- B. THE GENERAL ARRANGEMENT AND LOCATIONS OF DUCTWORK, PIPING, FIXTURES, ETC. ARE INDICATED BY THE DRAWINGS AND SHALL BE INSTALLED IN ACCORDANCE THEREWITH; WITH THE EXCEPTION OF SUCH CHANGES AS MAY BE REQUIRED ON ACCOUNT OF OTHER TRADES. CONTRACTOR SHALL COORDINATE WORK WITH INSTALLATION OF OTHER SUBCONTRACTORS.
- C. MECHANICAL WORK SHALL BE COORDINATED WITH THE CONTRACTOR AS TO SCHEDULING, DIMENSIONING AND LOCATION OF EQUIPMENT.
- D. MAJOR ITEMS ARE SHOWN ON THE PROJECT PLANS. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL INCIDENTAL ITEMS REQUIRED TO PROVIDE A COMPLETE AND FUNCTIONAL SYSTEM.
- E. TRADE NAMES AND CATALOG NUMBERS SHALL BE INTERPRETED AS ESTABLISHING A GENERAL DESIGN AND STANDARD OF QUALITY AND SHALL NOT BE CONSTRUED AS LIMITING COMPETITION. UNLESS STATED OTHERWISE, THE CONTRACTOR MAY USE ANY ARTICLE WHICH, IN HIS JUDGEMENT, AND WITH WRITTEN COMMENT FROM THE ARCHITECT/ENGINEER INDICATING NO OBJECTION, IS EQUAL OR SUPERIOR TO THAT SPECIFIED. DRAWINGS SHOWING CHANGES OR REVISIONS REQUIRED BY THE SUBSTITUTION FOR SPECIFIED ITEMS SHALL BE SUBMITTED WITH THE SHOP DRAWING DATA, AND THE COSTS OF ALL SUCH CHANGES SHALL BE BORNE BY THE CONTRACTOR.
- F. SIMILAR ITEMS SHALL BE PROVIDED BY A SINGLE MANUFACTURER.
- G. ALL REQUIRED WALL OR FLOOR OPENINGS SHALL BE COORDINATED WITH THE CONTRACTOR.
- H. ALL PIPING SHALL BE ABOVE CEILING UNLESS INDICATED
- I. DO NOT INSTALL PVC PIPING OR ANY COMBUSTIBLE MATERIAL IN ANY AIR PLENUM.
- J. ALL EQUIPMENT SHALL BE WIPED CLEAN, REMOVING ALL TRACES OF OIL, DIRT, OR PAINT SPOTS.
- K. PROVIDE SUPPORTS TO RIGIDLY ATTACH ALL EQUIPMENT,
 APPURTENANCES AND PIPE AS REQUIRED FOR SUPPORT. PRIOR TO
 INSTALLATION OF HANGERS AND INSERTS, THE CONTRACTOR SHALL
 COORDINATE LOCATIONS AND REQUIREMENTS TO MINIMIZE
 CONFLICTS WITH OTHER BUILDING SYSTEMS. INSTALLATION OF
 PIPE HANGERS AND SUPPORTS SHALL BE IN STRICT ACCORDANCE
 WITH MSS SP-58, 69 AND 89.
- L. CONTRACTOR SHALL MAKE FINAL CONNECTIONS TO ALL EQUIPMENT INDICATED TO BE FURNISHED BY OTHERS.
- M. ALL MATERIALS AND WORKMANSHIP SHALL BE WARRANTED TO BE FREE FROM DEFECTS FOR A PERIOD OF ONE YEAR FROM DATE OF ACCEPTANCE AND CONTRACTOR SHALL MAKE GOOD, WITHOUT ADDITIONAL COST TO THE OWNER, ANY DEFECT WHICH MAY APPEAR WITHIN THAT PERIOD. MANUFACTURER'S WARRANTIES EXTENDING BEYOND ONE YEAR SHALL BE PROCESSED AND TURNED OVER TO THE OWNER.
- 2. SUBMISSION OF SHOP DRAWINGS, PRODUCT DATA, SAMPLES AND PROJECT INFORMATION
 - A. SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS:

 (1) MECHANICAL SLEEVE SEALS
 - (2) FIRE BARRIER PENETRATION SEALS
 (3) INSULATION
 - (4) ALL MECHANICAL EQUIPMENT
 - B. IDENTIFY ALL MECHANICAL SHOP DRAWINGS, PRODUCT DATA AND SAMPLES WITH THE NAME OF THE PROJECT. CLEARLY MARK THE SPECIFIC ITEMS INTENDED FOR USE. SUBMIT ALL RELATED ITEMS AT ONE TIME.
 - C. PRIOR TO SUBSTANTIAL COMPLETION OF THE PROJECT, SUBMIT THE FOLLOWING INFORMATION FOR REVIEW AND APPROVAL.

 (1) OPERATING AND MAINTENANCE INSTRUCTIONS.

 (2) "AS BUILT" DRAWINGS.
- 3. GUARANTEE: ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED TO BE FREE FROM DEFECTS FOR A PERIOD OF ONE (1) YEAR FROM DATE OF ACCEPTANCE AND CONTRACTOR SHALL MAKE GOOD, WITHOUT ADDITIONAL COST TO THE OWNER, ANY DEFECTS WHICH MAY APPEAR WITHIN THAT PERIOD. MANUFACTURER'S WARRANTIES EXTENDING BEYOND ONE YEAR SHALL BE PROCESSED AND TURNED OVER TO THE
- 4. "AS BUILT" DRAWINGS: CONTRACTOR SHALL KEEP AN ACCURATE RECORD OF THE LOCATION OF ALL CONCEALED DUCTWORK, PIPING, VALVES, CONTROLS, ETC., BOTH INTERIOR AND EXTERIOR. ON COMPLETION OF THE WORK, ONE PRINT EACH OF THE CONTRACT DRAWINGS WHICH ARE APPLICABLE SHALL BE NEATLY AND CLEARLY MARKED IN COLOR TO SHOW ALL VARIATIONS BETWEEN THE WORK ACTUALLY PROVIDED AND THAT INDICATED ON THE CONTRACT DRAWINGS.

5. OPERATING AND MAINTENANCE MANUALS

- A. GENERAL: PRIOR TO COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL PROVIDE TWO HARDBACKED LOOSELEAF RING TYPE BINDERS, IDENTIFIED WITH THE NAME OF THE PROJECT. CONTRACTOR SHALL DELIVER THESE BINDERS TO THE ENGINEER FOR REVIEW AND TRANSMITTAL TO THE OWNER.
- B. THE FOLLOWING ITEMS AND OTHER ADDITIONAL PERTINENT DATA FOR EACH ITEM OF EQUIPMENT SHALL BE INCLUDED:
 - (4) NAME OF MANUFACTURER
 - (1) NAME OF MANUFACTURER.
 (2) NAME, ADDRESS AND TELEPHONE NUMBER OF NEAREST
 - MANUFACTURER'S REPRESENTATIVE.

 (3) COPY OF LATEST APPROVED SHOP DRAWING.

 (4) MANUFACTURER'S OPERATING AND MAINTENANCE MANUAL
- INCLUDING LUBRICATION DATA.

 (5) PARTS NUMBERS FOR ALL REPLACEABLE ITEMS.

 (6) SERIAL NUMBERS OF ALL PRINCIPAL ITEMS OF EQUIPMENT.

 (7) CONTROL DIAGRAMS AND SEQUENCE OF OPERATION.

 (8) MANUFACTURER'S WRITTEN GUARANTEES THAT EXTEND
- C. THE OPERATING AND MAINTENANCE MANUALS SHALL BE CONSIDERED A PART OF THE FINAL INSPECTION AND THEY SHALL BE SUBMITTED FOR APPROVAL AT LEAST THIRTY (30) DAYS PRIOR TO REQUEST FOR FINAL INSPECTION.

BEYOND THE CONTRACTOR'S ONE YEAR GUARANTEE.

6. ACCESS DOORS: ACCESS DOORS SHALL BE PROVIDED FOR ALL CONCEALED VALVES, CONTROLS, AND ANY OTHER EQUIPMENT OR MATERIALS REQUIRING INSPECTION OR MAINTENANCE. ACCESS DOORS SHALL BE FURNISHED FOR FLOORS, WALLS AND CEILINGS, OF ADEQUATE SIZE SO THAT CONCEALED ITEMS WILL BE READILY ACCESSIBLE FOR SERVICING OR FOR REMOVAL AND REPLACEMENT IF NECESSARY.

7. PAINTIN

- A. SCOPE OF WORK: MECHANICAL EQUIPMENT, MATERIALS, AND RELATED PIPING DO NOT REQUIRE PAINTING EXCEPT AS INDICATED BELOW.
- B. EQUIPMENT WITH A FACTORY APPLIED FINISH WILL NOT REQUIRE ADDITIONAL PAINTING EXCEPT TOUCH-UP WITH MATCHING FINISH
- WHERE IT IS DAMAGED.

 C. PIPING, FABRICATED SUPPORTS, OR OTHER UNFINISHED AND UNPROTECTED MATERIALS LOCATED OUTDOORS SHALL BE PAINTED WITH A SUITABLE PRIMER AND COMPATIBLE FINISH PAINT.
- D. PAINT INSIDE OF DUCTWORK WITH MATTE BLACK PAINT WHERE VISIBLE BEHIND AIR INLETS AND OUTLETS.

COLOR SHALL BE AS DIRECTED BY ENGINEER.

E. PROTECTION OF WORK: PAINTING SHALL BE DONE WITH ALL POSSIBLE CARE TO PROTECT THIS WORK AND WORK OF OTHER TRADES. ALL DAMAGE TO THIS AND OTHER WORK CAUSED BY THE PAINTING OPERATIONS SHALL BE CORRECTED, CLEANED OR REPAIRED AS REQUIRED. HARDWARE, SPECIAL CONTROL ITEMS, GAUGES, THERMOMETERS, NAMEPLATES, INSTRUMENT GLASS AND OTHER SIMILAR ITEMS SHALL BE REMOVED OR PROPERLY PROTECTED DURING THE PAINTING OPERATIONS TO INSURE THAT THESE ITEMS ARE NOT COVERED OR SPLATTERED WITH PAINT.

8. IDENTIFICATION

- (1) SUBMIT LIST OF WORDING, SYMBOLS, LETTER SIZE, AND COLOR CODING FOR MECHANICAL IDENTIFICATION.

 (2) SUBMIT VALVE CHART AND SCHEDULE, INCLUDING VALVE
- TAG NUMBER, LOCATION, FUNCTION, AND VALVE
 MANUFACTURER'S NAME AND MODEL NUMBER.

 (3) PRODUCT DATA: PROVIDE MANUFACTURERS CATALOG
 LITERATURE FOR EACH PRODUCT REQUIRED.
- B. NAMEPLATES
 (1) DESCRIPTION: LAMINATED THREE-LAYER PLASTIC WITH
 ENGRAVED LETTERS ON LIGHT CONTRASTING BACKGROUND
- C. TAGS
- (1) METAL TAGS: BRASS WITH STAMPED LETTERS; TAG SIZE MINIMUM 1-1/2 INCHES (40 MM) DIAMETER.
 (2) CHART: TYPEWRITTEN LETTER SIZE LIST IN ANODIZED
- ALUMINUM FRAME.
- D. STENCILS

 (1) STENCILS: WITH CLEAN CUT SYMBOLS AND LETTERS OF
 - FOLLOWING SIZE:

 (A) 3/4 TO 1-1/4 INCHES (20-30 MM) OUTSIDE

 DIAMETER OF INSULATION OR PIPE: 8 INCHES

 (200 MM) LONG COLOR FIELD, 1/2 INCHES (15 MM)

 HIGH LETTERS.
 - (B) 1-1/2 TO 2 INCHES (40-50 MM) OUTSIDE DIAMETER OF INSULATION OR PIPE: 8 INCHES (200 MM) LONG COLOR FIELD, 3/4 INCH (20 MM) HIGH LETTERS.
 - (C) 2-1/2 TO 6 INCHES (65-150 MM) OUTSIDE DIAMETER
 OF INSULATION OR PIPE: 12 INCHES (300 MM) LONG
 COLOR FIELD, 1-1/4 INCHES (30 MM) HIGH
 - LETTERS.
 (D) 8 TO 10 INCHES (200–250 MM) OUTSIDE DIAMETER
 OF INSULATION OR PIPE: 24 INCHES (600 MM) LONG
 COLOR FIELD, 2–1/2 INCHES (65 MM) HIGH

- (E) OVER 10 INCHES (250 MM) OUTSIDE DIAMETER OF INSULATION OR PIPE: 32 INCHES (800 MM) LONG COLOR FIELD, 3-1/2 INCHES (90 MM) HIGH
- (F) DUCTWORK AND EQUIPMENT: 2-1/2 INCHES (65 MM)
- (2) STENCIL PAINT: AS SPECIFIED IN SECTION 09900, SEMI-GLOSS ENAMEL, COLORS CONFORMING TO ASME A13.1.
- E. PIPE MARKERS
 - COLOR: CONFORM TO ASME A13.1.
 PLASTIC PIPE MARKERS: FACTORY FABRICATED, FLEXIBLE, SEMI— RIGID PLASTIC, PREFORMED TO FIT AROUND PIPE OR PIPE COVERING; MINIMUM INFORMATION INDICATING FLOW DIRECTION ARROW AND IDENTIFICATION OF FLUID BEING CONVEYED.
- E CEILING TACKS
- F. CEILING TACKS
 (1) DESCRIPTION: STEEL WITH 3/4 INCH (20 MM) DIAMETER
 - COLOR CODED HEAD.
 - (2) COLOR CODE AS FOLLOWS: (A) YELLOW – HVAC EQUIPMENT
 - (B) RED FIRE DAMPERS/SMOKE DAMPERS
 (C) GREEN PLUMBING VALVES
 (D) BLUE HEATING/COOLING VALVES

G. INSTALLATION

- (1) DEGREASE AND CLEAN SURFACES TO RECEIVE ADHESIVE FOR
- identification materials.

 (2) Install plastic nameplates with corrosive—resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion
- (3) INSTALL TAGS WITH CORROSION RESISTANT CHAIN.(4) INSTALL PLASTIC PIPE MARKERS IN ACCORDANCE WITH

AND SEAL WITH CLEAR LACQUER.

- MANUFACTURER'S INSTRUCTIONS.

 (5) IDENTIFY AIR CONDITIONING UNITS AND FANS WITH PLASTIC NAMEPLATES OR STENCIL PAINTING.
- (6) IDENTIFY CONTROL PANELS AND MAJOR CONTROL COMPONENTS OUTSIDE PANELS WITH PLASTIC NAMEPLATES.
- (7) IDENTIFY DUCTWORK WITH PLASTIC NAMEPLATES OR STENCILLED PAINTING. IDENTIFY WITH AIR HANDLING UNIT OR FAN AND AREA BEING SERVED.
- (8) TAG AUTOMATIC CONTROLS, INSTRUMENTS, AND RELAYS.
- KEY TO CONTROL SCHEMATIC.

 (9) IDENTIFY PIPING, CONCEALED OR EXPOSED, WITH PLASTIC PIPE MARKERS OR STENCILLED PAINTING. IDENTIFY SERVICE, FLOW DIRECTION, AND PRESSURE. INSTALL IN CLEAR VIEW AND ALIGN WITH AXIS OF PIPING. LOCATE IDENTIFICATION NOT TO EXCEED 20 FEET (6 M) ON STRAIGHT RUNS INCLUDING RISERS AND DROPS, ADJACENT TO EACH VALVE AND TEE, AT EACH SIDE OF PENETRATION OF STRUCTURE OR ENCLOSURE, AND AT EACH OBSTRUCTION.
- (10) PROVIDE CEILING TACKS TO LOCATE VALVES ABOVE T-BAR
 TYPE PANEL CEILINGS. LOCATE IN CORNER OF PANEL
 CLOSEST TO EQUIPMENT.

9. CONCRETE EQUIPMENT PADS

A. UNLESS OTHERWISE NOTED, CONCRETE PADS NOT LESS THAN 4 INCHES HIGH AND WHICH PROJECT NOT LESS THAN 4 INCHES BEYOND THE EQUIPMENT ON ALL SIDES SHALL BE PROVIDED ALL FLOOR—MOUNTED EQUIPMENT. CONCRETE SHALL HAVE A COMPRESSIVE STRENGTH OF 3000 PSI © 28 DAYS, 3% TO 8% AIR ENTRAINMENT, 6 INCHES SLUMP MAXIMUM UPON PLACEMENT. CONCRETE SHALL NOT BE PLACED WHEN TEMPERATURE WILL FALL BELOW 32 DEGREES F DURING PLACEMENT OR DURING A PERIOD OF THREE DAYS AFTER PLACEMENT. ANCHOR BOLTS SHALL BE SET PRIOR TO POURING OF THE SLABS.

10. INSULATION

- A. FLAME/SMOKE RATINGS: PROVIDE COMPOSITE PLUMBING INSULATION (INSULATION, JACKETS, COVERINGS, SEALERS, MASTICS AND ADHESIVES) WITH FLAME—SPREAD RATING OF 25 OR LESS, AND SMOKE—DEVELOPED RATING OF 50 OR LESS, AS TESTED BY ANSI/ASTM E84 (NFPA 255) METHOD. INSULATION SHALL BE LABELED BY THE MANUFACTURER. THE LABEL SHALL INDICATE THE INSULATING VALUE, FLAME SPREAD AND SMOKE—DEVELOPED
- B. SUBMITTALS: SUBMIT MANUFACTURER'S SPECIFICATIONS AND INSTALLATION INSTRUCTIONS FOR EACH TYPE OF PLUMBING INSULATION. SUBMIT SCHEDULE SHOWING MANUFACTURER'S PRODUCT NUMBER, THICKNESS, AND FURNISHED ACCESSORIES FOR EACH PLUMBING SYSTEM REQUIRING INSULATION.
- C. INSTALLATION: INSULATION SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS USING ONLY ADHESIVES, MASTICS AND PLUMBING FASTENERS APPROVED BY THE INSULATION MANUFACTURER. INSULATION SHALL NOT BE APPLIED UNTIL AFTER THE EQUIPMENT HAS BEEN TESTED WITH RESULTS ACCEPTABLE TO THE ARCHITECT/ENGINEER. INSULATION WITH A VAPOR BARRIER JACKET SHALL BE APPLIED WITH A CONTINUOUS, UNBROKEN VAPOR SEAL AND ALL JOINTS SHALL BE SEALED WITH A VAPOR BARRIER ADHESIVE UNLESS OTHERWISE INDICATED. STAPLES, STICK CLIPS AND HANGERS SHALL BE VAPOR SEALED

WHERE THEY PUNCTURE VAPOR BARRIER JACKETS.

D. MATERIALS:

- (1) FLEXIBLE DUCT INSULATION: ASTM C1290, MINERAL FIBER BLANKET, WITH OPERATING TEMPERATURE OF 250°F.

 THERMAL CONDUCTIVITY "K"=0.30 AT 75°F, DENSITY=0.75 LB/CU. FT. F AT 75 DEGREES F. FACTORY APPLIED JACKET (ASJ) SHALL CONSIST OF WHITE KRAFT PAPER BONDED TO ALUMINUM FOIL AND REINFORCED WITH GLASS FIBER YARN. EQUAL TO OWENS—CORNING ASJ.
- (2) FLEXIBLE CERAMIC FIBER INSULATION: BLANKET TYPE INSULATION, MINIMUM 8LB/CU FT DENSITY, HAVING A "K" FACTOR OF 0.24 AT 70°F MEAN TEMPERATURE NON-COMBUSTIBLE WITH FLAME SPREAD, SMOKE DEVELOPED, AND FUEL CONTRIBUTED INDEXES OF 0, ASTM 84/UL 723; MELTING POINT OF 3200°F; NORMAL SERVICE RANGE UP TO 2300°F; INSTALL WITH 3" THICKNESS FOR 2-HOUR FIRE RATING AND ZERO CLEARANCE TO COMBUSTIBLES. INSULATION SHALL BE THERMAL CERAMICS KAOWOOL FIREMASTER BLANKET, FIBERFRAX DURABLANKET, OR APPROVED EQUAL.
- (3) ELASTOMERIC CELLULAR FOAM PIPE INSULATION: ASTM C534, TYPE 1
 TUBULAR FORM, UNSLIT TUBING OR PRE-SLIT TUBULAR WITH FACTORY
 APPLIED PRESSURE SENSITIVE ADHESIVE. "K"=0.27 AT 75
 DEGREES F, SERVICE TEMPERATURE OF TO 200°F. NO

E. DUCT INSULATION

JACKET REQUIRED.

- (1) DUCT INSULATION: INSULATE ALL SUPPLY AIR, OUTDOOR AIR DUCTS AND RETURN DUCTS.
- (2) PROVIDE INSULATION WITH VAPOR RETARDER JACKETS.
 PIPING SYSTEM WITH EQUIVALENT THICKNESS AND
 COMPOSITION OF INSULATION AS APPLIED TO ADJOINING
- (3) EXTEND DUCT INSULATION WITHOUT INTERRUPTION THROUGH WALLS, FLOORS AND SIMILAR PIPING PENETRATIONS, EXCEPT WHERE OTHERWISE INDICATED.
- (4) INSTALL PROTECTIVE METAL SHIELDS AND INSULATED INSERTS WHEREVER NEEDED TO PREVENT COMPRESSION OF
- (5) SUPPLY, RETURN AND OUTSIDE AIR DUCTS: INSULATE WITH 2" THICK FLEXIBLE DUCTWORK INSULATION.
- (6) DUCTWORK CONNECTED TO HOOD: INSULATE WITH 3" THICK

FLEXIBLE CERAMIC FIBER INSULATION.

F. PIPE INSULATION

(1) REFRIGERANT SUCTION AND HOT GAS PIPING: INSULATE 1-1/2" AND SMALLER PIPES WITH 1-1/2" THICK ELASTOMERIC CELLULAR FOAM INSULATION. INSULATE LARGER THAN 1-1/2" PIPES WITH 2" THICK ELASTOMERIC CELLULAR FOAM.

11. DUCTWORK

- A. GALVANIZED STEEL DUCTS: ASTM A653/A653M GALVANIZED STEEL SHEET, LOCK-FORMING QUALITY, HAVING G60 ZINC COATING IN CONFORMANCE WITH ASTM A90/90M.
- B. KITCHEN EXHAUST DUCTS: FABRICATE KITCHEN EXHAUST DUCTS AND SUPPORTS, USED FOR SMOKE AND VAPOR REMOVAL FROM COOKING EQUIPMENT, OF 16 GAUGE MINIMUM BLACK STEEL. FOR DUCT CONSTRUCTION, COMPLY WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS", AND NFPA 96 "REMOVAL OF SMOKE AND GREASE—LADEN VAPORS FROM COMMERCIAL COOKING EQUIPMENT". CONTINUOUSLY WELD JOINTS AND SEAMS FOR GREASE—TIGHT CONSTRUCTION. PROVIDE ACCESS DOORS ON HORIZONTAL DUCT SECTIONS AND AT ANY CHANGE IN DIRECTION AS REQUIRED BY CODE.
- C. FABRICATE AND SUPPORT IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE.
- D. WHERE RECTANGULAR ELBOWS ARE USED, FURNISH TURNING VANES.
- E. INCREASE DUCT SIZES GRADUALLY, NOT EXCEEDING 15° DIVERGENCE WHEREVER POSSIBLE; MAXIMUM 30° DIVERGENCE UPSTREAM OF EQUIPMENT AND 45° CEONVERGENCE DOWNSTREAM.
- F. FLEXIBLE DUCT CONNECTIONS SHALL BE FABRICATED IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE.
- G. VOLUME CONTROL DAMPERS SHALL BE RUSKIN MODEL MD-35 AND SHALL BE FABRICATED IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE.
- I. FIRE DAMPERS SHALL BE DYNAMIC UNITS OF TYPES AND SIZES SUITABLE FOR THE MOUNTING POSITION AND PRESSURE CLASSIFICATION OF THE DUCTWORK IN WHICH INSTALLED. PROVIDE FIRE DAMPERS BEARING A 1-1/2 HOUR UL LABEL AND IN CONFORMANCE WITH NFPA 90A AND UL555.

12. DIFFUSERS, REGISTERS AND GRILLES

- A. DIFFUSERS, REGISTERS AND GRILLES SHALL BE THE TYPE, MATERIAL, AIR PATTERN AND FINISH INDICATED ON THE DRAWINGS.
- B. INSTALL AIR OUTLETS AND INLETS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. INSTALL DIFFUSERS, REGISTERS AND GRILLES TO DUCTWORK WITH AIRTIGHT CONNECTION.

13. CLEANING AND TESTING

- A. CLEAN EQUIPMENT AND FIXTURES TO A SANITARY CONDITION WITH CLEANING MATERIALS APPROPRIATE TO THE SURFACE AND MATERIAL BEING CLEANED. CLEAN DUCT SYSTEMS AND FORCE AIR AT HIGH VELOCITY THROUGH DUCT TO REMOVE ACCUMULATED DUST.
- B. REPLACE FILTERS OF OPERATING EQUIPMENT.
- C. HEATING AND COOLING SYSTEMS AND EXHAUST SYSTEMS SHALL
 BE TESTED, ADJUSTED AND BALANCED (TAB). AIR HANDLING SYSTEMS
 SHALL BE ADJUSTED TO WITHIN +/- 10% OF DESIGN. THE TOTAL
 OF AIR OUTLETS AND INLETS SHALL BE ADJUSTED TO WITHIN PLUS
 10% AND MINUS 5% OF DESIGN TO SPACE. ADJUST OUTLETS
 AND INLETS IN SPACE TO WITHIN +/- 10% OF DESIGN.
- D. THE TAB CONTRACTOR SHALL NOT BE AFFILIATED IN ANY WAY BE WITH THE INSTALLING CONTRACTOR OR EQUIPMENT SUPPLIERS.

MECHANICAL NOTES

FITTINGS, OFFSETS AND TRANSITIONS AS REQUIRED.

- A. ARRANGE AND PAY FOR ALL PERMITS AND INSPECTIONS.
- B. ALL WORK SHALL COMPLY WITH THE VIRGINIA UNIFORM STATEWIDE BUILDING CODE, THE INTERNATIONAL MECHANICAL CODE, NFPA, AND LOCAL
- REGULATIONS.

 C. DRAWINGS INDICATE GENERAL LAYOUT OF PIPING, DUCTWORK AND EQUIPMENT. COORDINATE INSTALLATION WITH OTHER TRADES AND PROVIDE ADDITIONAL
- D. MECHANICAL EQUIPMENT, MATERIALS AND LABOR SHALL INCLUDE A ONE YEAR WARRANTY EXCEPT HEAT PUMP COMPRESSOR MATERIAL WARRANTY SHALL BE FIVE YEARS.
- E. SUBMIT SHOP DRAWINGS FOR REVIEW. PROVIDE TWO BOUND SETS OF APPROVED SHOP DRAWING INFORMATION AND ALL MANUFACTURERS' INSTRUCTIONS FOR OPERATION AND MAINTENANCE. PROVIDE RED LINED AS—BUILT DRAWINGS AT THE END OF THE PROJECT INDICATING INSTALLED CONDITIONS, LOCATIONS AND EQUIPMENT.
- F. COORDINATE LOCATIONS OF DUCTWORK, CEILING MOUNTED REGISTERS AND OTHER ITEMS WITH THE STRUCTURE AND LIGHT FIXTURES.
- G. VERIFY AND DEMONSTRATE TO OWNER THE OPERATION OF ALL EQUIPMENT AND CONTROLS. BALANCE AIRFLOW WITH DAMPERS FOR ACCEPTABLE SPACE TEMPERATURES AND NOISE LEVELS.
- G. DUCTWORK SHALL BE GALVANIZED SHEET METAL PER SMACNA WITH TURNING VANES IN ELBOWS AND MANUAL DAMPERS FOR BALANCING. INSULATE DUCTS WITH MINIMUM R5 FIBERGLASS WRAP WITH ALL SERVICE VAPOR BARRIER JACKET. DUCTWORK IN VENTILATED ATTIC OR CRAWL SPACE SHALL HAVE MINIMUM R8 INSULATION PER ENERGY CODE.
- H. FLEXIBLE DUCTS SHALL HAVE STEEL WIRE HELIX REINFORCEMENT, CONTINUOUS INNER LINER, 1-1/2" FIBERGLASS INSULATION AND OUTER JACKET TO COMPLY WITH UL 181, CLASS 1. FLEXIBLE DUCTS MAY ONLY BE USED FOR FINAL CONNECTION TO REGISTERS WITH MAXIMUM LENGTH OF EIGHT FEET. INSTALL WITH MINIMUM BENDS AND MAXIMUM OF 1" SAG.
- I. CONFIRM LOCATION OF NEW ELECTRICAL PANELBOARDS. PIPING AND DUCTWORK SHALL NOT BE INSTALLED ABOVE ELECTRICAL PANELBOARDS.
- J. TEST AND BALANCE ALL AIRFLOWS FOR PROPER OPERATION AND AIRFLOW.
- K. SUPPLY AND RETURN REGISTERS SHALL BE HART & COOLEY OR EQUAL, STEEL, WHITE ENAMEL FINISH. SUPPLY REGISTER TO BE TWO-WAY THROW WITH INTEGRAL DAMPER.
- L. CONDENSATE LINES TO BE PVC WITH TRAP AND CLEANOUT TEE AT COOLING COIL. DRAINS TO CONNECT WITH OPEN SITE DRAIN TO BATHROOM PLUMBING PIPING
- M. PROVIDE FLEXIBLE CONNECTORS AT CONNECTION OF DUCTWORK TO AIR HANDLERS.
- O. APPLY UL RATED FIRE STOPPING SEALANT AROUND DUCTS AND PIPES THAT PENETRATE RATED CEILING MEMBRANE, WALLS OR FLOORS.
- P. COORDINATE LOCATION OF WALL/ROOF PENETRATIONS WITH THE ARCHITECTURAL DRAWINGS. FLASH AND SEAL PENETRATIONS WATERTIGHT. PAINT WALL CAPS AND OTHER EXTERIOR ITEMS TO MATCH ADJACENT WALL PROOF
- Q. PROVIDE AND INSTALL ACCESS DOORS WHERE REQUIRED FOR DAMPERS AND OTHER DEVICES.
- R. CONTROLS: PROVIDE SYSTEMS WITH A PROGRAMMABLE THERMOSTAT WITH 7
 DAY/24 HOUR TIMECLOCK, MULTISTAGE HEATING AND COOLING CONTROLS
 WHERE APPLICABLE. SUBMIT SAMPLE OF THERMOSTAT FOR OWNER APPROVAL.
- S. EXHAUST FAN DUCT TO BE SMOOTH, RIGID, ROUND DUCT.
- T. DRYER VENT TO BE SMOOTH, RIGID, ROUND DUCT. DRYER VENT CAP TO HAVE BACKFLOW FLAPPER. PROVIDE PERMANENT LABEL ON WALL WITH THE ACTUAL INSTALLED DRYER VENT EQUIVALENT LENGTH AND SUBMIT DRYER MANUFACTURER'S DATA INDICATING THAT THE INSTALLED EQUIVALENT LENGTH IS LESS THAN THE MANUFACTURER'S MAXIMUM LENGTH.
- U. FIRE DAMPERS SHALL BE DYNAMIC UNITS OF TYPES AND SIZES SUITABLE FOR THE MOUNTING POSITION AND PRESSURE CLASSIFICATION OF THE DUCTWORK IN WHICH INSTALLED. PROVIDE FIRE DAMPERS BEARING A 1-1/2 HOUR UL LABEL AND IN CONFORMANCE WITH NFPA 90A AND UL555.

PROJECT NO. 09218.03 REV. DATE

DATE: DECEMBER 21 2024

4615 OLD FREDERICKSBURG RD, MINERAL VA

TRUCTIO

ONS.

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V-1

1. AIR HANDLER— DIRECT DRIVE, THREE SPEED MOTOR, COPPER TUBES, ALUMINUM FINS. REFRIGERANT METERING DEVICE, SLOPED CONDENSATE PAN. HEAT PUMP — MATCHED WITH INDOOR COIL, R-410A REFRIGERANT, MINIMUM 15.0 SEER.

2.ROUTE CONDENSATE DRAIN TO FLOOR DRAIN OR OWNER APPROVED OPEN SITE DRAIN.

3.UL LISTED ELECTRIC HEATER, SINGLE POINT ELECTRICAL CONNECTION, HIGH LIMIT CONTROLS.

4. THERMOSTAT — 7 DAY PROGRAMMABLE HEATPUMP THERMOSTAT, AUTO CHANGEOVER.
5. FOR VERTICAL UNITS, MOUNT AIR HANDLER ON RETURN PLENUM BOX WITH RUBBER VIBRATION PADS. PROVIDE CONDENSATE OVERFLOW DETECTION SWITCH IN AUXILIARY DRAIN PAN TO DE—ENERGIZE AIR HANDLER.

FAN SCHEDULE											
LINUT	UNIT CFM	S.P.	DDIVE	DDM		MOTOR		MANUFACTURER/			
UNIT			DRIVE	RPM	WATTS	VOLTS	PH	MODEL	AREA SERVED	CONTROL	NOTES
EF-1	50	0.75	DIRECT		51.3	120	1	NUTONE QTXE150	TOILETS	WALL SWITCH	1
EF-2	80	0.75	DIRECT	826	1/4 HP	120	1	GREENHECK G-097-VG	CORRIDOR	CONTINUOUS	2

SCHEDULE NOTES:

1. INLINE DIRECT DRIVE FAN, BACKDRAFT DAMPER, VARIABLE SPEED CONTROLLER, ELECTRICAL DISCONNECT.

CONTROL AS INDICATED IN SCHEDULE.
2. DIRECT DRIVE, ELECTRICAL DISCONNECT, ROOF CURB, CONTROL AS INDICATED IN SCHEDULE.

FAN COIL UNIT SCHEDULE										
MARK	FC-1	FC-2A	FC-2B	FC-2C	FC-3A	FC-3B	FC-4A	FC-4B	FC-5A	FC-5B
DESIGN AIRFLOW,CFM	880	424	381	424	424	424	381	381	424	424
MOTOR SPEED	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH
COOLING CAPACITY TOTAL MBH	27.0	12.0	6.0	12.0	12.0	12.0	6.0	9.0	12.0	12.0
HEATING CAPACITY TOTAL MBH	30.0	12.3	8.7	12.3	12.3	12.3	8.7	9.6	12.3	12.3
POWER SUPPLY POWER SUPPLY, V,PH,HZ MCA, A MOCP, A	230,1,60 2.73 15	230,1,60 1.0 15								
UNIT MANUFACTURER UNIT MODEL TOTAL NOISE, DB	MITSUBISHI PEAD-A30AA7 39.0	MITSUBISHI MSZ-FS12NA-U1 44.0	MITSUBISHI MSZ-FS06NA-U1 40.0	MITSUBISHI MSZ-FS12NA-U1 44.0	MITSUBISHI MSZ-FS12NA-U1 44.0	MITSUBISHI MSZ-FS12NA-U1 44.0	MITSUBISHI MSZ-FS06NA-U1 40.0	MITSUBISHI MSZ-FS09NA-U1 40.0	MITSUBISHI MSZ-FS12NA-U1 44.0	MITSUBISHI MSZ-FS12NA-Uʻ 44.0

1. COOLING CAPACITY BASED ON 80.0/67.0 DEG.F. ENTERING AIR

2. PROVIDE CONTROLLER/SENSOR AS INDICATED ON THE PLANS. THERMOSTATS SHALL

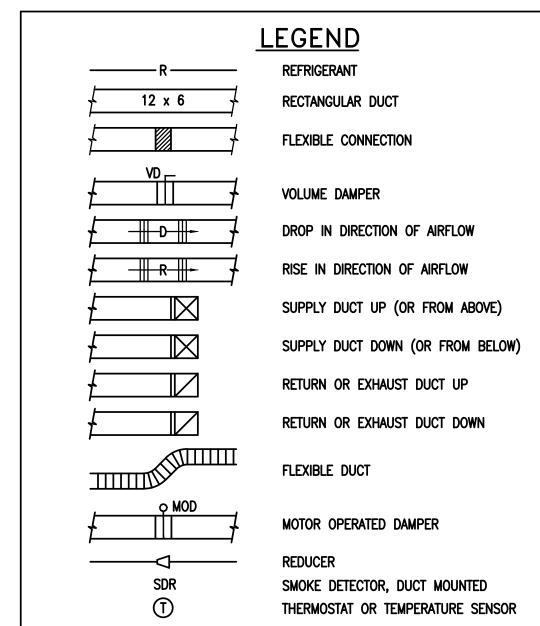
HAVE ADAPTIVE RECOVERY TECHNOLOG /.

3. PROVIDE CONDENSATE PUMPS AS REQUIRED TO DISCHARGE CONDENSATE. CONDENSATE TO FOLLOW ROUTE OF REFRIGERANT PIPING AND TERMINATE ON ROOF

GR	GRILLES, REGISTERS AND DIFFUSERS SCHEDULE							
MARK	MANUFACTURER & MODEL NO.	DESCRIPTION		FINISH	ACCESSORIES & FEATURES			
SUPPLY	SUPPLY DIFFUSERS							
CD-1	METALAIRE 5000-1	9"X9" LOUVER FACE SURFACE MOUNT DIFFUSER		WHITE	MODEL D5A DAMPER			
GRILLES	GRILLES & REGISTERS							
CR-1	METALAIRE V4004—1	6"X4" DOUBLE DEFLECTION CEILING SUPPLY REGISTER	STEEL	WHITE	OPPOSED BLADE DAMPER			
CR-2	METALAIRE SRH	6"X6" CEILING EXHAUST REGISTER	STEEL	WHITE	OPPOSED BLADE DAMPER			
TR-1	METALAIRE V4004-1	12"X6" DOUBLE DEFLECTION SIDEWALL SUPPLY REGISTER	STEEL	WHITE	OPPOSED BLADE DAMPER			
TR-2	METALAIRE V4004—1	10"X6" DOUBLE DEFLECTION SIDEWALL SUPPLY REGISTER	STEEL	WHITE	OPPOSED BLADE DAMPER			
TR-3	METALAIRE V4004-1	6"X6" DOUBLE DEFLECTION SIDEWALL SUPPLY REGISTER	STEEL	WHITE	OPPOSED BLADE DAMPER			
TR-4	METALAIRE V4004—1	6"X4" DOUBLE DEFLECTION SIDEWALL SUPPLY REGISTER	STEEL	WHITE	OPPOSED BLADE DAMPER			
TR-5	METALAIRE SRH 6"X6" SIDEWALL EXHAUST REGISTER		STEEL	WHITE	OPPOSED BLADE DAMPER			
TG-1	METALAIRE SRH	RH 18"X12" SIDEWALL RETURN GRILLE		WHITE				
BG-1	METALAIRE SRH 12"X12" SIDEWALL LOW RETURN GRILLE			WHITE				

HEAT PUMP UNIT SCHEDULE						
MARK	MSHP-1	MSHP-2	MSHP-3	MSHP-4	MSHP-5	
COOLING CAPACITY TOTAL MBH	27.0	28.4	22.0	18.0	22.0	
HEATING CAPACITY TOTAL MBH	30.0	28.6	25.0	22.0	25.0	
POWER SUPPLY POWER SUPPLY, V,PH,HZ MCA, A MOCP, A	230,1,60 17.0 31.0	230,1,60 22.1 25.0	230,1,60 30.5 40.0	230,1,60 17.2 20.0	230,1,60 30.5 40.0	
UNIT MANUFACTURER UNIT MODEL TOTAL NOISE, DB UNIT WEIGHT, LBS	MITSUBISHI SUZ-KA30NA2 55.0 129	MITSUBISHI MXZ-3C30NA4 56.0 150	MITSUBISHI MXZ-3C24NAHZ2 58.0 190	MITSUBISHI MXZ-2C20NA4 54.0 130	MITSUBISHI MXZ-3C24NAHZ2 58.0 190	

MOUNT OUTDOOR UNIT ON ROOF FRAME, 18" ABOVE THE ROOF.



ABBREVIATIONS BRITISH THERMAL UNIT CEILING DIFFUSER CEILING FIRE DAMPER CFD CUBIC FEET PER MINUTE CFM CEILING GRILLE COEFFICIENT OF PERFORMANCE CEILING REGISTER DRY BULB TEMPERATURE ENTERING AIR TEMPERATURE ENERGY EFFICIENCY RATIO EFFICIENCY **EXTERNAL** DEGREES FAHRENHEIT FEET PER MINUTE HORSEPOWER INCH, INCHES LEAVING AIR TEMPERATURE MAXIMUM THOUSAND BTU PER HOUR VOLUME DAMPER MOUNTING HEIGHT MINIMUM MOTOR OPERATED DAMPER NORMALLY CLOSED NOT IN CONTRACT NORMALLY OPEN OUTSIDE AIR PRESSURE DROP PRESSURE SENSOR POUNDS PER SQUARE INCH POUNDS PER SQUARE INCH GAGE RETURN AIR STATIC PRESSURE TEMPERATURE TOP GRILLE TOP REGISTER WET BULB TEMPERATURE WC, WG WATER COLUMN ABOVE FINISHED FLOOR ACCESS DOOR BELOW BETWEEN CEILING CONNECT, CONNECTION CONTINUED EACH **FLOOR** FLEXIBLE GALVANIZED

REQD

REQUIRED

DUCT MOUNTED SMOKE DETECTOR

CONSTRUCTION

MECHANICAL

CALVARY BAPTI PHASE THREE

PROJECT NO. 09218.03

DATE: DECEMBER 21 2024

4615 OLD FREDERICKSBURG RD, MINERAL VA
540.915.1233 WWW, THESUMMITSTUBIO.COM

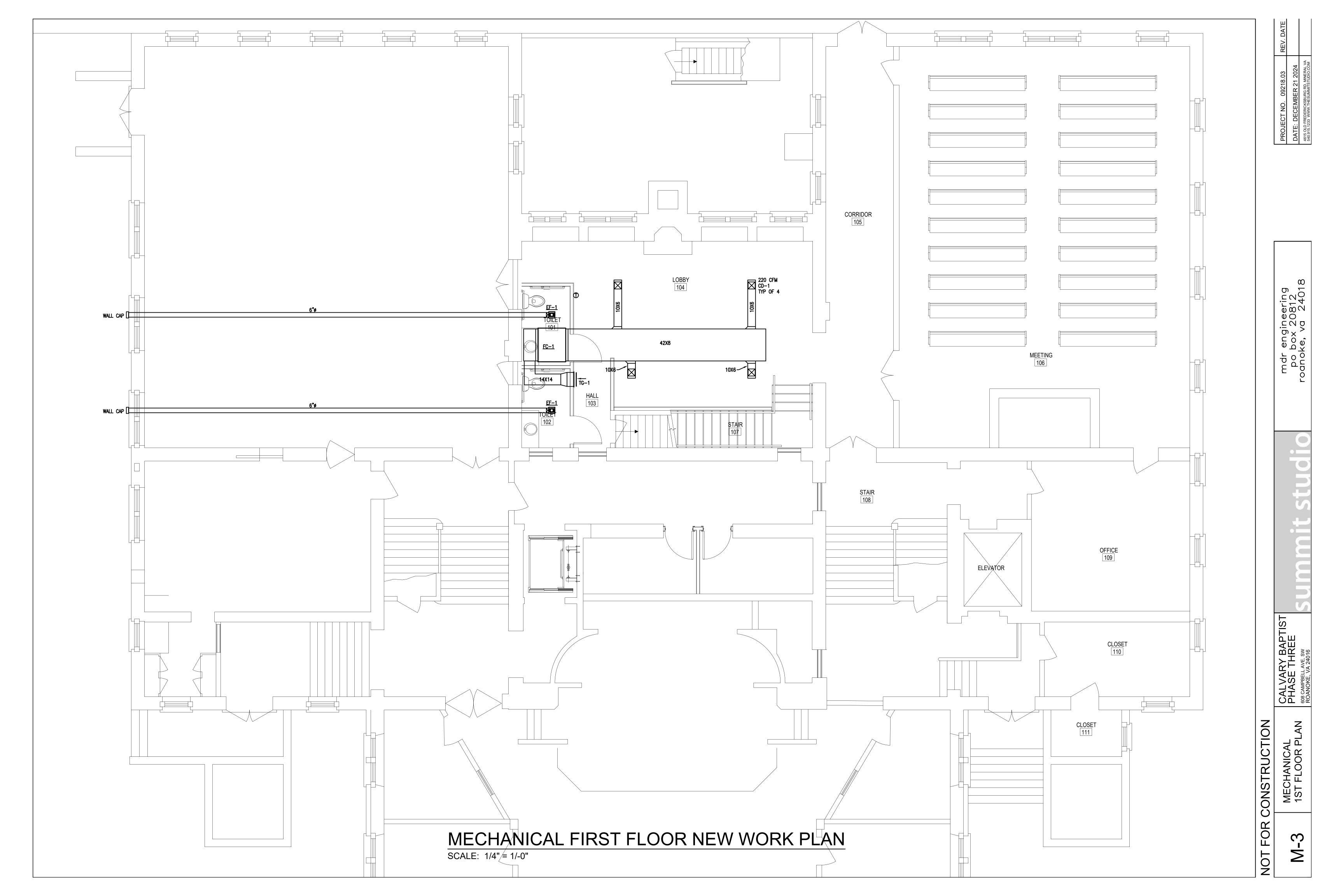
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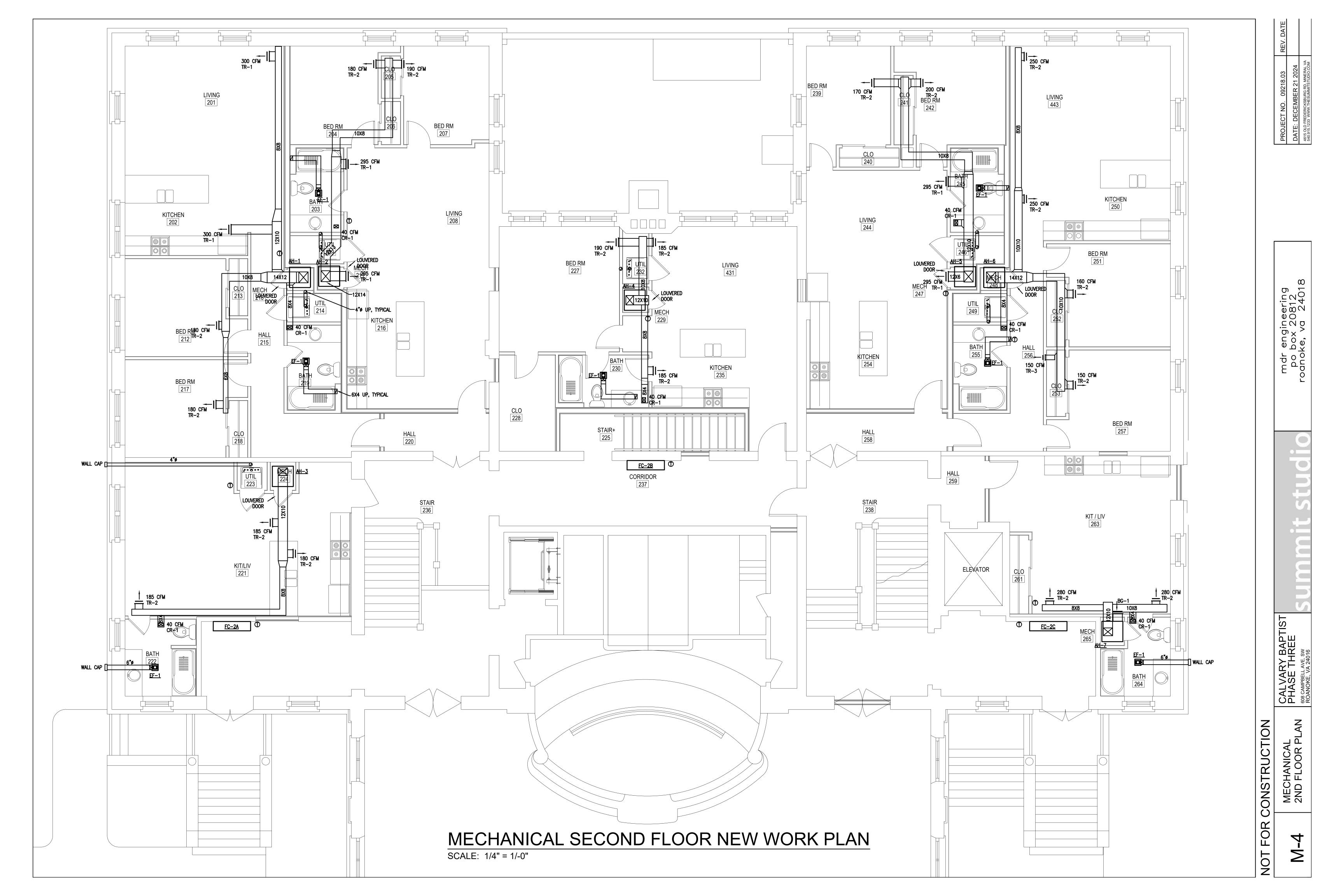
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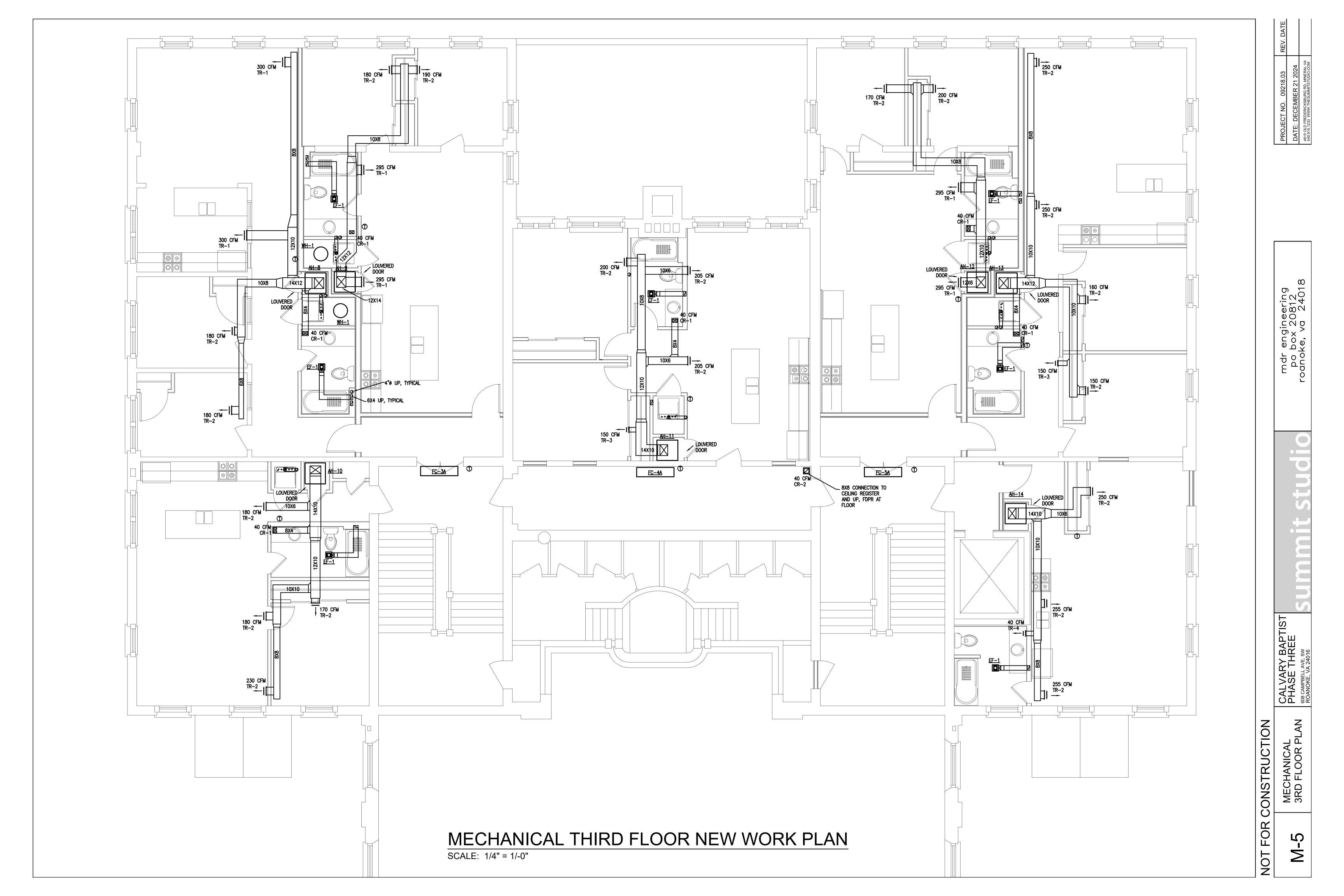
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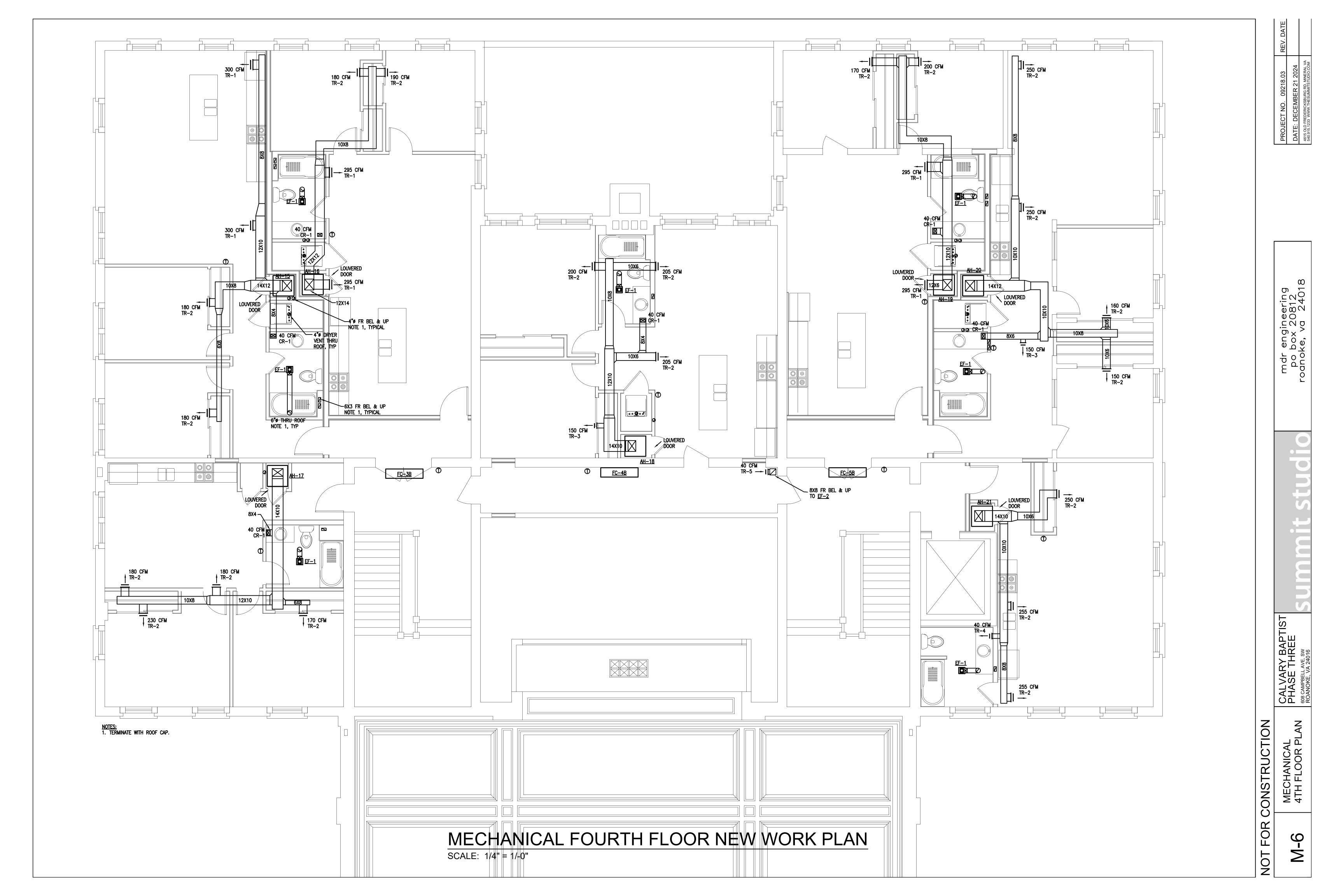
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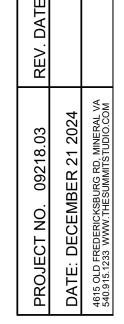
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CALVARY BAPTIST PHASE THREE

MECHANICAL ROOF PLAN

CONSTRUCTION

NOT FOR

M-7

NOTE:
ALL SUPPLY AIR DUCT SHALL BE WRAPPED EXTERNALLY AS PER SPECIFICATIONS | CFM A NO POP RIVETS ALLOWED -CONSTRUCT TEE FITTING OF TWO ELBOWS OR PROVIDE DIVIDER, LOCATED AS INDICATED BELOW. W2 _ _ _ CFM B ---- W1 = W2W3 = W4ALL RECTANGULAR ELBOWS SHALL HAVE TURNING VANES (EVEN IF NOT SHOWN).
DOUBLE THICKNESS VANES SHALL BE
USED ON DUCTS 36" AND LARGER. $W2 = \frac{CFM B}{CFM A} \times W$

DETAIL - DUCT TEE FITTING

OPPOSED BLADE DAMPER AS PER SPECIFICATIONS

BRANCH DUCT TAKE-OFF @ SUPPLY MAIN

PROVIDE CONCEALED CEILING DAMPER REGULATOR

W3 = W-W2

SELF TAPPING CADMIUM PLATED HEX HEAD SHEET METAL SCREW STRAPS TO BE TIGHT AGAINST DUCT.

DUCT STRAP HANGER DETAIL
NOT TO SCALE

HANGER SIZES FOR RECTANGULAR DUCT

30" 1"X18" GAGE STRAP NONE REQUIRED 10'-0"

MAX. SIDE

HORIZONTAL SUPPORT ANGLE

MAXIMUM SPACING

REFRIGERANT PIPE SUPPORTS AT WALL

NOTE: LIQUID LINE SIMILAR WITH FELT LINED BRASS SLEEVE AROUND PIPE.

/ 6<u>"x</u>4"x1/2"-12" LONG ——
ANCHORED TO STRUCTURE
WITH 1/2"x3 1/2" EXPANSION
BOLTS.

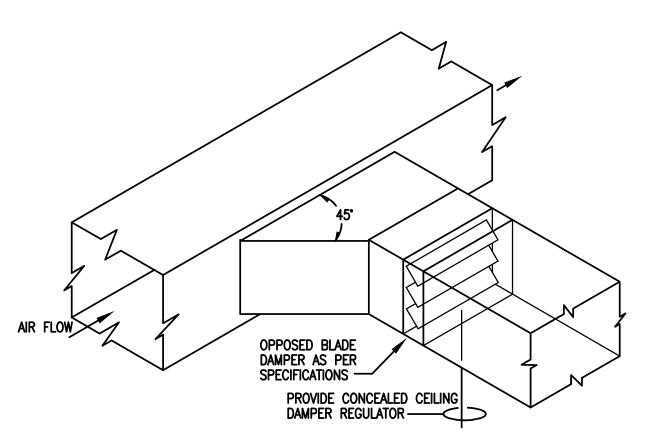
SEAL ALL AROUNDOPENING

ANCHOR TO STRUCTURE—WITH 1/2"x1 1/2" BOLT.

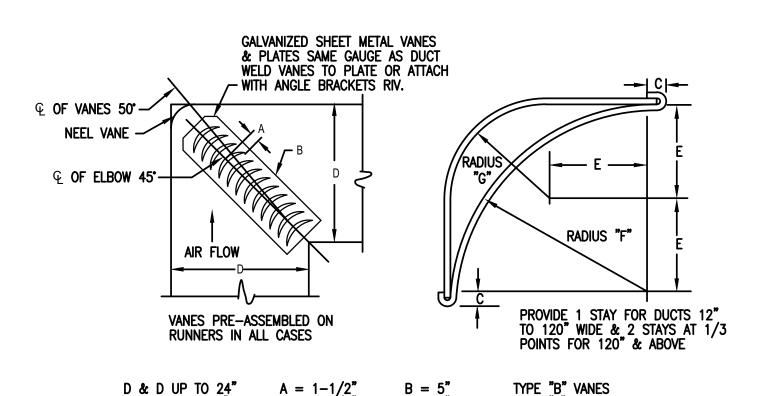
U BOLT WITH -WASHER

16 GAUGE — GALV. SLEEVE

- / 2"x2"x3/16"

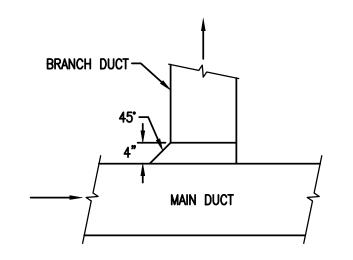


BRANCH DUCT TAKE-OFF @ SUPPLY MAIN

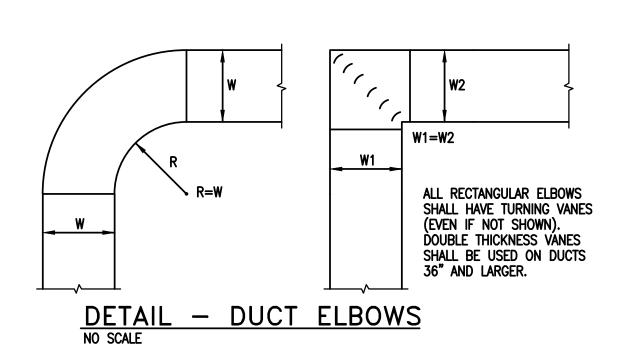


TYPE "B" VANES TYPE "A" VANES RADIUS "F" = 4-1/2" RADIUS "G" = 2-1/4" RADIUS "F" = 2" RADIUS "G" = 1"

SQUARE ELBOW DETAIL NOT TO SCALE

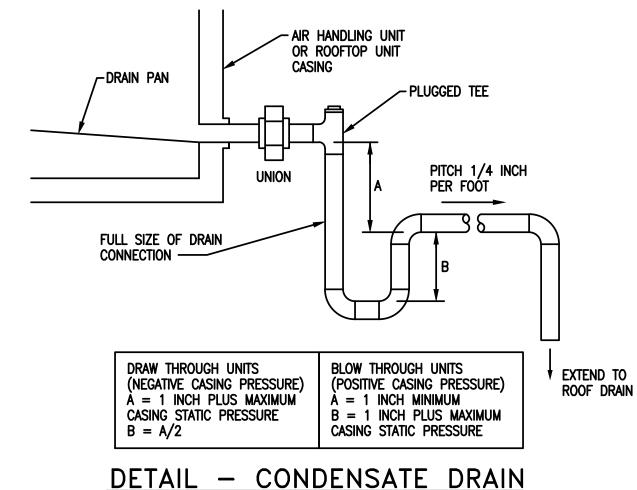


DETAIL - BRANCH DUCT CONNECTION
NO SCALE



DUCT SIZE AS T

(1200 CFM)*



CFM-B (1800 CFM)*

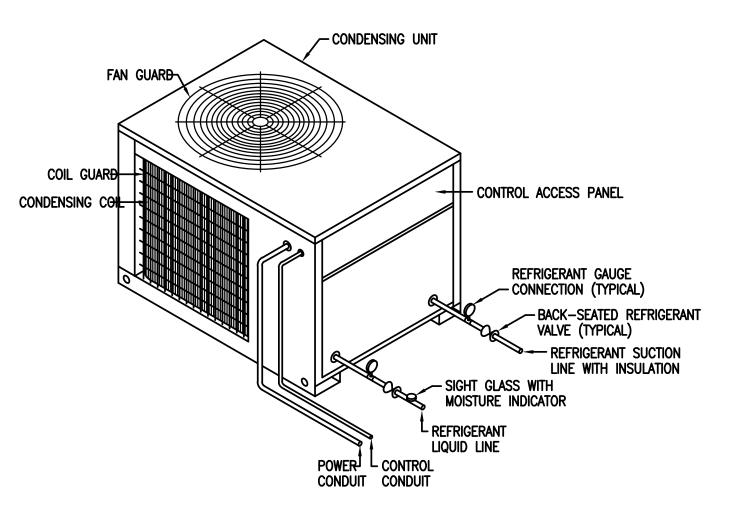
A — WIDTH OF DUCT MAIN BEFORE TAKEOFF.
B — WIDTH OF TAKEOFF CONNECTION.
CFM—A — TOTAL AIR QUANTITY PASSING THRU DUCT AT A
INCLUDING QUANTITY REMOVED AT TAKEOFF B.
CFM—B — AIR QUANTITY REMOVED THRU TAKEOFF B

SAY B = 22" (ROUND OFF TO NEAREST INCH)

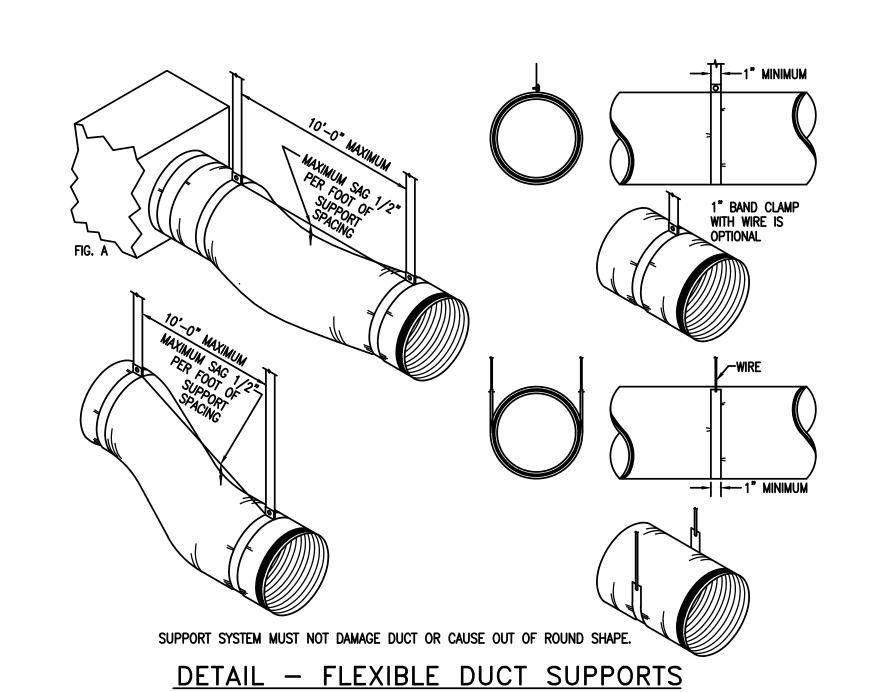
DETAIL - BRANCH DUCT CONNECTION NO SCALE

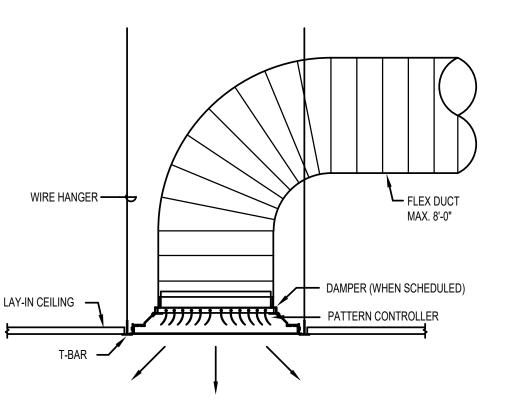
* EXAMPLE: CFM-A = 3000 CFM $B = \frac{1800 \text{ CFM}}{3000 \text{ CFM}} \times 36^{"} = 21.6"$

CFM-A (3,000 CFM)*

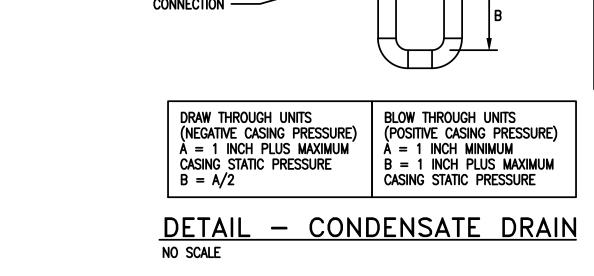


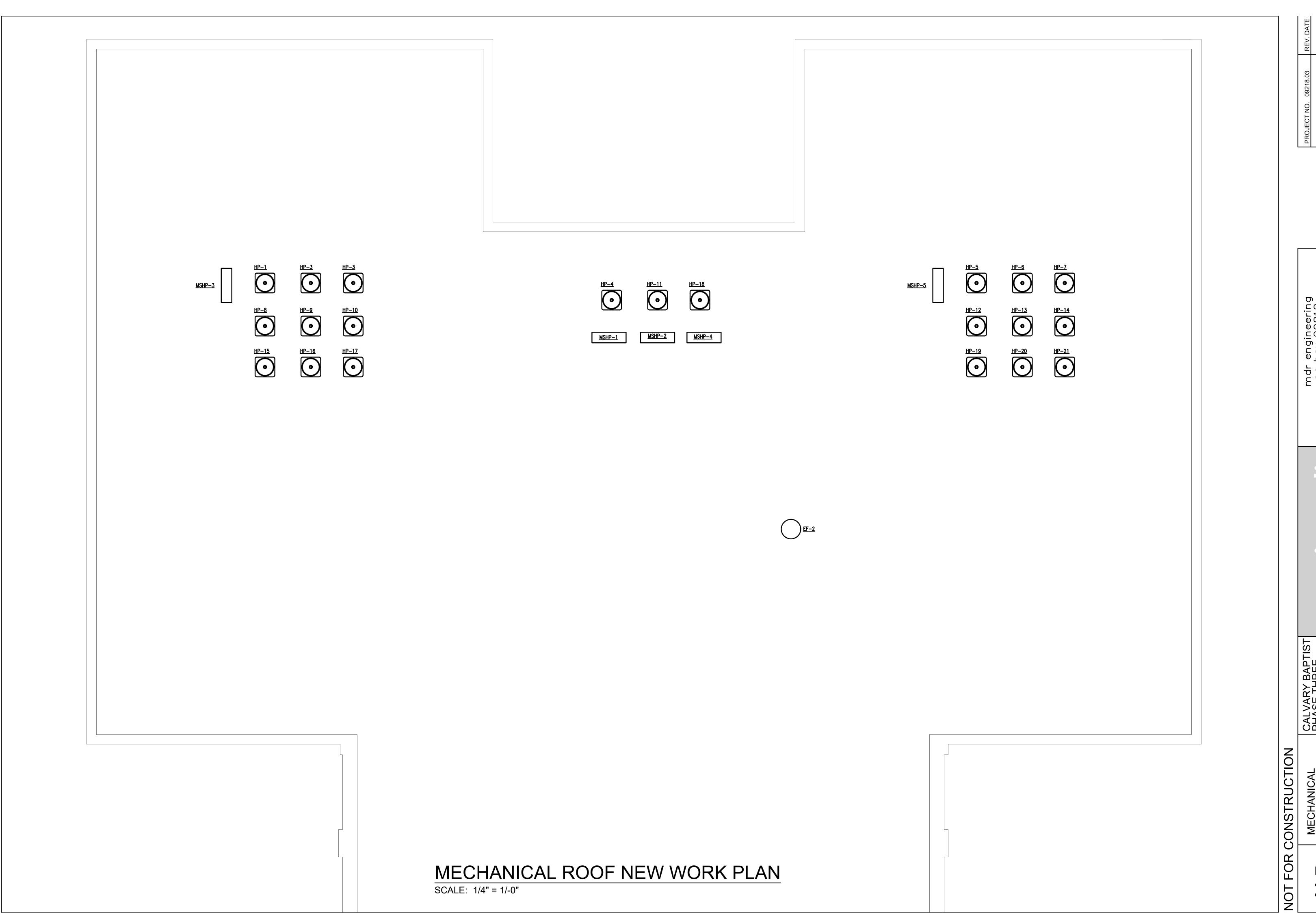
AIR COOLED HEAT PUMP UNIT DETAIL NOT TO SCALE





LAY-IN CEILING DIFFUSER DETAIL





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- A. INSTALLATION SHALL BE IN STRICT ACCORDANCE WITH THE VIRGINIA UNIFORM STATEWIDE BUILDING CODE INCLUDING REFERENCED CODES AND STANDARDS AND IN ACCORDANCE WITH MANDATES OF THE LOCAL BUILDING OFFICIALS.
- B. THE GENERAL ARRANGEMENT AND LOCATIONS OF PIPING FIXTURES, ETC. ARE INDICATED BY THE DRAWINGS AND SHALL BE INSTALLED IN ACCORDANCE THEREWITH; WITH THE EXCEPTION OF SUCH CHANGES AS MAY BE REQUIRED ON ACCOUNT OF OTHER TRADES. CONTRACTOR SHALL COORDINATE WORK WITH INSTALLA-TION OF OTHER SUBCONTRACTORS.
- C. PLUMBING WORK SHALL BE COORDINATED WITH THE CONTRACTOR AS TO SCHEDULING, DIMENSIONING AND LOCATION OF EQUIPMENT.
- MAJOR ITEMS ARE SHOWN ON THE PROJECT PLANS. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL INCIDENTAL ITEMS REQUIRED TO PROVIDE A COMPLETE AND FUNCTIONAL SYSTEM.
- E. ALL PIPING SYSTEMS SHALL TERMINATE 5 FEET BEYOND THE BUILDING LINE UNLESS INDICATED OTHERWISE. EXTENSION OF THESE LINES SHALL BE PROVIDED BY THE SITE CONTRACTOR.
- TRADE NAMES AND CATALOG NUMBERS SHALL BE INTERPRETED AS ESTABLISHING A GENERAL DESIGN AND STANDARD OF QUALITY AND SHALL NOT BE CONSTRUED AS LIMITING COMPETITION. UNLESS STATED OTHERWISE. THE CONTRACTOR MAY USE ANY ARTICLE WHICH, IN HIS JUDGEMENT, AND WITH WRITTEN COMMENT FROM THE ARCHITECT/ENGINEER INDICATING NO OBJECTION, IS EQUAL OR SUPERIOR TO THAT SPECIFIED. DRAWINGS SHOWING CHANGES OR REVISIONS REQUIRED BY THE SUBSTITUTION FOR SPECIFIED ITEMS SHALL BE SUBMITTED WITH THE SHOP DRAWING DATA, AND THE COSTS OF ALL SUCH CHANGES SHALL BE BORNE BY THE
- G. SIMILAR ITEMS SHALL BE PROVIDED BY A SINGLE MANUFACTURER.
- H. ALL REQUIRED WALL OR FLOOR OPENINGS SHALL BE COORDINATED WITH THE CONTRACTOR.
- I. ALL PIPING SHALL BE ABOVE CEILING UNLESS INDICATED OTHERWISE.
- J. DO NOT INSTALL PVC PIPING OR ANY COMBUSTIBLE MATERIAL IN ANY AIR PLENUM.
- K. ALL EQUIPMENT SHALL BE WIPED CLEAN, REMOVING ALL TRACES OF OIL, DIRT, OR PAINT SPOTS.
- PROVIDE SUPPORTS TO RIGIDLY ATTACH ALL EQUIPMENT, APPURTENANCES AND PIPE AS REQUIRED FOR SUPPORT. PRIOR TO NSTALLATION OF HANGERS AND INSERTS, THE CONTRACTOR SHALL COORDINATE LOCATIONS AND REQUIREMENTS TO MINIMIZE CONFLICTS WITH OTHER BUILDING SYSTEMS. INSTALLATION OF PIPE HANGERS AND SUPPORTS SHALL BE IN STRICT ACCORDANCE WITH MSS SP-58, 69 AND 89.
- M. CONTRACTOR SHALL MAKE FINAL CONNECTIONS TO ALL EQUIPMENT INDICATED TO BE FURNISHED BY OTHERS.
- SUBMISSION OF SHOP DRAWINGS, PRODUCT DATA, SAMPLES AND PROJECT
 - A. SHOP DRAWINGS SHALL BE SUBMITTED FOR THE FOLLOWING ITEMS:
 - STRAINERS INSULATION
 - GAS COCKS
 - CL FANOUTS FLOOR DRAINS
 - GATE VALVES
 - (7) CHECK VALVES (8) BACKFLOW PREVENTERS
 - (9) ALL SCHEDULED EQUIPMENT INDICATED ON SHEET P-2 B. IDENTIFY ALL PLUMBING SHOP DRAWINGS, PRODUCT DATA AND SAMPLES WITH THE NAME OF THE PROJECT. CLEARLY MARK THE SPECIFIC ITEMS INTENDED FOR USE. SUBMIT ALL RELATED ITEMS AT ONE TIME.
 - C. PRIOR TO SUBSTANTIAL COMPLETION OF THE PROJECT, SUBMIT THE FOLLOWING INFORMATION FOR REVIEW AND APPROVAL.
 - OPERATING AND MAINTENANCE INSTRUCTIONS. "AS BUILT" DRAWINGS.
- GUARANTEE: ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED TO BE FREE FROM DEFECTS FOR A PERIOD OF ONE (1) YEAR FROM DATE OF ACCEPTANCE AND CONTRACTOR SHALL MAKE GOOD. WITHOUT ADDITIONAL COST TO THE OWNER. ANY DEFECTS WHICH MAY APPEAR WITHIN THAT PERIOD. MANUFACTURER'S WARRANTIES EXTENDING BEYOND ONE YEAR SHALL BE PROCESSED AND TURNED OVER TO THE
- "AS BUILT" DRAWINGS: CONTRACTOR SHALL KEEP AN ACCURATE RECORD OF THE LOCATION OF ALL CONCEALED PIPING, VALVES, CONTROLS, ETC., BOTH INTERIOR AND EXTERIOR. ON COMPLETION OF THE WORK ONE PRINT EACH OF THE CONTRACT DRAWINGS WHICH ARE APPLICABLE SHALL BE NEATLY AND CLEARLY MARKED IN COLOR TO SHOW ALL VARIATIONS BETWEEN THE WORK ACTUALLY PROVIDED AND THAT INDICATED ON THE CONTRACT DRAWINGS.
- 5. OPERATING AND MAINTENANCE MANUALS
 - A. GENERAL: PRIOR TO COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL PROVIDE TWO HARDBACKED LOOSELEAF RING TYPE BINDERS, IDENTIFIED WITH THE NAME OF THE PROJECT. CONTRACTOR SHALL DELIVER THESE BINDERS TO THE ENGINEER FOR REVIEW AND TRANSMITTAL TO THE OWNER.
 - THE FOLLOWING ITEMS AND OTHER ADDITIONAL PERTINENT DATA FOR EACH ITEM OF EQUIPMENT SHALL BE INCLUDED:
 - C. THE OPERATING AND MAINTENANCE MANUALS SHALL BE CONSIDERED A PART OF THE FINAL INSPECTION AND THEY SHALL B SUBMITTED FOR APPROVAL AT LEAST THIRTY (30) DAYS PRIOR TO REQUEST FOR FINAL INSPECTION.
- ACCESS DOORS: ACCESS DOORS SHALL BE PROVIDED FOR ALL CONCEALED VALVES, CONTROLS, AND ANY OTHER EQUIPMENT OR MATERIALS REQUIRING INSPECTION OR MAINTENANCE. ACCESS DOORS SHALL BE FURNISHED FOR FLOORS. WALLS AND CEILINGS, OF ADEQUATE SIZE SO THAT CONCEALED ITEMS WILL BE READILY ACCESSIBLE FOR SERVICING OR FOR REMOVAL AND REPLACEMENT IF NECESSARY.

7. IDENTIFICATION

- A. SUBMITTALS (1) SUBMIT LIST OF WORDING, SYMBOLS, LETTER SIZE, AND
 - COLOR CODING FOR MECHANICAL IDENTIFICATION. SUBMIT VALVE CHART AND SCHEDULE, INCLUDING VALVE TAG NUMBER, LOCATION, FUNCTION, AND VALVE MANUFACTURER'S NAME AND MODEL NUMBER.
 - PRODUCT DATA: PROVIDE MANUFACTURERS CATALOG LITERATURE FOR EACH PRODUCT REQUIRED.

- NAMEPLATES DESCRIPTION: LAMINATED THREE-LAYER PLASTIC WITH ENGRAVED LETTERS ON LIGHT CONTRASTING BACKGROUND
- COLOR.
- METAL TAGS: BRASS WITH STAMPED LETTERS; TAG SIZE MINIMUM 1-1/2 INCHES (40 MM) DIAMETER. (2) CHART: TYPEWRITTEN LETTER SIZE LIST IN ANODIZED

ALUMINUM FRAME.

- (1) DEGREASE AND CLEAN SURFACES TO RECEIVE ADHESIVE FOR IDENTIFICATION MATERIALS.
- (2) INSTALL PLASTIC NAMEPLATES WITH CORROSIVE-RESISTANT MECHANICAL FASTENERS, OR ADHESIVE. APPLY WITH SUFFICIENT ADHESIVE TO ENSURE PERMANENT ADHESION AND SEAL WITH CLEAR LACQUER.
- INSTALL TAGS WITH CORROSION RESISTANT CHAIN. INSTALL PLASTIC PIPE MARKERS IN ACCORDANCE WITH
- MANUFACTURER'S INSTRUCTIONS. (5) IDENTIFY CONTROL PANELS AND MAJOR CONTROL
- COMPONENTS OUTSIDE PANELS WITH PLASTIC NAMEPLATES. (6) IDENTIFY VALVES IN MAIN AND BRANCH PIPING WITH
- (7) IDENTIFY PIPING, CONCEALED OR EXPOSED. WITH PLASTIC PIPE MARKERS OR STENCILLED PAINTING. IDENTIFY SERVICE, FLOW DIRECTION, AND PRESSURE. INSTALL IN CLEAR VIEW AND ALIGN WITH AXIS OF PIPING. LOCATE IDENTIFICATION NOT TO EXCEED 20 FEET (6 M) ON STRAIGHT RUNS INCLUDING RISERS AND DROPS, ADJACENT TO EACH VALVE AND TEE, AT EACH SIDE OF PENETRATION OF STRUCTURE OR ENCLOSURE, AND AT EACH OBSTRUCTION. (8) PROVIDE CEILING TACKS TO LOCATE VALVES ABOVE T-BAR

TYPE PANEL CEILINGS. LOCATE IN CORNER OF PANEL

8. PIPING SPECIALTIES

A. PIPE ESCUTCHEONS: INSTALL PIPE ESCUTCHEONS ON EACH PIPE PENETRATION THRU FLOORS, WALLS PARTITIONS, AND CEILINGS WHERE PENETRATION IS EXPOSED TO VIEW AND ON EXTERIOR OF BUILDING. SECURE ESCUTCHEON TO PIPE OR INSULATION SO ESCUTCHEON COVERS PENETRATION HOLE, AND IS FLUSH WITH ADJOINING SURFACE. PROVIDE SHEET STEEL ESCUTCHEONS. SOLID OR SPLIT HINGED. FOR AREAS WHERE WATER AND CONDENSATION CAN BE EXPECTED TO ACCUMULATE, PROVIDE CAST BRASS OR SHEET BRASS ESCUTCHEONS, SOLID OR SPLIT HINGED.

CLOSEST TO EQUIPMENT.

- B. PIPE SLEEVES: INSTALL PIPE SLEEVES WHERE PIPING PASSES THROUGH WALLS, FLOORS, CEILINGS, AND ROOFS. DO NOT INSTALL SLEEVES THROUGH STRUCTURAL MEMBERS OF WORK, EXCEPT AS DETAILED ON DRAWINGS, OR AS REVIEWED BY ARCHITECT/ENGINEER. SIZE SLEEVES SO THAT PIPING AND INSULATION (IF ANY) WILL HAVE FREE MOVEMENT IN SLEEVE. INCLUDING ALLOWANCE FOR THERMAL EXPANSION.
- C. FIRE BARRIER PENETRATION SEALS: PROVIDE SEALS FOR ANY OPENING THROUGH FIRE-RATED WALLS, FLOORS, OR CEILINGS USED AS PASSAGE FOR PLUMBING COMPONENTS SUCH AS PIPING. INSTALLATION SHALL BE AS RECOMMENDED BY THE MANUFACTURER. SEALS SHALL BE EQUAL TO ONE OF THE FOLLOWING:
 - (1) DOW-CORNING FIRESTOP SYSTEM PENETRATION SEALS INCLUDING FIRE STOP SEALANT AND FIRE STOP FOAM.
 - (2) 3M BRAND "FIRE BARRIER WRAP/STRIP" NO. FS-195, FIRE BARRIER CAULK, CP-25 AND PUTTY NO. 303 SHALL BE USED WHERE PVC, POLYPROPYLENE OR OTHER NON-METALLIC PIPES PASS THROUGH FLOORS AND FIRE RATED WALLS.

INSULATION

- A. FLAME/SMOKE RATINGS: PROVIDE COMPOSITE PLUMBING INSULATION (INSULATION, JACKETS, COVERINGS, SEALERS, MASTICS AND ADHESIVES) WITH FLAME—SPREAD RATING OF 25 OR LESS, AND SMOKE-DEVELOPED RATING OF 50 OR LESS, AS TESTED BY ANSI/ASTM E84 (NFPA 255) METHOD. INSULATION SHALL BE LABELED BY THE MANUFACTURÉR. THE LABEL SHALL INDICATE THE INSULATING VALUE, FLAME SPREAD AND SMOKE-DEVELOPED
- B. SUBMITTALS: SUBMIT MANUFACTURER'S SPECIFICATIONS AND INSTALLATION INSTRUCTIONS FOR EACH TYPE OF PLUMBING INSULATION. SUBMIT SCHEDULE SHOWING MANUFACTURER'S PRODUCT NUMBER, THICKNESS, AND FURNISHED ACCESSORIES FOR EACH PLUMBING SYSTEM REQUIRING INSULATION.
- C. INSTALLATION: INSULATION SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS USING ONLY ADHESIVES. MASTICS AND PLUMBING FASTENERS APPROVED BY THE INSULATION MANUFACTURER. INSULATION SHALL NOT BE APPLIED UNTIL AFTER THE EQUIPMENT HAS BEEN TESTED WITH RESULTS ACCEPTABLE TO THE ARCHITECT/ENGINEER.

D. MATERIALS:

(1) CELLULAR FOAM PIPE INSULATION: TUBULAR, FLEXIBLE, FIRE RESISTANT INSULATION WITH OPERATING TEMPERATURE RANGE OF -40 DEGREES F TO 220 DEGREES . THERMAL CONDUCTIVITY "K"=0.27 BTU-IN/HOUR-SF-DEG F AT 75 DEGREES F. NO JACKET REQUIRED. EQUAL TO ARMSTRONG ARMAFLEX AP.

E. PIPE INSULATION

- (1) INSULATION OMITTED: OMIT INSULATION ON EXPOSED PLUMBING FIXTURE RUNOUTS FROM FACES OF WALL OR FLOOR TO FIXTURE: ON UNIONS. FLANGES. STRAINERS. FLEXIBLE CONNECTIONS, AND EXPANSION JOINTS.
- (2) COVER VALVES. FITTINGS AND SIMILAR ITEMS IN EACH PIPING SYSTEM WITH EQUIVALENT THICKNESS AND COMPOSITION OF INSULATION AS APPLIED TO ADJOINING PIPE RUN.
- (3) EXTEND PIPING INSULATION WITHOUT INTERRUPTION THROUGH WALLS. FLOORS AND SIMILAR PIPING PENETRATIONS, EXCEPT WHERE OTHERWISE INDICATED.
- (4) INSTALL PROTECTIVE METAL SHIELDS AND INSULATED INSERTS WHEREVER NEEDED TO PREVENT COMPRESSION OF INSULATION.
- (5) DOMESTIC COLD WATER PIPING, ABOVE GROUND: PIPING SHALL BE INSULATED WITH 1/2 INCH THICK GLASS FIBER. CELLULAR FOAM, OR POLYETHYLENE PIPE INSULATION.
- (6) DOMESTIC HOT WATER PIPING (INCLUDING HOT WATER recirculating): Piping Shall be insulated with 1 INCH THICK GLASS FIBER, CELLULAR FOAM, OR POLYETHYLENE PIPE INSULATION. VAPOR SEAL IS NOT

10. PLUMBING PIPING

- A. DOMESTIC WATER PIPING ABOVE GROUND
 - PIPE: TYPE L HARD DRAWN COPPER OR CPVC FITTINGS: CAST BRONZE OR WROUGHT COPPER OR CPVC JOINTS: SOLDERED USING TIN-ANTIMONY (95-5) SOLDER
- B. DOMESTIC WATER PIPING UNDERGROUND
- PIPE: TYPE K SEAMLESS ROLL STOCK FITTINGS: CAST BRONZE OR WROUGHT COPPER JOINTS: SOLDERED USING TIN-ANTIMONY (95-5) SOLDER
- C. SOIL. WASTE AND VENT PIPING BELOW GRADE AND STORM SEWER BELOW GRADE
 - SIZE: 4 INCHES AND SMALLER PIPE: SERVICE WEIGHT CAST IRON ASTM A-74 OR SCH. 40 PVC-DWV ASTM D-2665 FITTINGS: SERVICE WEIGHT CAST IRON OR PVC SOCKET FITTINGS (DWV) JOINTS: HUB & SPIGOT CAULKED OR COMPRESSION GASKETS FOR
- SOIL, WASTE AND VENT PIPING ABOVE GRADE AND STORM DRAINS & ROOF LEADERS

CAST IRON OR SOLVENT CEMENT JOINTS FOR PVC

- SIZE: 3 INCHES AND LARGER PIPE: SERVICE WEIGHT CAST IRON ASTM A-74 OR HUBLESS ASTM C-564 OR SCH. 40 PVC-DWV ASTM D-2665 FITTINGS: SERVICE WEIGHT OR HUBLESS CAST IRON OR PVC SOCKET FITTINGS (DWV) JOINTS: HUB & SPIGÓT CAULKED, COMPRESSION GASKETS OR NEOPRENE SLEEVES AND STAINLESS STEEL BANDS FOR CAST IRON OR SOLVENT CEMENT JOINTS FOR PVC
- SIZE: 2-1/2 INCHES AND SMALLER: SAME AS 3 INCHES AND LARGER EXĆEPT VENTS MAY BE SCH. 40 GALVANIZED STEEL ASTM A120/A53 WITH GALVANIZED CAST IRON OR MALLEABLE IRON
- E. ALL PIPE OF THE SAME SIZE SHALL BE THE SAME MATERIAL.
- SLOPE ALL DRAIN LINES 1/4 INCH PER FOOT MINIMUM FOR SIZES LESS THAN 4 INCHES; SLOPE 1/8 INCH PER FOOT FOR SIZES 4 INCHES AND LARGER.
- G. SOIL, WASTE AND VENT PIPING LOCATED BELOW GRADE SHALL BE MINIMUM 2 INCHES SIZE.
- VENTS SHALL EXTEND 12 INCHES ABOVE THE ROOF. ROOF FLASHING SHALL BE COORDINATED WITH BY THE CONTRACTOR.
- DOMESTIC HOT AND COLD WATER PIPING SHALL BE 1/2 INCHES SIZE UNLESS INDICATED OTHERWISE.

11. NATURAL GAS SYSTEMS

- A. GAS SERVICE PIPING:
 - (1) ALL SIZES: SCHEDULE 40 BLACK STEEL PIPE. ASTM A120/A53-CW OR ASTM/A53 GRADE B (WELDED OR SEAMLESS); WROUGHT STEEL BUTTWELDING FITTINGS.
 - (2) WRAPPING FOR EXPOSED PIPING: MACHINE WRAP PIPE USING 50% OVERLAP WRAP, WITH POLYVINYL CHLORIDE TAPE. HAND WRAP FITTINGS USING 100% OVERLAP WRAP EXTENDING 6 INCHES BEYOND FITTING ONTO WRAPPED PIPE. COMPLY WITH TAPE MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- B. BUILDING DISTRIBUTION PIPING AND VENT PIPING:
 - (1) ALL SIZES: SCHEDULE 40 BLACK STEEL PIPE. ASTM A120/A53-CW OR ASTM/A53 GRADE B (WELDED OR SEAMLESS); MALLEABLE IRON THREADED FITTINGS (EXPOSED PIPING ONLY): WROUGHT STEEL BUTTWELDING FITTINGS (CONCEALED AND EXPOSED PIPING).
- C. GAS COCKS:
 - (1) GAS COCKS 2 INCHES AND SMALLER: 150 PSI NON-SHOCK WOG, BRONZE STRAIGHTWAY COCK, FLAT OR SQUARE HEAD,
- (2) GAS COCKS 2-1/2 INCHES AND LARGER: 125 PSI NON-SHOCK WOG, IRÔN BODY BRONZE MOUNTED, STRAIGHTWAY COCK, SQUARE HEAD, FLANGED ENDS.
- ALL GAS PIPING EQUIPMENT CONNECTIONS SHALL BE PROVIDED WITH A 6 INCHES DIRT TRAP, UNION AND GAS COCK SHUT OFF.
- ALL JOINTS SHALL BE SEALED WITH CHEMICALLY RESISTANT SEALER APPLIED TO MALE THREADS OF PIPE CONNECTION.
- GAS PIPING SHALL BE INSTALLED WITH A 1/64 INCH PER FOOT DOWNWARD SLOPE IN DIRECTION OF FLOW.

12. CLEANOUTS

CLEANOUTS SHALL BE THE SAME SIZE AS LINE SERVED, BUT NOT LARGER THAN 4 INCHES, AND SHALL BE PROVIDED AT THE BASE OF EACH SOIL AND WASTE STACK, AT ALL POINTS WHERE DIRECTION CHANGE IS MORE THAN 45 DEGREES. AT MINIMUM INTERVALS OF 50 FEET FOR 4 INCHES AND SMALLER PIPING, AT MINIMUM INTERVALS OF 100 FEET FOR PIPING LARGER THAN 4 INCHES, AS REQUIRED BY CODE AND AS INDICATED ON THE DRAWINGS. COVERS SHALL BE SET FLUSH WITH FLOOR OR WALL

13. FLOOR DRAINS

- PROVIDE FLOOR DRAINS OF SIZE AND TYPE AS INDICATED ON DRAWINGS. ALL DRAINS CONNECTING TO SANITARY SEWER SYSTEM SHALL BE FURNISHED WITH P-TRAP. DRAINS SHALL HAVE OUTLET COMPATIBLE WITH PIPING SYSTEM TO WHICH IT IS CONNECTED.
- INSTALL FLOOR DRAINS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. PROVIDE FLOOR DRAINS WHERE INDICATED ON DRAWINGS AND AT LOW POINTS OF SURFACE AREAS TO BE DRAINED.

14. PLUMBING VALVES

- PROVIDE SHUT-OFF VALVE AND UNION OR EQUIVALENT AT EACH HOT AND COLD WATER EQUIPMENT CONNECTION. PROVIDE SHUT-OFF VALVE ON EACH BRANCH OR RISER THAT SERVES TWO OR MORE PLUMBING FIXTURES.
- B. GATE VALVES 2-1/2 INCHES AND SMALLER: ALL BRONZE, RISING STEM, SOLID WEDGE DISC. STOCKHAM B-100 OR B-108.
- C. CHECK VALVES IN HORIZONTAL PIPES:

- (1) 2 INCHES AND SMALLER: ALL BRONZE, REGRINDING BRONZE DISC, HORIZONTAL SWING, Y-PATTERN. STOCKHAM B-
- D. CHECK VALVES IN VERTICAL PIPES AND PUMP DISCHARGE: SILENT CHECK VALVE WITH SEMI-STEEL BODY, BRONZE TRIM AND STAINLESS STEEL SPRING. METRAFLEX 700 SERIES.
- BALL VALVES MAY BE USED IN LIEU OF GATE VALVES 2 INCHES AND SMALLER. BALL VALVES SHALL HAVE BRONZE BODY, BRONZE BALL AND TFE SEATS AND SEALS. STOCKHAM S-216BRRT OR S-

15. WATER HEATERS

- A. UL AND NEMA COMPLIANCE: PROVIDE ELECTRIC MOTORS AND ELECTRICAL COMPONENTS REQUIRED AS PART OF PLUMBING EQUIPMENT, WHICH HAVE BEEN LISTED AND LABELED BY UNDERWRITERS LABORATORIES AND COMPLY WITH NEMA STANDARDS.
- NEC COMPLIANCE: COMPLY WITH NATIONAL ELECTRICAL CODE (ANSI/NFPA 70) AS APPLICABLE TO INSTALLATION AND ÉLECTRICAL CONNECTIONS OF ANCILLARY ELECTRICAL COMPONENTS OF PLUMBING EQUIPMENT.
- WATER HEATERS SHALL BE FURNISHED WITH ASME RATED TEMPERATURE AND PRESSURE RELIEF VALVE WITH TEST LEVER.

16. PLUMBING FIXTURES

- CODES AND STANDARDS: COMPLY WITH APPLICABLE PORTIONS OF NATIONAL STANDARD PLUMBING CODE PERTAINING TO MATERIALS AND INSTALLATION OF PLUMBING FIXTURES.
 - (1) ANSI STANDARDS: COMPLY WITH APPLICABLE ANSI STANDARDS PERTAINING TO PLUMBING FIXTURES AND
 - (2) PDI COMPLIANCE: COMPLY WITH STANDARDS ESTABLISHED BY PDI PERTAINING TO PLUMBING FIXTURE SUPPORTS.
- (3) UL COMPLIANCE: CONSTRUCT WATER COOLERS IN ACCORDANCE WITH UL STANDARD 399 "DRINKING-WATER COOLERS", AND PROVIDE UL-LISTING AND LABEL.
- (4) ANSI COMPLIANCE: CONSTRUCT AND INSTALL BARRIER FREE PLUMBING FIXTURES IN ACCORDANCE WITH ANSI STANDARD A117.1 "SPECIFICATIONS FOR MAKING BUILDINGS AND FACILITIES ACCESSIBLE TO AND USABLE BY PHYSICALLY HANDICAPPED PEOPLE".
- B. ALL EXPOSED FIXTURE SUPPLIES AND WASTE LINES SHALL BE CHROME PLATED.
- PLUMBING FIXTURES SHALL BE POSITIVELY VENTED AND TRAPPED IN ACCORDANCE WITH THE BOCA PLUMBING CODE, LATEST EDITION. WET VENTING IS ALLOWED IF WASTE PIPING IS OVERSIZED AND IN ACCORDANCE WITH CODE PROVISIONS. LOCATION OF VENT SHALL NOT EXCEED MAXIMUM DISTANCES TO THE TRAP AS ESTABLISHED WITHIN THE BOCA PLUMBING CODE.

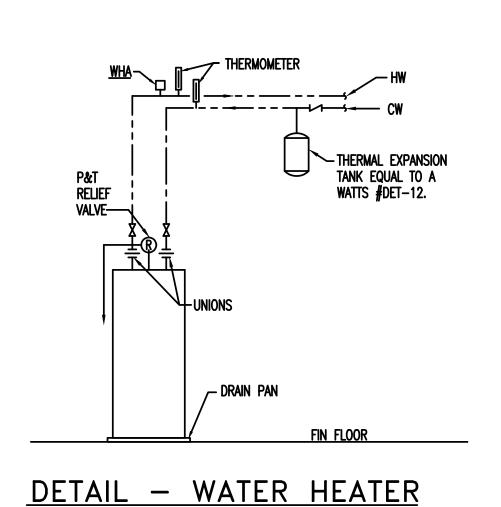
17. CLEANING AND TESTING

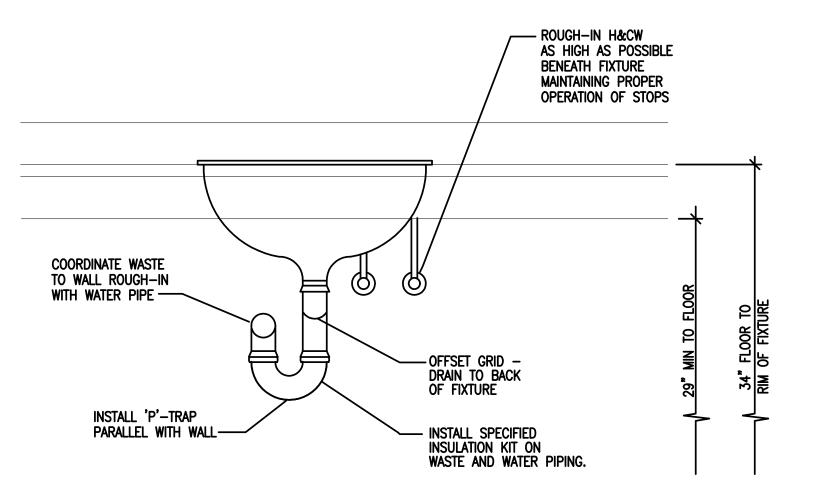
- A. ALL WATER PIPING, VALVES, ETC. SHALL BE THOROUGHLY FLUSHED OF FOREIGN MATTER AND TESTED FOR LEAKS FOR A PERIOD OF TWO HOURS AT NOT LESS THAN 25 PSIG. ANY LEAKAGE SHALL BE REPAIRED. DISINFECT DOMESTIC WATER PIPING INCLUDING WATER SERVICE PIPING IN ACCORDANCE WITH AWWA C601.
- ALL DRAIN, WASTE AND VENT PIPING SHALL BE TESTED FOR LEAKS BY FILLING PIPING SYSTEM TO OVERFLOW AND ALLOWING TO STAND FOR 24 HOURS. NO VISIBLE DROP IN WATER LEVEL WILL BE ACCEPTABLE

END OF SPECIFICATIONS

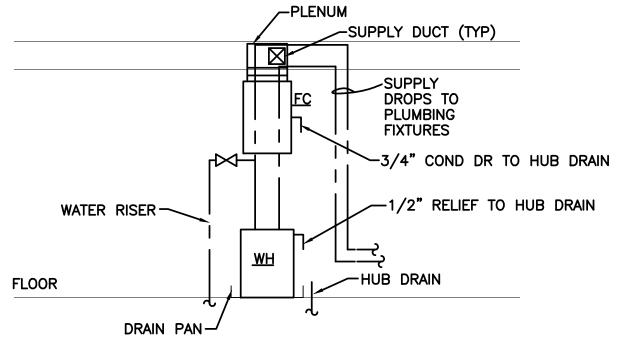
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<u>DETAIL - COUNTER MOUNT LAVATORY</u> NO SCALE



TYPICAL MECHANICAL **CLOSET SECTION**

PLUMBING EQUIPMENT SCHEDULE

- WC-1 KOHLER K-3978 WELLWORTH ELONGATED VITREOUS CHINA WATER CLOSET (TANK TYPE, FLOOR MTD., 1.6 GAL/FLUSH) CLASS FIVE FLUSHING TECHNOLOGY; KOHLER K-4650 ÉLONGATÉD SEAT; BOLT CAPS.
- KOHLER K-3554 BARRINGTON ELONGATED VITREOUS CHINA WATER CLOSET (TANK TYPE, FLOOR MTD., REAR DISCHARGE, 1.6 GAL/FLUSH) CLASS FIVE FLUSHING TECHNOLOGY; KOHLER K-4650 ELONGATED SEAT; BOLT CAPS.
- KOHLER K-39798 HIGHLINE ELONGATED VITREOUS CHINA WATER WC-3CLOSET (ADA, TANK TYPE, FLOOR MTD., 1.6 GAL/FLUSH) CLASS FIVE FLUSHING TECHNOLOGY; KOHLER K-4650 ELONGATED SEAT; BOLT CAPS.
- L-1 KOHLER K-2355 ARCHER UNDER-MOUNT LAVATORY; KOHLER FAUCET MODEL K-10215-4 FORTE. GRID DRAIN STRAINER AND ANGLE SUPPLIES LOOSE KEY STOPS
- KS-1 ELKAY #EFU131610TC STAINLESS STEEL SINGLE BOWL UNDERMOUNT KITCHEN SINK, 16 GA., TYPE 304 STAINLESS, 10" DEEP; #9176 DELTA FAUCET WITH 9" SPOUT, SINGLE LEVER CONTROL PULL DOWN SPRAY, CHROME P-TRAP AND SUPPLIES, #LK35
- IMB SIOUX CHIEF OX BOX, 696 SERIES WITH WATER VALVE AND WATER HAMMER
- ARRESTOR BT-1 OASIS TUB/SHOWER TSFW-6030-ABF; MOEN 82330 SINGLE HANDLE TUB/SHOWER FAUCET WITH VALVE, SHOWER HEAD, TUB SPOUT, ARM, FLANGE. COLOR TO BE WHITE.

ABS BOXES, ONE BOX WITH CENTER DRAIN AND ONE BOX WITH TWO WATER VALVES & WATER HAMMER ARRESTORS. PROVIDE FLANGED BOXES SUITABLE FOR DRYWALL

CHROME FLUSH WALL PLATE, RECESSED PLUG.

- CO JOSAM CLEANOUT FLOOR ROUND, SATIN BRONZE TOP, RECESSED PLUG.
- JOSAM 7E2 HUB DRAIN, 4"Ø NICKALOY STRAINER WITH ROUND FUNNEL WITH PERFORATED BASKET
- STATE ELECTRIC WATER HEATER, MODEL EN6-50-DOLBS, SINGLE ELEMENT, 48 GAL. CAPACITY TANK, 4500 W; 208/1; T&P RELIEF VALVE, EXPANSION TANK, HOT & COLD SHUTOFF VALVES, DRAIN PAN.

PLUMBING FIXTURE INSTALLATION SCHEDULE

FIXTURE	MARK	MH	CW	HW	VENT	WASTE
WATER CLOSET	WC-1	15"	3/4"		2"	3"
WATER CLOSET	WC-2	15"	3/4"		2"	3"
WATER CLOSET	WC-3	17"	3/4"		2"	3 "
LAVATORY	L-1	COUNTER	1/2"	1/2"	1-1/2"	2"
KITCHEN SINK	KS-1	COUNTER	1/2"	1/2"	1-1/2"	2"
BATHTUB	BT-1	72 " (A)	1/2"	1/2"	_	_

- NOTES

 1. SIZE GIVEN ARE FOR FIXTURE ONLY. EXCEPTIONS, IF ANY, ARE SHOWN ON PLANS.

 2. MOUNTING HEIGHT DIMENSIONS ARE TO FLOOD LEVEL RIM OF FIXTURE, UNLESS NOTED OTHERWISE.
 - (A) MOUNTING HEIGHT TO SHOWER HEAD

	<u>LEGEND</u>
	BRANCH CONNECTION — BOTTOM OF MAIN BRANCH CONNECTION — SIDE OF MAIN BRANCH CONNECTION — TOP OF MAIN PIPE DOWN OR PIPE FROM BELOW PIPE UP OR PIPE FROM ABOVE
—————————————————————————————————————	DIRECTION OF FLOW DOMESTIC COLD WATER DOMESTIC HOT WATER SPRINKLER HEAD SANITARY SEWER OR DRAIN SANITARY VENT RAIN LEADER ABOVE LOWEST FLOOR STORM SEWER OR DRAIN
° co 'co + +	CLEANOUT FLUSH WITH FLOOR CLEANOUT BELOW FLOOR HOSE BIBBS (PLAN & ELEVATION)
—————————————————————————————————————	GATE VALVE BALL VALVE THERMOMETER PRESSURE REDUCING VALVE (PRV)
® 7 → 2√	RELIEF VALVE BACKFLOW PREVENTER (BFP)

ABBREVIATIONS

ABV BTU BEL BET CLG CONC CONN CW CONT DN EA EWC F FD FL FR FT GPM GV	CONNECT, CONNECTION COLD WATER CONTINUED DOWN EACH ELECTRIC WATER COOLER DEGREES FARENHEIT FLOOR DRAIN FLOOR FROM FEET GALLONS PER MINUTE GATE VALVE
DN -:	
EA EWO	
EWC	
FD	
FL	
FR	=
HB HW	HOSE BIBB HOT WATER
	INCH, INCHES
IN Max	MAXIMUM
MIN	MINUMUM
RD	ROOF DRAIN
REQD	REQUIRED
RL SH	ROOF LEADER SHEET
TEMP	
TYP	TYPICAL
	SANITARY VENT
VTR	VENT THRU ROOF
W	SANITARY WASTE
WH	WALL HYDRANT

CONSTRUCTION PLUMBING SCHEDULES

NOT FOR

