibited - End Product Preferences (Sep 2009)" provision.

PREFERENCES - RESIDENT VENDOR PREFERENCE (SEP 2009): To qualify for the RVP, you must maintain an office in this state. An office is a nonmobile place for the regular transaction of business or performance of a particular service which has been operated as such by the bidder for at least one year before the bid opening and during that year the place has been staffed for at least fifty weeks by at least two employees for at least thirty five hours a week each. In addition, you must either: (1) maintain at a location in South Carolina at the time of the bid an inventory of expendable items which are representative of the general type of commodities for which the award will be made and which have a minimum total value, based on the bid price, equal to the lesser of fifty thousand dollars [\$50,000] or the annual amount of the contract; or (2) be a manufacturer headquartered and having an annual payroll of at least one million dollars in South Carolina and the end product being sold is either made or processed from raw materials into a finished end product by that manufacturer or its affiliate (as defined in Section 1563 of the Internal Revenue Code).

SUBSTITUTIONS PROHIBITED - END PRODUCT PREFERENCES (SEP 2009): If you receive the award as a result of the South Carolina end product or United States end product preference, you may not substitute a nonqualifying end product for a qualified end product. If you violate this provision, the State may terminate your contract for cause and you may be

debarred. In addition, you shall pay to the State an amount equal to twice the difference between the price paid by the State and your evaluated price for the item for which you delivered a substitute. [11-35-1534(B)(4)]

MINORITY PARTICIPATION (JAN 2006)

Is the bidder a South Carolina Certified Minority Business? Yes NO

Is the bidder a Minority Business certified by another governmental entity? Yes NO

If so, please list the certifying governmental entity: _____

Will any of the work under this contract be performed by a SC certified Minority Business as a subcontractor? Yes NO

If so, what percentage of the total value of the contract will be performed by a SC certified Minority Business as a subcontractor? Yes NO

Will any of the work under this contract be performed by a minority business certified by another governmental entity as a subcontractor? Yes NO

If so, what percentage of the total value of the contract will be performed by a minority business certified by another governmental entity as a subcontractor? Yes NO

If a certified Minority Business is participating in this contract, please indicate all categories for which the Business is certified:

- Traditional minority
- Traditional minority, but female
- Women (Caucasian females)
- Hispanic minorities
- DOT referral (Traditional minority)
- DOT referral (Caucasian female)
- Temporary certification
- SBA 8 (a) certification referral
- Other minorities (Native American, Asian, etc.)

(If more than one minority contractor will be utilized in the performance of this contract, please provide the information above for each minority business.)

VIII. BIDDING SCHEDULE / PRICE-BUSINESS PROPOSAL

Commodity (Material)

(do not include sales tax in your price, this will be calculated after award)

Item	Qty	Unit of Measure	Description	Unit Price
1	1	lot	Split System Heat Pumps as outlined on the schedule and as specified in this solicitation.	\$ _____

Manufacturer: _____ Product #: _____

Resident Vendor Preference _____
 SC End Product Preference _____
 US End Product Preference _____

DELIVERY ARO: _____

Item	Qty	Unit of Measure	Description	Unit Price
2	1	lot	Ductless Split System Heat Pumps as outlined on the schedule and as specified in this solicitation.	\$ _____

Manufacturer: _____ Product #: _____

Resident Vendor Preference _____
 SC End Product Preference _____
 US End Product Preference _____

DELIVERY ARO: _____

Item	Qty	Unit of Measure	Description	Unit Price
3	1	lot	Packaged Heat Pumps as outlined on the schedule and as specified in this solicitation.	\$ _____

Manufacturer: _____ Product #: _____

Resident Vendor Preference _____
 SC End Product Preference _____
 US End Product Preference _____

DELIVERY ARO: _____

NOTE: The commodity preferences do not apply to a single unit of an item with a price in excess of \$50,000 or a single award with a total potential value in excess of \$500,000. [11-35-1524(E)(2)]

Please refer to the preference clauses listed in the terms and conditions of this solicitation to ensure that you qualify to select the above preferences.

TOTAL (Items 1-3) = \$ _____

SECTION 23 81 26 - DUCTLESS SPLIT SYSTEM HEAT PUMPS

PART 1 - GENERAL (BY VENDOR)

1.1 Section 23 00 00 Mechanical, General applies to the work specified in this section of specifications.

1.2 SYSTEM DESCRIPTION:

- A. The split system heat pump shall be a Daikin as scheduled on the drawings or equal by Carrier, Mitsubishi, Samsung, Panasonic or approved equal.
- B. Each indoor unit or group of indoor units shall be independently controlled.
- C. Indoor and outdoor sections of the systems shall be by the same manufacturer.

1.3 QUALITY ASSURANCE

- A. The units shall be tested by a Nationally Recognized Testing Laboratory (NRTL), in accordance with ANSI/UL 1995 - Heating and Cooling Equipment and bear the Listed Mark.
- B. All wiring shall be in accordance with the National Electrical Code (N.E.C.).
- C. The units shall be manufactured in a facility registered to ISO 9001 and ISO14001 which is a set of standards applying to environmental protection set by the International Standard Organization (ISO).
- D. A full charge of R-410A for the condensing unit only shall be provided in the outdoor section of the heat pump.

1.4 DELIVERY, STORAGE AND HANDLING

Unit shall be stored and handled according to the manufacturer's recommendations.

1.5 **WARRANTY:** The units shall be covered by the manufacturer's limited warranty for a period of one (1) year from date of installation, or a maximum of eighteen (18) months from the date of shipment. In addition the compressor shall have a manufacturer's limited warranty for a period of six (6) years from date of installation. If, during this period, any part should fail to function properly due to defects in workmanship or material, it shall be replaced or repaired at the discretion of the manufacturer. This warranty shall not include labor.

1.6 The system shall be installed by a factory trained mechanical contractor. The mandatory contractor service and install training should be performed by the manufacturer.

1.7 The split system heat pump shall perform as scheduled on the drawings.

1.8 EQUIPMENT RAILS AND PIPE PENTHOUSES

Contractor to provide all equipment submittals to equipment supplier for proper selection of equipment rails and pipe penthouses. Equipment rails and pipe penthouses shall be manufactured by Imperial Metals or Roof Product System or approved equal.

- 1.9 The Ductless Split System Heat Pumps will be purchased by the Owner. The Vendor shall deliver the equipment to a location specified by the Installation Contractor. See Part 3 - Execution in this section of the specifications. Equipment rails and pipe penthouses shall be purchased and provided by the Installation Contractor.

PART 2 - PRODUCTS (BY VENDOR)

2.1 OUTDOOR UNIT:

A. GENERAL:

1. The outdoor unit shall be factory assembled and pre-wired with all necessary electronic and refrigerant controls. The refrigeration circuit of the condensing unit shall consist of scroll compressors, motors, fans, condenser coil, electronic expansion valves, solenoid valves, 4-way valve, distribution headers, capillaries, filters, shut off valves, oil separators, service ports and refrigerant regulator. High/low pressure gas line, liquid and suction lines shall be individually insulated between the outdoor and indoor units.
2. The outdoor unit can be wired and piped with outdoor unit access from the left, right, rear or bottom.
3. The connection ratio of indoor units to outdoor unit shall be permitted up to 200%.
4. The system shall automatically restart operation after a power failure and shall not cause any settings to be lost, thus eliminating the need for reprogramming.
5. The unit shall incorporate an auto-charging feature and a refrigerant charge check function.
6. The outdoor unit shall be modular in design and should allow for side-by-side installation with minimum spacing.
7. The following safety devices shall be included on the condensing unit; high pressure switch, control circuit fuses, crankcase heaters, fusible plug, high pressure switch, overload relay, inverter overload protector, thermal protectors for compressor and fan motors, over current protection for the inverter and anti-recycling timers.
8. Oil recovery cycle shall be automatic occurring 2 hours after start of operation and then every 8 hours of operation.
9. The outdoor unit shall be capable of heating operation at 0°F dry bulb ambient temperature without additional low ambient controls.
10. The system shall continue to provide heat to the indoor units in heating operation while in the defrost mode.

B. UNIT CABINET:

The outdoor unit shall be completely weatherproof and corrosion resistant. The unit shall be constructed from rust-proofed mild steel panels coated with a baked enamel finish.

C. FAN:

The condensing unit shall consist of one or more propeller type, direct-drive 350 and 750 W fan motors that have multiple speed operation via a DC (digitally commutating) inverter. The condensing unit fan motor shall have multiple speed operation of the DC (digitally commutating) inverter type, and be of high external static pressure and shall be factory set as standard at 0.12 in. WG. A field setting switch to a maximum 0.32 in. WG pressure is available to accommodate field applied duct for indoor mounting of condensing units. The fan shall be a vertical discharge

configuration with a nominal airflow maximum range of 6,700 CFM to 14,120 CFM dependant on model specified. The fan motor shall have inherent protection and permanently lubricated bearings and be mounted. The fan motor shall be provided with a fan guard to prevent contact with moving parts.

D. COIL:

The condenser coil shall be manufactured from copper tubes expanded into aluminum fins to form a mechanical bond. The heat exchanger coil shall be of a waffle louver fin and rifled bore tube design to ensure high efficiency performance. The heat exchanger on the condensing units shall be manufactured from Hi-X seamless copper tube with N-shape internal grooves mechanically bonded on to aluminum fins to an e-Pass Design. The fins are to be covered with an anti-corrosion acrylic resin and hydrophilic film type E1. The pipe plates shall be treated with powdered polyester resin for corrosion prevention. The thickness of the coating must be between 2.0 to 3.0 microns.

E. COMPRESSOR:

1. The inverter scroll compressors shall be variable speed (PAM inverter) controlled which is capable of changing the speed to follow the variations in total cooling and heating load as determined by the suction gas pressure as measured in the condensing unit. In addition, samplings of evaporator and condenser temperatures shall be made so that the high/low pressures detected are read every 20 seconds and calculated. With each reading, the compressor capacity (INV frequency or STD ON/OFF) shall be controlled to eliminate deviation from target value.
2. The inverter driven compressor in each condensing unit shall be of highly efficient reluctance DC (digitally commutating), hermetically sealed scroll "G-type" with a maximum speed of 7,980 rpm.
3. Neodymium magnets shall be adopted in the rotor construction to yield a higher torque and efficiency in the compressor instead of the normal ferrite magnet type. At complete stop of the compressor, the neodymium magnets will position the rotor into the optimum position for a low torque start.
4. The capacity control range shall be as low as 6% to 100%.
5. Each non-inverter compressor shall also be of the hermetically sealed scroll type.
6. Each compressor shall be equipped with a crankcase heater, high pressure safety switch, and internal thermal overload protector.
7. Oil separators shall be standard with the equipment together with an intelligent oil management system.
8. The compressor shall be spring mounted to avoid the transmission of vibration.
9. Units sized 8-12 ton shall contain a minimum of 2 compressors, 14-16 ton units shall contain a minimum of 3 compressors and 18-20 ton shall contain a minimum of 4 compressors. In the event of compressor failure the remaining compressors shall continue to operate and provide heating or cooling as required at a proportionally reduced capacity. The microprocessor and associated controls shall be designed to specifically address this condition.
10. In the case of multiple condenser modules, conjoined operation hours of the compressors shall be balanced by means of the Duty Cycling Function, ensuring sequential starting of each module at each start/stop cycle, completion of oil return, completion of defrost or every 8 hours.

G. ELECTRICAL:

The control voltage between the indoor and outdoor unit shall be 16VDC non-shielded, stranded 2 conductor cable. The control wiring shall be a two-wire multiplex transmission system, making it possible to connect multiple indoor units to one outdoor unit with one 2-cable wire, thus simplifying the wiring operation.

2.2 INDOOR UNITS

- A. Each system shall perform in accordance to the ratings shown in the schedule on the drawings. Performance shall be based on nominal cooling conditions of 80°FDB, 67°FWB for the indoor unit and 95°FDB for the outdoor unit and nominal heating conditions of 70°FDB for the indoor unit and 47°FDB for the outdoor unit.
- B. The indoor units shall be completely factory assembled and tested. Units shall be factory wired and piped, and shall have electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory. Both refrigerant lines shall be insulated from the outdoor unit. The indoor units shall be equipped with a return air thermistor.
- C. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The unit shall be equipped with a programmed drying mechanism that dehumidifies while inhibiting changes in room temperature.

D. CONCEALED CEILING DUCTED UNITS:

- 1. General: Daikin indoor unit FXMQ or equal by Sanyo or approved equal shall be a built-in ceiling concealed fan coil unit, operable with refrigerant R-410A, equipped with an electronic expansion valve, for installation into the ceiling cavity. It shall be constructed of a galvanized steel casing. It shall be a horizontal discharge air with horizontal return air configuration. Units shall be a low height (15-3/8") cabinet. The indoor units sound pressure shall range from 41 dB(A) to 45 dB(A) at low speed measured 5 feet below the ducted unit.
- 2. The unit shall have an external adjustable static pressure switch.
- 3. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.
- 4. The fan shall be direct-drive Sirocco type fan with statically and dynamically balanced impeller with high and low fans speeds available. Air flow rate shall be available in high and low settings. The fan motor shall be thermally protected. Fans shall be capable of external static pressures as scheduled on drawings.
- 5. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance. The coil shall be a 3 row cross fin copper evaporator coil with 13 fpi design completely factory tested. The refrigerant connections shall be flare connections and the condensate will be 1-1/4 inch outside diameter PVC.

E. WALL MOUNTED UNITS:

1. General: Daikin indoor unit FXAQ or equal by Sanyo or approved equal shall be a wall mounted fan coil unit, operable with refrigerant R-410A, equipped with an electronic expansion valve, for installation onto a wall within a conditioned space. A mildew-proof, polystyrene air filter and condensate drain pan shall be included as standard equipment. The indoor units sound pressure shall range from 32 dB(A) to 35 dB(A) at low speed measured at 3.3 feet below and from the unit.
2. The unit shall have an auto-swing louver which ensures efficient air distribution, which closes automatically when the unit stops. The remote controller shall be able to set five (5) steps of discharge angle. The front grille shall be easily removed for washing. The discharge angle shall automatically set at the same angle as the previous operation upon restart. The drain pipe shall be able to be fitted to from either left or right sides.
3. The cabinet shall be affixed to a factory supplied wall mounting template and located in the conditioned space. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.
4. The fan shall be direct-drive cross-flow fan with statically and dynamically balanced impeller with high and low fans speeds available. Air flow rate shall be available in high and low settings. The fan motor shall be thermally protected.
5. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance. The coil shall be a 2-row cross fin copper evaporator coil with 14 fpi design completely factory tested. The refrigerant connections shall be flare connections and the condensate will be 11/16 inch outside diameter PVC. A thermistor will be located on the liquid and gas line. A condensate pan shall be located in the unit.
6. A condensate pump with a 15 foot lift shall be located below the coil in the condensate pan with a built in safety alarm. Condensate pump shall be factory installed, high capacity.

F. 4-WAY CEILING CASSETTE UNITS:

1. General: Daikin indoor unit model FXFQ or equal by Sanyo or approved equal shall be a ceiling cassette fan coil unit, operable with R-410A refrigerant, equipped with an electronic expansion valve, for installation into the ceiling cavity equipped with an air panel grill. It shall be a four-way air distribution type, ivory white, impact resistant with a washable decoration panel. The supply air is distributed via motorized louvers which can be horizontally and vertically adjusted from 0° to 90°. The indoor units sound pressure shall range from 28 dB(A) to 33 dB(A) at low speed measured at 5 feet below the unit.
2. A condensate pump with a 21 inch lift shall be located below the coil in the condensate pan with a built in safety alarm.
3. The 4-way supply air flow shall be able to be field modified to 3-way and 2-way airflow to accommodate various installation configurations including corner installations. Return air shall be through the concentric panel, which includes a resin net mold resistant filter.
4. Units shall be capable of fresh air intake.
5. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.
6. The fan shall be direct-drive turbo fan type with statically and dynamically balanced impeller with high and low fans speeds available. Air flow rate shall be available in high and low settings. The fan motor shall be thermally protected.
7. The return filter shall be filtered means of a washable long-life filter with mildew proof resin.

8. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance. The coil shall be a 2-row cross fin copper evaporator coil with 17 FPI design completely factory tested. The refrigerant connections shall be flare connections and the condensate will be 1 -1/4 inch outside diameter PVC. A condensate pan shall be located under the coil. A thermistor will be located on the liquid and gas line.

2.4 CONTROLS:

- A. The controls shall be capable of supporting remote controllers, schedule timers, system controllers, centralized controllers, and system integration to the Building Management System (see specification section 25 55 00 - Automatic Temperature Controls).
- B. Physical Characteristics: The control system shall be a neutral color plastic material. Each control may have a Liquid Crystal Display (LCD).
- C. Electrical Characteristics: From each circuit board to the controls, the electrical voltage shall be 16 volts DC. Control wiring shall run from the indoor unit terminal block to the specific controller for that unit. The wire shall be a non-shielded, 2-core sheathed vinyl cord or cable, size AWG18-2.
- D. INDIVIDUAL ZONE CONTROLLER
 1. The wired navigation controller shall be provided for each system (do not daisy-chain systems), and shall be able to function as follows:
 - a. The controller shall have a maximum wiring length of 1,640 feet.
 - b. The controller shall have a self diagnosis function that constantly monitors the system for malfunctions (total of 80 components).
 - c. The controller shall be able to immediately display fault location and condition.
 - d. An LCD digital display will allow the temperature to be set in 1°F units.
 - e. The controller shall be equipped with a thermostat sensor in the controller making possible more comfortable room temperature control.
 - f. The controller shall monitor room temperature and preset temperature by microcomputer and can select cool/heat operation mode automatically.
 - g. The controller shall allow the user to select cool / heat / fan operation mode with indoor remote controller of choice without using the cool / heat selector.
 2. The wired navigation controller shall have the following features:
 - a. Operation: Start/stop, operation mode, temperature setting, 60°F-90°F set point range, fan speed, and airflow direction.
 - b. Monitoring: Status, malfunction flashing, malfunction content, filter sign, operation mode, temperature setting, permit/prohibit selection, fan speed, airflow direction.
 - c. Scheduling: Occupied/Unoccupied with timed override and temporary temperature override.
 - d. Control Management: Field setting mode, group setting, auto-restart.

PART 3 - EXECUTION (BY INSTALLATION CONTRACTOR)

- 3.1 Suspend concealed ceiling ducted indoor units and ceiling mounted cassette units from threaded rods from floor or roof support structure as recommended the unit manufacturer. Provide spring vibration isolators at each hanger rod. Mount unit level by checking casing. Provide seismic sway

cables at each unit support and connect to floor or roof structure, leaving the allowable slack in the cable, per 2012 International Building Code.

- 3.2 Mount wall mounted units to the building wall structure per manufacturer's printed installation instructions, and support for seismic protection per the 2012 International Building Code.
- 3.3 Connect condensate drain and secondary drain connection to fan coil unit and pipe to condensate main as shown on drawings.
- 3.4 After construction is completed, including painting, clean exposed surfaces of units. Vacuum clean coils and inside of cabinets.
- 3.5 Provide flexible duct connections for supply and return air duct connections.
- 3.6 **EQUIPMENT RAILS**
 - A. Roof mounted equipment rails shall be RPS model ER-4A.
 - B. The rails shall be 18 gauge galvanized steel, monolithic construction, with integral base plate, continuous welded corner seams, factory installed 2 x 4 nailer and including and 18 gauge galvanized steel counter-flashing complete with screws.
- 3.7 See Pipe Penthouse detail on drawings.
- 3.8 **OUTDOOR UNIT INSTALLATION:**
 - A. Where shown on drawings, mount outdoor units on equipment rails on roof. Equipment rails shall be furnished and installed under Division 23. Equipment rail curbs shall be attached to roof decking in compliance with the seismic requirements of the 2012 International Building Code. Bolt units to equipment rails per the seismic requirements of the 2012 International Building Code.
 - B. Install all components in strict accordance with manufacturer's written installation instructions.
- 3.9 The Ductless Split System Heat Pumps shall be included in the Contractor's one year warranty, see WARRANTY paragraph in section 23 00 00 Mechanical, General.
- 3.10 Contractor shall receive the new Ductless Split System Heat Pumps as coordinated with the manufacturer's representative.

END OF SECTION 23 34 23

SECTION 23 81 43 - PACKAGED HEAT PUMPS

PART 1 - GENERAL (BY VENDOR)

- 1.1 Section 23 00 00 Mechanical, General applies to the work specified in this section of specifications.
- 1.2 Provide packaged heat pump units as shown on plans. Cooling and heating capacities shall be as listed on schedule on drawings. The unit shall be properly assembled and tested at the factory. It shall be designed for use with Refrigerant 410a.
- 1.3 Cooling capacity ratings shall be based on ARI standards.
- 1.4 Packaged heat pumps shall be tested in accordance with UL 559 or UL 1995.
- 1.5 Packaged heat pumps shall be Trane models listed on drawings or equal by Carrier or Johnson Controls (York), Lennox, or approved equal.
- 1.6 The Packaged Heat Pumps will be purchased by the Owner. The Vendor shall deliver the equipment to a location specified by the Installation Contractor. See Part 3 - Execution in this section of the specifications.

PART 2 - PRODUCT (BY VENDOR)

- 2.1 Provide horizontal packaged, one piece, air-to-air electric heat pumps designed to function as a year round air conditioning system. Units shall be completely assembled and tested complete with refrigerant charge and ready to operate. The total unit shall listed by U.L. and carry a U.L. label.
- 2.2 All wiring internal to the unit shall be colored and numbered for identification.
- 2.3 All units shall be provided with condenser coil guards.
- 2.4 Electric resistance heaters shall be internally wired nickel chromium elements with controls necessary for complete operation. Safety controls shall include primary high temperature and overcurrent protection. Heaters shall be U.L. listed and shall comply with N.E.C.
- 2.5 Unit compressors shall be welded fully hermetic reciprocating with crankcase heaters and suitable vibration isolators. Compressors shall be of same manufacturer as unit and shall be tested and designed in unit to operate down to -20°F outdoor air temperature on the heating cycle without shutting off. The standard unit shall be capable of operating down to 35°F outdoor air temperature on the cooling cycle. Compressors shall have a five year non-prorated warranty. Where noted in schedule on drawings, provide low ambient kits to allow cooling operation to 0°F.
- 2.6 Indoor and outdoor coils shall be aluminum plate fins mechanically bonded to seamless copper tubes.
- 2.7 Fans and Motors: Indoor air fan shall be forward curved, double width, double inlet, centrifugal type. Belt driven unit motor pulleys shall be adjustable pitch. Indoor fan motor shall have permanently lubricated bearings. Outdoor fans shall be propeller type with direct driven permanently lubricated motor. Fans shall discharge upward. Indoor and outdoor fans shall have internal thermal overload protection.

- 2.8 Unit cabinet shall be constructed of galvanized steel, phosphatized, and finished with an air-dry paint coating with removable access panels. Structural members shall be 16 gauge with access doors and removable panels of minimum 20 gauge. Cabinet interior shall be insulated with ½" thick neoprene-coated fiberglass. Cabinet panels shall be easily removable for service to all operating components. A condensate drain for the indoor coil shall be provided.
- 2.9 Safety Controls: The heat pump heating/cooling system shall be protected with high pressurestat, low pressurestats, loss-of-charge protection, indoor coil freezestats, and current and temperature sensitive overload devices. Each of these devices shall be wired to prevent compressor restart. Two-compressor units shall have separate and independent refrigeration and control systems designed to allow for standby operation of either compressor if one is locked out. Two-compressor units shall have 2-stage compressor heat and cool with built-in electric strip heat lock out to prevent resistance heat operation above 40°F ambient.
- 2.10 An outdoor coil defrost system shall be incorporated into the base unit to prevent frost accumulation during heating cycle. The defrost cycle shall function on the basis of time and coil temperature. A 90-minute timer shall actuate a defrost mode only if coil temperature is low enough to indicate a heavy frost condition. Defrost shall have a positive termination time of a maximum of 10 minutes or when the defrost thermostat is satisfied to prevent prolonged operation on a defrost cycle. Electric resistance heaters shall operate automatically during the defrost cycle.
- 2.11 Thermostats shall be provided under section 25 55 00, Automatic Temperature Controls.
- 2.12 Emergency heat control shall consist of emergency heat control box containing emergency heat relays and outdoor thermostats; and an emergency heat thermostat subbase (with warning light). Control shall allow for manual bypass of compressor and outdoor thermostats if compressor becomes inoperative, or for service. Outdoor thermostats shall provide for staging of electric resistance heat according to outdoor temperature. Thermostats shall be wired into the electric heater contactors and shall have an adjustable set point to provide economical resistance heat staging.
- 2.13 Time delay circuit to prevent compressor short cycling as a result of a rapid change in thermostat setting and automatically prevents compressor restart at least 5 minutes after shutdown.
- 2.14 Provide for each stage of electric heat on outdoor thermostat to lock out electric heat when outdoor temperature is below its setpoint. Provide emergency heat switch on thermostat to bring on heat if the compressor fails.
- 2.16 Provide unit with filter frames to accept 2" filters, MERV 8.
- 2.17 Provide 14 gauge galvanized all welded seismic curb for each unit. Curbs shall meet the seismic requirements of the 2012 International Building Code. Curb shall be 14" high or a minimum of 8" above the roof insulation. Curb shall be sloped so top of unit is level, verify roof slope prior to ordering curb.

PART 3 - EXECUTION (BY INSTALLATION CONTRACTOR)

- 3.1 Mount units on curb installed by a General Contractor. Curbs shall be attached to the concrete roof decking and supplemental steel as required to comply with the seismic requirements of the 2012 International Building Code. Install unit per manufacturer's written installation instructions.

- 3.2 Provide construction filters. Change to throwaway type MERV 8 after substantial completion.
- 3.3 Provide 3" deep PVC P-trap at connection to condensate drain. Pipe PVC condensate drain full size of equipment connection to nearest roof drain.
- 3.4 Set the minimum position of the outside air hood motorized damper at O.A. CFM listed in schedule on drawings.
- 3.5 The Packaged Heat Pumps shall be included in the Contractor's one year warranty, see WARRANTY paragraph in section 23 00 00 Mechanical, General.
- 3.6 Contractor shall receive the new Packaged Heat Pumps as coordinated with the manufacturer's representative.

END OF SECTION 23 81 43

SECTION 23 82 19 - SPLIT SYSTEM HEAT PUMPS

PART 1 - GENERAL (BY VENDOR)

- 1.1 Section 23 00 00 Mechanical, General applies to the work specified in this section of specifications.
- 1.2 Air handling unit shall be of the same manufacturer as outdoor section of heat pump. See schedule on drawings for capacities.
- 1.3 Provide an outdoor heat pump section as shown on plans. Cooling and heating capacities shall be as listed on schedule on drawings. The unit shall be properly assembled and tested at the factory. It shall be designed for use with Refrigerant 410A.
- 1.4 Equipment shall be Trane models listed on drawings or equal by Carrier, Johnson Controls, Lennox or approved equal.

1.5 EQUIPMENT RAILS AND PIPE PENTHOUSES

Contractor to provide all equipment submittals to equipment supplier for proper selection of equipment rails and pipe penthouses. Equipment rails and pipe penthouses shall be manufactured by Imperial Metals or Roof Product System or approved equal.

- 1.6 The Split System Heat Pumps will be purchased by the Owner. The Vendor shall deliver the equipment to a location specified by the Installation Contractor. See Part 3 - Execution in this section of the specifications. Equipment rails and pipe penthouses shall be purchased and provided by the Installation Contractor.

PART 2 - PRODUCT (BY VENDOR)

2.1 AIR HANDLING UNITS

- A. Provide direct-expansion fan coils in the location and manner shown on drawings. Air handling unit shall be equipped with supplementary electric heater as indicated on drawings.
- B. Coil shall be constructed with aluminum plate fins mechanically bonded to nonferrous tubing with all joints brazed. Coil shall have refrigerant metering device, check valve, and refrigerant line fittings. Unit shall have condensate drain pan with drain connections.
- C. Casings shall be insulated and constructed of cold-rolled steel, bonderized and finished with baked enamel. Provide unit with access panels.
- D. Fan for air handlers shall be forward curved with double inlet, mounted on motor shaft, dynamically and statically balanced. Fan motor shall be multi-speed with internal overload protection and be resiliently mounted. Fan-motor shall be removable.

2.2 HEAT PUMP UNITS

- A. Outdoor unit coil shall be of nonferrous construction. Coil shall have aluminum plate fins, mechanically bonded to seamless copper tubes. Coil shall be protected by a grille. Factory-installed coil refrigerant metering device shall be mounted on unit.

- B. Unit shall be furnished with direct-driven, propeller type fans. Condenser fan motors shall have inherent protection. Fan motors shall be permanently lubricated and resiliently mounted. Each fan shall have a safety guard. Controls shall be included for cycling fan(s) for intermediate season operation.
- C. Compressors shall be hermetically designed with internal spring isolators. Compressors shall have both thermal and current sensitive overload device. Compressor shall be equipped with a crankcase heater and have high-pressure protection. Compressor shall have a 5-year non-prorated warranty. Compressor shall be same manufacturer as unit.
- D. Safety devices shall consist of low pressure switches, pressure relief device and compressor overload devices. An automatic defrost control shall be included to accomplish defrosting of outdoor coil. Control wiring terminal board shall be designed to match indoor unit terminal board and accessory thermostat terminals for standardized point-to-point connectors.
- E. Accessories shall include condenser coil guard, outdoor thermostat, supplemental heat relay, liquid line filter-drier, and crankcase heater.
- F. Thermostats shall be furnished under section 25 55 00 Automatic Temperature Controls. Systems shall be furnished with conventional thermostat interface.

PART 3 - EXECUTION (BY INSTALLATION CONTRACTOR)

3.1 AIR HANDLING UNITS

- A. Provide auxiliary drain pan below air handlers located above ceilings with float switch to cut unit off if pan floods. Tie drain line from pan into primary drain line from air handler with a normally closed gate valve in drain line from pan. Drain auxiliary drain from air handler into auxiliary drain pan. (See detail)
- B. Provide flexible duct connectors at all supply and return connections at each air handling unit.
- C. Provide sway cables attached to the building structure and support points of the air handling for seismic protection per the 2012 International Building Code. Sway cables shall have the allowable slack to prevent transmission of vibration through the cables to the building structure.
- D. All units with refrigerant piping exceeding 80 linear feet shall be provided with expansion valves and accumulators. See section 23 21 13 Mechanical Piping.

3.2 See Pipe Penthouse detail on drawings.

3.3 HEAT PUMP UNITS

Mount units on existing equipment curbs. Bolt units to curbs per the seismic requirements of the 2012 International Building Code. Install units per manufacturer's written installation instructions.

3.4 The Ductless Split System Heat Pumps shall be included in the Contractor's one year warranty, see WARRANTY paragraph in section 23 00 00 Mechanical, General.

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3.5 Contractor shall receive the new Ductless Split System Heat Pumps as coordinated with the manufacturer's representative.

END OF SECTION 23 82 19

SPLIT SYSTEM HEAT PUMP SCHEDULE ①																
AIR HANDLING UNIT						HEAT PUMP										
MARK	TRANE MODEL ②	CFM	O.A. CFM	FAN E.S.P.	HP.	AUX. HEAT KW (NET)	VOLT/ PHASE	MARK	TRANE MODEL ②	COOLING ③				HEATING * 11°F ④		VOLT/ PHASE
										TOTAL	SENS.	ENT. AIR	SEER	CAPACITY	COP	
AH-1	4TEC3F60	2,000	450	0.45"	1.0	1153	208/3	HP-1	4TUA3060	56.6	40.1	80/67	13.0	34.4	2.0	208/3
AH-2	4TEC3F60	2,000	435	0.45"	1.0	1153	208/3	HP-2	4TUA3060	56.6	40.1	80/67	13.0	34.4	2.0	208/3
AH-3	4TEC3F48	1,600	205	0.45"	1/2	1153	208/3	HP-3	4TUA3048	46.0	33.1	80/67	13.0	24.8	2.0	208/3
AH-4	4TEC3F60	2,000	445	0.45"	1.0	1153	208/3	HP-4	4TUA3060	56.6	40.1	80/67	13.0	34.4	2.0	208/3
AH-5	4TEC3F48	1,600	250	0.45"	1/2	1153	208/3	HP-5	4TUA3048	46.0	33.1	80/67	13.0	24.8	2.0	208/3
AH-6	DELETED															
AH-7	DELETED															

- AIR HANDLING UNIT AND HEAT PUMP TO MATCH AVAILABLE ELECTRICAL SERVICE, SEE ELECTRICAL. AIR HANDLING UNIT SHALL HAVE ONE POINT OF POWER CONNECTION.
- OR EQUAL BY CARRIER, JCI, OR APPROVED EQUAL.
- BASED ON 95°F CONDENSER AIR TEMPERATURE.
- BASED ON 10°F ENTERING AIR TEMPERATURE.
- PROVIDE UNIT WITH LOW AMBIENT KIT.

DUCTLESS SPLIT SYSTEM HEAT PUMP SCHEDULE ①															
AIR HANDLING UNIT						HEAT PUMP									
MARK	DAIKIN MODEL ②	CFM	H.P.	O.A. CFM	E.S.P.	VOLT/ PHASE	MARK	DAIKIN MODEL ②	COOLING ③				HEATING * 41°F ④		VOLT/ PHASE
									TOTAL	SENS.	ENT. AIR	SEER	CAPACITY	HSPF	
AH-8 ⑤	FCQ24	780	1/6	3.0	N/A	208/1	HP-8	RZQ24	24.0	18.9	80/67	16.8	27.0	9.7	208/1
AH-9 ⑤	FCQ24	780	1/6	3.0	N/A	208/1	HP-9	RZQ24	24.0	18.9	80/67	16.8	27.0	9.7	208/1
AH-10 ⑤	FCQ24	780	1/6	3.0	N/A	208/1	HP-10	RZQ24	24.0	18.9	80/67	16.8	27.0	9.7	208/1
AH-11 ⑤	FBQ36	1,130	1/3	N/A	0.45"	208/1	HP-11	RZQ36	36.0	27.2	80/67	17.5	40.0	9.1	208/1
AH-12 ⑤ ⑥	FCQ30	830	1/6	16.5	N/A	208/1	HP-12	RZQ30	30.0	22.4	80/67	15.8	34.0	9.7	208/1

- AIR HANDLING UNIT AND CONDENSING UNIT TO MATCH AVAILABLE ELECTRICAL SERVICE, SEE ELECTRICAL. AIR HANDLING UNIT SHALL HAVE ONE POINT OF POWER CONNECTION.
- OR EQUAL BY CARRIER, MITSUBISHI, SAMSUNG, PANASONIC, OR APPROVED EQUAL, SEE SPECIFICATIONS.
- BASED ON 95°F CONDENSER AIR TEMPERATURE.
- BASED ON 10°F ENTERING AIR TEMPERATURE.
- PROVIDE WITH WIRED WALL THERMOSTAT (NO REMOTE CONTROL), LOW AMBIENT CONTROL, HARD START KIT, ANTI-SHORT CYCLING PROTECTION, AND FACTORY INSTALLED HIGH CAPACITY CONDENSATE PUMP.
- PROVIDE FRESH AIR KIT

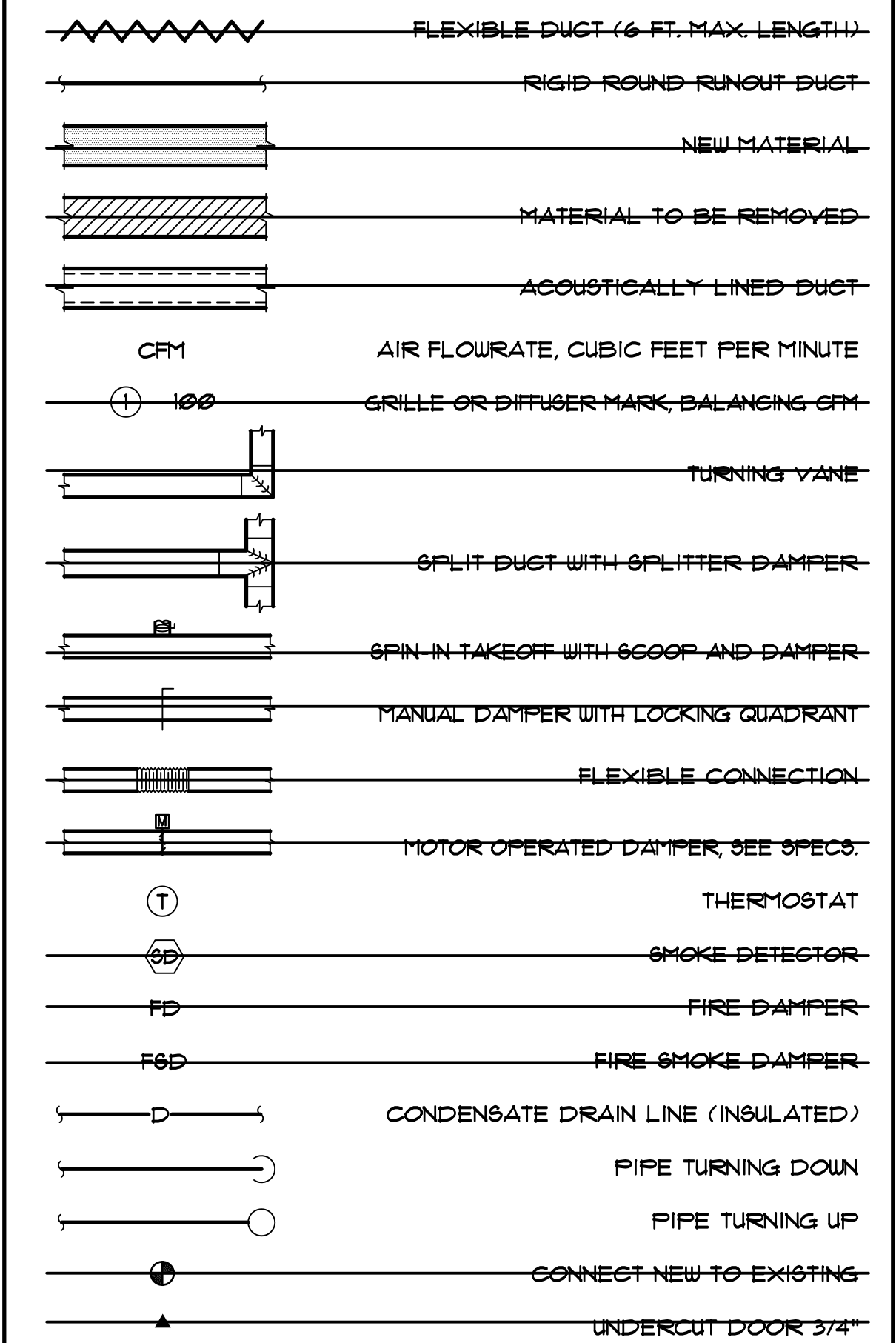
PACKAGED HEAT PUMP SCHEDULE ① ⑥													
MARK	TRANE ②	O.A. CFM	AUX. HEAT KW (NET)	INDOOR FAN			COOLING ③				HEATING * 11°F ④		VOLT/ PHASE
				CFM	E.S.P.	H.P.	TOTAL	SENS.	ENT. AIR	SEER	TOTAL	COP	
RTU-1 ⑤	WSC060	500	13.1	2,000	0.45"	1.0	63.4	47.2	80/67	13.0	34.4	2.3	208/3
RTU-2	WSC036	160	9.0	1,200	0.45"	1.0	38.0	27.3	80/67	13.0	20.6	2.1	208/3
RTU-3	DELETED												
RTU-4	4WCC3042	125	9.0	1,400	0.45"	1/2	40.5	29.1	80/67	13.0	24.9	2.3	208/1
RTU-5	WSC036	120	9.0	1,200	0.45"	1.0	38.0	27.3	80/67	13.0	20.6	2.1	208/3
RTU-6	WSC036	125	9.0	1,200	0.45"	1.0	38.0	27.3	80/67	13.0	20.6	2.1	208/3
RTU-7	DELETED												

- ROOF TOP UNIT TO MATCH AVAILABLE ELECTRICAL SERVICE, SEE ELECTRICAL. UNIT SHALL BE SINGLE POINT POWER CONNECTION.
- OR EQUAL BY CARRIER, DAIKIN, JCI, OR APPROVED EQUAL.
- BASED ON 95°F CONDENSER AIR TEMPERATURE.
- BASED ON 10°F ENTERING AIR TEMPERATURE.
- PROVIDE DYNAMIC AIR CLEANER AIR FILTER WITH CARBON MESH SCREEN, ELECTROSTATIC FILTER PAD TO REMOVE PARTICULATES, GASES, AND ODORS. MERV 13 MINIMUM.
- PROVIDE 12" HIGH SEISMIC CURB, SEISMICALLY ANCHORED TO CONCRETE DECK ON ROOF.

NOTES

- DO NOT SCALE DRAWINGS, ROUGH FROM ARCHITECTURAL, EXISTING CONDITIONS, AND EQUIPMENT MANUFACTURER'S DRAWINGS.
- DIMENSIONS ARE IN INCHES UNLESS OTHERWISE NOTED. DUCT SIZES SHOWN ON DRAWINGS ARE INTERIOR DIMENSIONS.
- WHENEVER THE WORD "PROVIDE" IS USED IT SHALL MEAN FURNISH AND INSTALL COMPLETE AND READY FOR USE.
- PROVIDE GLASSFIBER AND MASTIC ON ALL DUCT INSULATION. SEE SPECIFICATIONS. DUCT TAPE WILL NOT BE ACCEPTED.
- PROVIDE "P" TRAP FOR ALL CONDENSATE DRAINS. PROVIDE INSULATED DRAIN LINES FROM ALL DRAIN CONNECTIONS.
- CONSTRUCT DUCTWORK AS JOB PROGRESSES AND AFTER GOOD COORDINATION WITH ALL CONCERNED TRADES AND EXISTING CONDITIONS.
- BOLT UNIT TO EXISTING ROOF CURB PER THE SEISMIC REQUIREMENTS OF THE 2012 INTERNATIONAL BUILDING CODE. ROUTE REFRIGERANT LINES TO PIPE PENTHOUSE AS INDICATED AND CONNECT TO ASSOCIATED AIR HANDLING UNIT.
- BOLT UNIT TO EQUIPMENT RAILS PER THE SEISMIC REQUIREMENTS OF THE 2012 INTERNATIONAL BUILDING CODE. ROUTE REFRIGERANT LINES TO PIPE PENTHOUSE AS INDICATED AND CONNECT TO ASSOCIATED AIR HANDLING UNIT.
- PROVIDE FULL SIZE CONDENSATE DRAIN LINE. ROUTE TO NEAREST ROOF DRAIN. ELBOW DOWN AT DRAIN.
- PROVIDE FULL SIZE INSULATED CONDENSATE DRAIN LINE. ROUTE AS INDICATED ON PLANS.
- PROVIDE FULL SIZE INSULATED CONDENSATE DRAIN LINE. ROUTE TO NEAREST FLOOR DRAIN. ELBOW DOWN AT DRAIN.
- PROVIDE FULL SIZE INSULATED CONDENSATE DRAIN LINE. ROUTE TO CONDENSATE DRAIN RISER AS SHOWN ON PLANS.
- SEE SPECIFICATIONS FOR FLEXIBLE DUCT REQUIREMENTS.
- WHERE DUCTS PASS OVER RECESSED LIGHTING FIXTURES, MAINTAIN 1" CLEARANCE FROM TOP OF FIXTURE TO BOTTOM OF DUCT.
- INSTALLATION OF EQUIPMENT, DUCTWORK AND PIPING, INCLUDING VIBRATION ISOLATION SHALL COMPLY WITH 2012 INTERNATIONAL BUILDING CODE FOR SEISMIC PROTECTION. SEE SPECIFICATIONS.
- WHERE SPIN IN TAKEOFFS ARE LOCATED ABOVE INACCESSIBLE CEILINGS, OMIT DAMPER.
- THE MINIMUM DISTANCE BETWEEN TAKEOFFS ON THE SAME SIDE OF THE DUCTS SHALL BE FOUR (4) TIMES THE DIAMETER OF THE FIRST TAKEOFF.

SYMBOLS



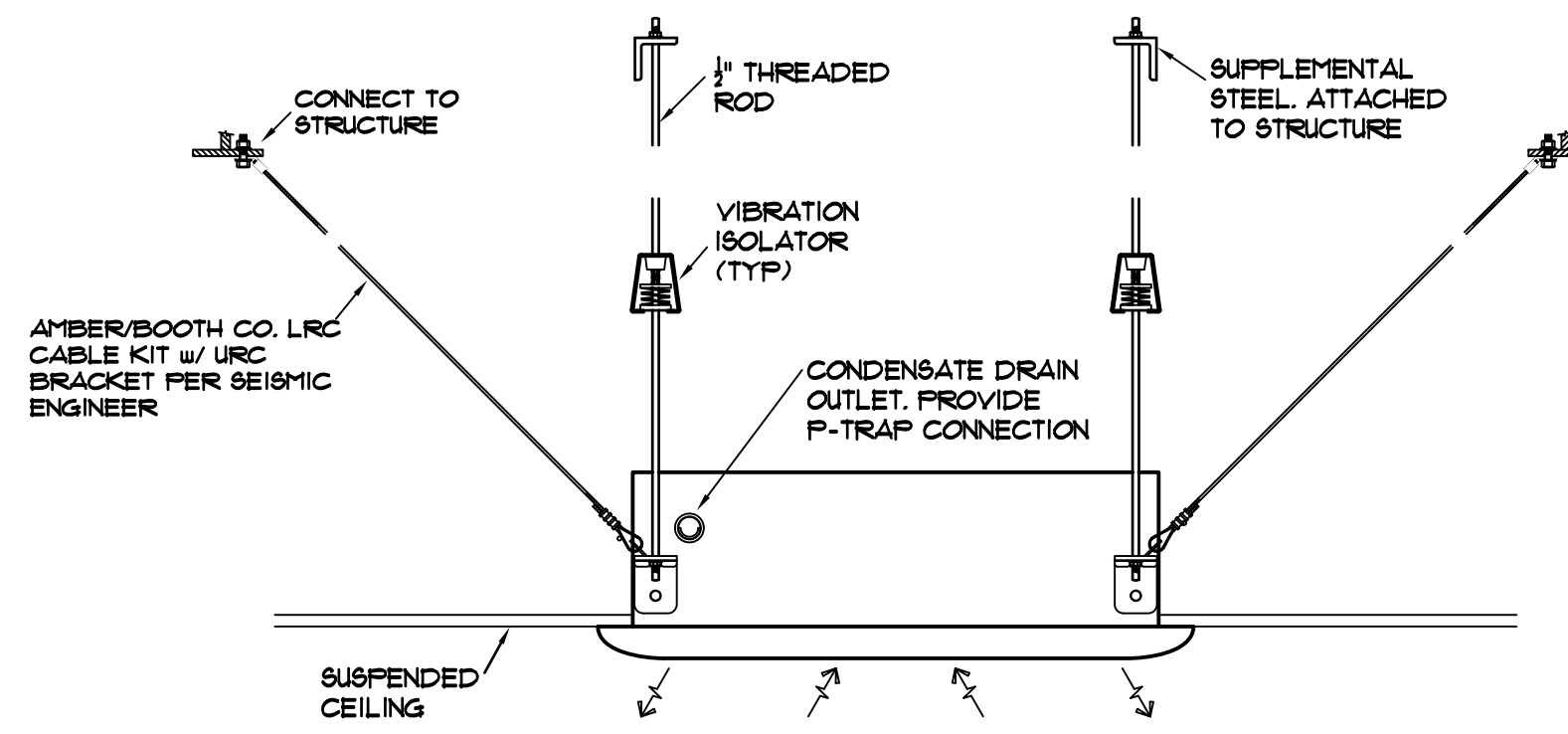
MECHANICAL DESIGN INC.
 4403 Broad River Road
 Columbia, S.C. 29210
 (803) 721-9857 FAX
 CONTACT: D. WILDS
 COMM. NO. 122998
 DATE: 04/04/14

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 MECHANICAL DESIGN, INC.
 No. 000098
 ENGINEER
 No. 27803
 4-4-14

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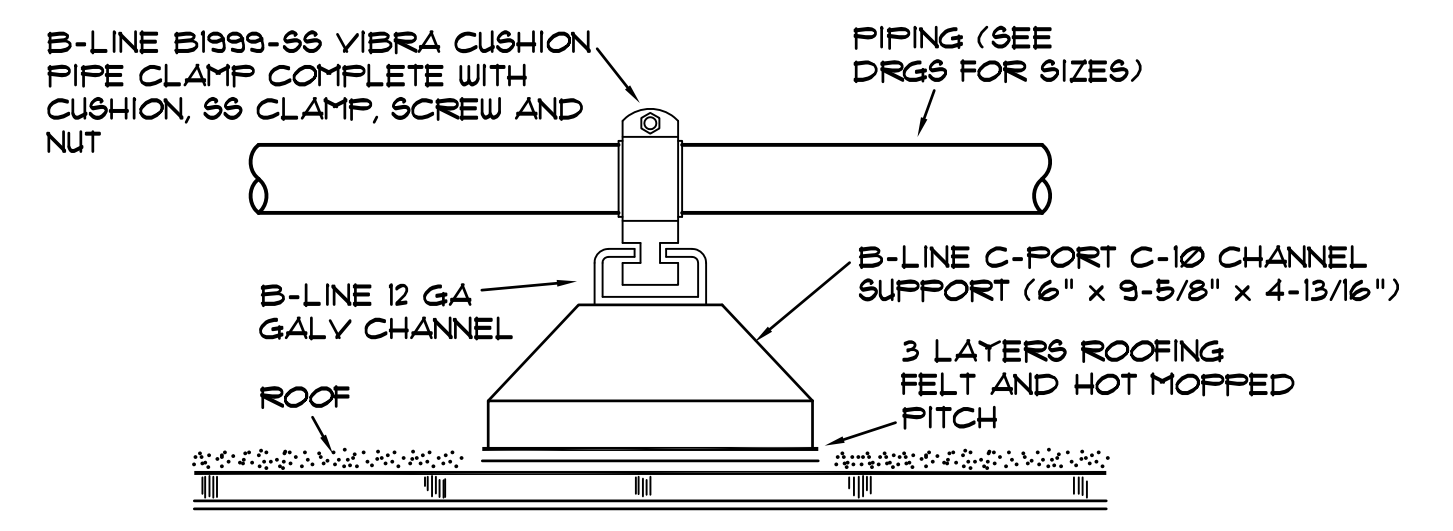
REVISIONS:
 DRAWN BY: JPO
 CHECKED BY: CDW
 COMM NO: 122998
 DATE: 4/04/2014
 SHEET TITLE:

HVAC NOTES, SYMBOLS, AND SCHEDULES
 SHEET NO:
M001

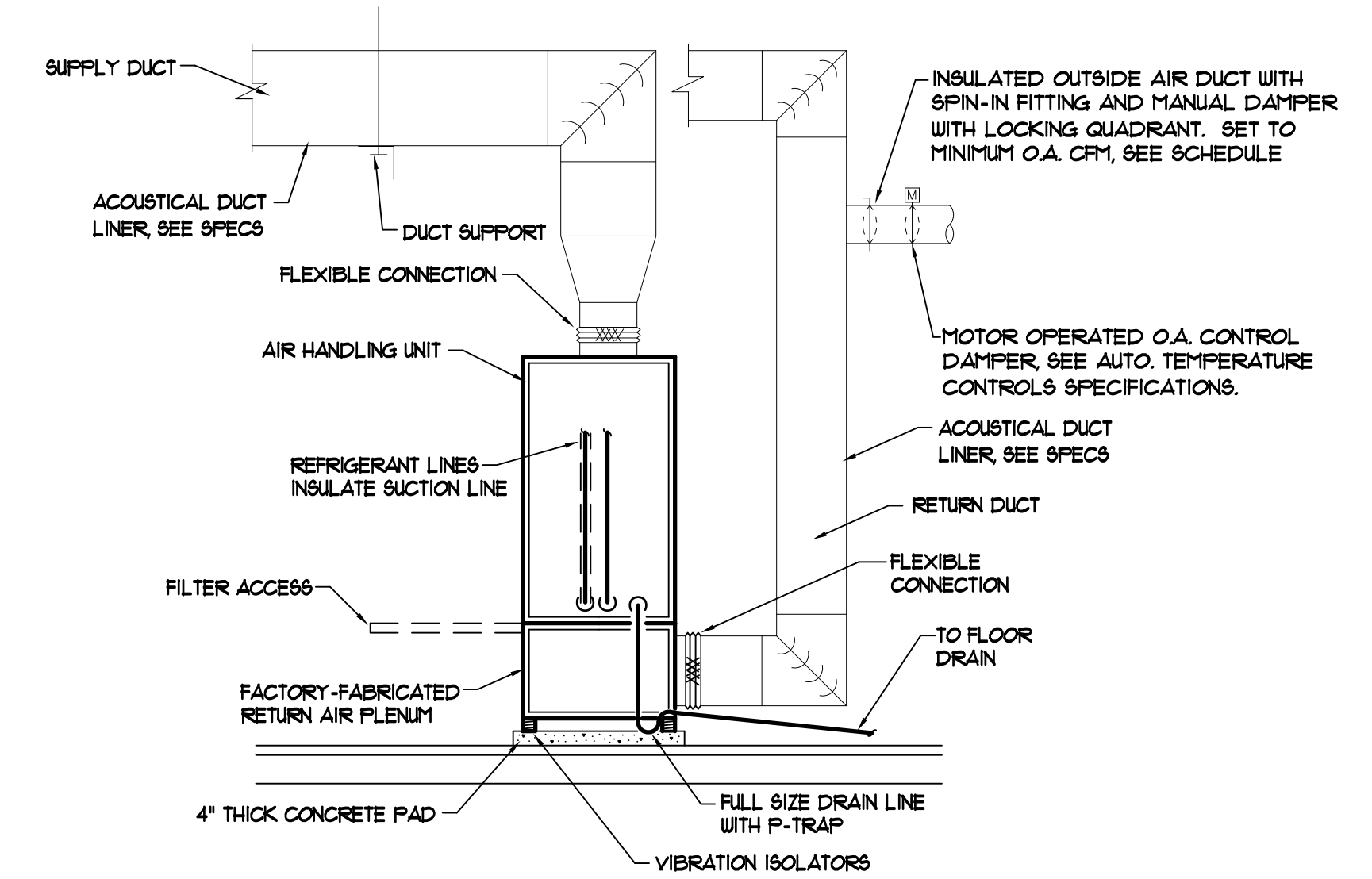


(AH-8, AH-9, AH-10 & AH-12)
CEILING CASSETTE DETAIL
 NOT TO SCALE

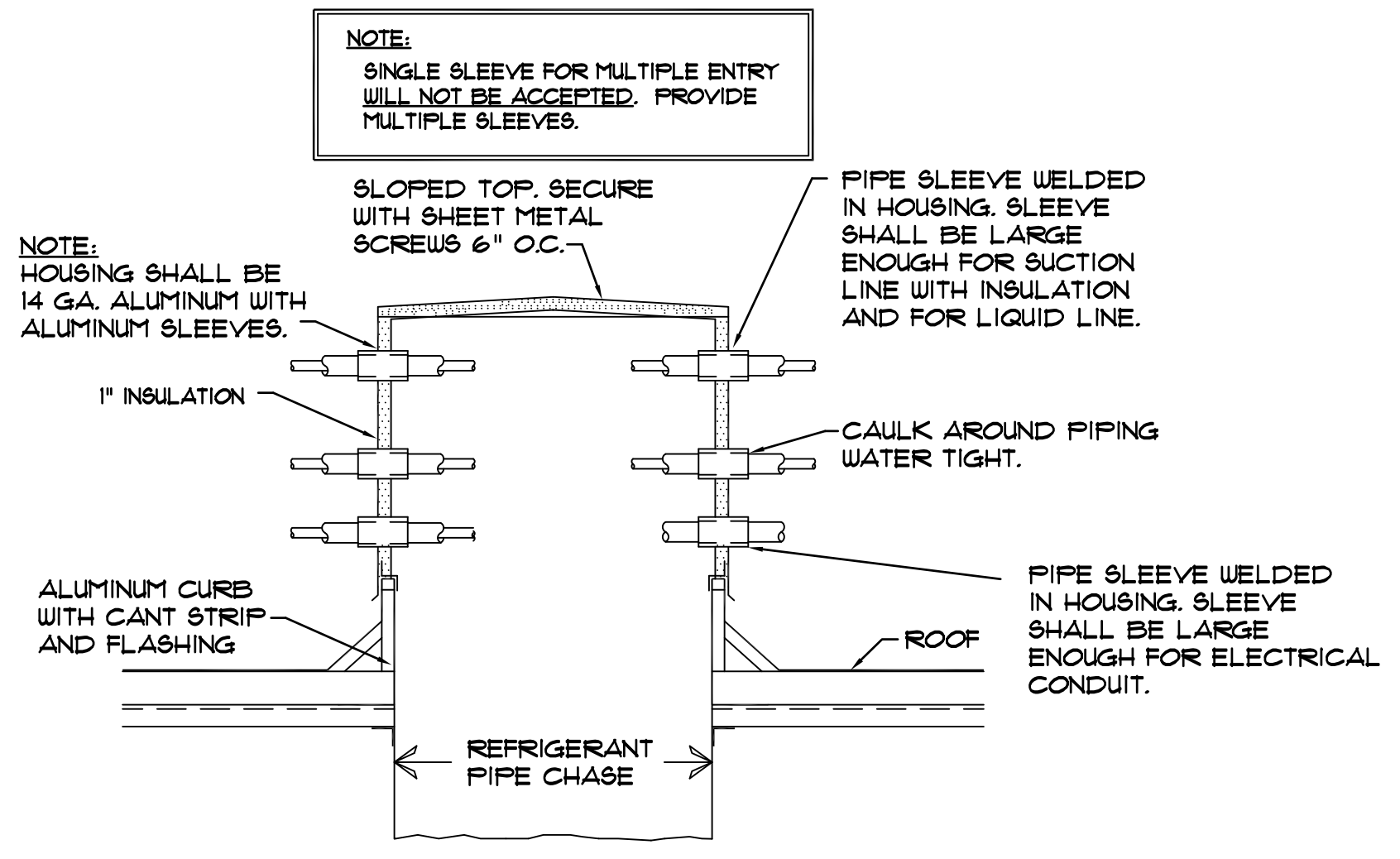
NOTE:
 ALL ROOF WORK SHALL BE DONE BY THE MECHANICAL CONTRACTOR AND ROOF FLASHING DONE BY USC'S ROOFING CONTRACTOR. VENDOR SHALL SET RTU'S ON CURBS, AND CONDENSING UNITS AND HEAT PUMPS ON EQUIPMENT RAILS IN COMPLIANCE WITH THE 2012 IBC SEISMIC REQUIREMENTS.



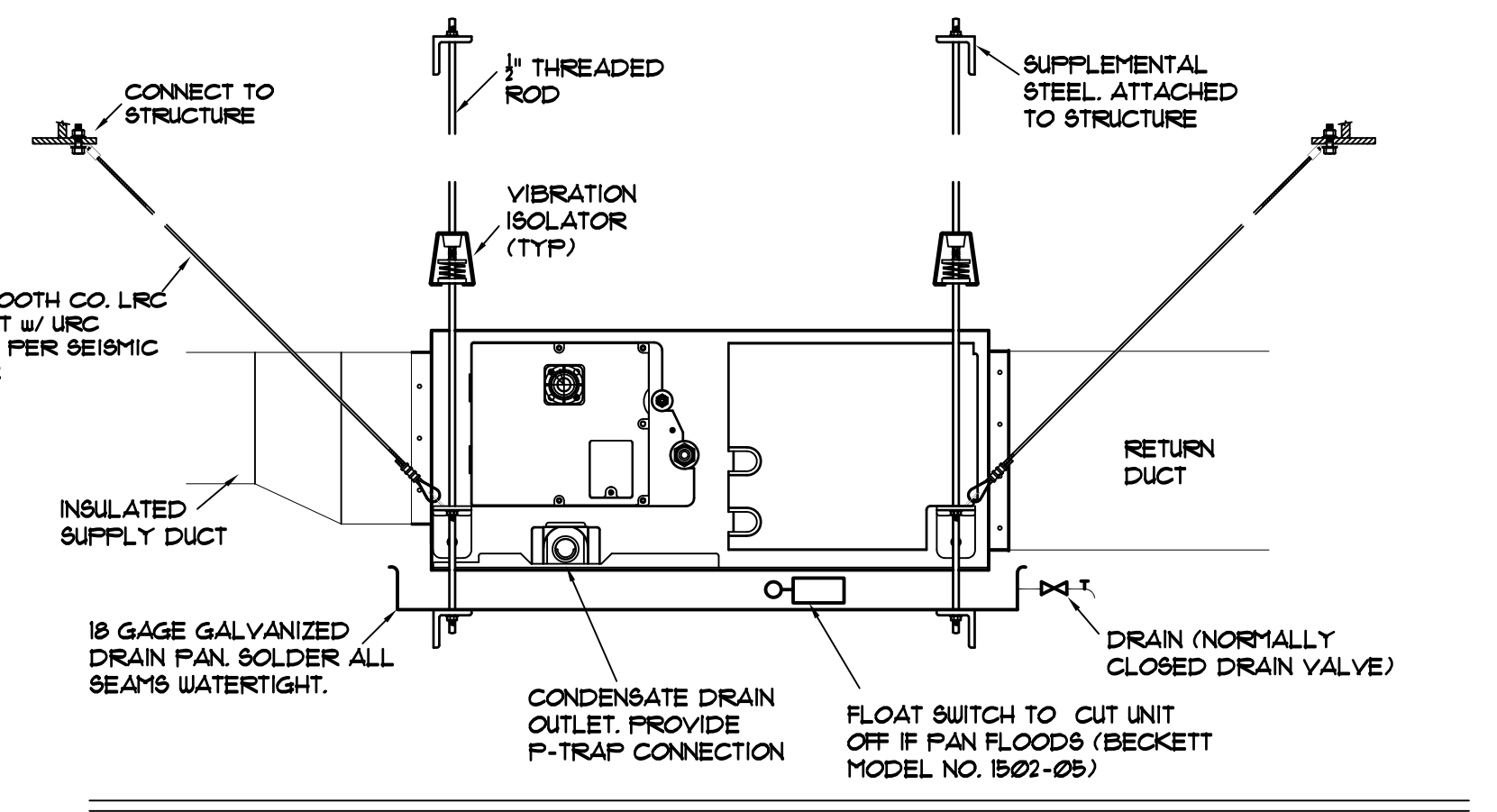
ROOFTOP PIPE SUPPORT DETAIL
 NO SCALE



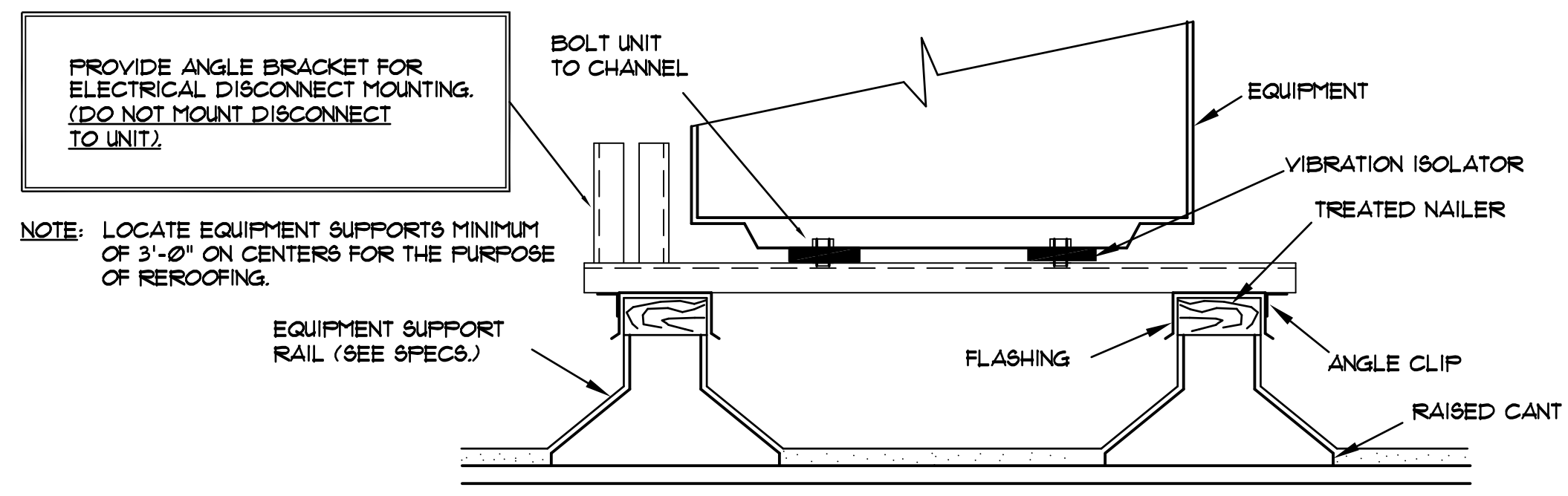
(AH-1 THRU AH-7)
VERTICAL AIR HANDLER DETAIL
 NOT TO SCALE



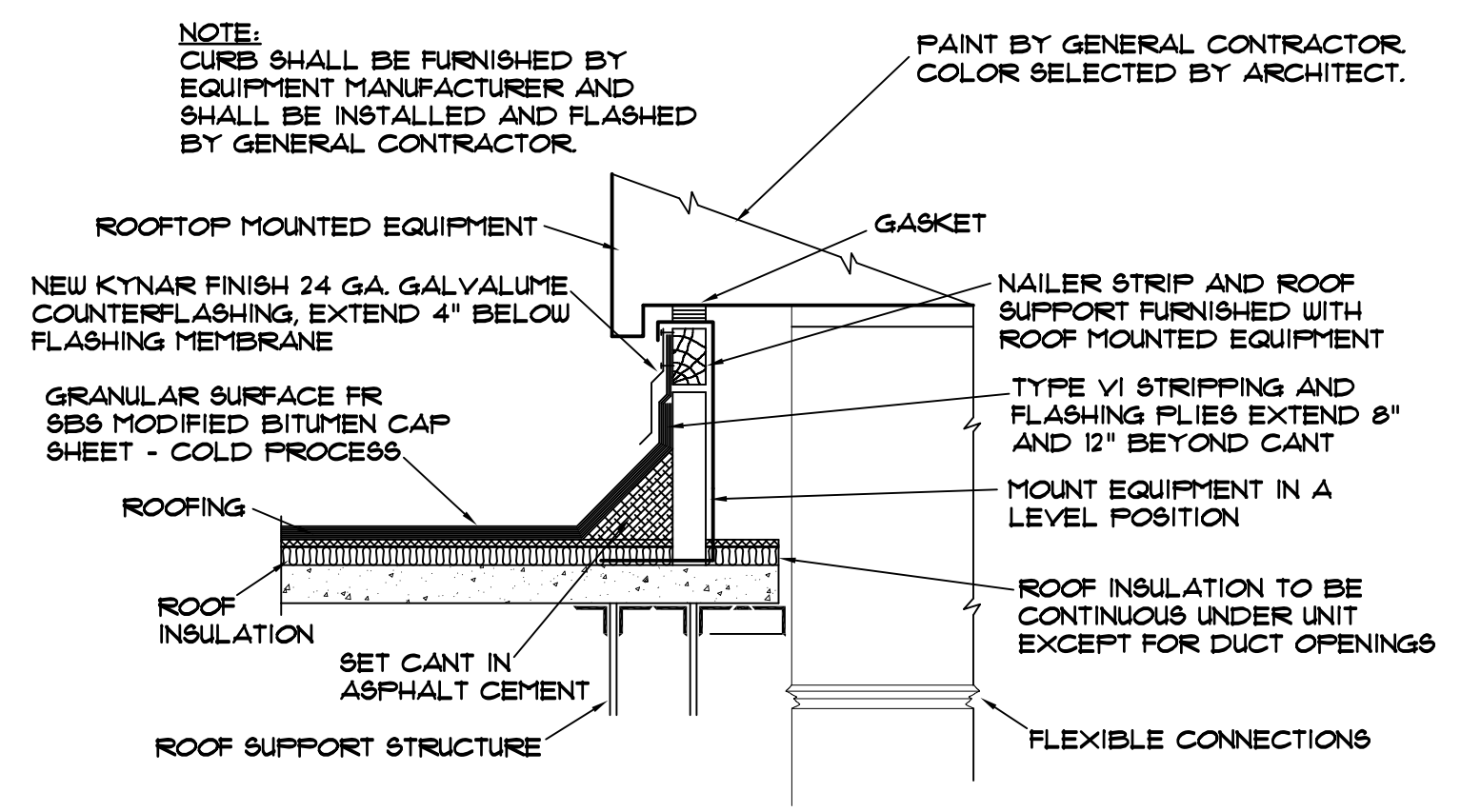
PIPE CHASE PENTHOUSE DETAIL
 NOT TO SCALE



(AH-11)
HORIZONTAL AIR HANDLER DETAIL
 NOT TO SCALE



ROOFTOP EQUIPMENT SUPPORT DETAIL
 NO SCALE



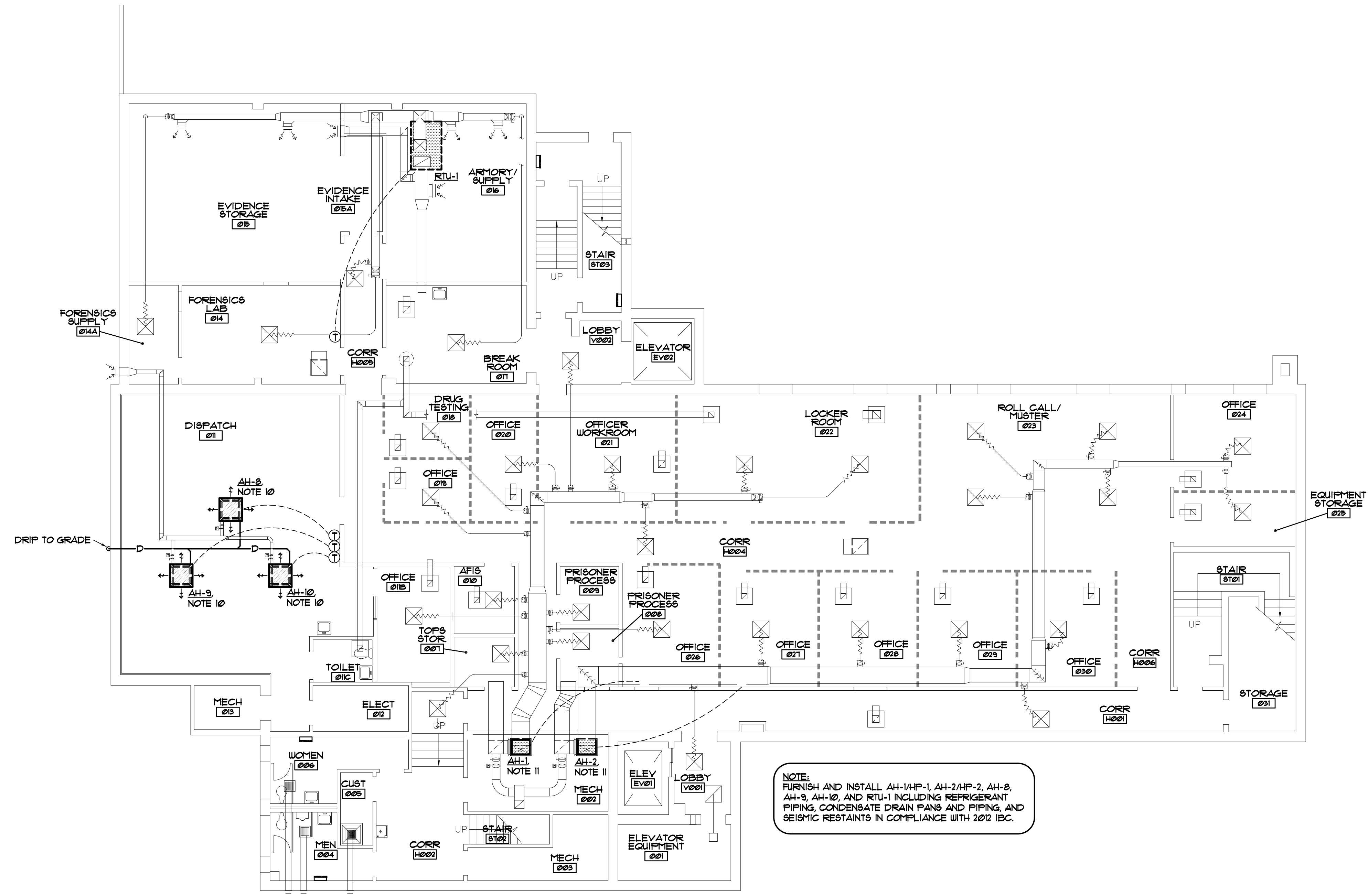
ROOF MOUNTED EQUIPMENT DETAIL
 NOT TO SCALE

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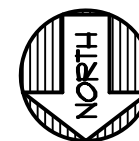
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 SHEET TITLE: HVAC DETAILS
 SHEET NO: M002



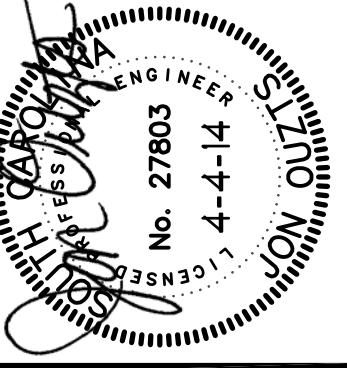
NOTE:
 FURNISH AND INSTALL AH-1/4P-1, AH-2/4P-2, AH-3,
 AH-8, AH-10, AND RTU-1 INCLUDING REFRIGERANT
 PIPING, CONDENSATE DRAIN PANS AND PIPING, AND
 SEISMIC RESTRAINTS IN COMPLIANCE WITH 2012 IBC.



BASEMENT HVAC RENOVATION FLOOR PLAN
 SCALE: 1/8" = 1'-0"

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CHECKED BY: CDW

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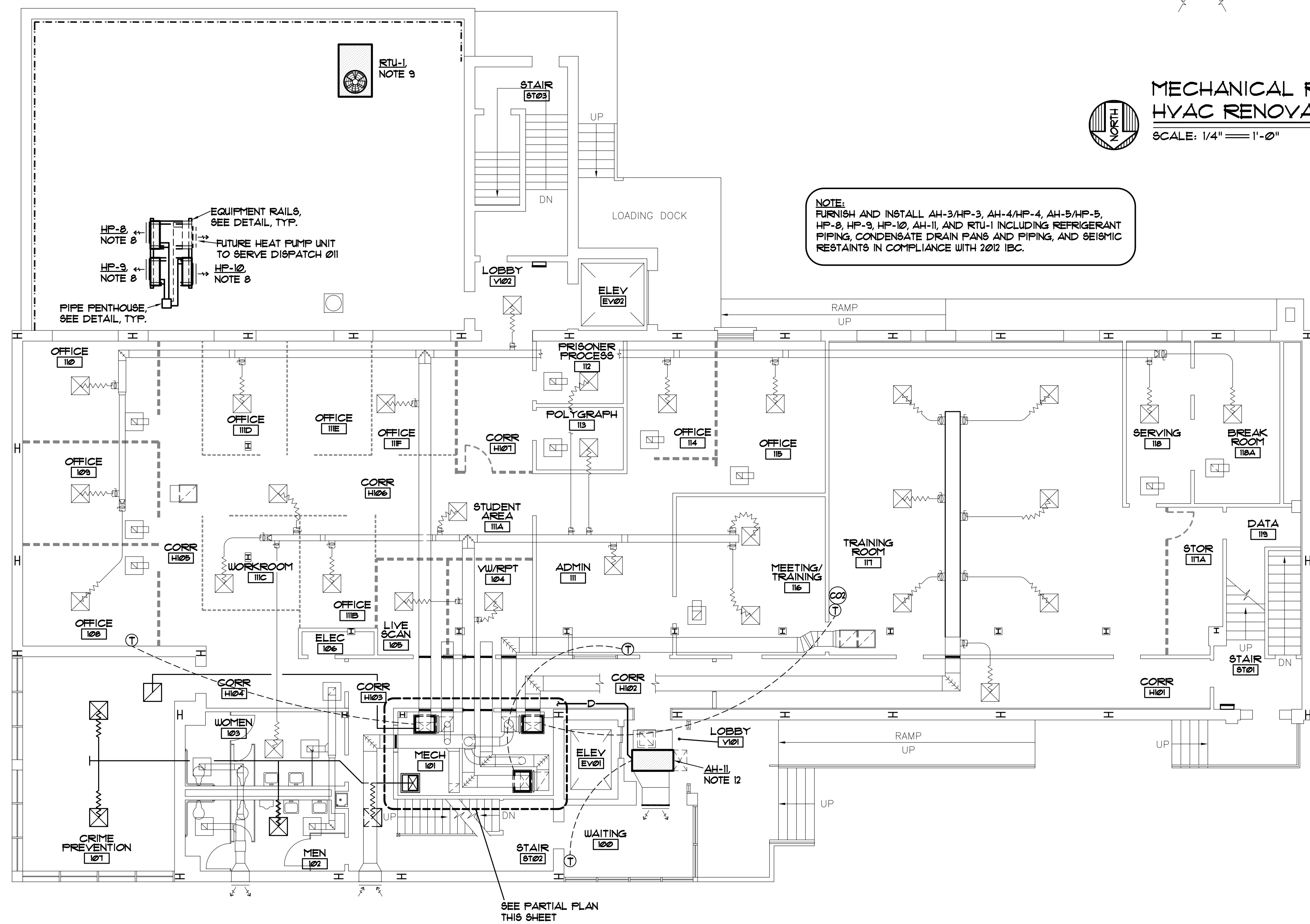
DATE: 4/04/2014

SHEET TITLE:

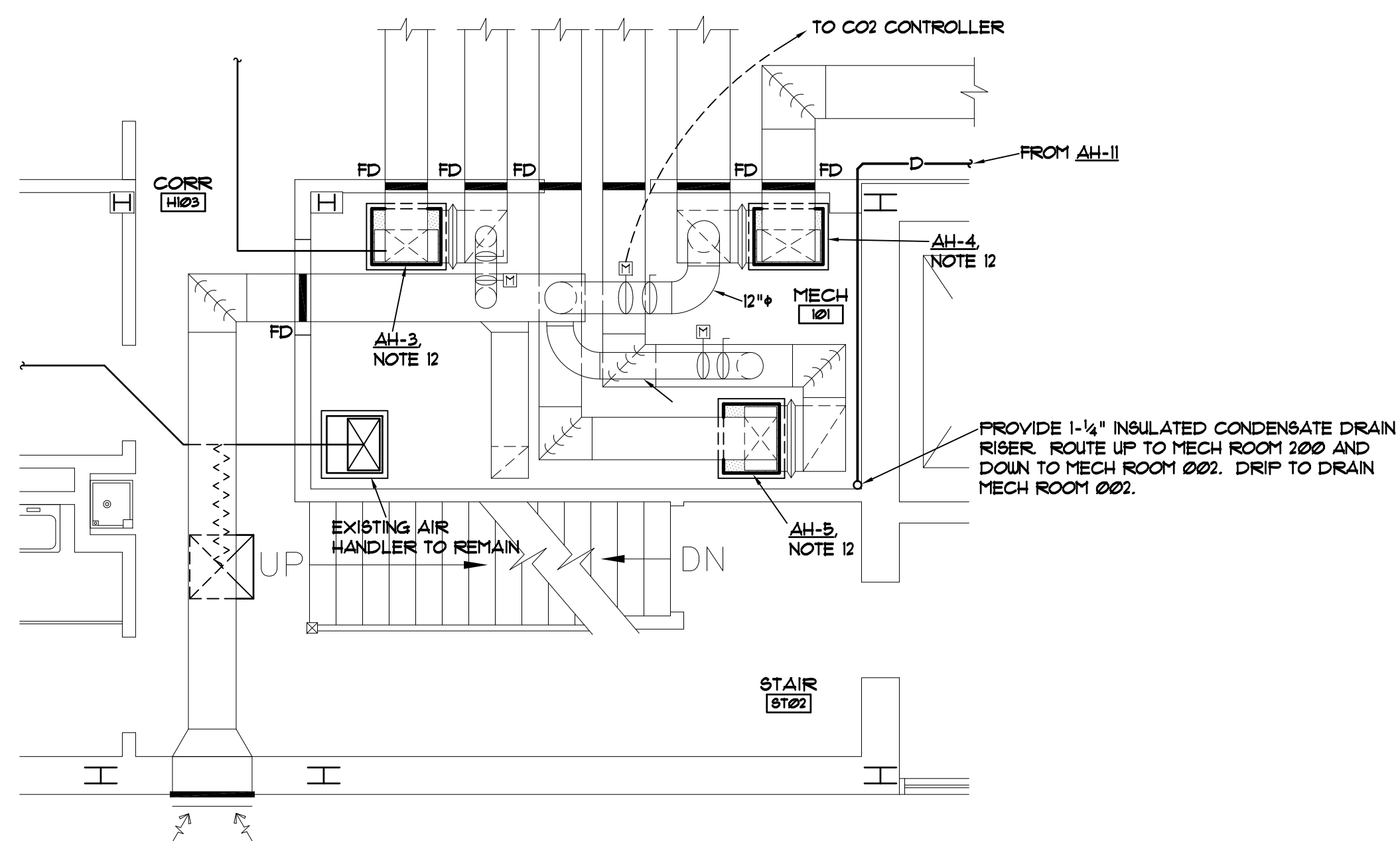
BASEMENT
 HVAC RENOVATION
 FLOOR PLAN

SHEET NO:

M201



FIRST FLOOR HVAC RENOVATION FLOOR PLAN
SCALE: 1/8" = 1'-0"



**MECHANICAL ROOM 101
HVAC RENOVATION PARTIAL FLOOR PLAN**
SCALE: 1/4" = 1'-0"

NOTE:
FURNISH AND INSTALL AH-3/HP-3, AH-4/HP-4, AH-5/HP-5,
HP-8, HP-9, HP-10, AH-1, AND RTU-1 INCLUDING REFRIGERANT
PIPING, CONDENSATE DRAIN PANS AND PIPING, AND SEISMIC
RESTRAINTS IN COMPLIANCE WITH 2012 IBC.

EQUIPMENT RAILS,
SEE DETAIL, TYP.
FUTURE HEAT PUMP UNIT
TO SERVE DISPATCH 011
HP-8
NOTE 8
HP-9
NOTE 8
HP-10
NOTE 8

PIPE PENHOUSE
SEE DETAIL, TYP.

PROVIDE 1-1/4" INSULATED CONDENSATE DRAIN
RISER. ROUTE UP TO MECH ROOM 200 AND
DOWN TO MECH ROOM 002. DRIP TO DRAIN
MECH ROOM 002.

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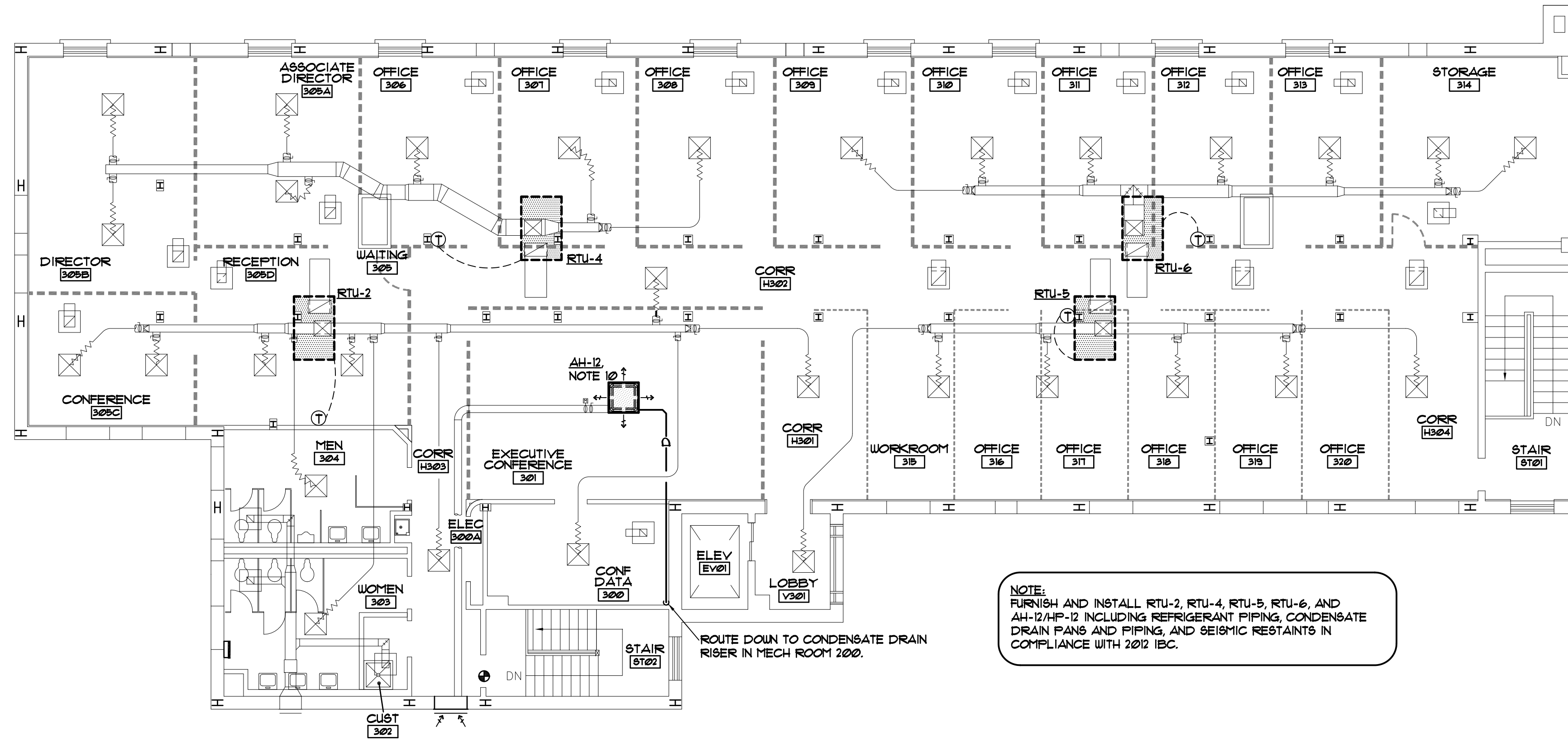
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REGISTERED PROFESSIONAL ENGINEER
No. 27803
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STATE OF SOUTH CAROLINA

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COLUMBIA, SOUTH CAROLINA

REVISIONS:

DRAWN BY:	JPO
CHECKED BY:	CDW
COMM NO:	122998
DATE:	4/04/2014
SHEET TITLE:	1ST FLOOR HVAC RENOVATION FLOOR PLAN

SHEET NO:
M202



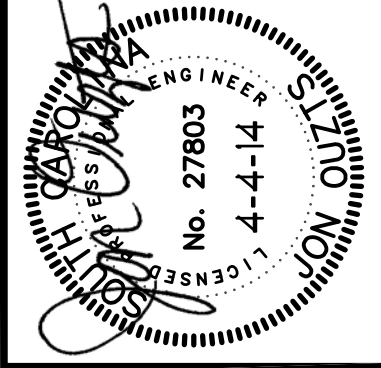
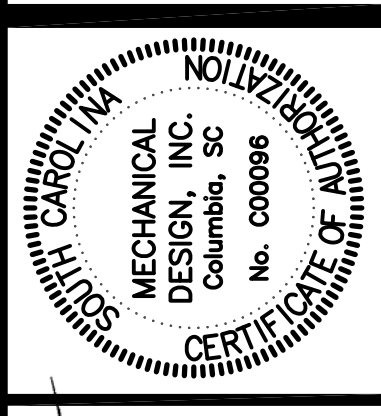
NOTE:
 FURNISH AND INSTALL RTU-2, RTU-4, RTU-5, RTU-6, AND
 AH-12/HP-12 INCLUDING REFRIGERANT PIPING, CONDENSATE
 DRAIN PANS AND PIPING, AND SEISMIC RESTRAINTS IN
 COMPLIANCE WITH 2012 IBC.

NOTE:
 EXISTING AH-6/HP-6 AND AH-7/HP-7 SERVING 2ND FLOOR
 SHALL REMAIN. SEE SCHEDULES ON SHEET M201.

THIRD FLOOR HVAC RENOVATION FLOOR PLAN
 SCALE: 1/8" = 1'-0"

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MECHANICAL DESIGN INC.
 4403 Broad River Road
 Columbia, S.C. 29210
 (803) 721-9837 FAX
 CONTACT: D. WILDS
 COMM. NO. 122998
 DATE: 04/04/14

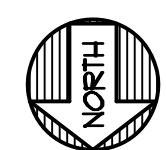
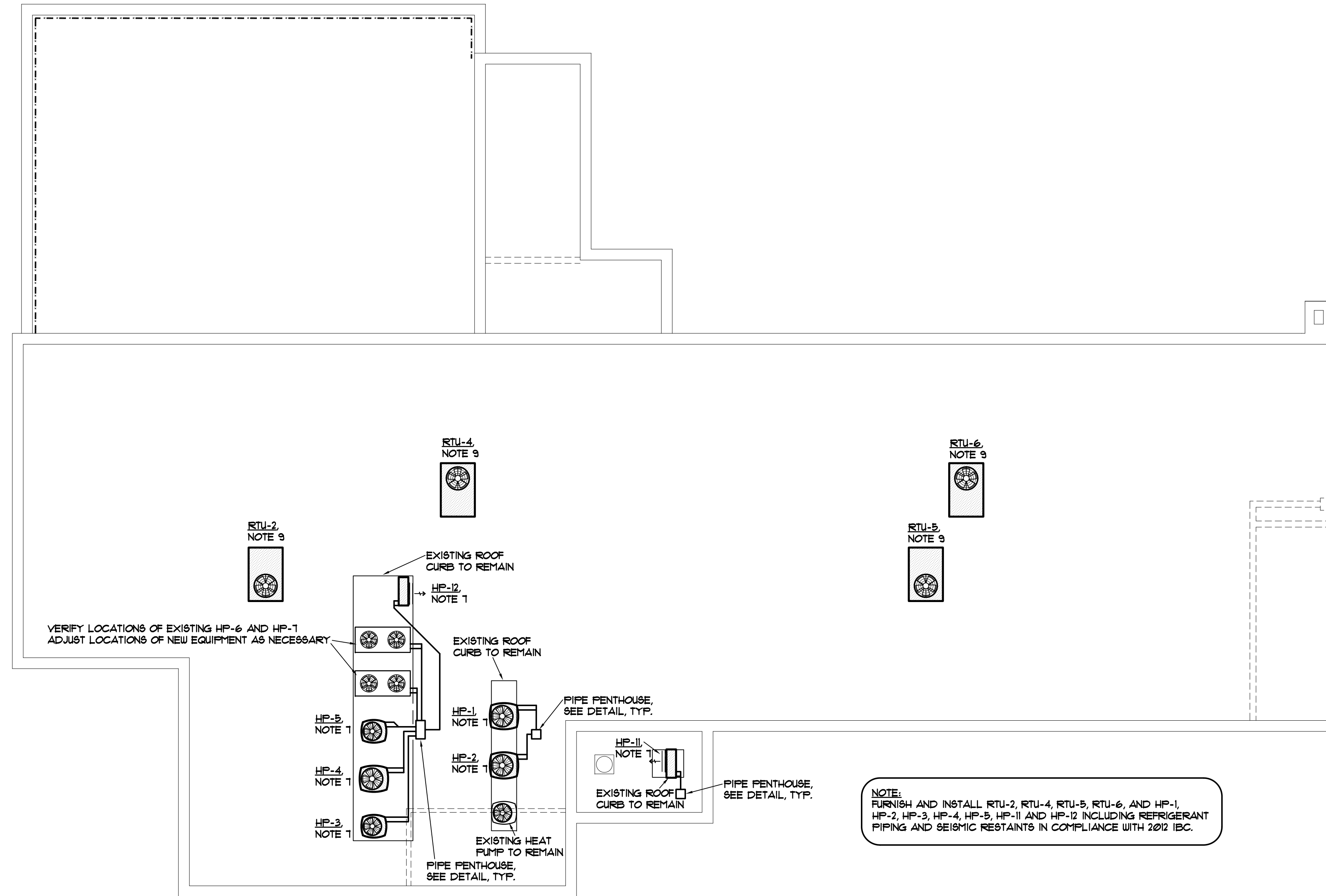


1600 HAMPTON ANNEX - DEFERRED MAINTENANCE
 UNIVERSITY OF SOUTH CAROLINA
 COLUMBIA, SOUTH CAROLINA

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SHEET TITLE:	

2ND & 3RD FLOOR
 HVAC RENOVATION
 FLOOR PLANS

SHEET NO:
M203

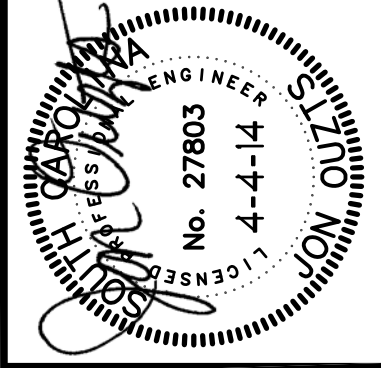
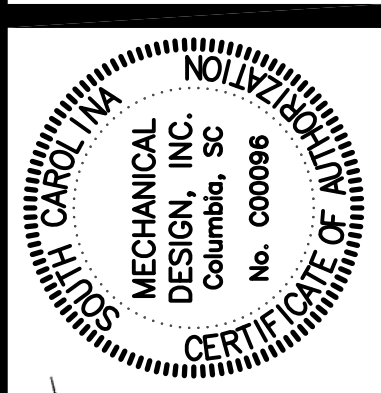


ROOF HVAC RENOVATION FLOOR PLAN

SCALE: 1/8" = 1'-0"

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CHECKED BY: CDW

COMM NO: 122998

DATE: 4/04/2014

SHEET TITLE:

ROOF HVAC RENOVATION FLOOR PLAN

SHEET NO:

M204