

MECHANICAL LEGEND (not all may apply)

GENERAL ABBREVIATIONS

| | | | | | | | |
|--------|----------------------------|-------|---|------|--------------------------------|-------|--------------------------------|
| AAV | AUTOMATIC AIR DAMPER | DET | DETAIL | HX | HEAT EXCHANGER | REQD | REQUIRED |
| AAV | AUTOMATIC AIR VENT | DIA | DIAMETER | IA | INSTRUMENT AIR | REV | REVISED |
| AB | AIR BLENDER | DN | DOWN | IE | INVERT ELEVATION | RG | RETURN GRILLE |
| AC* | AIR CONDITIONING UNIT | DPR | DAMPER | IN | RELATIVE HUMIDITY/ROOF | RH | RELIEF VENT |
| ACC | AIR COOLED CONDENSER | DPT | DEW POINT TEMPERATURE | INV | INVERT | RV | RELIEF VENT |
| ACCU | AIR COOLED CONDENSING UNIT | DR | DRAIN | KEC | KITCHEN EQUIPMENT CONTRACTOR | RPM | ROOM |
| AD | ACCESS DOOR | DTS | DUAL TEMPERATURE SUPPLY | KH | KITCHEN HOOD | RPM | REVOLUTIONS PER MINUTE |
| ADL | ADJUSTABLE | DTR | DUAL TEMPERATURE RETURN | KV | KITCHEN VENT | RR | RETURN REGISTER |
| ADJ | ADJUSTABLE | DWG | DRAWING | LAT | LEAVING AIR TEMPERATURE | SA | SUPPLY AIR |
| AF | AFTER FILTER | EA | EACH / EXHAUST AIR | LB | POUND | SCHED | SCHEDULE |
| AFF | ABOVE FINISHED FLOOR | EAH | EXHAUST AIR HOOD | LD | LINEAR DIFFUSER | SHWP | SECONDARY CHILLED WATER PUMP |
| ALT | ALTERNATE | EAL | EXHAUST AIR LOUVER | LWT | LEAVING WATER TEMPERATURE | SD | SUCTION DIFFUSER |
| ALUM | ALUMINUM | EAT | ENTERING AIR TEMPERATURE | MATL | MATERIAL | SECT | SECTION |
| AP | ACCESS PANEL | EC | ELECTRICAL CONTRACTOR | MAV | MANUAL AIR VENT | SG | SUPPLY GRILLE |
| APPROX | APPROXIMATE | EF | EXHAUST FAN | MAX | MAXIMUM | SHWP | SECONDARY HOT WATER PUMP |
| ARCH | ARCHITECTURAL | EG | EXHAUST GRILLE | MBH | BTU'S PER HOUR, THOUSAND | SHT | SHEET |
| AUTO | AUTOMATIC | ELEV | ELEVATION | MC | MECHANICAL CONTRACTOR | SL | SOUND LINING |
| AVG | AVERAGE | ELEC | ELECTRICELECTRICAL | MCW | MECHANICAL CITY WATER | SM | SURFACE MOUNT |
| BAS | BUILDING AUTOMATION SYSTEM | EQ | EQUAL | MECH | MECHANICAL | SPEC | SPECIFICATIONS |
| BBD | BALANCED BACKDRAFT DAMPER | EQUIP | EQUIPMENT | MFG | MANUFACTURER | SPT | STATIC PRESSURE TRANSMITTER |
| BE | BOTTOM ELEVATION | EQUIV | EQUIVALENT | MIN | MINIMUM | SQ FT | SQUARE FOOT (FEET) |
| BF | BUTTERFLY | ER | EXHAUST REGISTER | MISC | MISCELLANEOUS | SQ IN | SQUARE INCHES |
| BPF | BACKFLOW PREVENTER | ESP | EXTERNAL STATIC PRESSURE | MSW | MECHANICAL SOFT WATER | SR | SUPPLY REGISTER |
| BLDG | BUILDING | ET | EXPANSION TANK | NA | NOT APPLICABLE | SS | STAINLESS STEEL |
| BLR | BOILER | EUH | ELECTRIC UNIT HEATER | NC | NORMALLY CLOSED/NOISE CRITERIA | STD | STANDARD |
| BOD | BOTTOM OF DUCT | EW | ELECTRIC WATER HEATER | NG | NATURAL GAS | STL | STEEL |
| BOP | BOTTOM OF PIPE | EW | ENTERING WATER TEMPERATURE | NO | NOT IN CONTRACT | STRUC | STRUCTURAL |
| BOT | BOTTOM | EXCL | EXCLUDING | NO | NORMALLY OPEN | TCC | TEMPERATURE CONTROL CONTRACTOR |
| BP | BOOSTER PUMP | EXIST | EXISTING | NOM | NOMINAL | TE | TEMPERATURE CONTROL VALVE |
| BTU | BRITISH THERMAL UNIT | EXP | EXPANSION | NTS | NOT TO SCALE | TCV | TEMPERATURE CONTROL VALVE |
| BTUH | BTU PER HOUR | FAH | FAHRENHEIT | CA | CENTER | TI | TEMPERATURE INDICATOR |
| BV | BALL VALVE | FD | FLAT DRAIN | OAH | OUTSIDE AIR HOOD | TMV | THERMOSTATIC MIXING VALVE |
| CA | COMPRESSED AIR | FF | FINISHED FLOOR | OAL | OUTSIDE AIR LOUVER | TSP | TOTAL STATIC PRESSURE |
| CAF | COMBUSTION AIR FAN | FI | FIRE HYDRANT | OC | OCCUPANCY SENSOR | TSTAT | THERMOSTAT |
| CCW | COUNTER CLOCKWISE | FL | FLOOR | OPC | OPENING | TYP | TYPICAL |
| CD | CEILING DIFFUSER | FOB | FUEL OIL BOTTOM | OSY | OUTSIDE SCREW AND YOKE | TV | THERMAL EXPANSION VALVE |
| CFM | CUBIC FEET PER MINUTE | FOR | FUEL OIL RETURN | PC | PLUMBING CONTRACTOR | U | UNDERGROUND |
| CHV | CHECK VALVE | FOS | FUEL OIL SUPPLY | PCWP | PRIMARY CHILLED WATER PUMP | UN | UNIT |
| CH | CHILLER | FOT | FLAT ON TOP | PERM | PERIMETER | UNO | UNLESS OTHERWISE NOTED |
| CHWP | CHILLED WATER PUMP | FPC | FIRE PROTECTION CONTRACTOR | PF | PRE FILTER | VAC | VACUUM |
| CHWR | CHILLED WATER RETURN | FS | FLOOR FINISH | PH | PHASE | VA | VALVE |
| CHWS | CHILLED WATER SUPPLY | FFAV | FAN POWERED VAV | PI | PRIMARY HOT WATER PUMP | VAV | VARIABLE AIR VOLUME |
| CI | CAST IRON | FS | FLOOR SINK | PLB | PLUMBING | VLD | VOLUME DAMPER |
| COL | COLUMN | GA | GAUGE | PI | PRIMARY HOT WATER PUMP | VERT | VERTICAL |
| CONN | CONNECTION | GALV | GALVANIZED | PI | PRESSURE INDICATOR | VFD | VARIABLE FREQUENCY DRIVE |
| COOL | COOLING TOWER | GC | GENERAL CONTRACTOR | PLG | PLUMBING | VOL | VOLUME |
| CJ | CONDENSING UNIT | GPH | GALLONS PER HOUR | PI | PRESSURE | W | WITH |
| CU | CABINET UNIT HEATER | GPM | GALLONS PER MINUTE | PRV | PRESSURE REDUCING VALVE | WO | WITHOUT |
| CU FT | CUBIC FEET | HC | HEAT EXCHANGER | PS | PRESSURE SWITCH | WB | WET BULB TEMPERATURE |
| CU IN | CUBIC INCH | HCRIZ | HORIZONTAL | PSD | PLENUM SLOT DIFFUSER | WG | WATER GAUGE |
| CW | CLOCKWISE | HR | HOUR | PSI | POUND PER SQUARE INCH | WP | WEATHER PROOF |
| CWP | CONDENSING WATER PUMP | HRT | HEAT TRACE | PSIA | POUND PER SQUARE INCH ABSOLUTE | XP | EXPLOSION PROOF |
| CWS | CONDENSING WATER SUPPLY | HVAC | HEATING, VENTILATING AND AIR CONDITIONING | PSIG | POUND PER SQUARE INCH GAUGE | | |
| CWR | CONDENSING WATER RETURN | HWP | HOT WATER PUMP | PVC | POLYVINYL CHLORIDE | | |
| DB | DRY BULB TEMPERATURE | HWR | HOT WATER RETURN | RCP | RECIRCULATION PUMP | | |
| DDC | DIRECT DIGITAL CONTROL | HWS | HOT WATER SUPPLY | REF | REFERENCE | | |

MECHANICAL SYMBOLS

| | | | | | |
|--|--|--|--|--|---|
| | BALANCING VALVE | | PRESSURE TEMPERATURE TEST STATION (PTTS) | | FLEXIBLE CONNECTION |
| | M-MANUAL CALIBRATED CIRCUIT SENSOR (VENTURI) | | THERMOMETER | | POINT OF CONNECTION / EXTENT OF REMOVAL |
| | GATE VALVE | | MANUAL AIR VENT (A=AUTOMATIC) | | DUCT SMOKE DETECTOR |
| | BUTTERFLY VALVE | | WATER FLOW TRANSMITTER | | STATIC PRESSURE TRANSMITTER |
| | GLOBE VALVE | | SUPPLY DIFFUSER | | SQUARE ELBOW WITH TURNING VAINS |
| | BALL VALVE | | RETURN DIFFUSER | | SUPPLY AIR (ROUND DUCT) |
| | CHECK VALVE | | EXHAUST DIFFUSER | | SUPPLY AIR (RECTANGULAR DUCT) |
| | GAS COOK | | PLENUM SLOT DIFFUSER | | R-RETURN, E-EXHAUST, Oa=OUTSIDE AIR |
| | TEMPERATURE REGULATING VALVE | | DUCT TAP LEFT | | R-RETURN, E-EXHAUST, Oa=OUTSIDE AIR |
| | PRESSURE RELIEF VALVE | | DUCT TAP RIGHT | | R-RETURN, E-EXHAUST, Oa=OUTSIDE AIR |
| | RELIEF VALVE | | AIR FLOW DIRECTION | | R-RETURN, E-EXHAUST, Oa=OUTSIDE AIR |
| | STRAINER | | OPPOSED BLADE DAMPER | | R-RETURN, E-EXHAUST, Oa=OUTSIDE AIR |
| | 3-WAY VALVE | | PARALLEL BLADE DAMPER | | R-RETURN, E-EXHAUST, Oa=OUTSIDE AIR |
| | VALVE AND END CAP | | FIRE DAMPER (HORIZONTAL OR VERTICAL) | | R-RETURN, E-EXHAUST, Oa=OUTSIDE AIR |
| | UNION | | SMOKE DAMPER (HORIZONTAL OR VERTICAL) | | R-RETURN, E-EXHAUST, Oa=OUTSIDE AIR |
| | FLANGED CONNECTION | | COMBINATION SMOKE FIRE DAMPER | | R-RETURN, E-EXHAUST, Oa=OUTSIDE AIR |
| | REDUCER | | BALANCED BACKDRAFT DAMPER | | R-RETURN, E-EXHAUST, Oa=OUTSIDE AIR |
| | ELBOW UP | | AUTOMATIC AIR DAMPER | | R-RETURN, E-EXHAUST, Oa=OUTSIDE AIR |
| | PIPE TEE DOWN | | MANUAL DAMPER | | R-RETURN, E-EXHAUST, Oa=OUTSIDE AIR |
| | ELBOW DOWN | | TEMPERATURE TRANSMITTER | | R-RETURN, E-EXHAUST, Oa=OUTSIDE AIR |
| | THERMOSTAT OR TEMPERATURE SENSOR | | INSERTION TYPE FLOW METER | | R-RETURN, E-EXHAUST, Oa=OUTSIDE AIR |
| | HUMIDITY TRANSMITTER | | STRAP-ON TYPE FLOW METER | | R-RETURN, E-EXHAUST, Oa=OUTSIDE AIR |
| | CARBON MONOXIDE SENSOR | | | | R-RETURN, E-EXHAUST, Oa=OUTSIDE AIR |
| | CARBON DIOXIDE SENSOR | | | | R-RETURN, E-EXHAUST, Oa=OUTSIDE AIR |

CONTROL SYMBOL LEGEND

| | | | |
|--|---------------------------------------|--|----------------------------------|
| | AI ANALOG INPUT SIGNAL | | TT TEMPERATURE TRANSMITTER |
| | AO ANALOG OUTPUT SIGNAL | | T ROOM TEMPERATURE SENSOR |
| | DI DIGITAL INPUT SIGNAL | | H RELATIVE HUMIDITY SENSOR |
| | DO DIGITAL OUTPUT SIGNAL | | S CARBON DIOXIDE SENSOR |
| | ES END SWITCH | | DPS DIFFERENTIAL PRESSURE SWITCH |
| | DPT DIFFERENTIAL PRESSURE TRANSMITTER | | HT HUMIDITY TRANSMITTER |
| | SPT STATIC PRESSURE TRANSMITTER | | SD DUCT MOUNTED SMOKE DETECTOR |
| | LTS LOW TEMPERATURE SWITCH | | CTS CURRENT TRANSFORMER SWITCH |
| | AFT AIR FLOW TRANSMITTER | | |
| | ES END SWITCH | | |
| | NO NORMALLY OPEN | | |

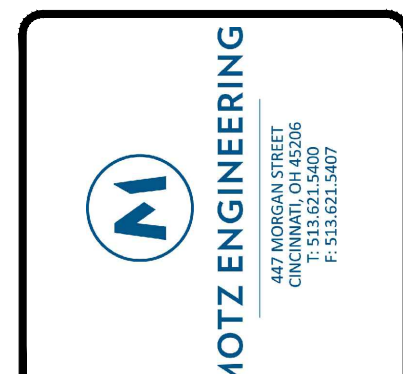
GENERAL NOTES (DEMOLITION):

- UNLESS OTHERWISE NOTED, ALL DUCTWORK AND PIPING SHOWN DASHED AND DARK IS TO BE REMOVED.
- CONTRACTOR TO COORDINATE DEMOLITION WITH OTHER TRADES BEFORE BEGINNING WORK.
- REFER TO THIS SHEET FOR GENERAL NOTES AND ABBREVIATIONS.
- CONTRACTOR SHALL TAKE OVERALL CFM MEASUREMENTS ON ALL EXISTING TO REMAIN EQUIPMENT PRIOR TO COMMENCING ANY DEMOLITION WORK. INFORMATION GATHERED SHALL BE UTILIZED FOR RE-BALANCING SYSTEM. CONTRACTOR SHALL RE-BALANCE ALL SYSTEMS AT THE CONCLUSION OF THE PROJECT.
- THIS CONTRACTOR SHALL PATCH AND REPAIR ALL HOLES, DAMAGE OR MODIFICATIONS LEFT BY REMOVAL OF DUCTWORK AND REPAIR WALLS, FLOORS, CEILINGS, ETC. TO MATCH EXISTING. ALL PATCHING AND FINISHING SHALL BE PERFORMED BY A QUALIFIED TRADESPERSONS. ALL DEMOLITION WORK AND INSTALLATION SHALL BE COORDINATED WITH OWNER PRIOR TO STARTING.
- ALL REMOVED EQUIPMENT IN WORKING ORDER SHALL BE REVIEWED BY THE OWNER'S REPRESENTATIVE. IF OWNER'S REPRESENTATIVE WISHES TO RETAIN THE EQUIPMENT, CONTRACTOR REMOVING EQUIPMENT SHALL DELIVER THE EQUIPMENT TO LOCATION AS DIRECTED BY THE OWNER'S REPRESENTATIVE. IF THE OWNER'S REPRESENTATIVE WISHES THE EQUIPMENT TO BE DISPOSED OF, THE CONTRACTOR REMOVING THE EQUIPMENT SHALL DISPOSE OF EQUIPMENT WITH NO ADDITIONAL COST TO THE OWNER.

GENERAL NOTES (NEW):

- UNLESS OTHERWISE NOTED, ALL DUCTWORK AND PIPING SHOWN DARK IS NEW. DARK IS TO BE REMOVED.
- ALL WORK SHALL BE INSTALLED PER THE 2017 IMC AND ALL LOCAL APPLICABLE CODES.
- VERIFY CONDITIONS IN THE FIELD PRIOR TO BID AND CONSTRUCTION.
- WHERE CONFLICTS EXIST AMONG DRAWINGS, SPECIFICATIONS AND EQUIPMENT SCHEDULES, THE MORE STRINGENT SHALL APPLY.
- REFER TO DRAWINGS M5.00 - M5.40 FOR MECHANICAL DETAILS, DIAGRAMS AND SCHEDULES.
- CONTRACTOR SHALL CAREFULLY COORDINATE DUCTWORK AND PIPING PATHWAY / LOCATIONS WITH OTHER TRADES AND EXISTING CONDITIONS. ALL DUCTWORK AND PIPING SHALL BE INSTALLED AS TIGHT TO THE STRUCTURE AS POSSIBLE. CONNECTIONS TO THE SUPPLY AIR DEVICES MAY BE MADE WITH FLEXIBLE DUCTWORK. REFER TO THE DETAIL ON DRAWING M5.10 FOR FLEXIBLE DUCT CONNECTIONS. ALL CONDITIONS SHALL BE FIELD VERIFIED BEFORE ORDERING EQUIPMENT OR FABRICATED MATERIAL.
- CONTRACTOR SHALL PROVIDE ALL ROOF OR WALL NON-COMBUSTIBLE FRAMING AS REQUIRED TO INSTALL EQUIPMENT, DUCTWORK, AND PIPING. COORDINATE NEW WORK WITH OTHER TRADES PRIOR TO BEGINNING CONSTRUCTION. NO WORK IS TO BE INSTALLED OR FABRICATED UNTIL AFTER THE PROJECT COORDINATION HAS BEEN APPROVED BY THE OWNER'S REPRESENTATIVE.
- INSTALL A MANUAL BALANCE DAMPER IN ALL BRANCH DUCTS, INCLUDING ALL SUPPLY, RETURN, AND EXHAUST GRILLES.
- ALL SQUARE THROATED ELBOWS SHALL HAVE AIRFOIL TURNING VANES AND SHALL ONLY BE USED WHEN RADIUS ELBOWS WILL NOT FIT.
- ALL ROUND BRANCH DUCT CONNECTIONS SHALL BE MADE WITH BELLMOUTH FITTINGS OR ANGLED TEES. STRAIGHT SPR-IN TAP COLLARS SHALL NOT BE ACCEPTABLE.
- ALL DAMPERS, VALVES, AND CONTROL COMPONENTS THAT ARE LOCATED ABOVE CEILINGS SHALL BE INSTALLED WHERE COMPLETELY ACCESSIBLE. CONTRACTOR SHALL PROVIDE ACCESS PANELS AS REQUIRED.
- ALL NEW VARIABLE AIR VOLUME TERMINAL UNITS ARE TO BE INSTALLED WHERE COMPONENTS ARE COMPLETELY ACCESSIBLE. CONTRACTOR SHALL COORDINATE TO PROVIDE THE VAV UNIT WITH A CONTROL ENCLOSURE AND PIPE CONNECTIONS ON THE MOST ACCESSIBLE SIDE OF THE UNIT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING THE CORRECT LEFT OR RIGHT HAND CONFIGURATION. REFER TO THE APPLICABLE DETAIL ON DRAWING M5.10 FOR ADDITIONAL REQUIREMENTS.
- DUCTWORK CONNECTION TO DIFFUSER / VAV TO BE THE SAME SIZE AS THE NECK SIZE UNLESS OTHERWISE NOTED.
- UNLESS OTHERWISE NOTED, ALL DUCTWORK SHALL BE FABRICATED FROM GALVANIZED STEEL METAL, INSTALLED IN ACCORDANCE WITH SMACNA DUCT CONSTRUCTION STANDARDS FOR GAUGE, REINFORCEMENT, AND SUPPORT. 2" W.G. PRESSURE CLASS FOR ALL DUCTWORK UNLESS NOTED OTHERWISE. ALL JOINTS AND SEAMS SHALL BE SEALED AND FASTENED AND MADE AIRTIGHT IN ACCORDANCE OF CHAPTER 13 OF THE OBC.
- CONTRACTOR SHALL TAKE OVERALL CFM MEASUREMENTS ON ALL EXISTING DUCTWORK TO REMAIN PRIOR TO COMMENCING ANY WORK. INFORMATION GATHERED SHALL BE UTILIZED FOR REBALANCING SYSTEM. CONTRACTOR SHALL REBALANCE ALL SYSTEMS AT THE CONCLUSION OF THE PROJECT.
- UL LISTED FIRESTOPPING SHALL BE USED AT ANY PENETRATION THROUGH A FIRE RATED ASSEMBLY. REFER TO ARCHITECTURAL CONSTRUCTION DOCUMENTS FOR LOCATIONS OR RATED ASSEMBLIES. CONTRACTOR SHALL USE UL LISTED FIRESTOP SYSTEM METHODS FOR THROUGH-PENETRATION ASSEMBLIES. TYPICAL OF ALL FIRE RATED WALLS.
- DUCTWORK AND PIPING SHALL BE SUPPORTED INDEPENDENT OF CEILING, CONDUIT, OTHER DUCTWORK, OTHER PIPING, ETC.
- IN AREAS WHERE CEILINGS ARE NOT BEING REPLACED, AND CONTRACTOR HAS WORK ABOVE CEILINGS, CONTRACTOR SHALL PATCH AND REPAIR CEILINGS TO MATCH EXISTING.
- CONTRACTOR SHALL COORDINATE ALL REQUIRED WALL PENETRATIONS FOR DUCT OR PIPING WITH GENERAL CONTRACTOR PRIOR TO CONSTRUCTION OF NEW WALLS. ALL DUCT PENETRATIONS SHALL BE IN COMPLIANCE WITH THE PROJECT SPECIFICATIONS. CONTRACTOR SHALL PERFORM ALL CUTTING AND PATCHING REQUIRED FOR DUCT PENETRATIONS THROUGH WALLS.
- CONTRACTOR SHALL COORDINATE ALL REQUIRED ROOF OPENINGS FOR DUCTWORK WITH THE GENERAL CONTRACTOR.
- CONTRACTOR SHALL PROVIDE ALL ADDITIONAL STEEL FRAMING AS REQUIRED TO INSTALL ROOF MOUNTED EQUIPMENT CURBS.
- CONTRACTOR SHALL INSTALL ALL EQUIPMENT, DUCTWORK, PIPING, VALVES, INSULATION, SUPPORTS ETC. AS INDICATED OR AS REQUIRED TO ALLOW OPERATION AND USE OF ALL AREAS AND ALL SYSTEMS REQUIRED FOR OCCUPIED USE DURING CONSTRUCTION.
- CONTRACTOR TO VERIFY EXISTING DUCTWORK / PIPING SUPPLY AND RETURN SYSTEM, SIZE, AND TYPE PRIOR TO MAKING CONNECTIONS.

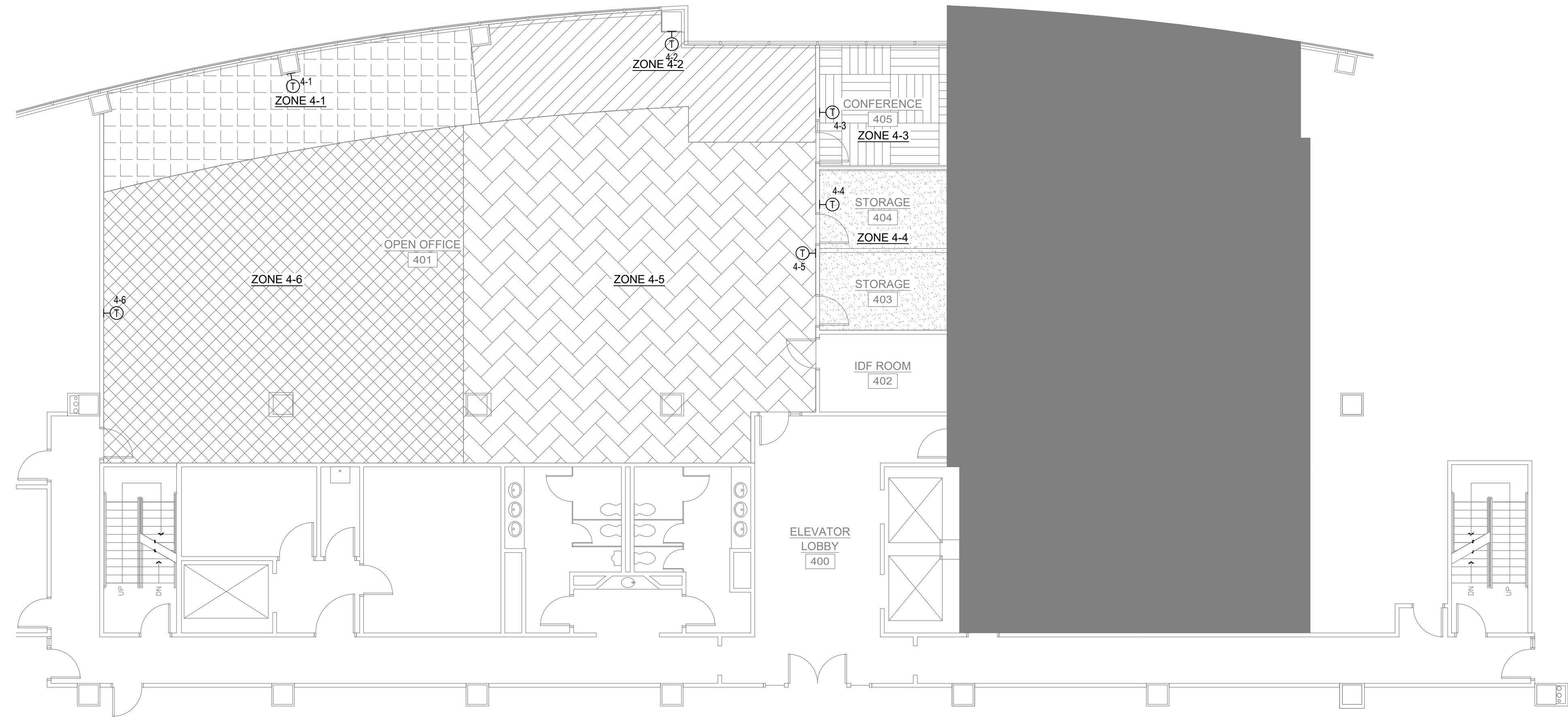
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| 1 | ISSUED FOR 5% CONSTRUCTION DOCS | 11/18/2022 | | | |
| 2 | ISSUED FOR 100% BID SET | 03/07/2023 | | | |

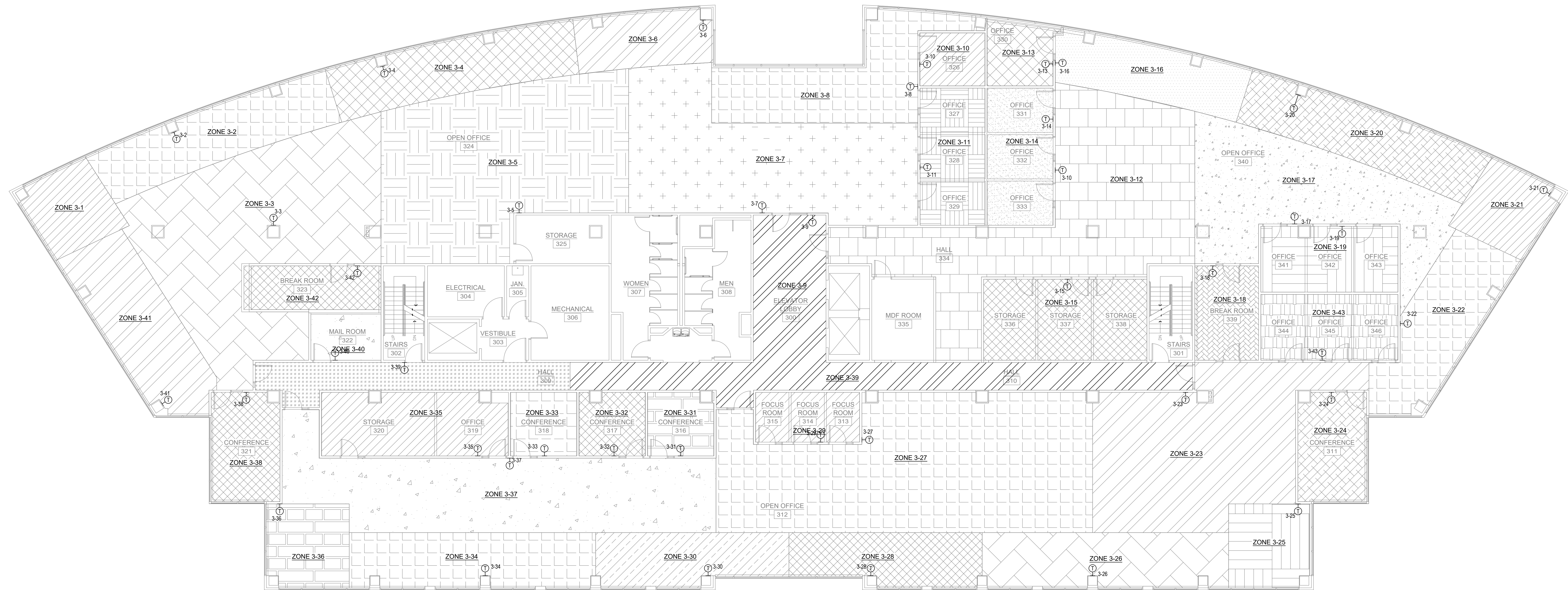
PROPOSED OFFICES FOR:
INTERNAL REVENUE SERVICE
 7300 TURFWAY ROAD
 THIRD & FOURTH FLOORS
 FLORENCE, KY. 41042
KEVIN SULLIVAN ARCHITECTURE LLC
 2646 PANCOAST AVE. CINCINNATI, OHIO 45211
 (513) 721-2191
 kevin@sullivanarchitecture.com

| | |
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| AS SHOWN | 22064 |
| DATE: | DRAWN BY: |
| 11/18/2022 | JDH |
| MECHANICAL GENERAL INFORMATION | |
| SHEET | |
| M0.00 | |



FOURTH FLOOR MECHANICAL ZONING PLAN
SCALE: 1/8"=1'-0"

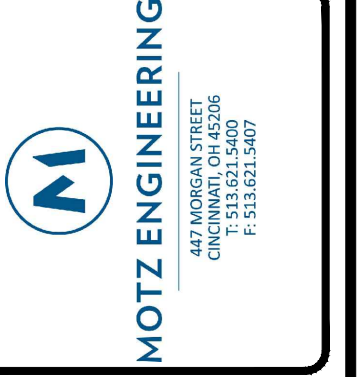
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THIRD FLOOR MECHANICAL ZONING PLAN
SCALE: 1/8"=1'-0"

1
MZ.00

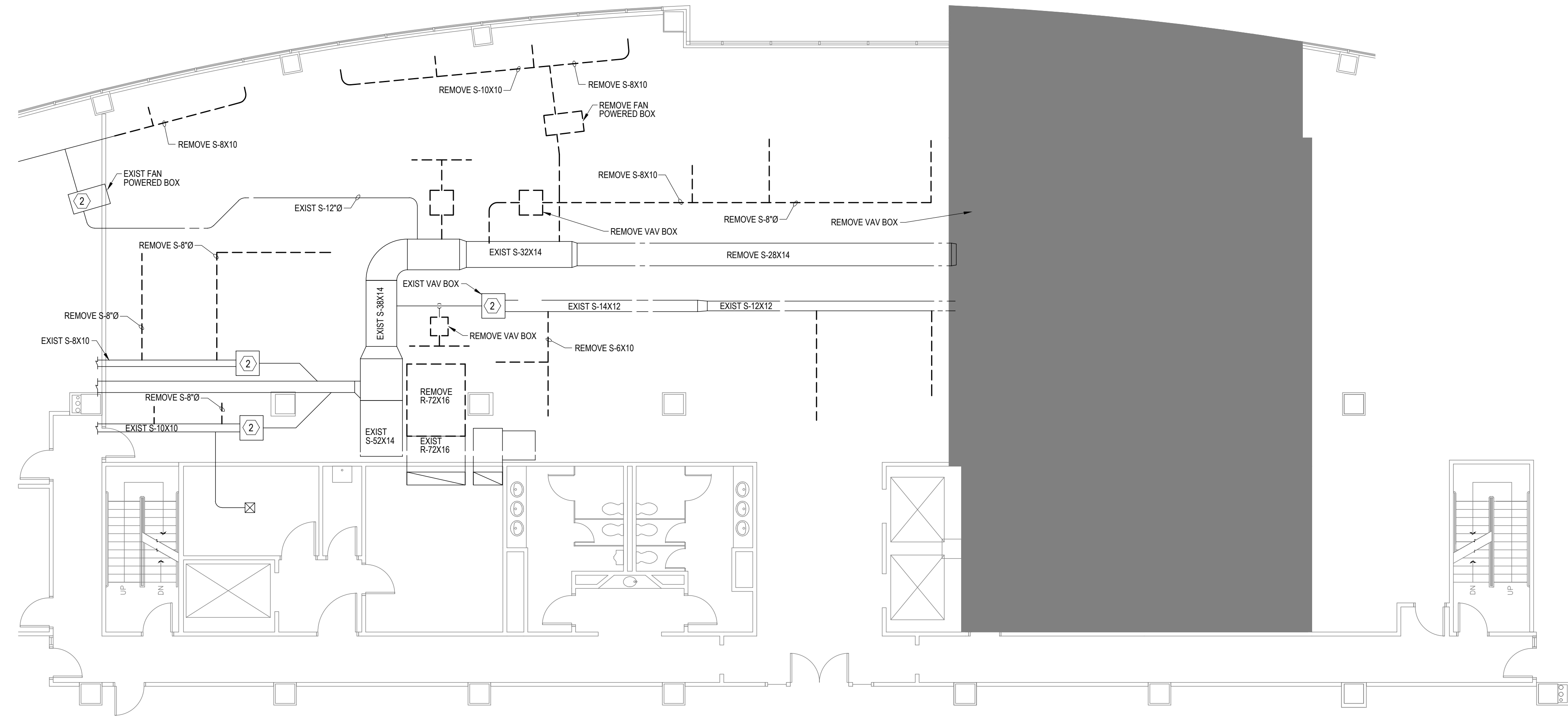
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| 3RD & 4TH FLOOR MECHANICAL ZONING PLAN | |
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FOURTH FLOOR MECHANICAL DEMOLITION PLAN
SCALE: 1/8"=1'-0"

2
M1.30

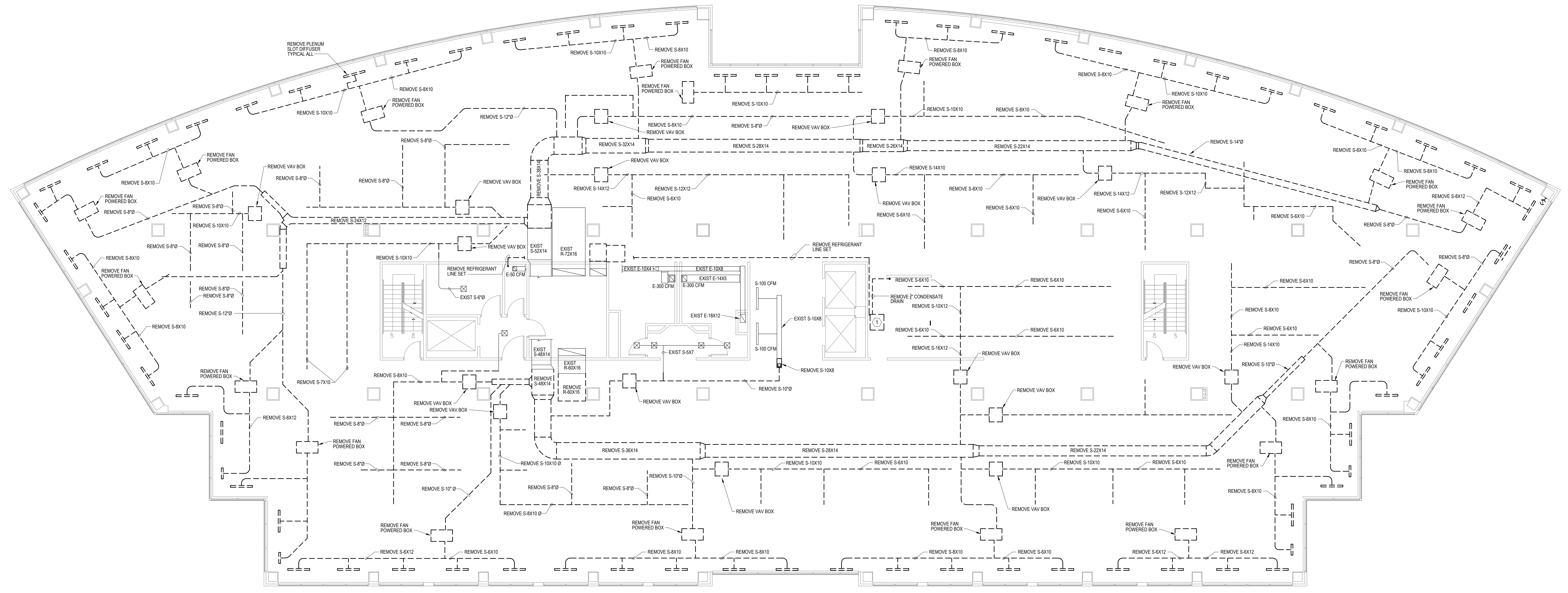
DRAWING NOTES:

- REMOVE EXISTING COMPUTER ROOM AIR CONDITIONING UNIT INCLUDING ALL ASSOCIATED REFRIGERANT PIPING, DRAIN PIPING, CONTROLS, ETC.
- EXISTING VAV BOX TO REMAIN.

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400 ANTHONY DRIVE
CINCINNATI, OHIO 45219
513.533.8800

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THIRD FLOOR MECHANICAL DEMOLITION PLAN
SCALE: 1/8"=1'-0"

1
M1.30

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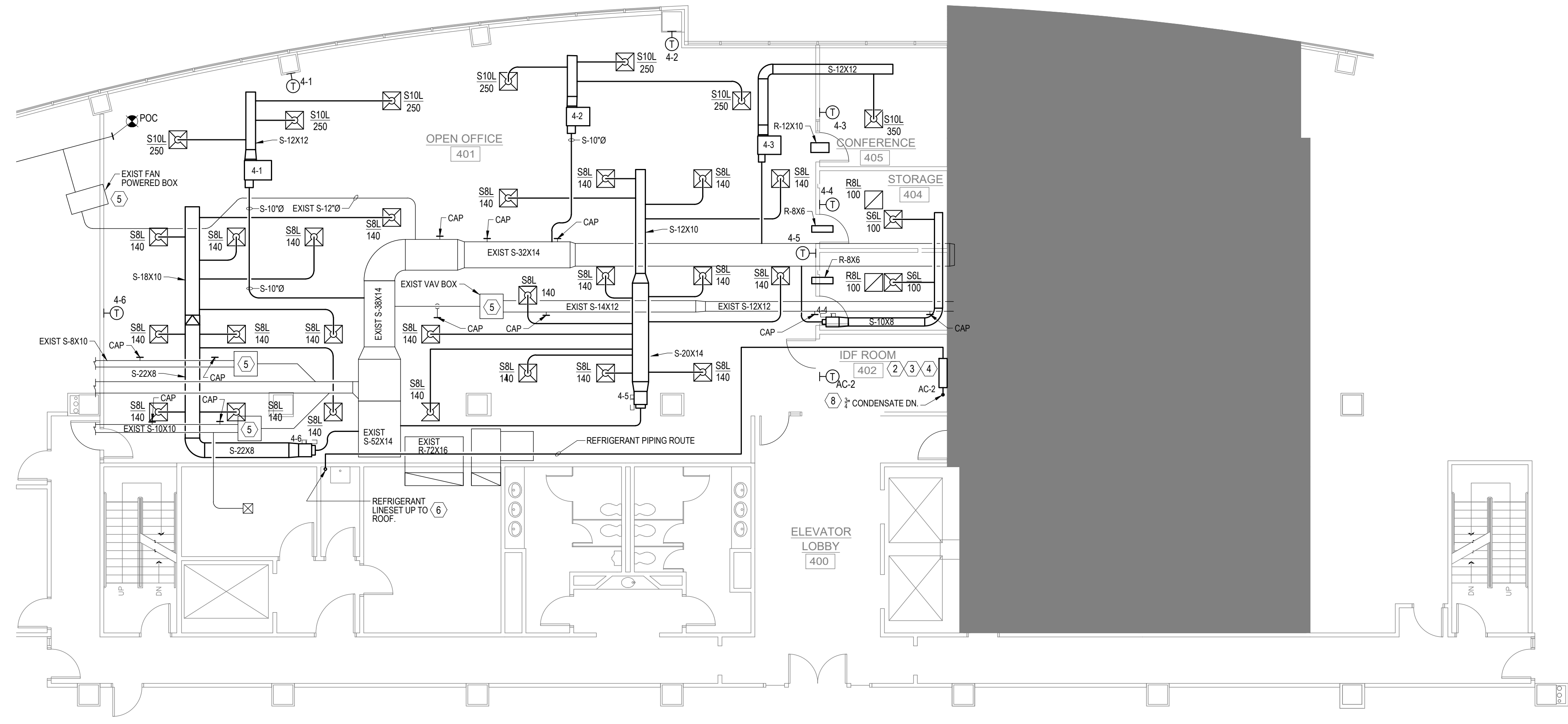
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3RD & 4TH FLOOR MECHANICAL DEMOLITION PLAN

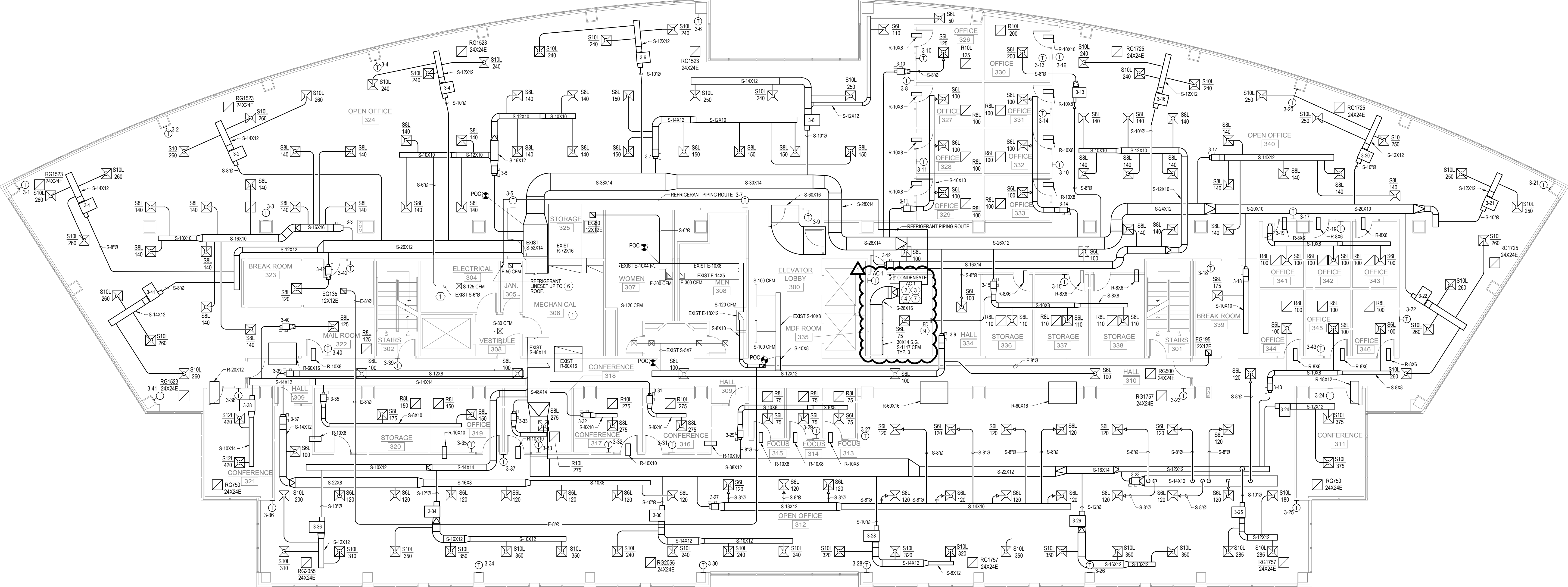
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FOURTH FLOOR MECHANICAL PLAN
SCALE: 1/8"=1'-0"

2
M2.30



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

1
M2.30

- DRAWING NOTES:**
- VENTILATION TO REMAIN UNCHANGED.
 - SIZE AND INSTALL REFRIGERANT LINES IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS FOR LONG LINE APPLICATIONS.
 - ROUTE REFRIGERANT LINES TO JANITORS CLOSET AND UP TO NEW CONDENSING UNIT ON ROOF. FIELD COORDINATE EXACT ROUTE WITH EXISTING CONDITIONS. EXACT LOCATION OF CONDENSING UNIT ON ROOF TO BE COORDINATED WITH BUILDING OWNER. SEAL AND MAKE WATER TIGHT ALL REFRIGERANT LINE PENETRATIONS THROUGH ROOF. SEE DETAIL SHEET M5.10 FOR DETAILS.
 - ROUTE 1/2" COPPER CONDENSATE TO HUB DRAIN LOCATED IN MDF ROOM 335.
 - EXISTING VAV BOX TO REMAIN. PROVIDE NEW PNEUMATIC THERMOSTAT FOR EXISTING VAV BOX. EXTEND PNEUMATICS AS REQUIRED TO ADJACENT SPACE. COORDINATE NEW THERMOSTAT LOCATION IN ADJACENT SPACE WITH BUILDING OWNER.
 - EXTEND REFRIGERANT LINE SET UP THROUGH EXISTING PIPE ENCLOSURE ON ROOF TO AIR COOLED CONDENSING UNIT PER MANUFACTURERS RECOMMENDATIONS.
 - COMPUTER ROOM AIR CONDITIONING UNIT SHOULD BE INSTALLED WITH STAINLESS STEEL SECONDARY DRAIN PAN WITH WELDED SEAMS.
 - EXTEND 1/2" COPPER CONDENSATE LINE ON TO THIRD FLOOR. TERMINATE INTO HUB DRAIN LOCATED IN MDF ROOM 335.
 - PROVIDE FIRE DAMPER AT DUCT PENETRATION. MATCH FIRE DAMPER TO DUCT SIZE.

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| 1 | ISSUED FOR BID (Design Intent Drawings) | 10/14/2022 | NO. | ISSUE / REVISION | DATE |
| 2 | ISSUED FOR BID (CONSTRUCTION DOCS) | 11/22/2022 | 1 | ISSUED FOR BID (Design Intent Drawings) | 10/14/2022 |
| 3 | ISSUED FOR BID (CONSTRUCTION DOCS) | 01/19/2023 | 2 | ISSUED FOR BID (CONSTRUCTION DOCS) | 11/22/2022 |
| 4 | ISSUED FOR BID (CONSTRUCTION DOCS) | 02/17/2023 | 3 | ISSUED FOR BID (CONSTRUCTION DOCS) | 01/19/2023 |
| 5 | ADDED U-1 | 04/12/2023 | 4 | ADDED U-1 | 04/12/2023 |
| 6 | FOR PERMIT | 04/14/2023 | 5 | FOR PERMIT | 04/14/2023 |
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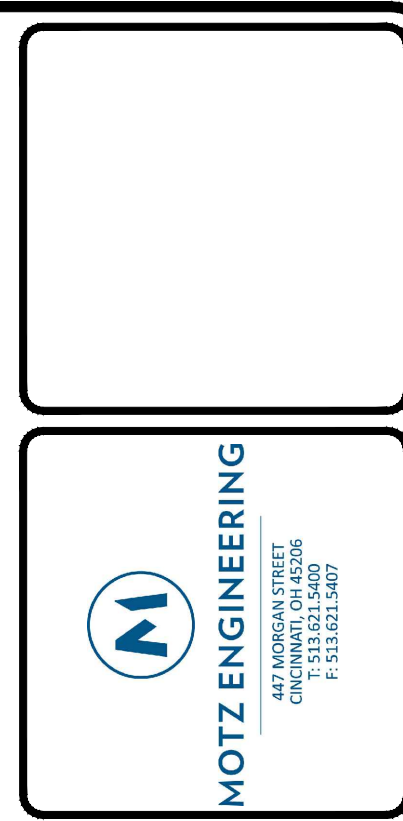
SCALE: AS SHOWN COMM. NO. 22064
DATE: 11/18/2022 DRAWN BY: JDH
3RD & 4TH FLOOR MECHANICAL PLAN
SHEET
M2.30

GENERAL NOTES:

- REFRIGERANT SHALL BE EVACUATED PER ALL LOCAL AND EPA REGULATIONS, AND DELIVERED TO OWNER IN APPROVED CONTAINERS AS DIRECTED BY OWNER.

DRAWING NOTES:

- REMOVE EXISTING ACCU AND ALL ASSOCIATED REFRIGERANT PIPING, SPECIALTIES ETC. INSTALL NEW ACCU-1 IN SAME LOCATION. CONTRACTOR TO PROVIDE ANY NECESSARY STEEL REQUIRED TO MODIFY EXISTING ROOF CURBS FOR INSTALLATION OF NEW ACCU-1. EXISTING UNIT WEIGHTS 265 LBS AND NEW UNIT WEIGHTS 230 LBS.
- INSTALL REFRIGERANT LINES PER MANUFACTURER'S RECOMMENDATIONS.
- CONTRACTOR TO MAINTAIN ROOF WARRANTY. ALL ROOFING WORK TO BE PERFORMED BY CARLISLE ROOFING USING CARLISLE ROOFING MATERIALS. CONTRACTOR TO COORDINATE ALL ROOFING WORK WITH BUILDING OWNER.
- CONTRACTOR TO OBTAIN THE SERVICES OF A STRUCTURAL ENGINEER (TRUMAN P. YOUNG AND ASSOCIATES 513-961-5655, THP LIMITED INC. 513-241-3222, OR STEPHEN SCHAEFER AND ASSOCIATES 513-542-3300), TO PROVIDE EVALUATION OF THE EXISTING STRUCTURE. STRUCTURAL DRAWINGS WILL BE AVAILABLE BY THE OWNER.



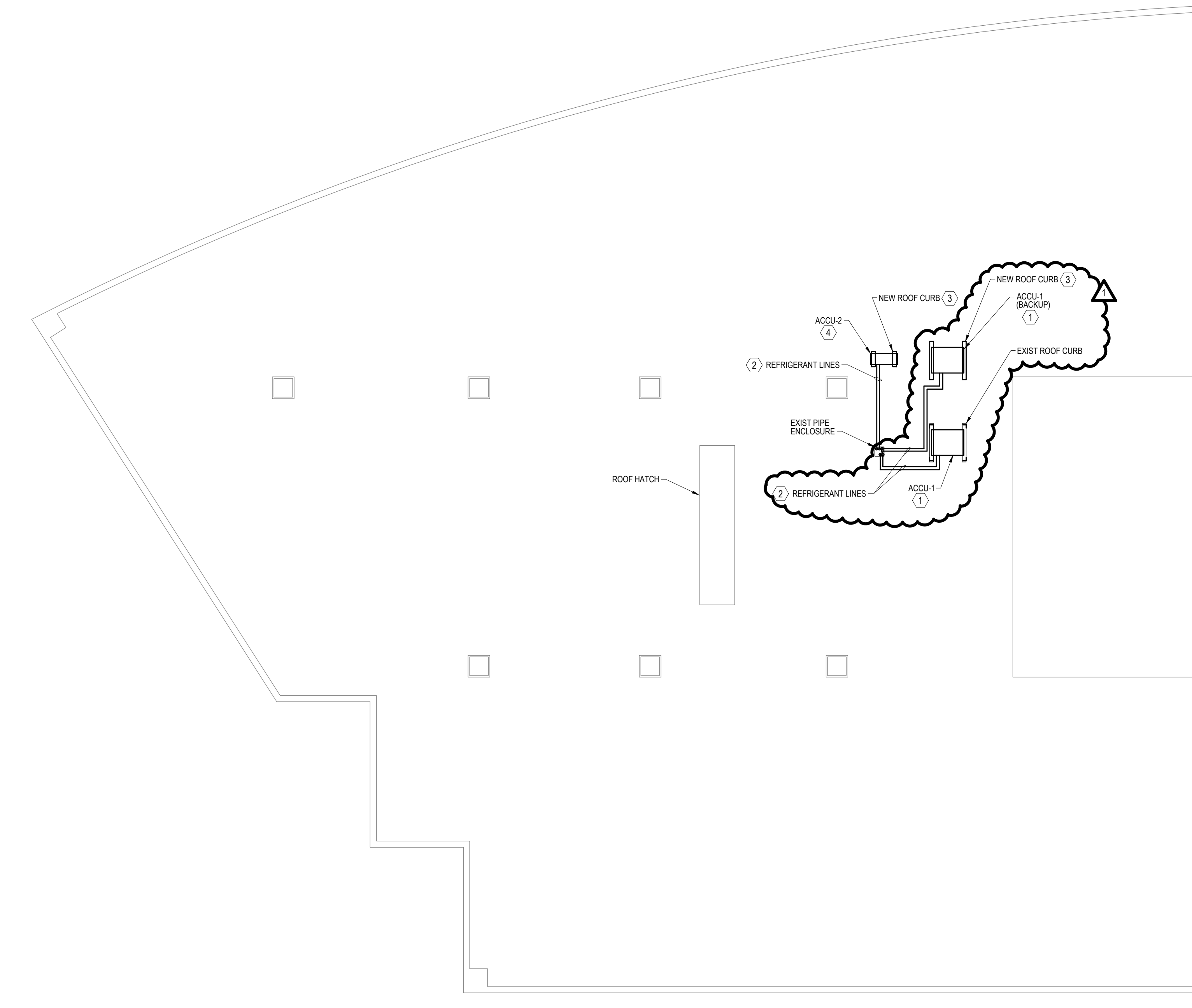
| NO. | ISSUE / REVISION | DATE | NO. | ISSUE / REVISION | DATE |
|-----|---|------------|-----|------------------|------|
| 1 | ISSUED FOR BID (Design Intent Drawings) | 10/14/2022 | | | |
| 2 | ISSUED FOR BIDDING CONSTRUCTION DOCS | 11/22/2022 | | | |
| 3 | ISSUED FOR BIDDING CONSTRUCTION DOCS | 01/18/2023 | | | |
| 4 | ISSUED FOR BIDDING CONSTRUCTION DOCS | 02/15/2023 | | | |
| 5 | ISSUED FOR BIDDING CONSTRUCTION DOCS | 04/12/2023 | | | |
| 6 | FOR PERMIT | 04/14/2023 | | | |
| 7 | ADDENDUM 2 | 04/26/2023 | | | |

PROPOSED OFFICES FOR:
INTERNAL REVENUE SERVICE
 7300 TURFWAY ROAD
 THIRD & FOURTH FLOORS
 FLORENCE, KY. 41042
KEVIN SULLIVAN ARCHITECTURE LLC
 2646 PANCOAST AVE. CINCINNATI, OHIO 45211
 (513) 721-2191 kevin@sullivanarchitecture.com

| | |
|-----------------------------|-----------|
| SCALE: | COMM. NO. |
| AS SHOWN | 22064 |
| DATE: | DRAWN BY: |
| 11/18/2022 | JDH |
| MECHANICAL ROOF PLAN | |
| SHEET | |
| MR1.0 | |



DEMOLITION ROOF PLAN
 SCALE: 1/8"=1'-0"



MECHANICAL ROOF PLAN
 SCALE: 1/8"=1'-0"

| OUTDOOR AIR VENTILATION SCHEDULE: THIRD FLOOR | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-------------|------------------------|-------------------|----------------------|-----------------------|--------------------|-------------------------------------|--------------------------|------------------------------------|-------------------------|-------------------------------|-------------------------|--------------------------|------------------------------|---------------------------|-----------------------------|-----------------------|----------------------------|--------------------------|---------------|----------------------|-----------------|--------------------------------------|-----------------|--------------|----------------|------------------|---|---|
| ROOM NAME | ROOM NUMBER | GROSS FL AREA (SQ. FT) | NET AREA (SQ. FT) | NET FL AREA (SQ. FT) | BREATHING ZONE (FEET) | OCCUPANCY CATEGORY | MAX. NO. OF OCCUPANTS (PER 1000 SF) | OUTSIDE AIR PER OCC. CFM | OUTSIDE AIR PER FL AREA CFM/SQ.FT. | DESIGN NUMBER OF PEOPLE | SHORT TERM OCCUPANT DIVERSITY | ACTUAL NUMBER OF PEOPLE | AIR SYSTEM EFFECTIVENESS | INITIAL ZONE OUTSIDE AIR CFM | SYSTEM OCCUPANT DIVERSITY | UNCORRECTED OUTSIDE AIR CFM | DESIGN SUPPLY AIR CFM | MIN. DESIGN SUPPLY AIR CFM | OUTSIDE AIR RATIO, (Z/P) | ACTUAL OA CFM | ACTUAL OUTDOOR AIR % | NO. OF FIXTURES | EXHAUST REQUIREMENTS CFM PER FIXTURE | CFM PER SQ. FT. | REQUIRED CFM | CONTINUOUS CFM | INTERMITTENT CFM | | |
| HALL | 309 | 250 | 1 | 250 | 6.0 | CORRIDORS | 0 | 0 | 0.06 | 0 | 100% | 0 | 80% | 15 | 100% | 15 | 230 | 100 | 0.19 | 22 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| ELEVATOR LOBBY/HALL | 300/310 | 989 | 1 | 989 | 6.0 | CORRIDORS | 0 | 0 | 0.06 | 0 | 100% | 0 | 80% | 74 | 100% | 59 | 740 | 375 | 0.20 | 80 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| CONFERENCE | 311 | 242 | 1 | 242 | 6.0 | CONFERENCE/MEETING | 50 | 5 | 0.06 | 13 | 100% | 13 | 80% | 99 | 100% | 80 | 500 | 500 | 0.20 | 54 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| OPEN OFFICE | 312 | 5,529 | 1 | 5,529 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 28 | 100% | 28 | 80% | 590 | 100% | 472 | 9290 | 3000 | 0.20 | 1001 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| FOCUS ROOM | 313 | 54 | 1 | 54 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 1 | 100% | 1 | 80% | 10 | 100% | 8 | 75 | 55 | 0.19 | 8 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| FOCUS ROOM | 314 | 54 | 1 | 54 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 1 | 100% | 1 | 80% | 10 | 100% | 8 | 75 | 55 | 0.19 | 8 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| FOCUS ROOM | 315 | 54 | 1 | 54 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 1 | 100% | 1 | 80% | 10 | 100% | 8 | 75 | 55 | 0.19 | 8 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| CONFERENCE | 316 | 133 | 1 | 133 | 6.0 | CONFERENCE/MEETING | 50 | 5 | 0.06 | 7 | 100% | 7 | 80% | 54 | 100% | 43 | 275 | 275 | 0.20 | 30 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| CONFERENCE | 317 | 134 | 1 | 134 | 6.0 | CONFERENCE/MEETING | 50 | 5 | 0.06 | 7 | 100% | 7 | 80% | 54 | 100% | 43 | 275 | 275 | 0.20 | 30 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| CONFERENCE | 318 | 138 | 1 | 138 | 6.0 | CONFERENCE/MEETING | 50 | 5 | 0.06 | 7 | 100% | 7 | 80% | 54 | 100% | 43 | 275 | 275 | 0.20 | 30 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| OFFICE | 319 | 140 | 1 | 140 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 1 | 100% | 1 | 80% | 17 | 100% | 13 | 150 | 90 | 0.19 | 16 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| STORAGE | 320 | 230 | 1 | 230 | 6.0 | STORAGE ROOMS | 0 | 0 | 0.12 | 0 | 100% | 0 | 80% | 35 | 100% | 28 | 175 | 175 | 0.20 | 19 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| CONFERENCE | 321 | 242 | 1 | 242 | 6.0 | CONFERENCE/MEETING | 50 | 5 | 0.06 | 13 | 100% | 13 | 80% | 99 | 100% | 80 | 500 | 500 | 0.20 | 54 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| MAIL ROOM | 322 | 106 | 1 | 106 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 1 | 100% | 1 | 80% | 14 | 100% | 11 | 125 | 75 | 0.19 | 13 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| BREAK ROOM | 323 | 196 | 1 | 196 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 1 | 100% | 1 | 80% | 21 | 100% | 17 | 120 | 110 | 0.19 | 13 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| OPEN OFFICE | 324 | 5992 | 1 | 5,992 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 30 | 100% | 30 | 80% | 637 | 100% | 510 | 7700 | 3200 | 0.20 | 830 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| STORAGE | 325 | 154 | 1 | 154 | 6.0 | STORAGE ROOMS | 0 | 0 | 0.12 | 0 | 100% | 0 | 80% | 23 | 100% | 18 | 115 | 115 | 0.20 | 12 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| OFFICE | 326 | 113 | 1 | 113 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 1 | 100% | 1 | 80% | 15 | 100% | 12 | 125 | 75 | 0.19 | 12 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| OFFICE | 327 | 94 | 1 | 94 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 1 | 100% | 1 | 80% | 13 | 100% | 11 | 100 | 75 | 0.18 | 11 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| OFFICE | 328 | 93 | 1 | 93 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 1 | 100% | 1 | 80% | 13 | 100% | 11 | 100 | 75 | 0.18 | 11 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| OFFICE | 329 | 93 | 1 | 93 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 1 | 100% | 1 | 80% | 13 | 100% | 11 | 100 | 75 | 0.18 | 11 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| OFFICE | 330 | 135 | 1 | 135 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 1 | 100% | 1 | 80% | 16 | 100% | 13 | 200 | 100 | 0.16 | 22 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| OFFICE | 331 | 98 | 1 | 98 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 1 | 100% | 1 | 80% | 13 | 100% | 11 | 100 | 75 | 0.18 | 11 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| OFFICE | 332 | 96 | 1 | 96 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 1 | 100% | 1 | 80% | 13 | 100% | 11 | 100 | 75 | 0.18 | 11 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| OFFICE | 333 | 96 | 1 | 96 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 1 | 100% | 1 | 80% | 13 | 100% | 11 | 100 | 75 | 0.18 | 11 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| HALL | 334 | 473 | 1 | 473 | 6.0 | CORRIDORS | 0 | 0 | 0.06 | 0 | 100% | 0 | 80% | 35 | 100% | 28 | 200 | 200 | 0.18 | 22 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| STORAGE | 336 | 138 | 1 | 138 | 6.0 | STORAGE ROOMS | 0 | 0 | 0.12 | 0 | 100% | 0 | 80% | 21 | 100% | 17 | 110 | 110 | 0.19 | 12 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | | |
| STORAGE | 337 | 141 | 1 | 141 | 6.0 | STORAGE ROOMS | 0 | 0 | 0.12 | 0 | 100% | 0 | 80% | 21 | 100% | 17 | 110 | 110 | 0.19 | 12 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| STORAGE | 338 | 142 | 1 | 142 | 6.0 | STORAGE ROOMS | 0 | 0 | 0.12 | 0 | 100% | 0 | 80% | 21 | 100% | 17 | 110 | 110 | 0.19 | 12 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| BREAK ROOM | 339 | 198 | 1 | 198 | 6.0 | STORAGE ROOMS | 0 | 0 | 0.12 | 0 | 100% | 0 | 80% | 30 | 100% | 24 | 175 | 150 | 0.20 | 19 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| OPEN OFFICE | 340 | 3,470 | 1 | 3,470 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 18 | 100% | 18 | 80% | 373 | 100% | 298 | 5170 | 1900 | 0.20 | 557 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| OFFICE | 341 | 93 | 1 | 93 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 1 | 100% | 1 | 80% | 13 | 100% | 11 | 100 | 75 | 0.18 | 11 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| OFFICE | 342 | 94 | 1 | 94 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 1 | 100% | 1 | 80% | 13 | 100% | 11 | 100 | 75 | 0.18 | 11 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| OFFICE | 343 | 95 | 1 | 95 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 1 | 100% | 1 | 80% | 13 | 100% | 11 | 100 | 75 | 0.18 | 11 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| OFFICE | 344 | 95 | 1 | 95 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 1 | 100% | 1 | 80% | 13 | 100% | 11 | 100 | 75 | 0.18 | 11 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| OFFICE | 345 | 95 | 1 | 95 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 1 | 100% | 1 | 80% | 13 | 100% | 11 | 100 | 75 | 0.18 | 11 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| OFFICE | 346 | 95 | 1 | 95 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 1 | 100% | 1 | 80% | 13 | 100% | 11 | 100 | 75 | 0.18 | 11 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTALS: | | 20,582 | | 20,582 | | | | | | 143 | | 143 | | 2513 | | 2010 | 28065 | 12885 | 20.1% | 3024 | | | | | | 0 | 0 | | |

NOTE: 1. The design number of people shown for each room is the estimated maximum for each room per ASHRAE 62.1 in accordance to IMC Section 403.2. The actual number of people is based on either the estimated actual occupancy or the short term occupancy.
2. The ventilation air calculations for this schedule are based on ASHRAE Standard 62 in accordance to IMC Section 403.2.

Sum of Room Peak Occupancies = 143
Peak System Occupancy = 143
Occupant Diversity Factor, (D) = 100%

Sum of Room Supply Air Quantities = 28065
Supply Fan Diversity Factor = 55%
Actual Total System Supply Air Flow = 15120

Uncorrected Outdoor Air Flow = 2010 CFM
Ventilation Efficiency = 20.1%
Required OA Flow = 3024 CFM
Actual Final Outdoor Air Flow = 3024 CFM

| OUTDOOR AIR VENTILATION SCHEDULE: FOURTH FLOOR | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------------|------------------------|-------------------|----------------------|-----------------------|--------------------|-------------------------------------|--------------------------|------------------------------------|-------------------------|-------------------------------|-------------------------|--------------------------|------------------------------|---------------------------|-----------------------------|-----------------------|----------------------------|--------------------------|---------------|----------------------|-----------------|--------------------------------------|-----------------|--------------|----------------|------------------|---|
| ROOM NAME | ROOM NUMBER | GROSS FL AREA (SQ. FT) | NET AREA (SQ. FT) | NET FL AREA (SQ. FT) | BREATHING ZONE (FEET) | OCCUPANCY CATEGORY | MAX. NO. OF OCCUPANTS (PER 1000 SF) | OUTSIDE AIR PER OCC. CFM | OUTSIDE AIR PER FL AREA CFM/SQ.FT. | DESIGN NUMBER OF PEOPLE | SHORT TERM OCCUPANT DIVERSITY | ACTUAL NUMBER OF PEOPLE | AIR SYSTEM EFFECTIVENESS | INITIAL ZONE OUTSIDE AIR CFM | SYSTEM OCCUPANT DIVERSITY | UNCORRECTED OUTSIDE AIR CFM | DESIGN SUPPLY AIR CFM | MIN. DESIGN SUPPLY AIR CFM | OUTSIDE AIR RATIO, (Z/P) | ACTUAL OA CFM | ACTUAL OUTDOOR AIR % | NO. OF FIXTURES | EXHAUST REQUIREMENTS CFM PER FIXTURE | CFM PER SQ. FT. | REQUIRED CFM | CONTINUOUS CFM | INTERMITTENT CFM | |
| OPEN OFFICE | 401 | 3112 | 1 | 3,112 | 6.0 | OFFICE SPACE | 5 | 5 | 0.06 | 16 | 100% | 16 | 80% | 333 | 100% | 267 | 2900 | 1600 | 0.19 | 580 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| STORAGE | 404 | 106 | 1 | 106 | 6.0 | STORAGE ROOMS | 0 | 0 | 0.12 | 0 | 100% | 0 | 80% | 16 | 100% | 13 | 100 | 80 | 0.20 | 23 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| CONFERENCE | 405 | 162 | 1 | 162 | 6.0 | CONFERENCE/MEETING | 50 | 5 | 0.06 | 9 | 100% | 9 | 80% | 68 | 100% | 55 | 350 | 350 | 0.20 | 70 | 20.0% | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTALS: | | 3,486 | | 3,486 | | | | | | 25 | | 25 | | 434 | | 347 | 3450 | 2310 | 19.9% | 690 | | | | | | 0 | 0 | |

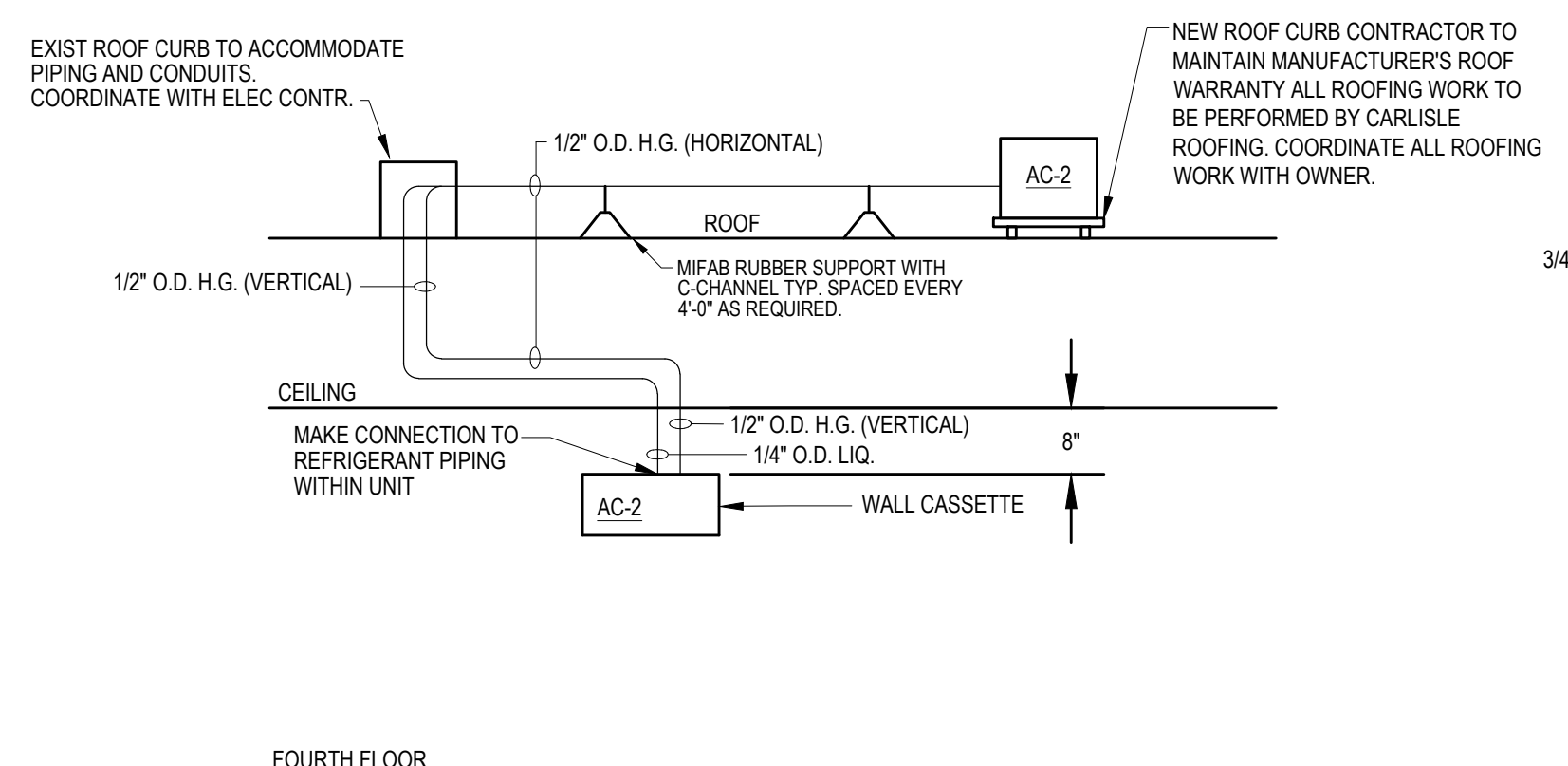
NOTE: 1. The design number of people shown for each room is the estimated maximum for each room per ASHRAE 62.1 in accordance to IMC Section 403.2. The actual number of people is based on either the estimated actual occupancy or the short term occupancy.
2. The ventilation air calculations for this schedule are based on ASHRAE Standard 62 in accordance to IMC Section 403.2.

Sum of Room Peak Occupancies = 25
Peak System Occupancy = 25
Occupant Diversity Factor, (D) = 100%

Sum of Room Supply Air Quantities = 3450
Supply Fan Diversity Factor = 100%
Actual Total System Supply Air Flow = 3450

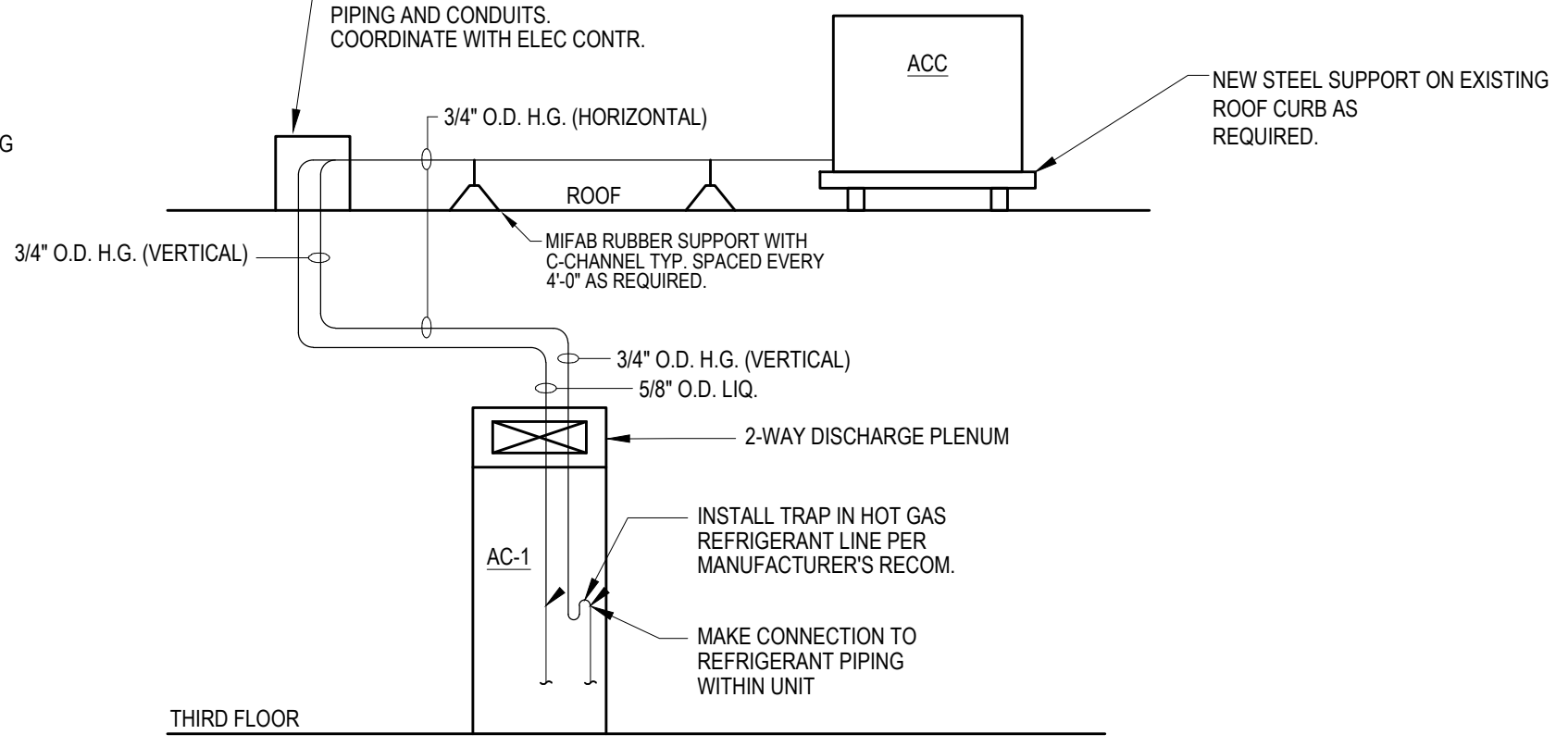
Uncorrected Outdoor Air Flow = 690 CFM
Ventilation Efficiency = 19.9%
Required OA Flow = 347 CFM
Actual Final Outdoor Air Flow = 690 CFM

| FAN POWERED VAV BOX SCHEDULE | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------------|-----------------|------------|--------------------------------------|------------------|------------------|-------------|------------------|--------------------------------|-------------|-----------------------|-----|-----|--|------------------------------|-----------|---|--|--|--|--|--|--|--|--|--|
| DESIGNATION | AREA SERVED | INLET SIZE | MIN. INLET STATIC PRESSURE (IN. WG.) | MAX. PRIMARY CFM | MIN. PRIMARY CFM | HEATING CFM | EC CAPACITY (KW) | FAN INFORMATION AIR FLOW (CFM) | ESP IN. WG. | ELECTRICAL DATA VOLTS | HP | FLA | ELECTRICAL DATA HEATER VOLTS / PH / HZ | BASIS OF DESIGN MANUFACTURER | MODEL NO. | ACCESSORIES | | | | | | | | | |
| 3-1 | OPEN OFFICE 324 | 8 | 0.07 | 780 | 300 | 380 | 5.0 | 380 | .5 | 277-ECM | 1/2 | 4.0 | 480/3/60 | PRICE | FDV5-3008 | ECM MOTOR, INLET FILTER, DUAL POINT ELECTRIC CONNECTION | | | | | | | | | |
| 3-2 | OPEN OFFICE 324 | 8 | 0.07 | 780 | 300 | 380 | 4.0 | 380 | .5 | 277-ECM | 1/2 | 4.0 | 480/3/60 | PRICE | FDV5-3009 | ECM MOTOR, INLET FILTER, DUAL POINT ELECTRIC CONNECTION | | | | | | | | | |
| 3-4 | OPEN OFFICE 324 | 10 | 0.07 | 720 | 300 | 350 | 4.0 | 350 | .5 | 277-ECM | 1/3 | 2.1 | 480/3/60 | PRICE | FDV5-2010 | ECM MOTOR, INLET FILTER, DUAL POINT ELECTRIC CONNECTION | | | | | | | | | |
| 3-6 | OPEN OFFICE 324 | 10 | 0.07 | 720 | 300 | 350 | 4.0 | 350 | .5 | 277-ECM | 1/3 | 2.1 | 480/3/60 | PRICE | FDV5-2011 | ECM MOTOR, INLET FILTER, DUAL POINT ELECTRIC CONNECTION | | | | | | | | | |
| 3-8 | OPEN OFFICE 324 | 10 | 0.07 | 1150 | 300 | 540 | 5.0 | 540 | .5 | 277-ECM | 1/2 | 4.0 | 480/3/60 | PRICE | FDV5-3010 | ECM MOTOR, INLET FILTER, DUAL POINT ELECTRIC CONNECTION | | | | | | | | | |
| 3-13 | OFFICE 330 | 6 | 0.07 | 200 | 100 | 100 | 2.0 | 100 | .5 | 277-ECM | 1/3 | 2.1 | 480/3/60 | PRICE | FDV5-2006 | ECM MOTOR, INLET FILTER, DUAL POINT ELECTRIC CONNECTION | | | | | | | | | |
| 3-16 | OPEN OFFICE 340 | 10 | 0.07 | 720 | 275 | 350 | 4.0 | 350 | .5 | 277-ECM | 1/3 | 2.1 | 480/3/60 | PRICE | FDV5-2010 | ECM MOTOR, INLET FILTER, DUAL POINT ELECTRIC CONNECTION | | | | | | | | | |
| 3-20 | OPEN OFFICE 340 | 10 | 0.07 | 750 | 350 | 365 | 4.0 | 365 | .5 | 277-ECM | 1/3 | 2.1 | 480/3/60 | PRICE | FDV5-2011 | ECM MOTOR, INLET FILTER, DUAL POINT ELECTRIC CONNECTION | | | | | | | | | |
| 3-21 | OPEN OFFICE 340 | 10 | 0.07 | 500 | 175 | 175 | 4.0 | 175 | .5 | 277-ECM | 1/3 | 2.1 | 480/3/60 | PRICE | FDV5-2010 | ECM MOTOR, INLET FILTER, DUAL POINT ELECTRIC CONNECTION | | | | | | | | | |
| 3-22 | OPEN OFFICE 340 | 10 | 0.07 | 1040 | 400 | 510 | 6.0 | 510 | .5 | 277-ECM | 1/2 | 4.0 | 480/3/60 | PRICE | FDV5-3010 | ECM MOTOR, INLET FILTER, DUAL POINT ELECTRIC CONNECTION | | | | | | | | | |
| 3-24 | CONFERENCE 311 | 10 | 0.07 | 750 | 390 | 365 | 5.0 | 365 | .5 | 277-ECM | 1/3 | 2.1 | 480/3/60 | PRICE | FDV5-2010 | ECM MOTOR, INLET FILTER, DUAL POINT ELECTRIC CONNECTION | | | | | | | | | |
| 3-25 | OPEN OFFICE 312 | 10 | 0.07 | 750 | 225 | 365 | 5.0 | 365 | .5 | 277-ECM | 1/3 | 2.1 | 480/3/60 | PRICE | FDV5-2010 | ECM MOTOR, INLET FILTER, DUAL POINT ELECTRIC CONNECTION | | | | | | | | | |
| 3-26 | OPEN OFFICE 312 | 12 | 0.07 | 1400 | | | | | | | | | | | | | | | | | | | | | |



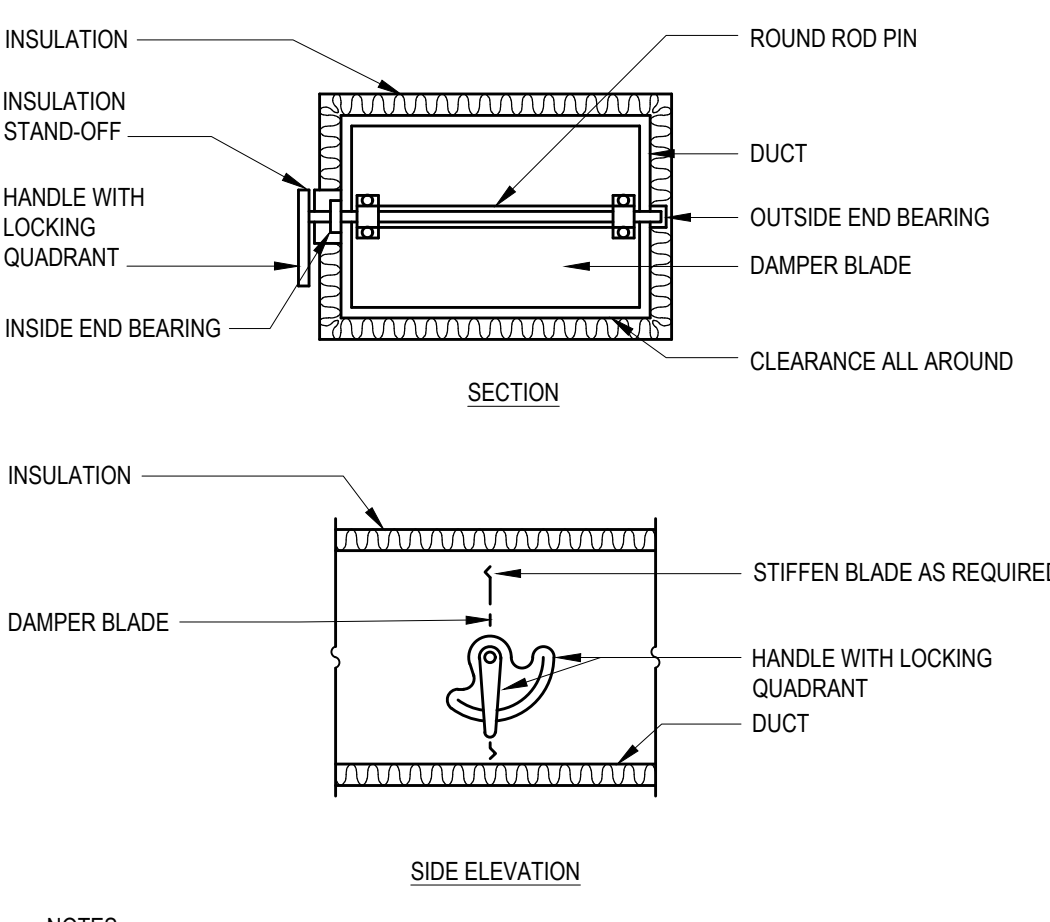
NOTE:
1. INSTALL AND SIZE REFRIGERANT PIPING PER MANUFACTURER'S RECOMMENDATIONS

AC-2 DETAIL
SCALE: N.T.S. 12 MS.10



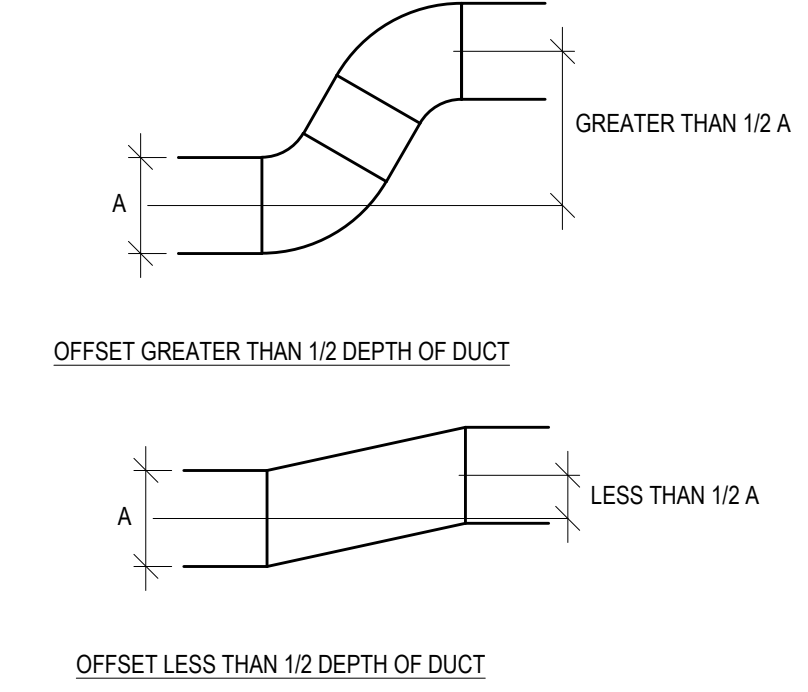
NOTE:
1. INSTALL AND SIZE REFRIGERANT PIPING PER MANUFACTURER'S RECOMMENDATIONS

AC-1 DETAIL
SCALE: N.T.S. 11 MS.10

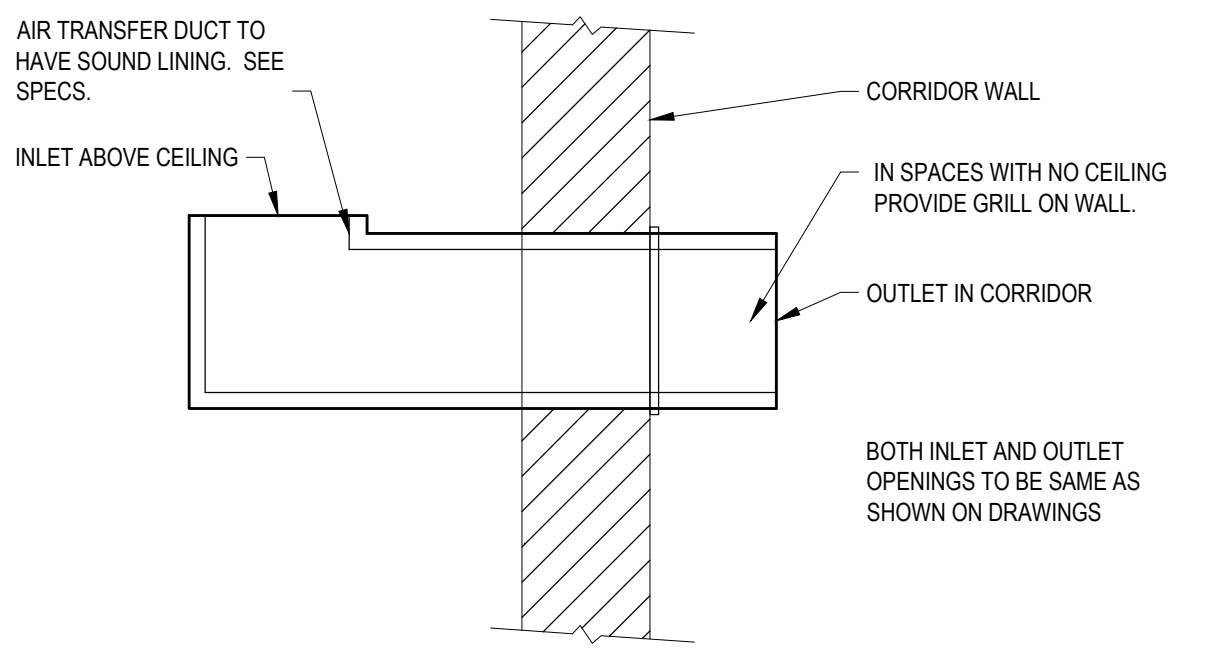


NOTES:
1. DELETE INSULATION STAND-OFF ON DUCTWORK WITHOUT EXTERIOR INSULATION.
2. DETAIL SHOWS SINGLE BLADE DAMPER. DAMPER INSTALLATION SHALL BE SIMILAR FOR MULTI-BLADE DAMPERS AND ROUND DAMPERS.

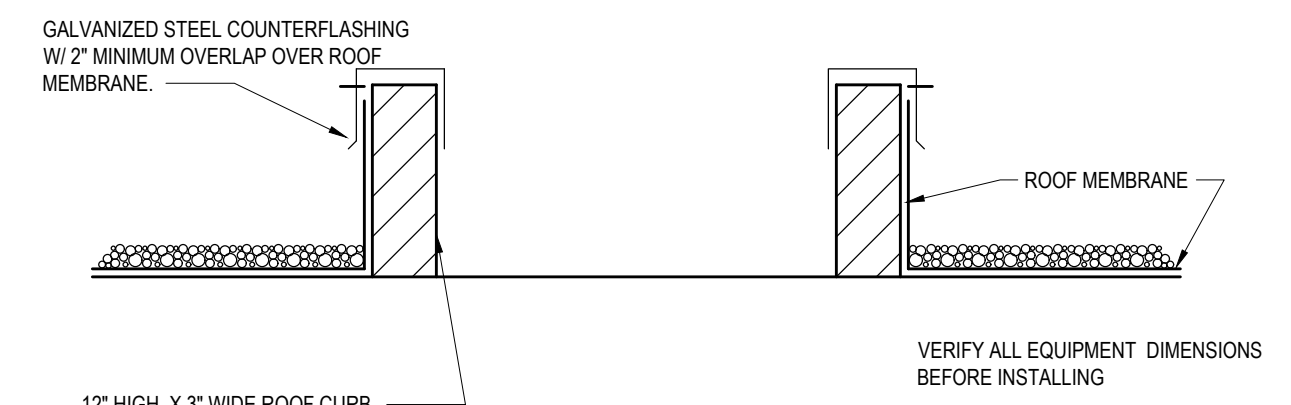
VOLUME DAMPER DETAIL
SCALE: N.T.S. 10 MS.10



DUCT OFFSET DETAIL
SCALE: N.T.S. 9 MS.10

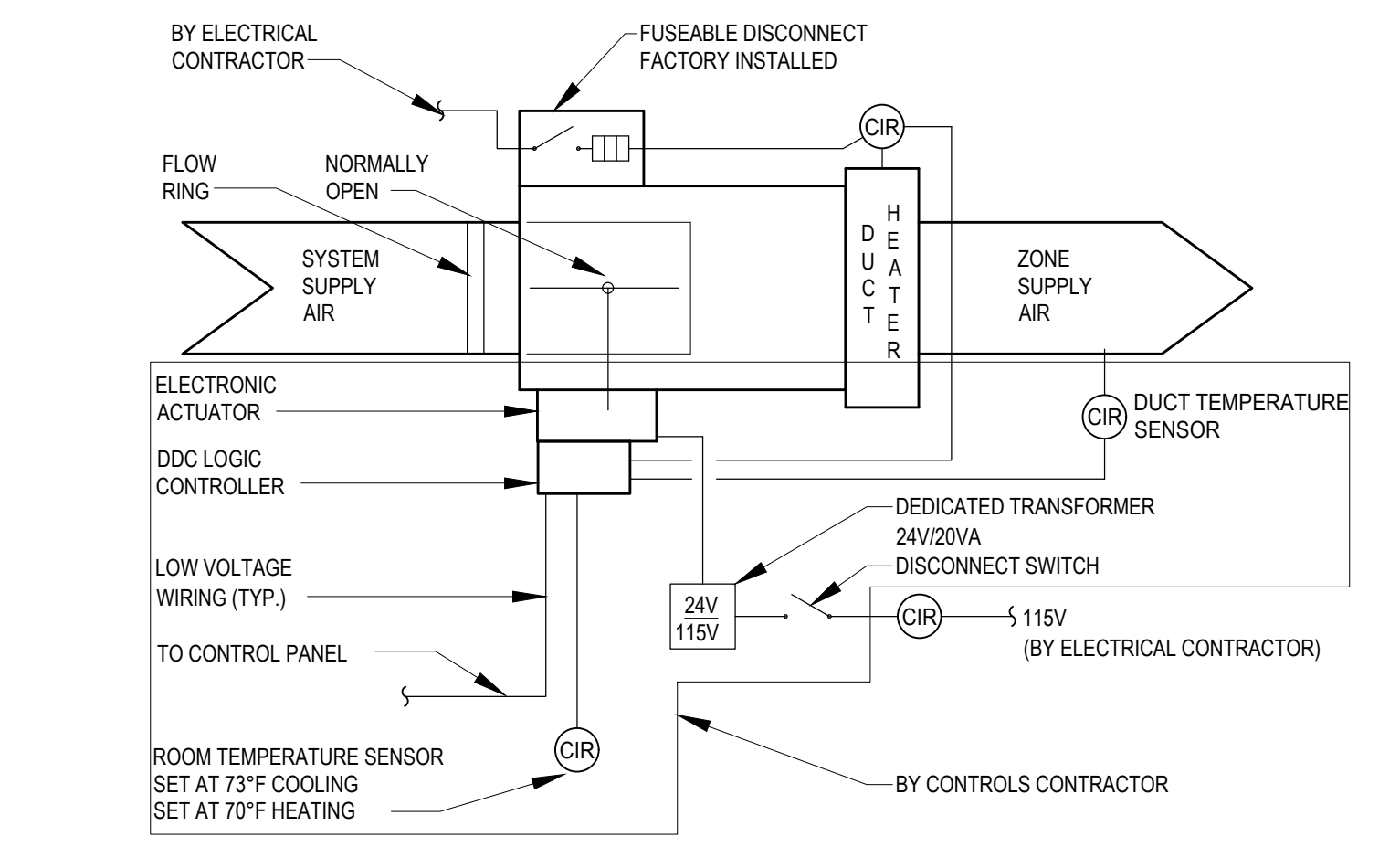


AIR TRANSFER DUCT DETAIL
SCALE: N.T.S. 8 MS.10



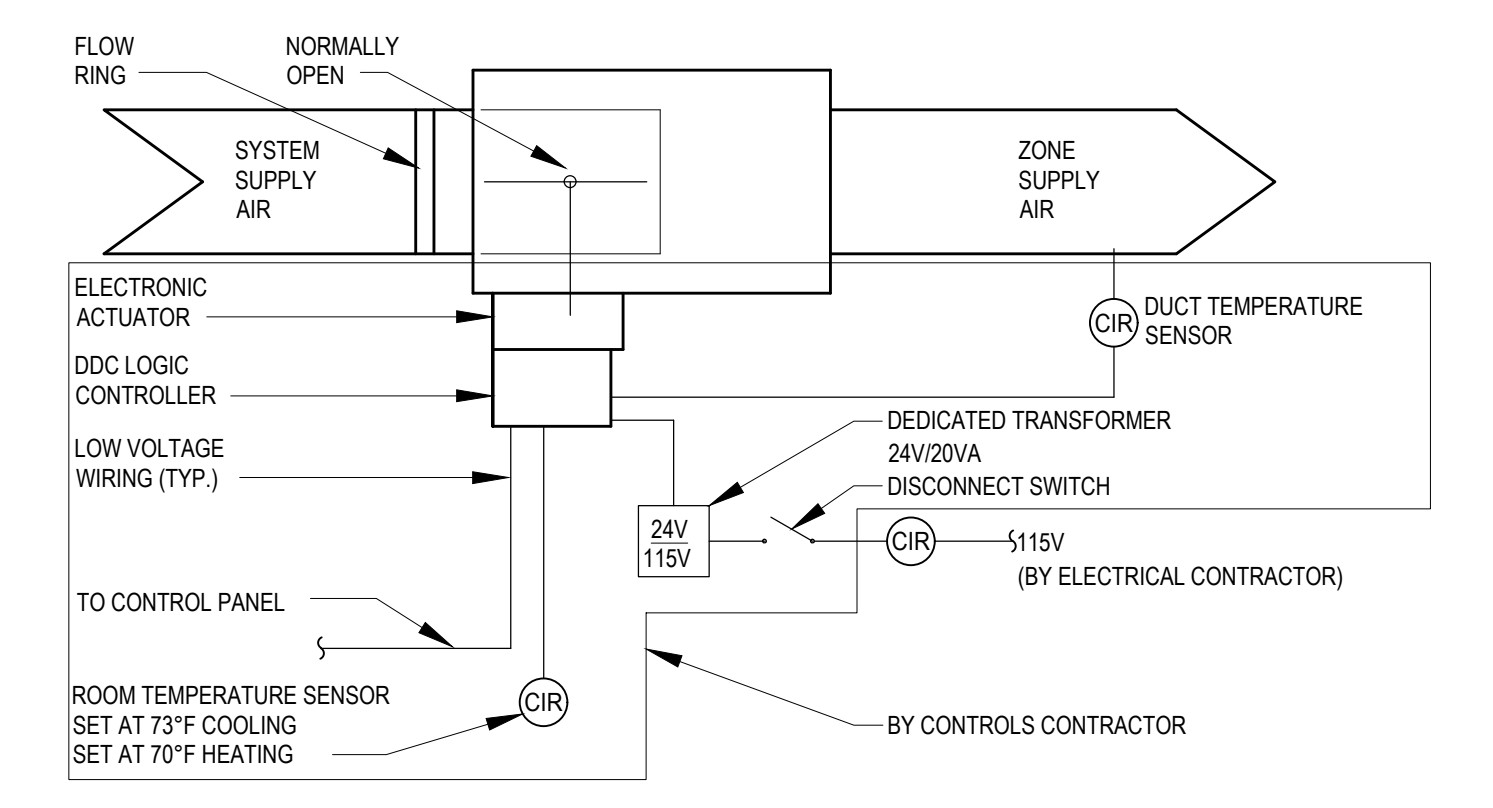
NOTE:
1. CONTRACTOR TO MAINTAIN MANUFACTURER'S ROOF WARRANTY. ALL ROOFING WORK TO BE PERFORMED BY CARLISLE ROOFING. COORDINATE ALL ROOFING WORK WITH BUILDING OWNER.

AIR COOLED CONDENSING UNIT ROOF CURB DETAIL
SCALE: N.T.S. 7 MS.10



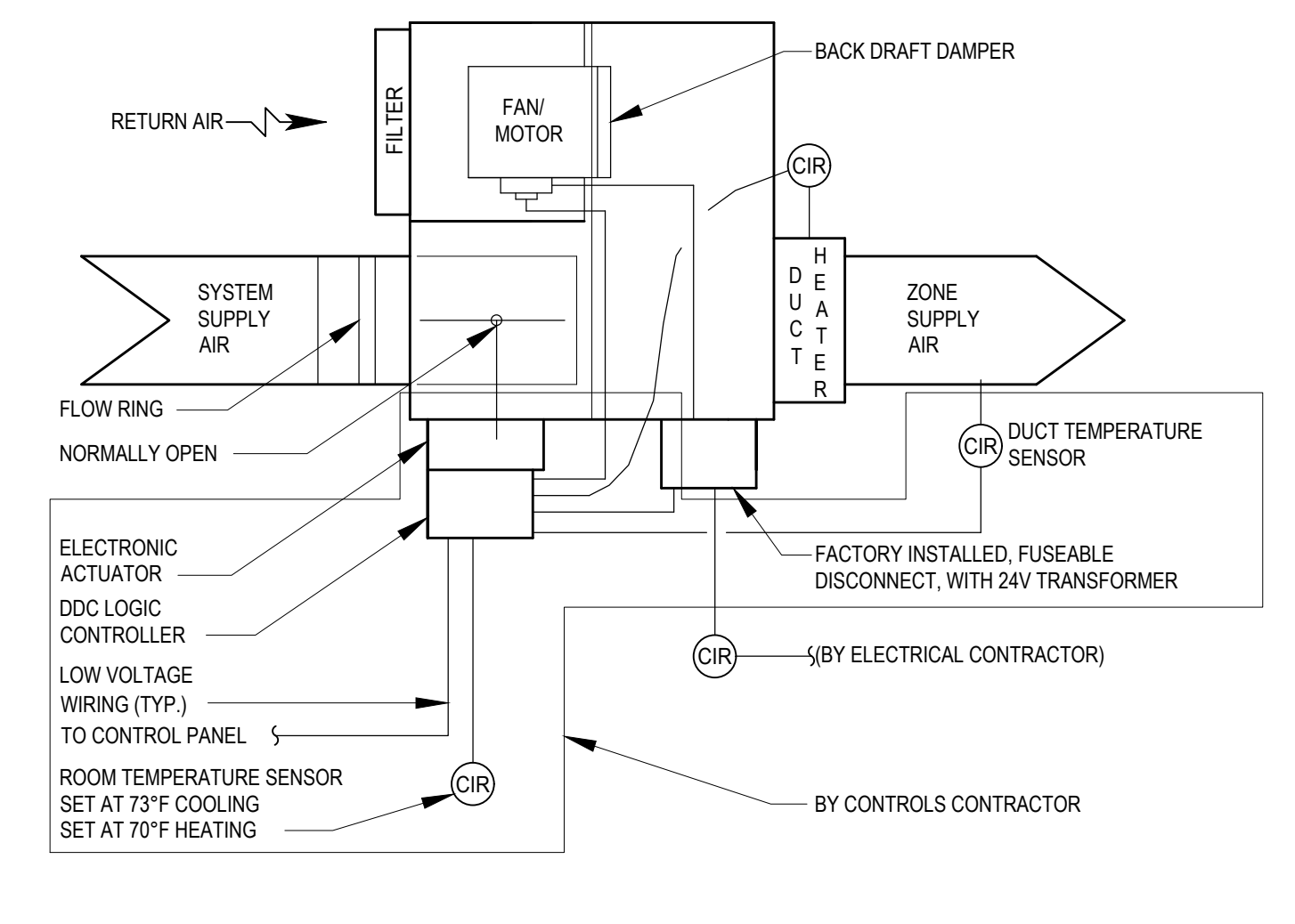
VAV BOX OPERATION:
THE ROOM TEMPERATURE SENSOR (T), THROUGH THE DDC LOGIC MODULE, MODULATES THE ELECTRONIC VAV DAMPER AND SUPPLY AIR FLOW TO MAINTAIN SPACE TEMPERATURE SETPOINT. ON A TEMPERATURE DROP THE DAMPER WILL CLOSE UNTIL IT REACHES ITS MINIMUM SETPOINT. IF SPACE TEMPERATURE CONTINUES TO DROP BELOW THE SETPOINT THE DDC LOGIC MODULE WILL ENERGIZE THE DUCT HEATER WITH A PROPORTIONAL SIGNAL TO THE SCR CONTROLLER TO MAINTAIN SPACE TEMPERATURE. THE ROOM SENSOR WILL PROPORTIONATELY CONTROL THE SCR CONTROLLER WHICH WILL MODULATE THE DUCT HEATER OUTPUT TO MAINTAIN SPACE TEMPERATURE SETPOINT.

VAV BOX W/ ELECTRIC REHEAT DETAIL
SCALE: N.T.S. 6 MS.10



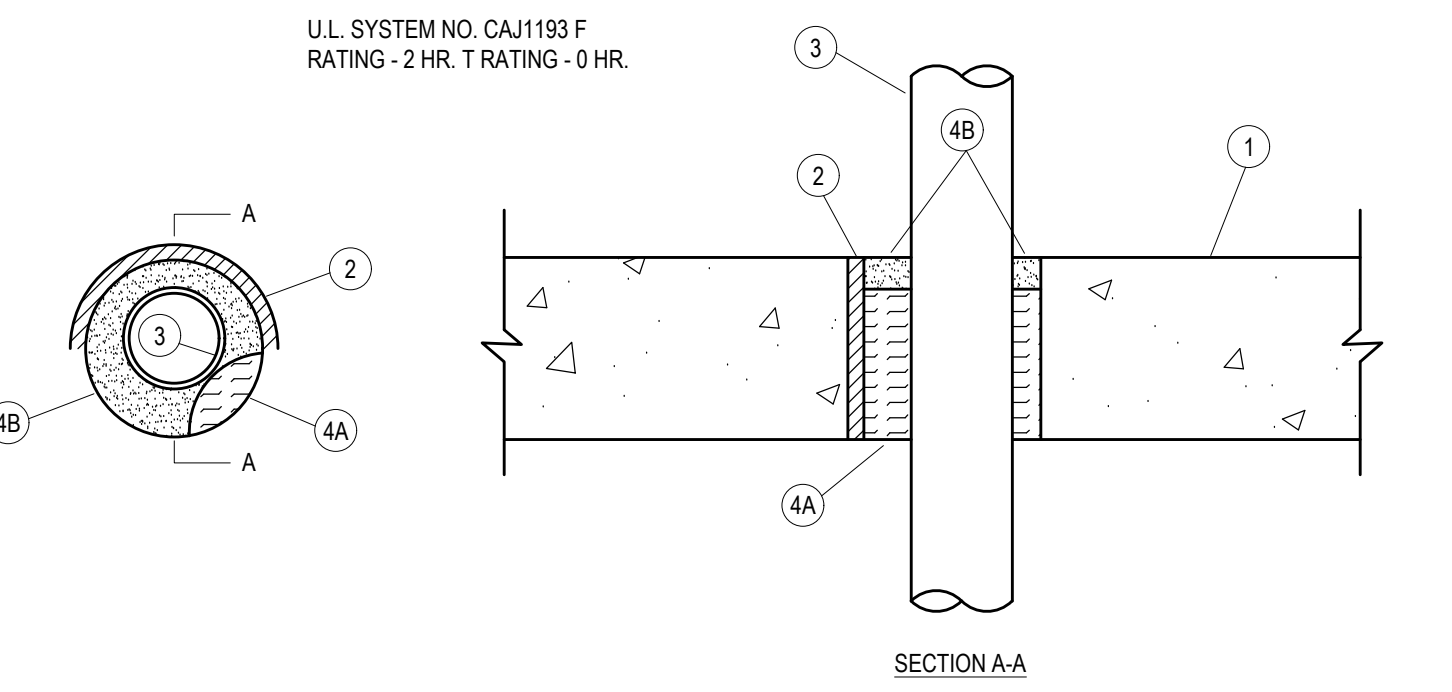
TYPICAL VAV BOX OPERATION:
THE ROOM TEMPERATURE SENSOR (T), THROUGH THE DDC LOGIC CONTROLLER, MODULATES THE ELECTRONIC VAV DAMPER AND SUPPLY AIR FLOW (FROM MINIMUM TO MAXIMUM CFM) TO MAINTAIN SPACE TEMPERATURE SETPOINT. ON A DROP IN SPACE TEMPERATURE THE DAMPER WILL CLOSE UNTIL THE THERMOSTAT IS SATISFIED OR THE DAMPER REACHES MINIMUM POSITION.

VAV BOX DETAIL
SCALE: N.T.S. 5 MS.10



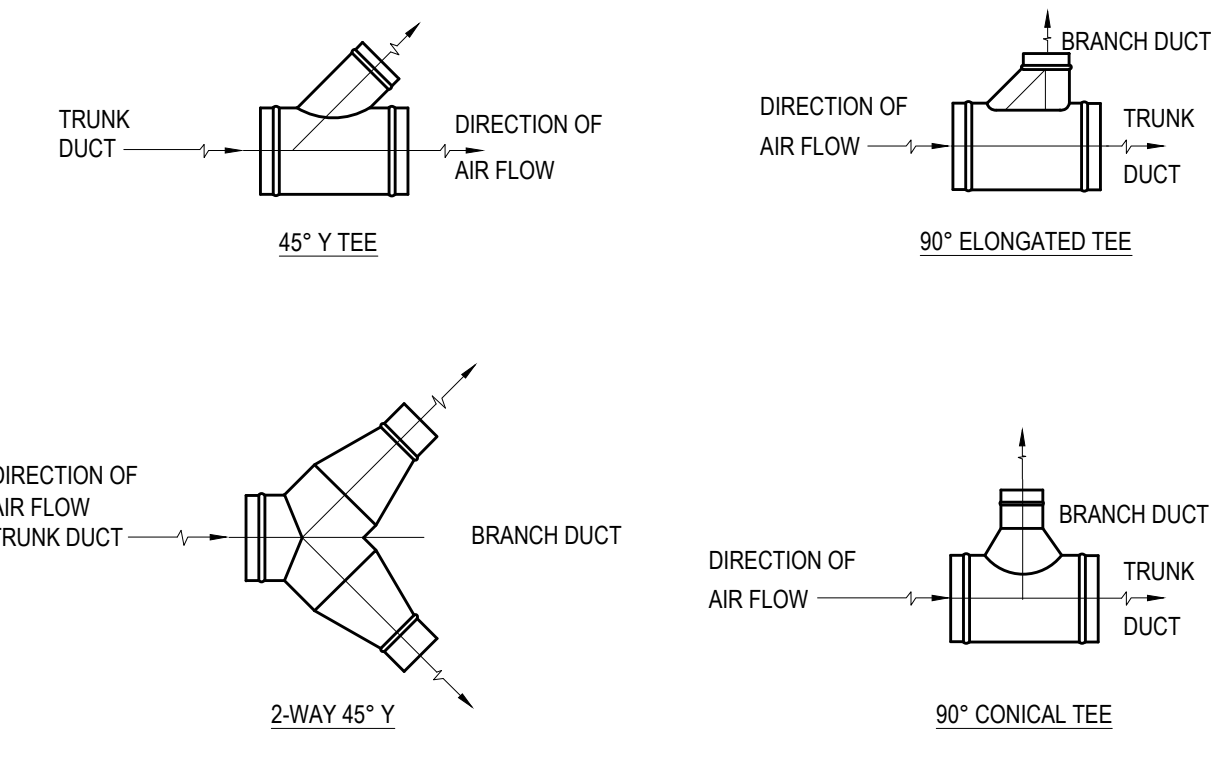
DDC (A/C) FAN POWERED VAV BOX (W/REHEAT) OPERATION:
THE ROOM TEMPERATURE SENSOR (T), THROUGH THE DDC LOGIC MODULE, MODULATES THE ELECTRONIC VAV DAMPER WITHIN THE FAN POWERED BOX AND SUPPLY AIR FLOW TO MAINTAIN THE SPACE TEMPERATURE SETPOINT. ON A DROP IN TEMPERATURE THE DAMPER WILL CLOSE UNTIL IT REACHES ITS MINIMUM SET POINT. IF SPACE TEMPERATURE CONTINUES TO DROP BELOW SETPOINT, THE DDC LOGIC MODULE WILL START THE RECIRCULATION FAN AND ENERGIZE THE DUCT HEATER WITH A PROPORTIONAL SIGNAL TO THE SCR CONTROLLER TO MAINTAIN SPACE TEMPERATURE. THE DUCT SENSOR AND ROOM SENSOR/THERMOSTAT WILL PROPORTIONATELY CONTROL THE SCR CONTROLLER WHICH WILL MODULATE THE DUCT HEATER OUTPUT TO MAINTAIN SPACE TEMPERATURE SETPOINT.

FAN POWERED VAV BOX W/ ELECTRIC REHEAT DETAIL
SCALE: N.T.S. 4 MS.10

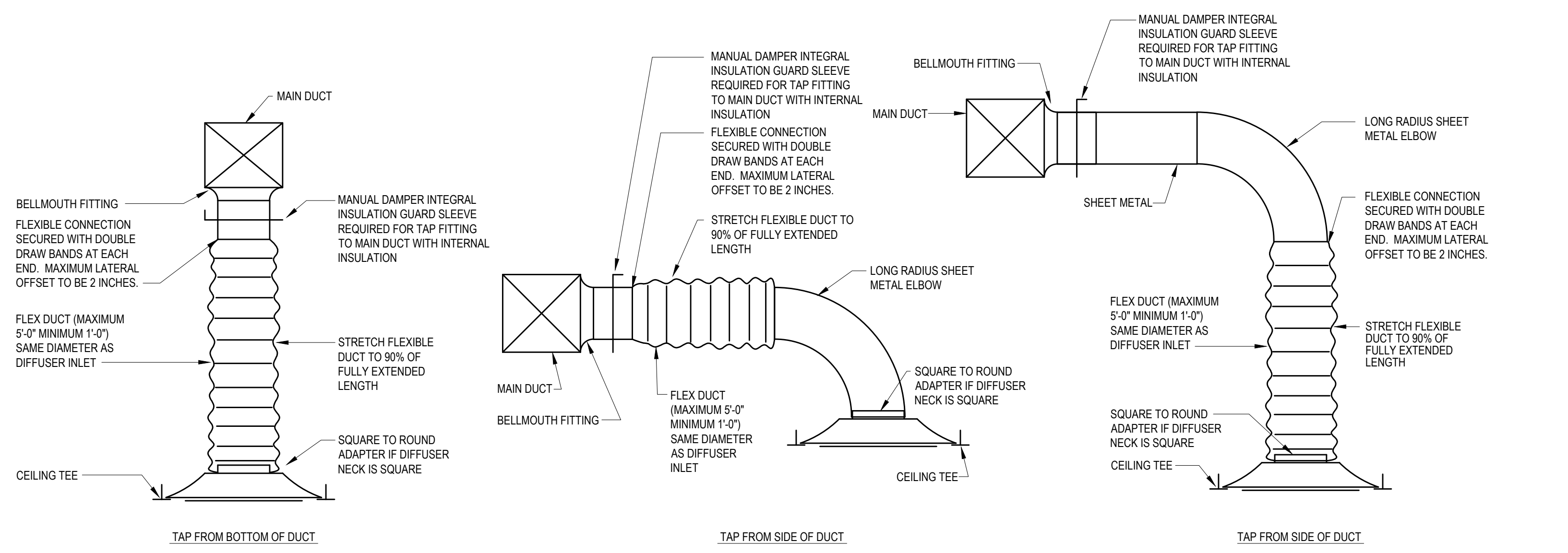


- FLOOR OR WALL ASSEMBLY - MIN. 4-1/2" IN THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100 - 150 PCF) CONCRETE FLOOR OR MIN. 5" THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS, MAX. DIAM. OF OPENING IS 10".
 - METALLIC SLEEVE - (OPTIONAL) - NOM. 1/8" IN DIAM. (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL SLEEVE CAST OR GROUTED IN TO FLOOR OR WALL ASSEMBLY FLUSH WITH FLOOR OR WALL SURFACES.
 - THROUGH PENETRANT - ONE METALLIC PIPE, CONDUIT OR TUBING TO BE INSTALLED EITHER CONCENTRICALLY OR ECCENTRICALLY WITHIN THE FIRESTOP SYSTEM. THE ANNULAR SPACE BETWEEN PIPES, CONDUITS OR TUBING AND PERIPHERY OF OPENING SHALL BE MIN. 1/2" TO MAX. 2-1/4". PIPE, CONDUIT OR TUBING TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES, CONDUITS OR TUBING MAY BE USED:
 - STEEL PIPE - NOM. 1/2" DIAM. (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
 - CONDUIT - NOM. 4" DIAM. (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING OR NOM. 6" DIAM. (OR SMALLER) STEEL CONDUIT.
 - FIRESTOP SYSTEM - THE FIRESTOP SYSTEM SHALL CONSIST OF THE FOLLOWING:
 - PACKING MATERIAL - MIN. 4" THICKNESS OF MIN. 4 PCF MINERAL WOOL BATT INSULATION FIRMLY PACKED INTO OPENING AS A PERMANENT FORM. PACKING MATERIAL TO BE RECESSED FROM TOP SURFACE OF FLOOR OR FROM BOTH SURFACES OF WALL AS REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.
 - FILL VOID OR CAVITY MATERIAL - CALK - MIN. 1/2" THICKNESS OF FILL MATERIAL APPLIED WITHIN THE ANNULUS FLUSH WITH TOP SURFACE OF FLOOR OR WITH BOTH SURFACES OF WALL ASSEMBLY.
- NELSON FIRESTOP PRODUCTS - OK N/S (NON-SAG) CALK FOR USE IN FLOORS OR WALL OR CLK SL (SOFT-LEVELING) CALK FOR USE IN WALLS ONLY.

U.L. SYSTEM NO. CAJ1193
THROUGH-PENETRATION FIRESTOP SYSTEMS
SCALE: N.T.S. 3 MS.10

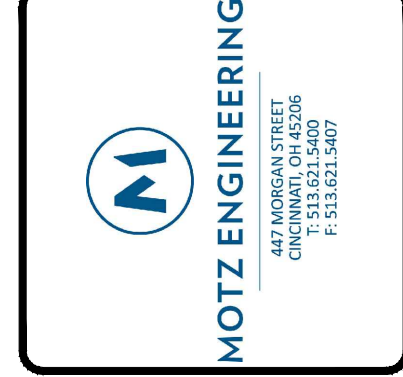


NOTE:
1. PROVIDE BALANCING DAMPER AT ALL BRANCH TAKE-OFFS
ROUND DUCT BRANCH TAKE-OFF DETAILS
SCALE: N.T.S. 2 MS.10



CEILING DIFFUSER CONNECTION DETAILS
SCALE: N.T.S. 1 MS.10

NOT FOR CONSTRUCTION



| NO. | ISSUE / REVISION | DATE |
|-----|---------------------------------|------------|
| 1 | ISSUED FOR 5% CONSTRUCTION DOCS | 11/13/2023 |
| 2 | ISSUED FOR 10% BID SET | 03/07/2023 |

| NO. | ISSUE / REVISION | DATE |
|-----|---------------------------------|------------|
| 1 | ISSUED FOR 5% CONSTRUCTION DOCS | 11/13/2023 |
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|-----|---------------------------------|------------|
| 1 | ISSUED FOR 5% CONSTRUCTION DOCS | 11/13/2023 |
| 2 | ISSUED FOR 10% BID SET | 03/07/2023 |

PROPOSED OFFICES FOR:
INTERNAL REVENUE SERVICE
7300 TURFWAY ROAD
THIRD & FOURTH FLOORS
FLORENCE, KY. 41042
KEVIN SULLIVAN ARCHITECTURE LLC
2646 PANCOAST AVE. CINCINNATI, OHIO 45211
(513) 721-2191
kevin@sullivanarchitecture.com

SCALE: AS SHOWN
DATE: 11/18/2022
COMM. NO. 22064
DRAWN BY: JDH

3RD & 4TH FLOOR MECHANICAL DEMOLITION PLAN

SHEET M5.10

(CONTINUED FROM SHEET M5.30)

C. 90-Degree Tees and Laterals and Conical Tees: Fabricate to comply with SMACNA's "HVAC Duct Construction Standards-Metal and Flexible," with metal thicknesses specified for longitudinal-seam straight ducts.

D. Diverging Flow Fittings: Fabricate with reduced entrance to branch tees and with no excess material projecting from fitting onto branch air entrance.

E. Fabricate elbows using die-formed, gored, plated, or mirrored construction. Bend radius of die-formed, gored, and plated elbows shall be 1-1/2 times duct diameter. Unless elbow construction type is indicated, fabricate elbows as follows:
1. Mitered Elbow Radius and Number of Pieces: Welded construction complying with SMACNA's "HVAC Duct Construction Standards-Metal and Flexible," unless otherwise indicated.
2. Die-Formed Elbows for Sizes through 12 inches in Diameter with 2-piece welded construction, 24 ga.
3. Round Elbows Larger Than 14 inches in Diameter: Fabricate gored elbows 22 ga. for 16 inches through 26 inches, 20 ga. for 28 inches and above.

F. All tees and crosses shall be conical fittings.

G. Round connections to rectangular ducts shall be made with bellmouth fittings.

H. All connections to round ductwork shall be made with full body fittings. Side laps and saddles are not acceptable.

PART 3 - EXECUTION

3.1 DUCT APPLICATIONS

A. Static-Pressure Classes: Unless otherwise indicated, construct ducts according to the following:
1. Supply Ducts (from air handling units to VAV terminal units), (Positive Pressure): 4 inch w.g. pressure class.
2. Supply Ducts (from terminal units to air devices), (Positive Pressure): 2-inch w.g. pressure class.
3. Return Ducts (from air devices to air handling units) (Negative Pressure): 2-inch w.g. pressure class.
4. Exhaust Ducts, (Negative Pressure): 2-inch w.g. pressure class.

B. All ducts shall be of galvanized steel construction.

3.2 DUCT INSTALLATION

A. Construct and install ducts according to the most current version of SMACNA's "HVAC Duct Construction Standards-Metal and Flexible," unless otherwise indicated.

B. Install round ducts in lengths not less than 10 feet unless interrupted by fittings.

C. Install ducts with fewest possible joints.

D. Install fabricated fittings for changes in direction, size, and shape and for connections. Fittings indicated on drawings are diagrammatic and are for information purposes only.

E. Install couplings tight to duct wall surface with a minimum of projections into duct. Secure couplings with sheet metal screws. Install screws at intervals of 12 inches, with a minimum of three (3) screws in each coupling.

F. Install ducts, unless otherwise indicated, vertically and horizontally and parallel and perpendicular to building lines; avoid diagonal runs.

G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.

I. Conspiral ducts from view in finished spaces. Do not encase horizontal runs in solid partitions unless specifically indicated.

J. Coordinate layout with suspended ceiling, fire-dampers, lighting layouts, and similar finished work.

K. Seal all joints and seams. Apply sealant to male end connectors before insertion, and afterward to cover entire joint and sheet metal screws. Longitudinal joints shall be on the top side of horizontal ducts.

L. Protect duct interiors from the elements and foreign materials until building is enclosed. Follow SMACNA's "Duct Cleanliness for New Construction." All ductwork to be maintained at the SMACNA Intermediate Cleanliness level.

M. This Contractor shall paint interiors of metal ducts, that do not have duct liner, for 24 inches upstream and downstream of duct-mounted registers and grilles. Apply one (1) coat of flat, black latex finish coat over a compatible galvanized-steel primer.

N. Duct dimensions on drawings are inside clear dimensions.

3.3 SEAM AND JOINT SEALING

A. Seal all duct seams and joints according to SMACNA's "HVAC Duct Construction Standards-Metal and Flexible" for duct pressure class indicated.

B. Seal ducts before external insulation is applied.

3.4 HANGING AND SUPPORTING

A. Support horizontal ducts within 24 inches of each elbow and within 48 inches of each branch intersection.

B. Support vertical ducts at maximum intervals of 6 feet and at each floor.

C. Install upper attachments to structures with an allowable load not exceeding one-fourth of failure (proof-test) load.

3.5 CONNECTIONS

A. Make connections to equipment with flexible connectors.

B. Comply with SMACNA's "HVAC Duct Construction Standards-Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 DUCT CLEANING

A. Clean new duct system(s) before testing, adjusting, and balancing.

B. Use service openings for entry and inspection.
1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated duct.
2. Disconnect and remove flexible ducts as needed for cleaning and inspection.
3. Remove and reinstall ceiling to gain access during the cleaning process.

C. Particulate Collection and Odor Control:
1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.
2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downward and away from air intakes and other points of entry into building.

D. Clean the following components by removing surface contaminants and deposits:
1. Air outlets and inlets (registers, grilles, and diffusers).
2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, belts, dampers, and drive assemblies.
3. Coils and related components.
4. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
5. Supply-air ducts, dampers, actuators, and turning vanes.
6. Dedicated exhaust and ventilation components and makeup air systems.

E. Mechanical Cleaning Methodology:
1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections to areas being cleaned are under negative pressure.
3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
4. Provide drainage and odor collection for wash-room procedures.
5. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

3.7 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections according to SMACNA's "HVAC Air Duct Leakage Test Manual" and prepare test reports:
1. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
2. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If pressure classes are not indicated, test the entire system at maximum design pressure. Do not pressurize systems above maximum design operating pressure. Give seven (7) day advance notice for testing.
3. Maximum Allowable Leakage: Comply with requirements for Leakage Class 3 for round ducts, Leakage Class 12 for rectangular ducts in pressure classes lower than and equal to 2 inch w.g. (both positive and negative pressures) and leakage class 6 for pressure classes above 2 inch w.g.

Remake leaking joints and reset unit leakage to equal to or less than maximum allowable.

SECTION 233300 - AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
1. Volume dampers.
2. Motorized Control Dampers.
3. Turning vanes.
4. Duct-mounting access doors.
5. Flexible connectors.
6. Flexible ducts.
8. Duct accessory hardware.

B. The motorized automatic control dampers are supplied by the HVAC Contractor. The HVAC contractor shall install the motorized automatic control dampers. TIC shall provide operators and linkage.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

A. Comply with the most current version of SMACNA's "HVAC Duct Construction Standards-Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods, unless otherwise indicated.

B. Galvanized Sheet Steel: Lock-forming quality, complying with ASTM A 663 and having G60 (Z180) coating designation; ducts shall have mill-phosphated finish for surfaces exposed to view.

C. Reinforcement Shapes and Plates: Galvanized-steel reinforcement when installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

D. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less, 3/8-inch minimum diameter for lengths longer than 36 inches.

2.2 VOLUME DAMPERS

A. Manufacturers:
1. Air Balance, Inc.
2. American Warning and Ventilating
3. Lindab (Medium velocity Basis of Design)
3. McGiR AirFlow Corporation
4. Metablast, Inc.
5. Ruskin Company (Low velocity Basis of Design)

B. General Description: Factory fabricated, with required hardware and accessories. Stiffen damper blades for stability. Include dial-type quadrant handle locking device to hold single-blade dampers in a fixed position without vibration. Close duct penetrations for damper components to seal duct consistent with pressure class. Provide stand-off assembly for all balancing dampers that are installed in insulated ducts.

C. Standard Volume Dampers: Single-blade up to 6" blade width and opposed multi-blade on 8" and larger blade width. Steel Frames: 22 gauge, hot-shaped, galvanized sheet steel channels, with mitered and welded corners; frames with flanges where indicated for attaching to walls and frameless frames where indicated for installing in ducts.
1. Steel Frames: 22 gauge, hot-shaped, galvanized sheet steel channels, with mitered and welded corners; frames with flanges where indicated for attaching to walls and frameless frames where indicated for installing in ducts.
2. Roll-Formed Steel Blades: 22 gauge galvanized sheet steel.
3. Blade Axes: Galvanized steel.
4. Bearings: Milled synthetic.
5. Tie Bars and Brackets: Aluminum.
6. Tie Bars and Brackets: Galvanized steel.

D. Low velocity rectangular: Ruskin Model MD25

E. Low velocity round: Ruskin Model MDRS25

2.3 MOTORIZED CONTROL DAMPERS

A. Manufacturers:
1. Air Balance, Inc.
2. American Warning and Ventilating
3. Greenheck
4. Ruskin Company

B. General Description: AMCA-rated, parallel or opposed blade design; minimum of 11 gauge thick, galvanized-steel frames with holes for duct mounting with maximum blade width of 18 inches.
1. Secure blades to 1/2 inch diameter, zinc-plated axles using zinc-plated hardware, with nylon blade bearings, blade-ledge hardware of zinc-plated steel and brass, ends sealed against spring-stainless steel blade bearings, and thrust bearings at each end of every blade.
2. Operating Temperature Range: From minus 40 to plus 200 deg F.
3. Provide parallel or opposed-blade design with inflatable seal blade edging, or replaceable rubber seals, rated for leakage at less than 10 cfm per sq. ft. of damper area, at differential pressure of 4 inch wg. when damper is fully open and forces of 50 lb. x 108 when tested according to AMCA 5002.
4. Coordinate damper mounting with the Temperature Control Contractor including blade and rod as well as the operator mounting.

2.4 TURNING VANES

A. Fabricate to comply with the most current version of SMACNA's "HVAC Duct Construction Standards-Metal and Flexible" for vanes and vane turners. Vane runners shall automatically align vanes.

B. Manufactured Turning Vanes: Fabricate 1-1/2 inch wide, arfo-vene, curved blades of galvanized sheet steel set 3/4 inch o.c.; support with bars perpendicular to blades set 2 inches o.c.; and set into vane runners suitable for duct mounting.
1. Manufacturers:
a. Ductmate Industries, Inc.
b. Duro Dyno Corp.
c. METALARE, Inc.

C. Seal around frame attachment to duct and door to frame with neoprene or foam rubber.

D. Insulation: 1-inch thick, fibrous-glass or polyethylene-foam board.

2.6 FLEXIBLE CONNECTORS

A. Manufacturers:
1. Ductmate Industries, Inc.
2. Duro Dyno Corp.
3. Ventflex, Inc.

B. General Description: Flame-retardant or noncombustible fabrics, coatings, and adhesives complying with UL 181, Class 1.

C. Metal-Edge Connectors: Factory fabricated with a fabric strip 3" to 7" wide attached to two strips of 2.34-inch wide, 0.028-inch thick, galvanized sheet steel or 0.032-inch thick aluminum sheets. Select metal compatible with ducts.

D. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
1. Minimum Weight: 26 oz./sq. yd.
2. Tensile Strength: 480 lbf/inch in the warp and 300 lbf/inch in the filling.
3. Service Temperature: Minus 40 to plus 200 deg F.

E. Outdoor System, Flexible Connector Fabric: Glass fabric double coated with weatherproof, synthetic rubber resistant to UV rays and ozone.
1. Minimum Weight: 24 oz./sq. yd.
2. Tensile Strength: 530 lbf/inch in the warp and 440 lbf/inch in the filling.
3. Service Temperature: Minus 50 to plus 250 deg F.

2.7 FLEXIBLE DUCTS

A. Manufacturers:
1. Flexmaster U.S.A., Inc.
2. Hart & Cooley, Inc.
3. McGiR AirFlow Corporation.

B. Non-Insulated Duct Connectors: UL 181 Class 1, black polymer film supported by helically wound, spring-steel wire.
1. Pressure Rating: 4-inch w.g. positive and 0.5-inch w.g. negative.
2. Maximum Air Velocity: 4000 fpm.
3. Temperature Range: Minus 20 to plus 175 deg F.

C. Insulated Duct Connectors: UL 181 Class 1, black polymer film supported by helically wound, spring-steel wire, fibrous-glass insulation; polyethylene vapor barrier film.
1. Pressure Rating: 4-inch w.g. positive and 0.5-inch w.g. negative.
2. Maximum Air Velocity: 4000 fpm.
3. Temperature Range: Minus 20 to plus 175 deg F.

D. Flexible Duct Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action, in sizes 3 through 18 inches to suit duct size.

PART 3 - EXECUTION

3.1 APPLICATION AND INSTALLATION

A. Install duct accessories according to applicable details in the most current version of SMACNA's "HVAC Duct Construction Standards-Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.

B. Provide duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel ducts.

C. Install backdraft dampers on exhaust fans or exhaust ducts where indicated.

D. Provide balancing dampers at points on supply, return, and exhaust systems where branches lead from larger ducts as required for air balancing. Install at a minimum of two (2) duct widths from branch takeoff. Locking quadrants shall be easily accessible and shall be installed on the outside of the duct insulation.

PART 3 - EXECUTION

3.1 IDENTIFICATION

E. Install duct access doors to allow for inspecting, adjusting, and maintaining accessories and terminal units as follows:
1. Downstream from volume dampers and equipment.
2. To interior of ducts for cleaning before and after each change in direction, at maximum 50-foot spacing. Duct-mounted grilles will replace access doors for duct cleaning.
3. On sides of ducts where adequate clearance is available.

F. Install the following sizes for duct-mounting, rectangular access doors: Based on the following maximum duct dimensions:
1. 5' and smaller: 6" x 8" door size.
2. 10' to 12": 8" x 12" door size.
3. 13' to 16": 12" x 16" door size.
4. 18' and larger: 14" x 14" door size.

G. Label access doors according to Division 23 Section "Mechanical Identification."

H. Install flexible connectors immediately adjacent to equipment in ducts associated with fans and motorized equipment supported by vibration isolators.

I. Connect terminal units to supply ducts with maximum 12-inch lengths of flexible duct. Do not use flexible ducts to change directions.

J. Connect diffusers to low pressure ducts with maximum 60-inch lengths of flexible duct clamped or strapped in place. See detail on drawings.

K. Connect flexible ducts to metal ducts with draw bands.

3.2 ADJUSTING

A. Adjust duct accessories for proper settings.

B. Final positioning of manual-volume dampers is specified in Division 23 Section "Testing, Adjusting, and Balancing."

SECTION 233600 - AIR TERMINAL UNITS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Pressure independent, variable volume air terminal units.

1.2 SUBMITTALS

A. Product Data: For each type of the following products, including rated capacities, furnished specialties, sound-power ratings, and accessories.
1. Air terminal units.
2. Liners and adhesives.
3. Sealants and gaskets.
4. Seismic-restraint devices.

B. Shop Drawings: For air terminal units, include plans, elevations, sections, details, and attachments to other work.
1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Wiring Diagrams: For power, signal, and control wiring.
3. Hangers and supports, including methods for duct and building attachment, seismic restraints, and vibration isolation.

C. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Ceiling suspension assembly members.
2. Size and location of initial access modules for acoustic tile.
3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.

D. Field quality-control reports.

E. Operation and Maintenance Data: For air terminal units to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
1. Instructions for resetting minimum and maximum air volumes.
2. Instructions for adjusting minimum set points.

1.3 QUALITY ASSURANCE

A. 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.

B. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2004, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up."

PART 2 - PRODUCTS

2.1 DAMPER MOTOR OPERATED VARIABLE VOLUME TERMINAL UNITS WITH ELECTRIC REHEAT COILS

A. Furnish and install, where shown, DDC operated, pressure independent, variable volume air control terminal units.

B. Variable air volume supply air control terminals for connection to medium pressure duct, central air systems, with direct digital control, and unit mounted hot water coils.

C. Identify each terminal unit with clearly marked identification label and airflow indicator. Label shall include unit number or flow, maximum factory set air flow, and coil type. Also provide, mounted on bottom of box to be clearly visible from below, laminated label indicating box number and AHU number which feeds box.

D. Controls: Terminal unit manufacturer shall include factory mounting, control, calibrating, and testing of direct digital control provided by Temperature Control Contractor in a separate bid package.

E. Casings: Units shall be completely factory assembled, manufactured of corrosion protected welded steel, and fabricated with a minimum of 18-gauge metal on the side steel of the VAV damper and 22-gauge metal on the end steel and unit casing.

F. Insulation: Flat Face - Interior surface of unit casing is acoustically and thermally lined with a minimum of 1 inch, R-Value 4.3, 1.8 lb./cu. ft. for face insulation. All exposed edges are sealed to prevent bypass in the airstream. Meets NFPA-90A, UL 181 and bacteriological standard ASTM C 665.

G. Assembly: Air volume damper, fans, and controls in single cabinet.

H. Volume Damper: Locate air volume damper assembly inside unit casing. Construct from extruded aluminum or a minimum of 20 gauge galvanized steel components. Key damper blades into shaft with nylon fitted pivot points. Flow sensor must be provided regardless of control system. Flow sensor must be a ring or cross. Bar or single point sensing device is not acceptable. Air volume control damper shall be factory calibrated assembly consisting of air valve with integral actuator. Electric actuator shall position damper.

I. Electric heating coil: Heating coil capacities shall be as scheduled on the drawings. A quick opening access panel shall be provided to allow cleaning and inspection of the coil. The coils shall be electric resistance type with SCR control. Provide disconnected with vent. Coil shall be tested and certified according to ARI Standard 410.

J. Tests:
1. Factory set and check all DDC controllers to within 5% of scheduled maximum and minimum settings. Base performance on tests conducted in accordance with ARI 860.
2. Maximum Casing Leakage: 1 percent of nominal air flow at 0.5 in w.g. inlet static pressure.
3. Maximum Damper Leakage: 1 percent of design air flow at 4 in w.g. inlet static pressure.

K. Each terminal unit shall operate as follows:
1. At all times (DDC control): Unit shall be capable of regulating supply air from minimum to maximum supply air quantities. Refer to drawings for minimum and maximum air quantities.
2. Each terminal unit shall include a laminated label showing terminal unit number and which AHU it is fed from.
3. Blbs shall be based on Procs. Triba, Carter, York, Trane, Tubo & Bailey terminal units equipped with hot water reheat coil of various types and sizes as scheduled on the drawings.
4. Unit shall include inlet air temperature sensor to automatically change from the heat/cool mode to satisfy zone requirements.

2.2 SOURCE QUALITY CONTROL

A. Factory Tests: Test assembled air terminal units according to ARI 860.
1. Label each air terminal unit with plan number, normal airflow, maximum and minimum factory-set airflow, coil type, and ARI certification label.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install air terminal units according to NFPA 90A, "Standard for the Installation of Air Conditioning and Ventilating Systems."

B. Install air terminal units level and plumb. Maintain sufficient clearance for normal service and maintenance.

C. Install wall-mounted thermostats.

3.2 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Hangers and Supports."

B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which they are attached.
1. Use powder-actuated concrete fasteners for standard-weight aggregate concrete and for slabs more than 4 inches thick.

3.3 CONNECTIONS

A. Connect ducts to air terminal units according to Division 23 Section "Metal Ducts."

B. Make connections to air terminal units with flexible connectors complying with requirements in Division 23 Section "Air Duct Accessories."

PART 3 - EXECUTION

3.4 IDENTIFICATION

A. Label each air terminal unit with plan number, normal airflow, and maximum and minimum factory-set airflow. Comply with requirements in Division 23 Section "Identification for HVAC Piping and Equipment" for equipment labels and warning signs and labels.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

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

D. Tests and Inspections:
1. After installing air terminal units and after electrical circuitry has been energized, test for compliance with requirements.
2. Leak Test: After installation, fill water coils and test for leaks. Repair leaks and retest until no leaks exist.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. Air terminal unit will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

3.6 STARTUP SERVICE

A. Perform startup service.
1. Complete installation and startup checks according to manufacturer's written instructions.
2. Verify that inlet duct connections are as recommended by air terminal unit manufacturer to achieve proper performance.
3. Verify that controls and control enclosure are accessible.
4. Verify that control connections are complete.
5. Verify that nomenclature and identification tags are visible.
6. Verify that controls respond to inputs as specified.

D. Demonstration:
A. Train Owner's maintenance personnel to adjust, operate, and maintain air terminal units.

SECTION 233713 - DIFFUSERS, REGISTERS AND GRILLES

PART 1 - GENERAL

1.1 REFERENCE

A. SCOPE OF WORK
1. Provide grilles, diffusers, air devices and appurtenances with size and capacities as shown on drawings.
2. Submit.

A. Product Data: For each product indicated, include the following:
1. Data Sheet: Indicate materials of construction; finish and mounting details; and performance data including throw and drop, static-pressure drop and noise ratings.
2. Diffuser, Register and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size and accessories furnished.

A. Section Includes:
1. Square Plaque Face Ceiling Diffusers
2. Round Diffusers
3. Supply Registers
4. Heavy Duty Bar Type Return Grilles and Registers
5. Eggcrate Grilles and Registers
6. Plenum Slot Diffusers

PART 2 - PRODUCTS

A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the manufacturers specified.
1. Price (Basis of Design)
2. Knauser
3. Tlus
4. Arnestat

2.2 Square Plaque Face Ceiling Diffusers
A. Ceiling diffusers of sizes and mounting types designated by the plans. Diffusers shall consist of a precision formed back core of one-piece seamless construction which incorporates a round inlet collar of sufficient length for connecting top of flexible duct. Air flow plaque assembly shall be incorporated between the back core and the ceiling panels to assure proper air distribution performance. The inner plaque assembly shall be completely removable from the diffuser face to allow full access to any dampers or other ductwork components located behind the diffuser rack. The diffuser is to include an integral opposed blade damper that is adjustable from the face of the air device. Finish shall be white powder coat unless otherwise specified on the drawings.

2.3 Round Ceiling Diffusers
A. Round diffusers of sizes and mounting types designated by the plans. Diffusers shall have a round outer cone constructed of 18-gauge steel and heavy gauge aluminum plaque face. The exposed surface of the plaque shall be smooth and flat. The airflow discharge pattern shall be field adjusted from horizontal to vertical by connecting top of flexible duct. Air flow plaque assembly shall be incorporated between the back core and the ceiling panels to assure proper air distribution performance. The inner plaque assembly shall be completely removable from the diffuser face to allow full access to any dampers or other ductwork components located behind the diffuser rack. The diffuser is to include an integral opposed blade damper that is adjustable from the face of the air device. Finish shall be white powder coat unless otherwise specified on the drawings.

2.4 Supply Registers
A. Supply registers of the sizes and mounting types indicated on the plans and outlet schedule. Registers shall be double deflection type with two sets of fully adjustable deflection blades spaced 3/4" on center. The front set of blades shall run parallel to the short dimension of the register. The integral volume control damper shall be of the opposed blade type and shall be constructed of cold rolled steel. The damper shall be operable from the register face. The damper shall be coated steel. Registers are to be suitable for surface mounting or duct mounting as indicated on the drawings. Registers mounted in walls shall have steel plaster frames. Provide 1-1/4" margin with countersunk screw mounting for drywall and masonry surfaces complete with mounting frame. Units in equipment rooms shall be a mill finish. All other registers shall have a white powder coat finish unless otherwise specified on the drawings.

2.5 Heavy Duty Bar Type Return Register and Grilles
A. Exhaust registers of the sizes and mounting types indicated on the plans and outlet schedule. Registers shall be 45-degree deflection fixed lower type with blades spaced 3/4" on center. The outlet shall have 18-gauge steel blades and heavy-duty steel support bars and frame. Blades shall run parallel to the long dimension of the register. The integral volume control damper shall be of the opposed blade type and shall be constructed of cold rolled steel. The damper shall be operable from the register face. The damper shall be coated steel. Registers mounted in walls shall have steel plaster frames. Provide 1-1/4" margin with countersunk screw mounting for drywall and masonry surfaces complete with mounting frame. All registers shall have a white powder coat finish unless otherwise specified on the drawings.

2.6 Eggcrate Grilles and Registers
A. Exhaust and vent registers and grilles of the sizes and mounting types indicated on the plans. Units shall be of aluminum construction, consisting of aluminum 1/2" x 1/2" x 1/2" eggcrate core and an extruded aluminum border. Units designated as registers shall be equipped with integral volume control damper of the opposed blade type and shall be constructed of heavy gauge