## GRILLES - REGISTERS - DIFFUSERS

| DESIG. | DUTY | TYPE | MOUNTING LOCATION | MATERIAL | VOLUME CONTROL | FINISH | AIR PATTERN CONTROL | METHOD OF SUPPORT | EQUAL TO MANUFACTURER AND MODEL NO. | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|
| A | SUPPLY | LOUVERED | LAY-IN CLG | STEEL | NO | OFF WHITE | YES | T-BAR | TITUS TMS 24X24 FACE | SEE NOTE 1,2 |
| B | RETURN | PERFORATED | LAY-IN CLG | STEEL | NO | OFF WHITE | NO | T-BAR | TITUS PAR 24X24 FACE | SEE NOTE 2 |
| C | SUPPLY | SLOT | LAY-IN CLG | STEEL | NO | BLACK | YES | T-BAR | TITUS TBD80 (1)1-1/2" SLOT | SEE NOTE 1,2,3,5 |
| D | SUPPLY | AER-BLADE | LAY-IN CLG | ALUMINUM | OBD | OFF WHITE | YES | T-BAR | TITUS 272RS | SEE NOTE 7 |
| E | RETURN | FIXED | SIDEWALL | STEEL | NO | OFF WHITE | YES | SURFACE | TITUS 25RL | SEE NOTE 4 |

NOTES:
1) NECK SIZES AS FOLLOWS:

| DESIGNATION "A" CFM RANGE | NECK SIZE | DESIGNATION "C" CFM RANGE | NECK SIZE | LENGTH |
|---|---|---|---|---|
| 000-250 | 8"RD | 000-130 | 8"RD | 2'-0" |
| 255-400 | 10"RD | 135-260 | 10"RD | 4'-0" |
| 405-550 | 12"RD | | | |
| 555-700 | 14"RD | | | |

2) NOTIFY ENGINEER OF ANY DISCREPENCIES BETWEEN NEW MODEL NUMBER AND EXISTING NUMBER PRIOR TO PURCHASE.
3) COORDINATE NEW INACTIVE SECTIONS NEXT TO SLOT DIFFUSER WITH ARCHITECT PRIOR TO BIDDING.
4) REFER TO DRAWINGS FOR GRILLE/NECK SIZES.
5) INACTIVE SECTIONS OF SLOT DIFFUSERS SHALL HAVE SHEET METAL LIGHTPROOF SIGHT GUARDS AND SHALL BE USED FOR RETURN AIR.
6) PROVIDE WITH 24X24 PANEL-BORDER TYPE 3 AND TRANSITION FROM SQUARE TO ROUND DUCT. REFER TO DRAWINGS FOR GRILLE/NECK SIZES.
7) APPROVED MANUFACTURERS: PRICE, TITUS, NAILOR, GREENHECK, & KRUEGER.

## FAN POWERED BOXES

| DESIG. | SERVES | DESIGN COOLING CFM | MIN COOLING CFM | ELECTRIC HEATING COIL | | | | INLET SIZE (IN.) | EQUAL TO MANUF & MODEL NO. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | HEATING CFM | FAN HP | ELEC KW | VOLT/PH | | |
| FP2-9A | OFFICE 257 | 620 | 155 | 434 | 1/8 | 4.5 | 277/480/3 | 10 | METALAIRE FVI |

NOTES: (APPLICABLE TO ALL BOXES)
1) REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2) PROVIDE FIBER FREE LINER EQUAL TO PLYMER FOAM INSULATION.
3) REFER TO SCHEDULE FOR MINIMUM SETPOINTS
4) BOXES SHALL BE BUILDING STANDARD DDC CONTROLS AND CONNECTED TO BMS VIA BUILDING STANDARD SEQUENCE OF OPERATION.
5) APPROVED MANUFACTURERS: ENVIRO-TEC, PRICE, NAILOR, TITUS, JCI, GREENHECK, & TRANE.
6) ALL SUBSTITUTIONS SHALL BE APPROVED, IN WRITING, PRIOR TO BID.
7) PROVIDE SINGLE POINT CONNECTION AND FUSED DISCONNECT FOR EACH UNIT.
8) BOXES SHALL BE PROVIDED WITH MAGNETIC CONTACTORS, SCR, AIR FLOR SWITCHES AND DOOR INTERLOCK.
9) FILTER RESISTANCE IS NOT INCLUDED IN THE SCHEDULED EXTERNAL STATIC PRESSURE.
10) BOXES SHALL BE PRESSURE INDEPENDENT.

# GENERAL DEMOLITION NOTES:

A. ALL WORK SHALL COMPLY WITH APPLICABLE NATIONAL, STATE AND LOCAL CODES, RULES, REGULATIONS AND REQUIREMENTS.

B. ALL WORK SHALL COMPLY WITH THE BUILDING TENANT CONSTRUCTION GUIDE. COORDINATE WITH BUILDING MANAGEMENT/OWNER FOR ACCESS TO ANY TENANT LEASE SPACES THAT MIGHT BE REQUIRED FOR THE INSTALLATION. . UNLESS DIRECTED BY LANDLORD ALL EQUIPMENT AND WORKMANSHIP SHALL BE GUARANTEED FOR 1 YEAR.

C. EXISTING CONDITIONS ARE BASED ON INFORMATION PROVIDED BY SITE SURVEY AND PREVIOUS RECORD DRAWINGS. HOWEVER, IT IS NOT INTENDED TO BE A TRUE REPRESENTATION OF ACTUAL CONDITIONS. CONTRACTOR SHALL VISIT JOB SITE PRIOR TO BIDDING TO ASCERTAIN EXISTING CONDITIONS AND SHALL NOTIFY ARCHITECT OF ANY DISCREPANCIES PRIOR TO BID.

D. REMOVAL OF EXISTING FIXTURES AND EQUIPMENT WILL REQUIRE ISOLATING THE PIPING RISERS OR MAINS VIA SHUT–OFF VALVES. INSTALL NEW ISOLATION VALVES WHERE REQUIRED FOR COMPLETION OF WORK.

E. REMOVAL OF EXISTING PLUMBING FIXTURES AND EQUIPMENT, ETC. WILL REQUIRE CAPPING AND SEALING EXISTING MAINS OR BRANCHES AS NECESSARY AND REQUIRED TO ALLOW THE REMAINING SYSTEMS TO FULLY OPERATE WITHOUT DEGRADATION.

F. CONTRACTOR SHALL PROVIDE PROTECTIVE PLASTIC DROP CLOTHS TO PROTECT THE EXISTING OCCUPIED AREAS AND EQUIPMENT FROM DUST AND DEBRIS DURING THE CONSTRUCTION WORK, AND SHALL CLEAN THE AREAS OF ALL CONSTRUCTION DIRT DAILY, AND UPON COMPLETION OF THE WORK.

G. ALL DRAINED PIPING RISERS AND MAINS SHALL BE REFILLED WITH PROPER FLUID AND PROPERLY VENTED BY THIS CONTRACTOR, ONCE NEW WORK HAS BEEN INSTALLED.

H. COORDINATE WITH GENERAL CONTRACTOR THE REMOVAL AND REPLACEMENT OF ALL EXISTING CEILINGS, WALLS, ETC. AS REQUIRED FOR MECHANICAL DEMOLITION WORK.

I. EXISTING PIPING AND EQUIPMENT ETC. NOT TO BE UTILIZED IN THE COMPLETED BUILDING SHALL BE DISCONTINUED OR REMOVED AS REQUIRED. ALL ENDS OF DISCONTINUED PIPING SHALL BE CAPPED IN THE NEAREST WALL, CEILING OR FLOOR SO THAT THEY ARE COMPLETELY CONCEALED. OPENINGS LEFT IN WALLS, CEILING, ETC. WHERE EQUIPMENT AND PIPE, ETC. ARE REMOVED AND NOT REPLACED, SHALL BE PATCHED NEATLY WITH SIMILAR MATERIAL TO ADJACENT CONSTRUCTION. REFER TO DRAWINGS DELINEATING NEW WORK FOR ADDITIONAL INFORMATION REGARDING SYSTEMS OR PORTIONS OF SYSTEMS WHERE USE IS TO BE DISCONTINUED.

J. EXISTING PIPING, FIXTURES AND EQUIPMENT THAT ARE NOT TO BE REUSED SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE OWNER IF THEY WISH TO RETAIN OWNERSHIP OF SAME. IF NOT, EQUIPMENT SHALL BECOME THE PROPERTY OF THIS CONTRACTOR AND SHALL BE REMOVED FROM THE SITE AS SOON AS PRACTICAL AND DISPOSED OF IN ACCORDANCE WITH APPLICABLE LAWS AND REGULATIONS.

K. ALL CUTTING AND CHANNELING OF EXISTING BUILDING SHALL BE ACCOMPLISHED IN A NEAT AND WORKMANLIKE MANNER WITHOUT REMOVAL OF EXCESS MATERIALS. THIS CONTRACTOR SHALL PATCH AND REPLACE WITH MATERIAL SIMILAR TO ADJACENT CONSTRUCTION.

L. WHERE EXISTING PIPING AND EQUIPMENT, ETC., THAT ARE TO BE UTILIZED IN THE COMPLETED PROGRAM CONFLICT WITH NEW CONSTRUCTION AND THE REQUIRED DEMOLITION. THEY SHALL BE RELOCATED AND RECONNECTED TO MAINTAIN THE DESIRED SERVICE.

M. PORTIONS OF EXISTING SYSTEMS MAY BE SHOWN FOR CLARITY EVEN THOUGH IT MAY NOT BE NECESSARY TO MODIFY OR REVISE THEM. ALL EXISTING SYSTEMS ARE SHOWN BASED ON ORIGINAL OR REMODEL BUILDING DRAWINGS. CONTRACTOR TO VERIFY ALL EXISTING CONDITIONS.

N. ALL WORK MUST BE COORDINATED AND SCHEDULED WITH THE OWNER AND OCCUPANTS OF THIS BUILDING SO AS TO PROVIDE THE LEAST AMOUNT OF DISRUPTION OF THE NORMAL BUILDING ACTIVITIES AS POSSIBLE. MAINTAIN CONDITIONED SPACE FOR ALL OWNER OCCUPIED AREAS DURING CONSTRUCTION.

O. ALL ACCESSIBLE ABANDONED PIPING AND DUCTWORK SHALL BE REMOVED AND PROPERLY DISPOSED OF.

# GENERAL NOTES:

A. ALL WORK SHALL COMPLY WITH APPLICABLE NATIONAL, STATE AND LOCAL CODES, RULES, REGULATIONS AND REQUIREMENTS.

B. ALL WORK SHALL COMPLY WITH THE BUILDING TENANT CONSTRUCTION GUIDE. COORDINATE WITH BUILDING MANAGEMENT/OWNER FOR ACCESS TO ANY TENANT LEASE SPACES THAT MIGHT BE REQUIRED FOR THE INSTALLATION. . UNLESS DIRECTED BY LANDLORD ALL EQUIPMENT AND WORKMANSHIP SHALL BE GUARANTEED FOR 1 YEAR.

C. EXISTING CONDITIONS ARE BASED ON INFORMATION PROVIDED BY SITE SURVEY AND PREVIOUS RECORD DRAWINGS. HOWEVER, IT IS NOT INTENDED TO BE A TRUE REPRESENTATION OF ACTUAL CONDITIONS. CONTRACTOR SHALL VISIT JOB SITE PRIOR TO BIDDING TO ASCERTAIN EXISTING CONDITIONS AND SHALL NOTIFY ARCHITECT OF ANY DISCREPANCIES PRIOR TO BID.

D. CONTRACTOR SHALL ENGAGE AN INDEPENDENT AIR BALANCING COMPANY TO OBTAIN AIR QUANTITIES SHOWN ON DRAWING. AT COMPLETION OF AIR BALANCE, BALANCING DAMPER SHALL BE TIGHTENED AND PROPERLY SEALED WITH FOIL TAPE.

E. ALL MEDIUM AND LOW PRESSURE DUCTWORK SHALL BE GALVANIZED SHEET METAL, FABRICATED. INSTALL AND SEAL MEDIUM PRESSURE DUCTWORK FOR 3"W.G. AND LOW PRESSURE DUCTWORK FOR 1"W.G. IN ACCORDANCE WITH SMACNA STANDARD. DUCTWORK SHALL BE INSULATED WITH FIBERGLASS BLANKET WITH FOIL FACED VAPOR BARRIER TO MEET ECC REQUIREMENT (MIN R5 VALUE).

F. ALL SUPPLY AND RETURN DUCT SIZES ARE FREE AREAS.

G. INDIVIDUAL DUCT RUN–OUTS TO EACH DIFFUSER SHALL BE SIZED IN ACCORDANCE TO THE DIFFUSER NECK SIZE FOUND IN THE GRILLES–REGISTERS–DIFFUSERS SCHEDULE UNLESS NOTED OTHERWISE

H. OFFSET DUCTS INTO JOIST SPACE FOR CLEARANCE WHERE SPACE ABOVE CEILING IS NOT SUFFICIENT FOR DUCTS TO CROSS OTHER DUCTS OR WORK OF OTHER TRADES.

I. INSULATED FLEX DUCT IN THE MEDIUM PRESSURE SYSTEM SHALL BE UTILIZED AT INLET TO VAV BOX OR FAN POWERED BOX ONLY. LENGTH SHALL BE LIMITED TO AN OVERALL LENGTH OF TWO (2) FEET AND BE STRAIGHT RUN. INSULATED FLEX DUCT IN THE LOW PRESSURE SYSTEM SHALL BE LIMITED TO AN OVERALL LENGTH OF SIX (6) FEET WITH A MAXIMUM OF A 90 DEGREE CHANGE IN DIRECTION. SUPPORTS SHALL BE SADDLE BANDED TO STRUCTURE. SUPPORTING FROM FIRE PROTECTION PIPING, ELECTRICAL CONDUIT OR CEILING SUPPORT WIRES IS NOT ACCEPTABLE.

J. VAV BOXES AND FAN POWERED BOXES SHALL HAVE 24" MINIMUM CLEARANCE ON ALL SIDES OF BOX. ENSURE NEC CLEARANCES ARE MAINTAINED INCLUDING 36" IN FRONT OF 0–208V POWER AND 42" IN FRONT OF 277/480V POWER.

K. CONTRACTOR SHALL VERIFY ALL EXISTING SLOT DIFFUSERS AS LOCATED PER DRAWINGS OR ENSURE RELOCATION TO MATCH PLANS. CONTRACTOR SHALL ALSO VERIFY THAT EXISTING SLOT INDICATED SHALL BE ABLE TO DELIVER CFM AS NOTED. IF NOT, CONTRACTOR SHALL REMOVE EXISTING SLOT AND REPLACE WITH NEW OR RELOCATED SLOT THAT CAN DELIVER CFM AS INDICATED.

L. ALL ENCLOSED ROOMS (INTERIOR AND PERIMETER) SHALL HAVE RETURN AIR PATH. ROOMS WITH ALL WALLS TO DECK SHALL HAVE LINED SHEET METAL RETURN AIR BOOTS PLACED IN WALL ABOVE CEILING SIZED FOR 500 FPM MAXIMUM. FIRE RATED WALLS SHALL HAVE FIRE DAMPERS WITHIN THE DUCT PER LOCAL CODE REQUIREMENTS. FIRE DAMPERS AND FIRE–SMOKE DAMPERS SHALL BE FREE AREA/OUT OF AIRSTREAM TYPE. ALL MOTORIZED DAMPERS SHALL BE FREE AREA/OUT OF AIRSTREAM TYPE.

M. PIPES AND DUCTS TO BE COORDINATED ON JOB WITH BUILDING STRUCTURE AND WORK OF OTHER CONTRACTORS. ROUTE AS HIGH AS PHYSICALLY POSSIBLE.

N. COORDINATE CEILING DIFFUSERS AND GRILLES WITH LIGHTING FIXTURES. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN.

O. THERMOSTATS TO BE MOUNTED 48" ABOVE FINISHED FLOOR LEVEL UNLESS NOTED OTHERWISE ON THE PLANS. CONTRACTOR SHALL COORDINATE LOCATION OF THERMOSTATS WITH ARCHITECT IN FIELD

P. REPAIR AND PATCH CONSTRUCTION DAMAGED DUE TO THE DEMOLITION OF THIS PROJECT, USING SAME METHODS AND MATERIALS TO MATCH EXISTING.

Q. PROVIDE TEMPORARY HIGH EFFICIENCY FILTER MEDIA ON MAIN RETURN AIR AND EXHAUST FROM FLOOR AT BEGINNING OF PROJECT AND REPLACED AT TWO (2) WEEK INTERVALS UNTIL PROJECT COMPLETION AT WHICH TIME THE FILTER MEDIA SHALL BE REMOVED.

R. FLEXIBLE DUCTS SHALL BE SIMILAR AND EQUAL TO THERMOFLEX: TYPE M–KE. FLEXIBLE DUCTS SHALL COMPLY WITH APPLICABLE REQUIREMENTS OF UL–181, NFPA 90–A AND OTHER GOVERNING AUTHORITIES.

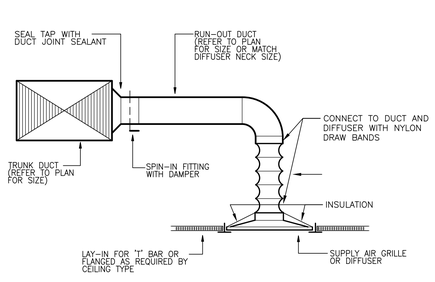
S. FLEXIBLE DUCT BETWEEN DUCT AND AC UNITS AND EXHAUST FANS SHALL BE EQUAL TO VENTFABRICS "VENTGLAS".

T. DUCTLINER SHALL BE 1–INCH ACOUSTICAL DUCT LINING IN ACCORDANCE WITH SMACNA STANDARDS. DUCT LINING SHALL BE OWENS–CORNING FIBERGLAS "AEROFLEX" NO. 200 OR EQUAL.

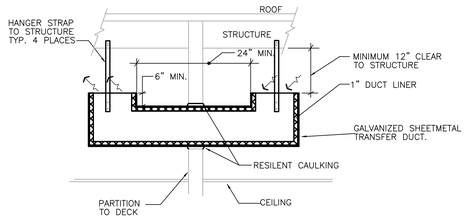
U. ALL EXISTING DUCTWORK SHALL BE FIELD VERIFIED TO BE INSULATED AND IN GOOD CONDITION, ANY TORN, DAMAGED OR MISSING INSULATION WILL BE REPLACED. EXISTING CONTROLS SHALL BE CONFIRMED TO BE IN WORKING CONDITION.

V. CONTROL CONTRACTOR SHALL PROVIDE 24V TRANSFORMER FOR UP TO 5 VAV BOXES SERVED FROM 120V J–BOX. PROVIDE CONTROL WIRE TO EACH VAV BOX.

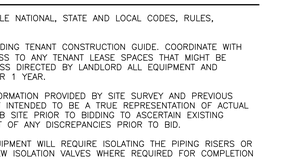
W. ENSURE ALL DEBRIS ABOVE RETURN AIR GRILLES IS REMOVED AND RETURN AIR GRILLE HAS A CLEAR OPEN PATH TO PLENUM.



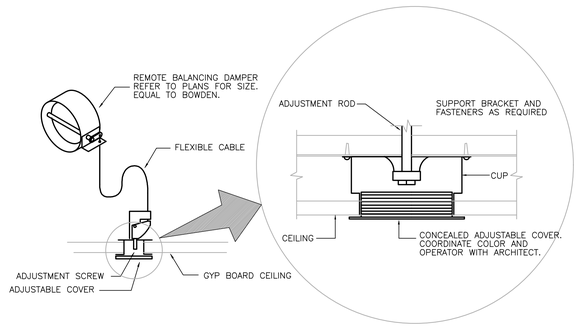

1 DIFFUSER CONNECTION DETAIL
SCALE: NOT TO SCALE




2 RA TRANSFER BOOT DETAIL
SCALE: NOT TO SCALE




3 EXPANDED TAP DETAIL
SCALE: NOT TO SCALE




5 CONCEALED DAMPER OPERATOR DETAIL
SCALE: NOT TO SCALE

## HVAC SYMBOLS

| SYMBOL | DESCRIPTION |
|---|---|
| | ARROW INDICATES EXISTING TO BE RELOCATED AS INDICATED ON PLAN |
| 150 | REDISTRIBUTE AIR TO EXISTING DIFFUSER AS INDICATED ON PLAN |
| 10X10 100 A | INDICATES SIZE, CFM, AND DIFFUSER TYPE |
| | NEW CEILING SUPPLY DIFFUSER |
| | NEW RETURN AIR/EXHAUST GRILLE |
| | EXISTING RETURN AIR/EXHAUST GRILLE |
| | NEW SLOT DIFFUSER |
| | EXISTING SLOT DIFFUSER |
| | POINT OF CONNECTION BETWEEN NEW AND EXISTING WORK |
| E | EXISTING TO REMAIN |
| | REMOVE EXISTING AS INDICATED |
| | CAP EXISTING DUCT |
| | MANUAL VOLUME CONTROL DAMPER |
| | DUCT TRANSITION |
| FD | FIRE (SMOKE) DAMPER (24V ACTUATOR) |
| T | NEW OR RELOCATED THERMOSTAT |
| T | EXISTING THERMOSTAT |
| | FLEXIBLE DUCT CONNECTION |
| | INDICATES A WALL TO DECK (FOR COORDINATION PURPOSE ONLY–REFER TO ARCHITECTS PLANS FOR REQUIREMENTS) |

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STATE OF TEXAS
TODD M. JOHNSON
86955
LICENSED PROFESSIONAL ENGINEER
2/14/25

PROJECT NUMBER:
DRAWN BY:
CHECKED BY:
R.S.F.:

INTERNATIONAL BUSINESS PARK
K. HOVNANIAN HOMES

521-019
TP
EC/CB
8,939

6111 W. PLANO PKWY,
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| NO. | REVISIONS: | DATE: |
|---|---|---|
| | | |

CLIENT/LANDLORD ISSUE DATE: 01/31/2025
BID ISSUE DATE: 02/14/2025
PERMIT ISSUE DATE: 02/14/2025
CONSTRUCTION ISSUE DATE: 02/14/2025

DRAWING TITLE:
MECHANICAL NOTES & SYMBOLS

DRAWING NUMBER:
M0.01

**DIVISION 23 - HEATING VENTILATING AND AIR CONDITIONING**

SECTION 230500 - COMMON WORK RESULTS
PART 1 - GENERAL
1.1 GENERAL NOTES AND SCOPE OF WORK
A. REFER TO SECTION 220500 ON PLUMBING SHEET P1.01 FOR INFORMATION RELATED TO HVAC GENERAL CONDITIONS, MISCELLANEOUS EQUIPMENT AND MATERIALS, AND CONSTRUCTION REQUIREMENTS.
1.2 RELATED SECTIONS
A. SECTIONS 230523, 230529, 230553 AND 230700 ARE APPLICABLE BUT THEY DO NOT APPEAR IN THESE DIVISION 23 SPECIFICATIONS. REFER TO GENERAL NOTES.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 230548 - VIBRATION CONTROLS
PART 1 - GENERAL
1.1 SCOPE OF WORK
A. REFER TO SECTION 230500.

PART 2 - PRODUCTS
2.1 EQUIPMENT PADS
A. PADS SHALL BE 3/4 INCH WATER RESISTANT NEOPRENE WITH WAFFLE PATTERN, MASON TYPE WSW, OR EQUAL.
2.2 ELASTOMERIC HANGERS
A. HANGER SHALL CONSIST OF RODS WITH STEEL BOX HOUSING NEOPRENE ISOLATION ELEMENT AND SPRING, MASON SERIES 30N, OR EQUAL.
2.3 RESTRAINED SPRING ISOLATORS
A. ISOLATORS SHALL UTILIZE A STEEL BASE WITH WAFFLED NEOPRENE PAD, WELDED STEEL ENCLOSURE WITH SPRING AND RESTRAINING BOLTS, MASON TYPE SLR, OR EQUAL.
2.4 ROOF CURB ISOLATORS
A. AS PART OF THE ROOF CURB, PROVIDE SPRING ISOLATORS WITH WATER-TIGHT DESIGN, RETRAINED SPRINGS AND NEOPRENE PADS, MASON TYPE RSC, OR EQUAL.
2.5 INERTIA BASES
A. PROVIDE STEEL POURING FORM FOR REINFORCED CONCRETE BLOCKS WITH FLOOR MOUNTED SPRINGS, MASON KSL, OR EQUAL.

PART 3 - EXECUTION
3.1 SCHEDULE
A. EQUIPMENT PADS - SMALL FLOOR MOUNTED EQUIPMENT OR PACKAGED EQUIPMENT WITH INTERNAL ISOLATION.
B. ELASTOMERIC HANGERS - SUSPENDED AIR HANDLING UNITS, EXHAUST FANS, TERMINAL UNITS, HEAT PUMPS, PUMPS, ETC.
C. RESTRAINED SPRING ISOLATORS - FLOOR MOUNTED FANS GREATER THAN ¾ HP.
D. ROOF CURB ISOLATORS - FACTORY FABRICATED ROOFTOP UNITS.
E. INERTIA BASES - FLOOR MOUNTED PUMPS GREATER THAN ½ HP.
3.2 INSTALLATION
A. INSTALL VIBRATION CONTROLS PER THE MANUFACTURER'S INSTRUCTIONS.

END OF SECTION

SECTION 230553 - IDENTIFICATION
PART 1 - GENERAL
1.1 SCOPE OF WORK
A. REFER TO SECTION 230500.
B. LABEL ALL NEW EQUIPMENT AND PIPING SYSTEMS.

PART 2 - PRODUCTS
2.1 PIPE LABELS
A. PRETENSION PIPE LABELS OF SEMI-RIGID PLASTIC FORMED TO COVER THE FULL CIRCUMFERENCE OF PIPE.
B. IDENTIFY THE SERVICE AND DIRECTION OF FLOW. LABELS SHALL CONTAIN AT LEAST ½ INCH HIGH LETTERING AND BE PLACED SO THEY ARE EASY TO READ.
2.2 VALVE TAGS
A. MULTILAYER, MULTICOLOR PLASTIC LABELS WITH MECHANICAL ENGRAVING AND CHAIN FOR ATTACHMENT TO VALVE.
2.3 EQUIPMENT LABELS
A. MULTILAYER, MULTICOLOR PLASTIC LABELS WITH MECHANICAL ENGRAVING AND HOLES FOR ATTACHMENT TO EQUIPMENT.

PART 3 - EXECUTION
3.1 PIPE LABELS
A. INSTALL PIPE LABELS WHERE PIPING IS EXPOSED OR ABOVE AN ACCESSIBLE CEILING AT MAXIMUM 20 FT. CENTERS.
3.2 VALVE TAGS
A. ATTACH TAGS TO VALVES USING CHAIN. PROVIDE A VALVE SCHEDULE FOR MOUNTING IN THE MECHANICAL ROOM.
3.3 EQUIPMENT LABELS
A. PERMANENTLY ATTACH LABELS TO EQUIPMENT. LOCATE WHERE LABEL CAN BE EASILY SEEN AND READ.

END OF SECTION.

SECTION 230593 - TESTING ADJUSTING AND BALANCING
PART 1 - GENERAL
1.1 SCOPE OF WORK
A. THE WORK INCLUDED IN THIS SECTION CONSISTS OF FURNISHING ALL LABOR, MATERIALS, INSTRUMENTS, TOOLS, AND SERVICES REQUIRED IN CONNECTION WITH THE TESTING, ADJUSTING AND BALANCING (TAB) OF THE HEATING, VENTILATING AND AIR CONDITIONING (HVAC) SYSTEMS AS DESCRIBED IN THE MECHANICAL SPECIFICATIONS AND/OR SHOWN ON THE MECHANICAL PLANS, OR REASONABLY IMPLIED THERE FROM.
B. THE TAB FIRM SHALL HAVE A LICENSED PROFESSIONAL ENGINEER SUPERVISING ALL WORK AND THE FIRM SHALL HOLD A CURRENT AABC OR NEHB CERTIFICATION.
C. REFER TO SECTION 230500.
1.2 START-UP, TEST AND ADJUST
A. PROVIDE ALL TESTS OF EQUIPMENT AND SYSTEMS REQUIRED TO PROVE COMPLIANCE WITH THE DRAWINGS AND SPECIFICATIONS. OWNER SHALL BE MADE COMPLETELY FAMILIAR WITH THE COMPLETE WORKING OF ALL THE MECHANICAL SYSTEMS.
B. THE TESTS SHALL DEMONSTRATE THE SPECIFIED CAPACITIES AND OPERATION OF ALL EQUIPMENT AND MATERIALS COMPRISING THE SYSTEMS. ALL DATA REQUIRED BY THESE SPECIFICATIONS SHALL BE PREPARED ON TYPED FORMS AND SUBMITTED TO THE ENGINEER FOR APPROVAL. COMPLETE APPROVAL WILL BE NECESSARY BEFORE FINAL PAYMENT CAN BE MADE. THE CONTRACTOR SHALL THEN MAKE AVAILABLE SUCH INSTRUMENTS NECESSARY FOR SPOT CHECKS ON THE SYSTEM.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION
3.1 HVAC SYSTEM
A. THE HVAC CONTRACTOR SHALL WORK IN CONJUNCTION WITH THE TAB CONTRACTOR TO START-UP AND OPERATE ALL EQUIPMENT NECESSARY TO PROVIDE A COMPLETE AIR AND WATER TEST AND BALANCE REPORT.
B. TAB CONTRACTOR SHALL MEASURE CFM AT ALL DIFFUSERS, REGISTERS AND GRILLES, AND HVAC UNITS, AS WELL AS WATER FLOWS AT COILS AND PUMPS, TO ASSURE THAT THEY MATCH THE QUANTITIES SHOWN ON THE PLANS (PLUS OR MINUS 5 PERCENT). CONFIRM ALL SEQUENCES OF OPERATION ARE PERFORMING CORRECTLY.
C. TAB CONTRACTOR SHALL CALIBRATE ALL EQUIPMENT AND SENSORS TO WORK PROPERLY AND GIVE CORRECT INFORMATION TO THE BMS SYSTEM.

END OF SECTION

SECTION 230900 - CONTROLS
PART 1 - GENERAL
1.1 SCOPE OF WORK
A. REFER TO SECTION 230500.

PART 2 - PRODUCTS
2.1 CONTROLS SYSTEM
A. PROVIDE NEW, MODIFY OR EXTEND AUTOMATIC TEMPERATURE CONTROLS TO ALL NEW EQUIPMENT SHOWN ON THE DRAWINGS.
B. REFER TO THE DRAWINGS FOR ANY SPECIAL SEQUENCES OF CONTROL AND LOCATION OF EQUIPMENT.
C. REMODEL PROJECTS SHALL UTILIZE EQUIPMENT BY THE SAME MANUFACTURER AS CURRENTLY EXISTS.

PART - EXECUTION
3.1 DESIGN AND LAYOUT
A. THE CONTROL SYSTEM DESIGN AND LAYOUT SHALL BE PERFORMED BY A FACTORY AUTHORIZED AGENT OF THE MANUFACTURER USED.
3.2 SYSTEM OPERATION
A. AT THE CONCLUSION OF WORK, ALL EQUIPMENT AND SYSTEMS SHALL BE PROVEN TO THE ENGINEER TO OPERATE IN ACCORDANCE WITH THE NEW OR EXISTING MAIN CONTROL PANEL AND NEW/EXISTING SEQUENCES OF OPERATION ON THE DRAWINGS.
B. PROVIDE ALL WIRING REQUIRED TO CONNECT INPUT/OUTPUT DEVICES TO CONTROL PANELS.
C. TEST AND ADJUST ALL DEVICES AND DOCUMENT CALIBRATION.
D. PROVIDE NECESSARY INSTRUCTION TO THE OWNER'S PERSONNEL.

END OF SECTION

SECTION 233113 - DUCTWORK
PART 1 - GENERAL
1.1 SCOPE OF WORK
A. REFER TO SECTION 230500.

PART 2 - PRODUCTS
2.1 GENERAL
A. CONCEALED DUCTWORK SHALL BE CONSTRUCTED OF NEW, PRIME GRADE, CONTINUOUS HOT-DIP MILL GALVANIZED, LOCK-FORMING, QUALITY STEEL. REFER TO SMACNA HVAC DUCT CONSTRUCTION STANDARDS.
B. WHERE DUCTS EXPOSED TO VIEW PASS THROUGH WALLS, FLOORS OR CEILINGS, PROVIDE SHEET METAL COLLARS TO COVER VOIDS AROUND THE DUCTS.
C. SQUARE AND ROUND ELBOWS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE SMACNA STANDARDS. ELBOWS NOT CONSTRUCTED WITH A CENTERLINE RADIUS OF AT LEAST 50 PERCENT OF THE DUCT WIDTH OR DIAMETER SHALL BE PROVIDED WITH TURNING VANES IN ACCORDANCE WITH SMACNA STANDARDS.
D. "FIBERBOARD" DUCTWORK WILL NOT BE ACCEPTED ON THIS PROJECT.
2.2 MEDIUM PRESSURE DUCT CONSTRUCTION
A. UNLESS NOTED OTHERWISE, MEDIUM PRESSURE DUCTS SHALL BE CONSTRUCTED TO A PRESSURIZATION CLASSIFICATION OF THREE (3) INCHES WG POSITIVE.
B. ALL ROUND MEDIUM PRESSURE DUCTS SHALL BE SPIRAL TYPE.
2.3 LOW PRESSURE DUCT CONSTRUCTION
A. LOW PRESSURE DUCTS CONNECTING SMALL AIR HANDLING EQUIPMENT, SHALL BE CONSTRUCTED TO A PRESSURIZATION CLASSIFICATION OF TWO (2) INCHES WG, POSITIVE OR NEGATIVE AS APPROPRIATE. THESE LOW PRESSURE ROUND DUCTS SHALL BE SPIRAL TYPE.
B. DUCTWORK DOWN STREAM OF AIR TERMINAL UNITS SHALL BE CONSTRUCTED TO A PRESSURE CLASSIFICATION OF ONE (1) INCHES WG POSITIVE. THESE LOW PRESSURE ROUND DUCTS MAY BE SPIRAL OR SNAP-LOCK TYPE.
C. SHOP FABRICATED DUCTS SHALL BE CONSTRUCTED, BRACED AND REINFORCED IN ACCORDANCE WITH SMACNA STANDARDS.
2.4 DUCT SEALING
A. SEAL ALL DUCTWORK ON THE PROJECT TO SMACNA CLASSIFICATION A.
2.5 FLEXIBLE DUCTS
A. FLEXIBLE DUCTS SHALL BE SIMILAR AND EQUAL TO THERMOFLEX TYPE M-KE AND SHALL COMPLY WITH APPLICABLE REQUIREMENTS OF UL-181, NFPA 90-A AND OTHER GOVERNING AUTHORITIES.
B. FLEXIBLE DUCTS SHALL BE FACTORY INSULATED WITH A NOMINAL 1 INCH THICKNESS OF FIBERGLASS INSULATION, PRODUCING A THERMAL CONDUCTANCE ("C") OF 0.23. DUCTS SHALL HAVE A POSITIVE INTERIOR AIR SEAL PERMANENTLY BONDED TO A COATED HIGH CARBON SPRING STEEL HELIX, ALL SHEATHED IN AN OUTER VAPOR BARRIER OF FIBERGLASS REINFORCED FILM LAMINATE.
C. FLEXIBLE DUCTS SHALL BE RATED FOR OPERATING PRESSURE OF PLUS 6 INCHES WG THROUGH 10 INCH DIAMETER, PLUS 4 INCHES WG THROUGH 16 INCH DIAMETER AND - 2 INCHES WG FOR ALL SIZES.
A. FLEXIBLE DUCTS TO DIFFUSERS AND GRILLES SHALL BE LIMITED TO 6 FOOT LENGTHS AND A MAXIMUM OF ONE (1) 90 DEGREE CHANGE IN DIRECTION. MEDIUM PRESSURE DUCTS SERVING TERMINAL UNITS SHALL BE LIMITED TO 2 FOOT LENGTHS WITH NO ELBOWS.
2.6 FLEXIBLE DUCT FABRIC
A. PROVIDE VENTFABRICS "VENTGLAS", OR EQUAL, 30 OZ PER SQ YD, BETWEEN SHEET METAL DUCTS AND AIR HANDLING EQUIPMENT, INCLUDING ALL FANS, AND POWER TYPE VENTILATORS.
2.7 DAMPERS
A. DAMPER AND SPLITTER HARDWARE FOR LOW PRESSURE DUCTS SHALL BE:
END BEARINGS - VENTLOK #607
REGULATOR FINISHED AREAS - VENTLOK #666, PLAIN COVER
REGULATOR UNFINISHED AREAS - VENTLOK #640, 3/8 INCH.
B. VOLUME DAMPERS SHALL BE LOCATED AT BRANCH TAKE-OFFS AT MAIN TRUNK DUCT. NO DAMPERS (SPLITTER DAMPERS) SHALL BE LOCATED IN THE CENTER OF DUCTS.

PART 3 - EXECUTION
3.1 FABRICATION
A. DUCTWORK SHOWN ON THE DRAWINGS, SPECIFIED, OR REQUIRED FOR HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS SHALL BE CONSTRUCTED AND ERECTED IN A FIRST CLASS MANNER.
B. DUCTS SHALL BE REINFORCED IN ACCORDANCE WITH THE APPROPRIATE SMACNA STANDARDS TO PREVENT BUCKLING, BREATHING, VIBRATION AND UNNECESSARY NOISE.
C. PROVIDE MANUALLY OPERATED VOLUME CONTROL DAMPERS IN DUCT BRANCHES, FOR PROPER BALANCING OF AIR DISTRIBUTION. DAMPERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE APPROPRIATE SMACNA STANDARDS.
D. PROVIDE HINGED ACCESS DOORS IN DUCTWORK FOR ACCESS TO ALL SMOKE DETECTORS, SENSORS, AND OTHER CONTROL DEVICES, MANUAL DAMPERS, AND FOR CLEANING OPERATIONS. FACTORY FABRICATED DOORS SIMILAR AND EQUAL TO MILCOR AND MEETING THESE SPECIFICATIONS SHALL BE ACCEPTABLE.
E. WHERE DUCTS CONNECT TO FANS, INCLUDING ROOF EXHAUSTERS PROVIDE FLEXIBLE DUCT FABRIC CONNECTIONS. PROVIDE A MINIMUM OF ½ INCH SLACK IN THE CONNECTIONS, AND A MINIMUM OF 2-1/2 INCH DISTANCE BETWEEN THE EDGES OF THE DUCTS, PLUS AN ADDITIONAL MINIMUM IF 1 INCH OF SLACK FOR EACH INCH OF STATIC PRESSURE ON THE FAN SYSTEM.
F. PROVIDE SCREENS ON DUCTS, FANS AND OPENINGS WHICH LEAD TO, OR ARE OUTDOORS. SCREENS SHALL BE 16 GAUGE, ½ INCH MESH, IN REMOVABLE GALVANIZED STEEL FRAMES.
G. FURNISH TEST OPENINGS WITH COVERS IN EACH DUCT FOR TAKING READINGS OF AIR VELOCITIES AND PRESSURES IN DUCTS. REFER TO THE APPROPRIATE SMACNA STANDARD FOR COVER CONSTRUCTION.
3.2 DUCT SUPPORTS
A. HORIZONTAL AND VERTICAL SHEET METAL DUCTWORK SHALL BE SUPPORTED IN ACCORDANCE WITH THE APPROPRIATE SMACNA STANDARDS.
B. HANGER DESIGN AND METHODS OF HANGING AND SUPPORTING SHALL BE COMPATIBLE WITH THE STRUCTURE.

END OF SECTION

SECTION 233713 - DIFFUSERS, REGISTERS AND GRILLES
PART 1 - GENERAL
1.1 GENERAL NOTES
A. REFER TO SECTION 230500

PART 2- PRODUCTS
2.1 AIR INLETS AND OUTLETS
A. GRILLES, REGISTERS, CEILING OUTLETS, AND CEILING INLETS SHALL BE AS INDICATED ON THE DRAWING, AND SHALL BE PROVIDED WITH HEAVY DUTY SPONGE, OR SOFT FELT GASKETS. THE THROW SHALL BE SUCH THAT THE VELOCITY AT THE END OF THE THROW IN THE FIVE (5) FOOT OCCUPANCY ZONE WILL NOT BE MORE THAN 50 FPM NOT LESS THAN 25 FPM. NOISE LEVELS (NC CURVE) SHALL NOT EXCEED 40.
B. IF PRODUCTS OF A MANUFACTURER OTHER THAN THE ONES INDICATED ON THE DRAWINGS ARE USED, THE SIZES SHOWN ON THE DRAWING SHALL BE CHECKED FOR PERFORMANCE, NOISE LEVEL, FACE VELOCITY, THROW AND PRESSURE DROP BEFORE THE SUBMITTAL IS MADE. SELECTIONS SHALL MEET THE MANUFACTURER'S OWN PUBLISHED DATA FOR THE ABOVE PERFORMANCE CRITERIA. SHOULD DEVICES OTHER THAN THOSE SCHEDULED BY NAME BE FURNISHED, THE MANUFACTURER SHALL DEMONSTRATE COMPLIANCE WITH NOISE CRITERIA, ON REQUEST, TO THE ARCHITECT'S SATISFACTION.
C. WHERE CALLED FOR IN SCHEDULES, THE GRILLES, REGISTERS, CEILING OUTLETS, AND CEILING INLETS SHALL BE PROVIDED WITH DEFLECTING DEVICES AND MANUAL DAMPERS. THESE SHALL BE STANDARD PRODUCTS OF THE MANUFACTURER, SUBJECT TO REVIEW BY THE ARCHITECT, AND SHALL BE SIMILAR AND EQUAL TO THOSE SCHEDULED.

PART 3 - EXECUTION
3.1 INSTALLATION
A. LOCATIONS OF OUTLETS SHOWN ON THE DRAWINGS ARE APPROXIMATE. COORDINATE THE EXACT LOCATION WITH REFLECTED CEILING PLAN AND OTHER TRADES.
B. VERIFY THE TYPE OF CEILING SYSTEM AND MATERIAL INTO EACH OF THE AIR INLETS AND OUTLETS IS TO BE INSTALLED, AND PROVIDE EQUIPMENT, WHICH PROPERLY "FITS" WHETHER SPECIFICALLY, SO INDICATED OR NOT ON THE DRAWINGS.

END OF SECTION

SECTION 232300 - REFRIGERANT PIPING
PART 1 - GENERAL
1.1 SCOPE OF WORK
A. REFER TO SECTION 230500.

PART 2 - PRODUCTS
2.1 COPPER PIPE
A. PIPING SHALL BE COPPER TYPE ACR WITH WROUGHT COPPER FITTINGS AND BRAZED JOINTS.

PART 3 - EXECUTION
3.1 INSTALLATION
A. REFER TO SECTION 230529 FOR METHODS OF SUPPORTING ALL PIPING.

END OF SECTION

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PMI JOB NO. 25003.001
PROJECT MGR. TODD JOHNSON



STATE OF TEXAS
TODD M. JOHNSON
86955
LICENSED
PROFESSIONAL ENGINEER
2/14/25

PROJECT NUMBER:
DRAWN BY:
CHECKED BY:
R.S.F.:

INTERNATIONAL BUSINESS PARK
K. HOVNANIAN HOMES

SEAL:

521-019
TP
EC/CB
8,939

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SUITE #2000,
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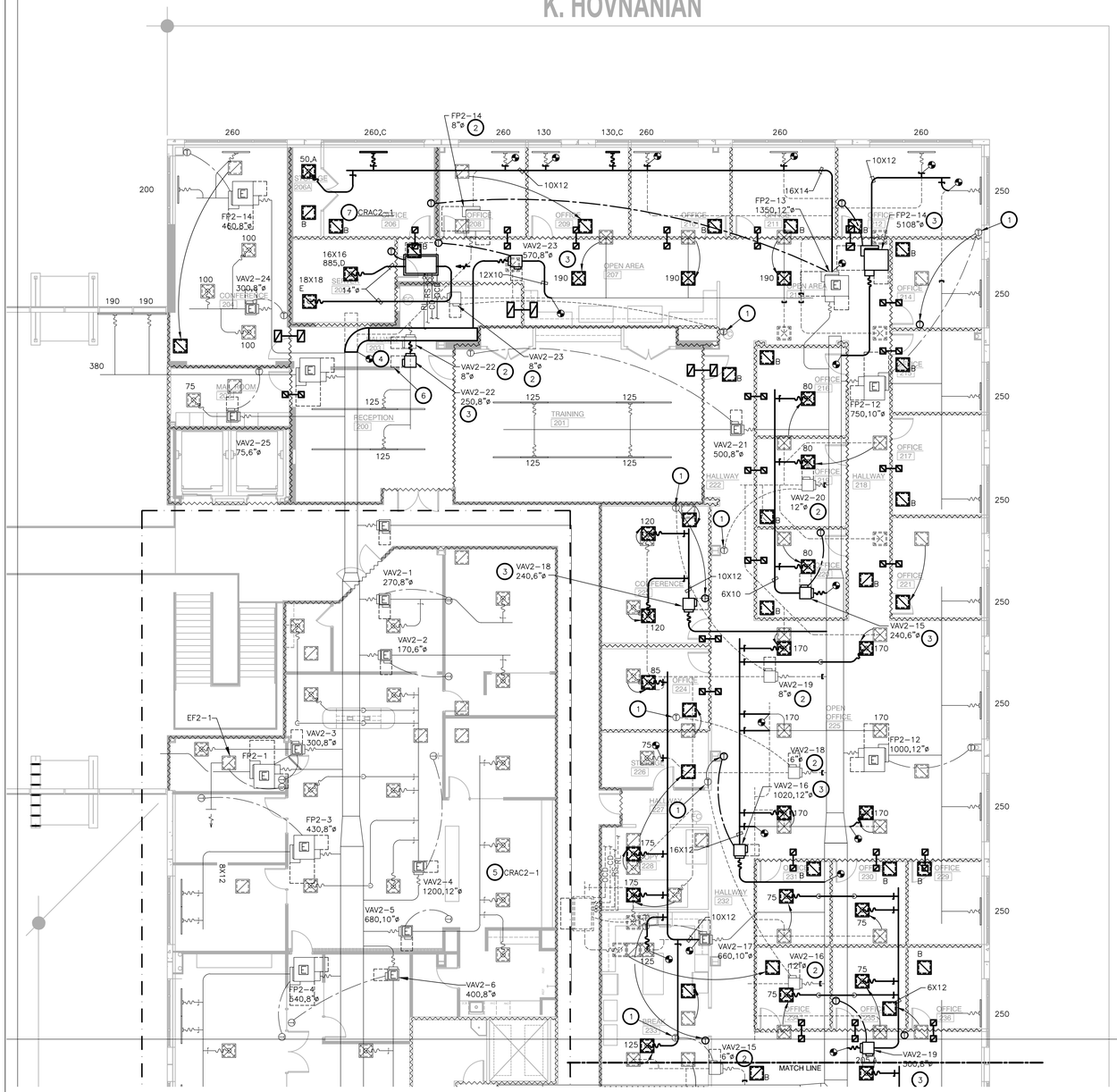
CLIENT/LANDLORD ISSUE DATE: 01/31/2025
BID ISSUE DATE: 02/14/2025
PERMIT ISSUE DATE: 02/14/2025
CONSTRUCTION ISSUE DATE: 02/14/2025

DRAWING TITLE:
MECHANICAL SPECIFCATIONS

DRAWING NUMBER:
M1.01

SUITE 2000
K. HOVNANIAN




1 LEVEL 02 MECHANICAL PLAN
SCALE: 1/8"=1'-0"

## ALTERNATE CRAC UNIT

HEAT REJECTION BTU'S WAS NOT KNOW AT THE TIME OF ISSUE. IF EXISTING UNIT CANNOT PRODUCE DESIRED BTU FOR EQUIPMENT INSTALLED, NOTIFY ENGINEER TO DESIGN NEW UNIT. CONTRACTOR SHALL PROVIDE NEW CRAC UNIT SIZED IN ACCORDANCE TO ENGINEER'S DESIGN AND MANUFACTURER'S RECOMMENDATIONS.

## NOTES BY SYMBOL (X):

1. RELOCATE EXISTING THERMOSTAT TO NEW LOCATION AS SHOWN ON PLAN. CONFIRM THAT THE THERMOSTATS ARE ASSOCIATED WITH THE TERMINAL BOX AS SHOWN ON THE DRAWING BEFORE RELOCATING AND ARE IN WORKING ORDER.
2. EXISTING LOCATION OF TERMINAL BOX TO BE RELOCATED. REMOVE EXISTING MEDIUM AND LOW PRESSURE DUCTWORK AS INDICATED ON DRAWINGS.
3. NEW LOCATION OF TERMINAL BOX. MOUNT BOX FROM STRUCTURE ABOVE. ENSURE BOX CLEARANCES ARE MAINTAINED AT NEW LOCATION. EXTEND NEW MEDIUM AND LOW PRESSURE DUCT AS INDICATED ON DRAWINGS. COORDINATE RELOCATION WITH OTHER TRADES INVOLVED.
4. REROUTE EXISTING MEDIUM PRESSURE DUCT AS INDICATED ON DRAWINGS AND MODIFY DUCTWORK AS REQUIRED FOR CONNECTION TO REMAINING EXISTING DUCT.
5. VERIFY EXISTING CRAC UNIT IS OPERATIONAL. CLEAN, REPAIR, AND RELOCATE EXISTING CRAC UNIT AND ASSOCIATED DUCTWORK AND REPLACE DIFFUSER/GRILLE WITH SAME SIZE AND TYPE. COORDINATE NEW LOCATION WITH OTHER TRADES INVOLVED AND EXTEND CONTROL WIRE TO NEW LOCATION.
6. PROVIDE ACCESS PANEL FOR ACCESS REQUIREMENTS OF EQUIPMENT. REFER TO ARCHITECTURAL PLANS FOR ADDITIONAL INFORMATION AND COORDINATE EXACT LOCATION WITH ARCHITECT AND INSTALLED LOCATION OF EQUIPMENT IN THE FIELD.
7. NEW LOCATION OF EXISTING CRAC UNIT. INSTALL UNIT FROM STRUCTURE USING ALL THREAD HANGER RODS WITH VIBRATION ISOLATOR PER EACH ROD. EXTEND REFRIGERANT PIPING TO EXISTING REFRIGERANT PIPING WHERE PIPING STARTS TO TO RUN VERTICAL RUN TO THE ROOF. PIPING SHALL BE PROPERLY SEALED IN ACCORDANCE TO MANUFACTURER'S RECOMMENDATIONS. EXTEND CONDENSATE PIPING TO EXISTING TERMINATION POINT.

REFER TO SHEET M0.01
FOR GENERAL NOTES,
SCHEDULES AND SYMBOLS.

REFER TO SHEET M2.12
FOR RETURN AIR DESIGN.

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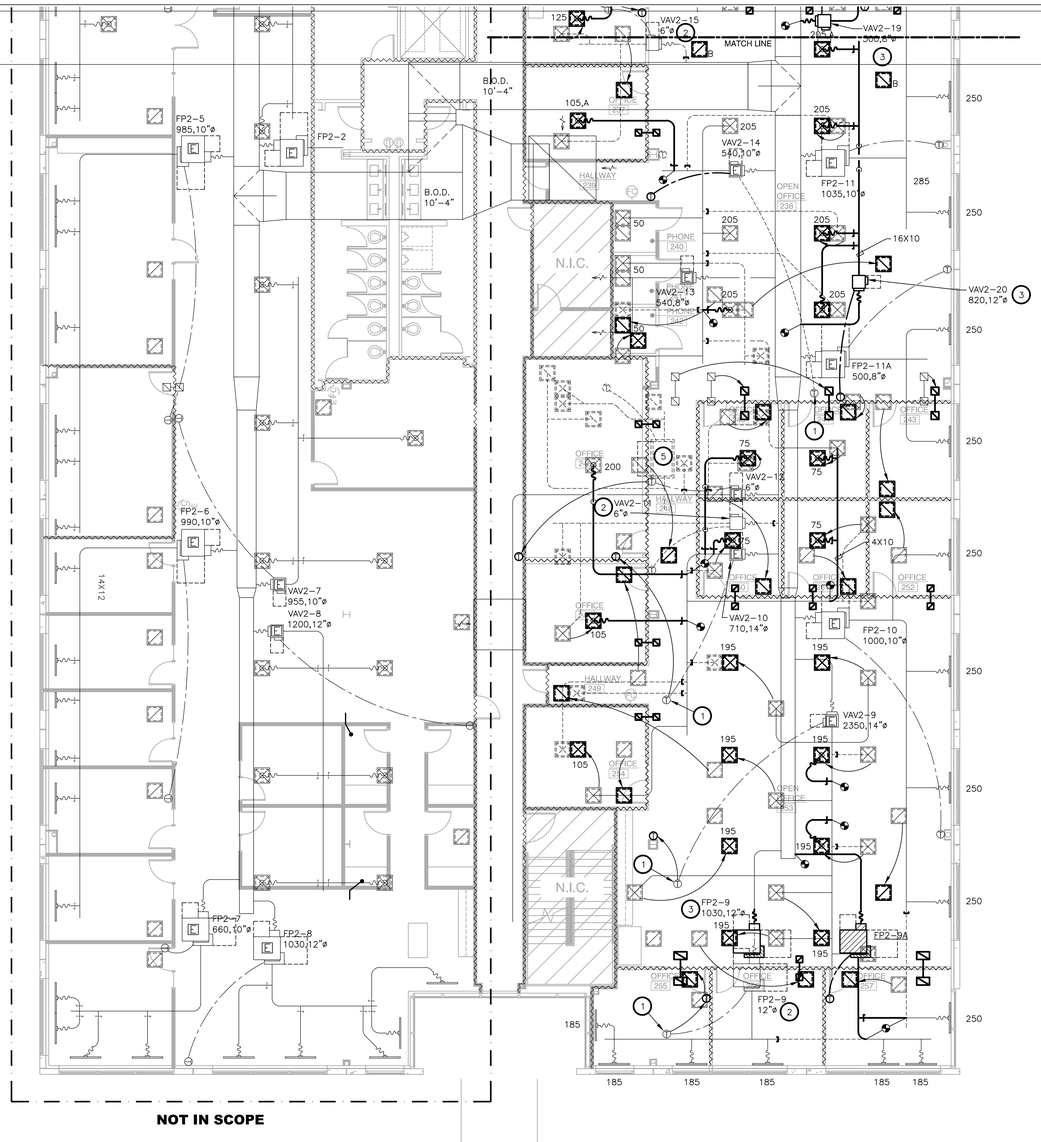
DRAWING TITLE:
LEVEL 02 MECHANICAL PLAN

DRAWING NUMBER:
M2.02A

SUITE 2200
DUNHAM




1 LEVEL 02 MECHANICAL PLAN
SCALE: 1/8"=1'-0"

REFER TO SHEET M2.02A
FOR KEYED NOTES

REFER TO SHEET M2.12
FOR RETURN AIR DESIGN.

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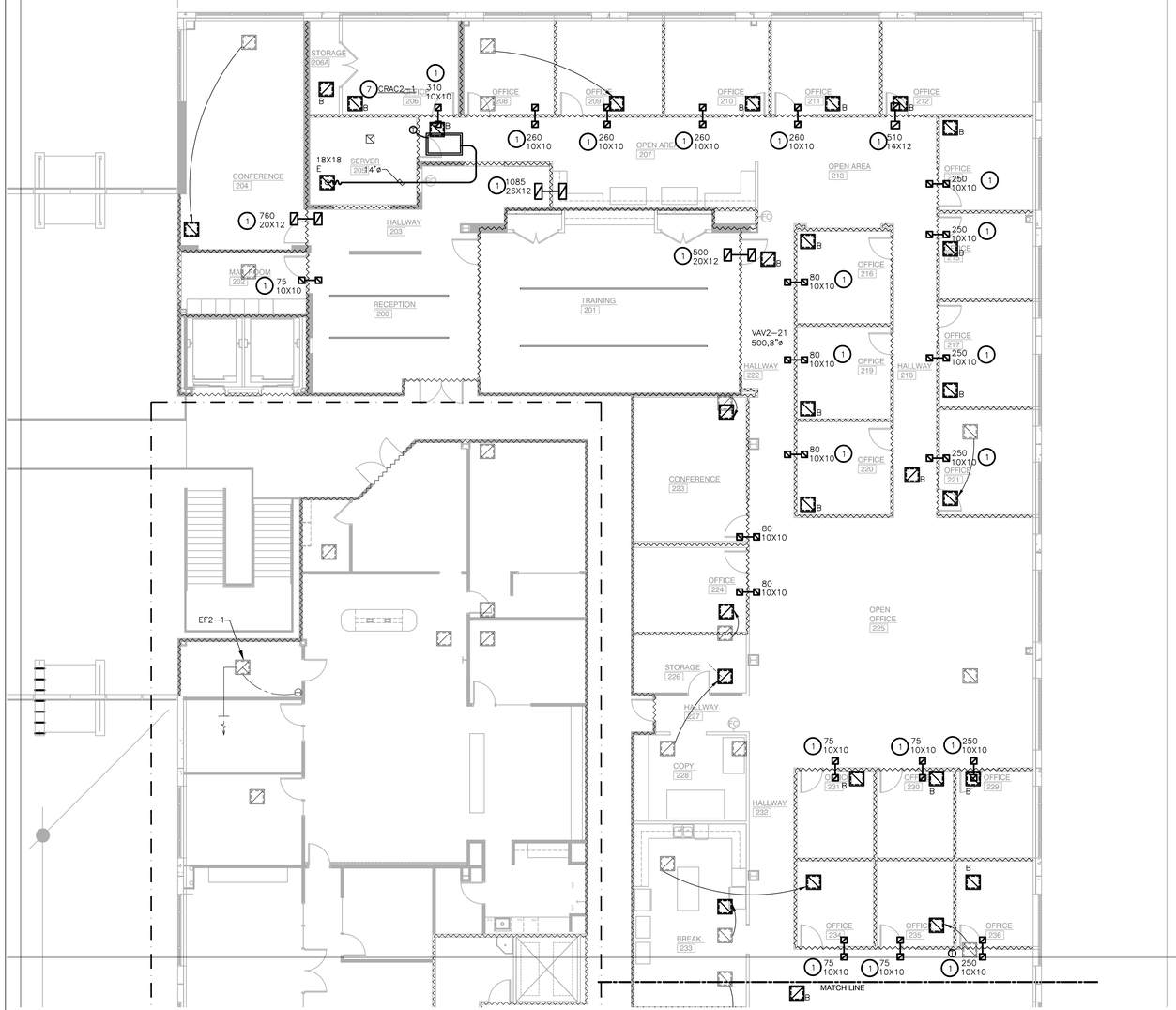
DRAWING TITLE:
LEVEL 02 MECHANICAL PLAN

DRAWING NUMBER:
M2.02B

SUITE 2000
K. HOVNANIAN




1 LEVEL 02 MECHANICAL RETURN AIR PLAN
SCALE: 1/8"=1'-0"

## NOTES BY SYMBOL (X):

1. PROVIDE ACOUSTICALLY LINED RETURN AIR BOOT THRU WALL TO DECK AS HIGH AS POSSIBLE ABOVE CEILING WITH INLET ELBOW AND OUTLET 90° ELBOW FACING UPWARD. SIZE PER PLANS. REFER TO DETAIL SHEET M0.01 FOR MORE INFORMATION.
2. INSTALL EXHAUST FAN AT CEILING AND SUPPORT FAN FROM STRUCTURE USING ALTHREAD HANGER RODS WITH VIBRATION ISOLATOR PER EACH ROD. EXTEND DUCT A MINIMUM OF 5'-0" FROM EXHAUST FAN THRU WALL TO DECK.
3. PROVIDE DOOR GRILLE AT LOWER HALF OF DOOR, PRIMED AND READY FOR PAINT. COORDINATE LOCATION WITH GENERAL CONTRACTOR.

REFER TO SHEET M0.01 FOR GENERAL NOTES, SCHEDULES AND SYMBOLS.

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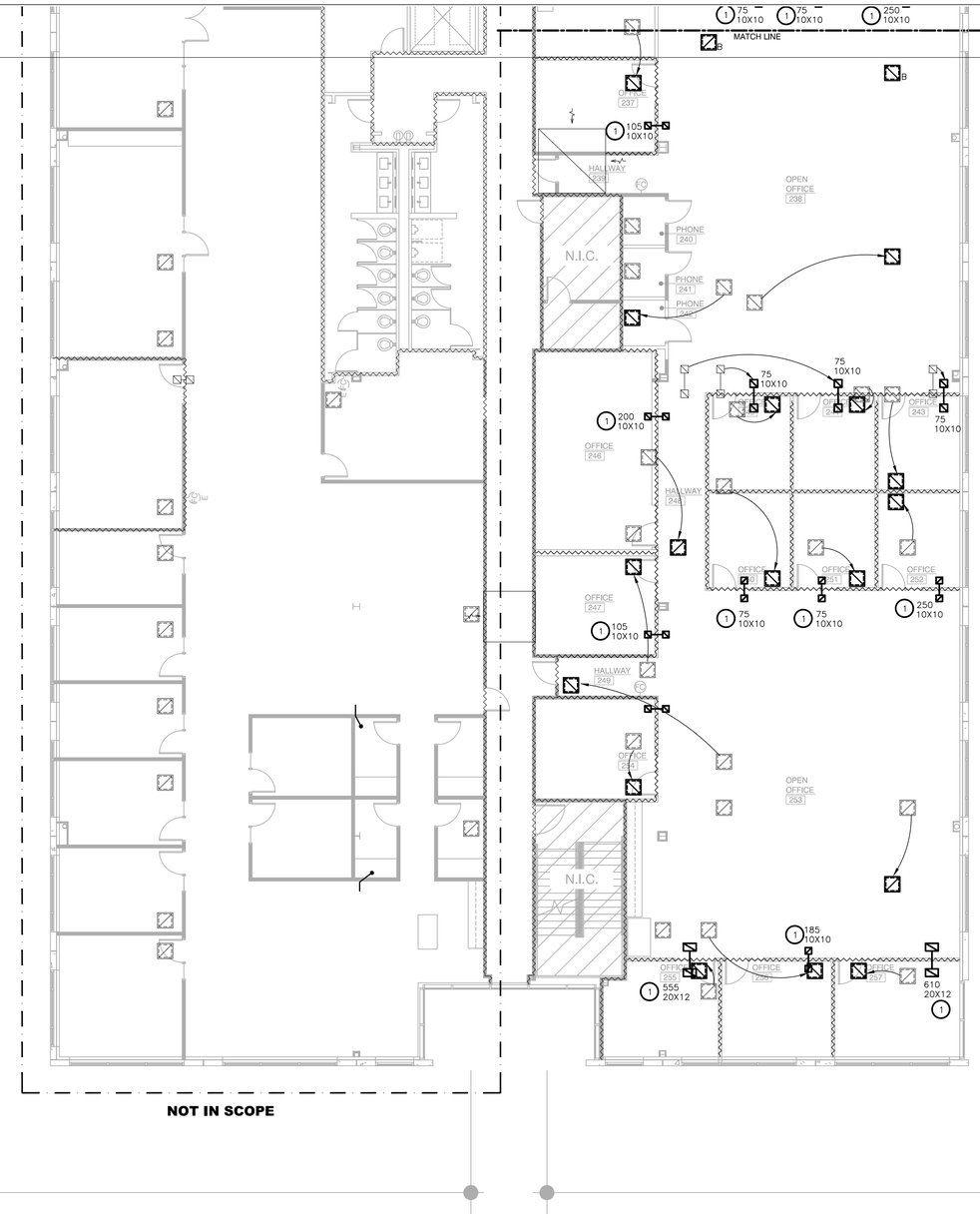
DRAWING TITLE:
LEVEL 02
MECHANICAL
RETURN AIR PLAN

DRAWING NUMBER:
M2.12A

TRUE NORTH

SUITE 2200
DUNHAM




REFER TO SHEET M2.12A FOR KEYED NOTES.

1 LEVEL 02 MECHANICAL RETURN AIR PLAN
SCALE: 1/8"=1'-0"

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DRAWING TITLE:
LEVEL 02
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RETURN AIR PLAN

DRAWING NUMBER:
M2.12B