

LEGEND AND ABBREVIATIONS

ACV AND PLUMBING		LEGEND		ABBREVIATIONS	
SYMBOL	DESCRIPTION	ABBREV	DESCRIPTION	ABBREV	DESCRIPTION
	SUPPLY AIR DUCT UP	ABV	ABOVE	MIN	MINIMUM
	EXHAUST, OUTSIDE OR RETURN AIR DUCT UP	AFF	ABOVE FINISH FLOOR	NO	NUMBER
	SUPPLY AIR DUCT DOWN / BELOW	AHU	AIR HANDLING UNIT	POC	POINT OF CONNECTION
	EXHAUST, OUTSIDE OR RETURN AIR DUCT DOWN / BELOW	ARCH	ARCHITECTURAL	QTY	QUANTITY
	DUCT ELBOW	BTUH	BRITISH THERMAL UNITS/HOUR	RA	RETURN AIR
	DUCT (1ST FIGURE, SIDE SHOWN; 2ND FIGURE, SIDE NOT SHOWN)	CD	CEILING DIFFUSER	RAR	RETURN AIR REGISTER
	VOLUME DAMPER	CLG	CEILING	RH	REHEAT
	DUCT FLEXIBLE CONNECTION	CONN	CONNECTION	SHT	SHEET
	RECTANGULAR DUCT TRANSITION	CONC	CONCRETE	TAB	TESTING AND BALANCING
	EQUIPMENT / MATERIALS TO BE REMOVED	CFM	CUBIC FEET/MINUTE	TAR	TRANSFER AIR DUCT
	CEILING DIFFUSER	DET	DETAIL	TAD	TRANSFER AIR REGISTER
	DIAMETER, PHASE	DN	DOWN	TAR	TRANSFER AIR REGISTER
	AT	DWGS	DRAWINGS	TEMP	TEMPERATURE
	EQUIPMENT INDICATOR A=EQUIPMENT ABBREVIATION B=MARK NUMBER	EA	EACH	TYP	TYPICAL
	FIRE SPRINKLER HEAD	ESP	EXTERNAL STATIC PRESSURE	V	VOLTS
		EXIST	EXISTING	VAV	VARIABLE AIR VOLUME
		FIN	FINISH	VD	VOLUME DAMPER
		FLEX	FLEXIBLE	W/	WITH
		FS	FIRE SPRINKLER		
		GALV	GALVANIZED		
		HP	HORSEPOWER		
		HZ	HERTZ		
		IN	INCHES		
		IN-WG	INCHES WATER GAUGE		
		LBS	POUNDS		

DUCTWORK NOTES AND INFORMATION

- THE INSTALLATION OF THE DUCTWORK (CONSTRUCTION, BRACING, REINFORCEMENT, SUPPORTS, SEALED, ETC.) SHALL BE PER INTERNATIONAL MECHANICAL CODE AND SMACNA DESIGN STANDARDS.
- PROVIDE VOLUME DAMPERS ON ALL SUPPLY, RETURN AND EXHAUST BRANCH DUCTS THAT ARE CONNECTED TO AIR DEVICES. WHERE THE VAV BOX OR EXHAUST FAN ONLY SERVE ONE AIR DEVICE, VOLUME DAMPERS ARE NOT REQUIRED.
- COORDINATE WITH THE TEST AND BALANCING CONTRACTOR FOR THE LOCATIONS OF ALL VOLUME DAMPERS FOR PROPER BALANCING OF THE AIR SYSTEM. PROVIDE VOLUME DAMPERS WHETHER OR NOT SHOWN ON THESE DRAWINGS.
- COORDINATE WITH THE TEST AND BALANCING CONTRACTOR FOR THE LOCATIONS OF AIR FLOW TEST PORTS. PROVIDE TEST PORTS WHETHER OR NOT SHOWN ON THESE DRAWINGS.
- 6-FT OF FLEXIBLE DUCTWORK IS ALLOWED FOR DUCT RUN OUTS TO AIR DEVICES IN AREAS WITH CEILINGS. FLEXIBLE DUCTWORK IS NOT ALLOWED IN AREAS WITHOUT CEILING.
- ALL DUCT DIMENSIONS ARE NET SIZES AND DO NOT INCLUDE THICKNESS OF DUCT INSULATION AND DUCT REINFORCEMENTS.
- PROVIDE 1-IN THICK ACOUSTICAL DUCT LINER FOR ALL TRANSFER DUCTS.
- SEAL ALL SUPPLY AIR, RETURN AIR AND EXHAUST AIR DUCTWORK ACCORDING TO THE PRESSURE CLASS LISTED ON THESE DRAWINGS.
- PROVIDE FOUR DUCT DIAMETERS OF STRAIGHT DUCT BEFORE THE INLET OF THE VAV BOX AND PIM.

DUCT PRESSURE CLASSES			
FAN TYPE	DUCT INVOLVED NEMA EFF (%)	POSITIVE (P) OR NEGATIVE (N) PRESSURE	MINIMUM PRESSURE CLASS IN-WG
AHU SUPPLY FAN	FROM RETURN AIR REGISTER TO COOLING COIL	N	1
	FROM AFTER FAN TO TERMINAL BOXES	P	3
	FROM TERMINAL BOXES TO ROOM OUTLETS	P	1

DUCT LEAKAGE CLASSIFICATION AND ALLOWABLE LEAKAGE				
DUCT PRESSURE CLASS, IN-WG	SEAL CLASS	APPLICABLE SEALING	SMACNA LEAKAGE CLASS	
			RECTANGULAR DUCT	ROUND DUCT
0.5, 1, 2	A	TRANSVERSE JOINTS ONLY	24	12
3 AND ABOVE	A	JOINTS, SEAMS AND ALL WALL PENETRATIONS	6	3

MECHANICAL NOTES:

- THE CONTRACTOR SHALL COORDINATE THEIR WORK WITH ALL TRADES AND VERIFY FIELD CONDITIONS AFFECTING OR AFFECTED BY THIS INSTALLATION. SHOULD CONFLICTS OCCUR, THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY.
- DESIGN HAS BEEN BASED ON EXISTING CONDITIONS THAT ARE EASILY AND READILY OBSERVABLE FOR FIELD VERIFICATION. HOWEVER, ASSUMPTIONS OF EXISTING CONDITIONS HAVE BEEN MADE FOR THOSE CONDITIONS THAT ARE NOT ACCESSIBLE FOR FIELD VERIFICATION. E.G., WITHIN WALLS, SHAFTS, ETC. IT SHALL REMAIN THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL SUCH HIDDEN CONDITIONS DURING CONSTRUCTION WORK IN ORDER TO ACCOMPLISH WORK SHOWN ON THESE DRAWINGS.
- ALL SURFACES/MATERIALS DISTURBED AS A RESULT OF INSTALLATION OF NEW WORK SHALL BE REPLACED/FINISHED TO MATCH EXISTING ADJACENT SURFACES/MATERIALS. SEAL AND PATCH ALL HOLES ON THE EXTERIOR WALL AND ROOF OF THE BUILDING RESULTING FROM NEW WORK, FINISH TO MATCH EXISTING ADJACENT SURFACE.
- AT THE COMPLETION OF THE INSTALLATION WORK, THE AIR CONDITIONING SYSTEM SHALL BE ADJUSTED, TESTED AND BALANCED TO CONFORM TO SPECIFIED AIR FLOW QUANTITIES. BALANCE AND ADJUST SYSTEMS TO ACHIEVE AN EVEN DISTRIBUTION OF AIR. SUBMIT TEST AND BALANCE REPORT FOR REVIEW BY THE ENGINEER.
- COORDINATE WITH THE TAB CONTRACTOR FOR THE LOCATION AND INSTALLATION OF ALL VOLUME DAMPERS FOR THE PROPER BALANCING OF THE AIR SYSTEMS, WHETHER OR NOT SHOWN ON THESE DRAWINGS.
- MECHANICAL CONTRACTOR TO PROVIDE HELP DURING THE TAB IN ADJUSTING THE FAN SPEED ON THE AIR HANDLING UNIT USING THE VFD IN LIEU OF CLOSING ALL OF THE BALANCING DAMPERS IN THE SYSTEM. THE GOAL IS TO PROVIDE THE MOST ENERGY EFFICIENT SYSTEM. ALSO THIS ALLOWS THE FAN TO INCREASE AS THE FILTERS LOAD UP.

GENERAL NOTES:

- REFER TO ARCHITECTURAL DRAWINGS FOR LOCATIONS OF FIRE RATED WALLS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING AND INSTALLING FIRE STOPS AT ALL FIRE RATED WALL PENETRATIONS.

FIRE SAFETY NOTES:

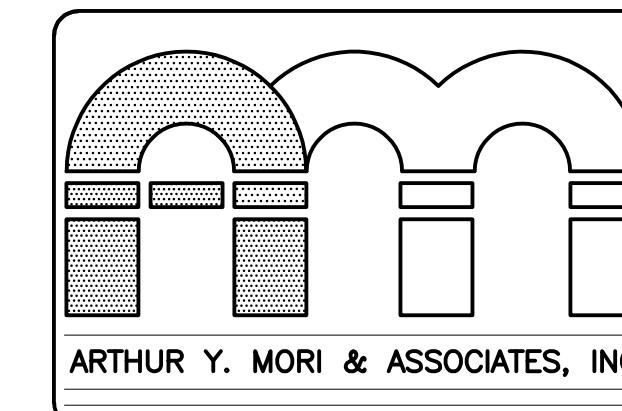
REPAIRS, RENOVATIONS, ALTERATIONS, RECONSTRUCTION, CHANGE OF OCCUPANCY AND ADDITIONS TO BUILDINGS SHALL CONFORM TO THIS CODE, NFPA 101, AND THE BUILDING CODE.

FIRE SAFETY DURING ALTERATION (EXCERPTS FROM NFPA 1 2012, AS AMENDED):

- WHERE THE BUILDING IS PROTECTED BY FIRE PROTECTION SYSTEMS, SUCH SYSTEMS SHALL BE MAINTAINED OPERATIONAL AT ALL TIMES DURING ALTERATION.
- WHERE ALTERATION REQUIRES MODIFICATION OF A PORTION OF THE FIRE PROTECTION SYSTEM, THE REMAINDER OF THE SYSTEM SHALL BE KEPT IN SERVICE AND THE FIRE DEPARTMENT SHALL BE NOTIFIED.
- WHEN IT IS NECESSARY TO SHUT DOWN THE SYSTEM, THE AHJ SHALL HAVE THE AUTHORITY TO REQUIRE ALTERNATE MEASURES OF PROTECTION UNTIL THE SYSTEM IS RETURNED TO SERVICE.
- THE FIRE DEPARTMENT SHALL BE NOTIFIED WHEN THE SYSTEM IS SHUT DOWN AND WHEN THE SYSTEM IS RETURNED TO SERVICE.
- AS NECESSARY DURING EMERGENCIES, MAINTENANCE, DRILLS, PRESCRIBED TESTING, ALTERATIONS, OR RENOVATIONS, PORTABLE OR FIXED FIRE-EXTINGUISHING SYSTEMS OR DEVICES OR ANY FIRE-WARNING SYSTEM SHALL BE PERMITTED TO BE MADE INOPERATIVE OR INACCESSIBLE. A FIRE WATCH SHALL BE REQUIRED AS SPECIFIED IN SECTIONS 13.3.4.3.5.2(3), 13.7.1.4.4, 16.5.4, 20.2.3.6, 34.6.3.3, 41.2.2.5, 41.2.2.6, 41.2.4, 41.3.4, 41.4.1, 34.5.4.3, AND 25.1.8 AT NO COST TO AHJ. 2012 NFPA 1 AS AMENDED.

FIRE SPRINKLER NOTES:

- THE WET PIPE FIRE SPRINKLER SYSTEM INCLUDES ALL PIPING, HANGERS, SPRINKLER HEADS, TESTING, GUARANTEE AND ALL ITEMS INCLUDED AND REQUIRED FOR A COMPLETE SYSTEM. ANY ADDITIONAL METAL PIPE SUPPORTS, SWAY BRACES, HANGERS, CLAMPS, ETC. AND ALL OTHER ACCESSORIES REQUIRED SHALL BE OF AN APPROVED PATTERN AND PLACED TO CONFORM WITH THE REQUIREMENTS OF NFPA STANDARD 13.
- THE QUANTITIES OF SPRINKLER HEADS WILL REMAIN THE SAME AS BEFORE THE RENOVATION OF THE SPACE. THE EXISTING METER IS ADEQUATE TO SERVICE THE AUTOMATIC FIRE SPRINKLER SYSTEM; INCLUSIVE OF THIS PROJECT SCOPE OF WORK.
- NEW FIRE SPRINKLER HEADS SHALL BE LIGATURE RESISTANT INSTITUTIONAL TYPE.
- THE CONTRACTOR SHALL UTILIZE THE EXISTING BRANCH LINE AS POINT OF CONNECTION FOR THE NEW SPRINKLER HEAD. EXTEND PIPE AS REQUIRED. PIPE MATERIAL SHALL MATCH THE EXISTING PIPE
- GENERAL CONTRACTOR SHALL HAVE HIS FIRE SPRINKLER CONTRACTOR COORDINATE WITH BUILDING ENGINEER FOR ANY REQUIRED SHUT-DOWN OF WATER, SPRINKLER DRAINING, RE-FILLING AND FIRE PANEL SILENCING DURING SPRINKLER HEAD REMOVAL/NEW WORK.
- THE FIRE SPRINKLER SYSTEM FOR THIS PROJECT INCLUDES THE RELOCATION OF THE EXISTING FS HEADS TO CONFORM TO THE NEW LAYOUT. ALL RELOCATED FS HEAD LOCATIONS WILL BE PROVIDED WITH NEW FS HEADS.
- THE DESIGN AND INSTALLATION OF THE SYSTEM SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS FOR LIGHT & ORDINARY HAZARD AS SET FORTH IN STANDARD NO. 13 OF THE NFPA, THE STATE FIRE CODE, NFPA 1 (2006), AND WITH THE PACIFIC COAST REQUIREMENTS FOR EARTHQUAKE CONSTRUCTION.

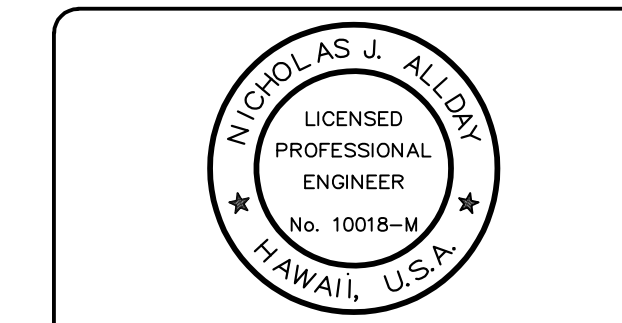


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SHEET TITLE  
LEGEND, ABBREVIATIONS AND NOTES

TMK: 4 - 6 - 014 : 030



LICENSE EXPIRE: 4/30/20

This work was prepared by me or under my supervision and construction of this project will be under my observation (observation of construction as defined in Section 16-115 of the Hawaii Administrative Rules, Department of Commerce and Consumer Affairs entitled Professional Engineers, Architects and Surveyors of the State of Hawaii).

NOTE:  
Contractor to check and verify all dimensions at job before proceeding with work.

COUNTY OF KAUAI  
CHAPTER 12, KAUAI COUNTY BUILDING CODE  
KAUAI COUNTY CODE 1987, AS AMENDED  
ARTICLE 6 - ENERGY CODE

BUILDING COMPONENT SYSTEMS  
 ELECTRICAL COMPONENT SYSTEMS  
 MECHANICAL COMPONENT SYSTEMS

I CERTIFY THAT THE DESIGN IS IN COMPLIANCE WITH THE ENERGY CODE PERTAINING TO:  
SECTION 12-6.3 ADOPTION OF THE INTERNATIONAL ENERGY CONSERVATION CODE (IECC)  
SECTION 12-6.4 LOCAL AMENDMENTS TO THE IECC

SIGNATURE: Nicholas J. Allday DATE: 10-09-19  
NAME: NICHOLAS J. ALLDAY  
TITLE: PRINCIPAL MECHANICAL ENGINEER  
LICENSE NO.: 10018-M

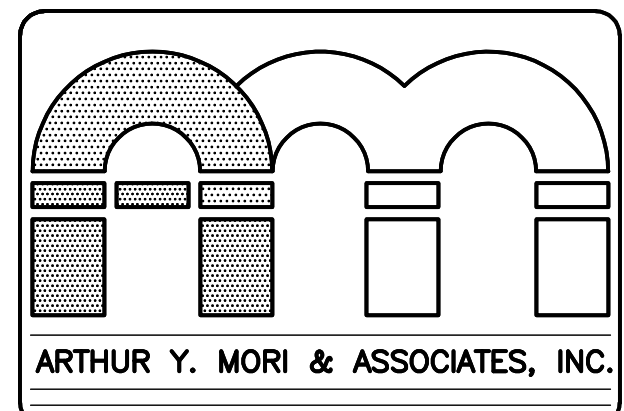
NO.	REVISION

JOB NO. -

SHEET  
**M-1**

October 11, 2019

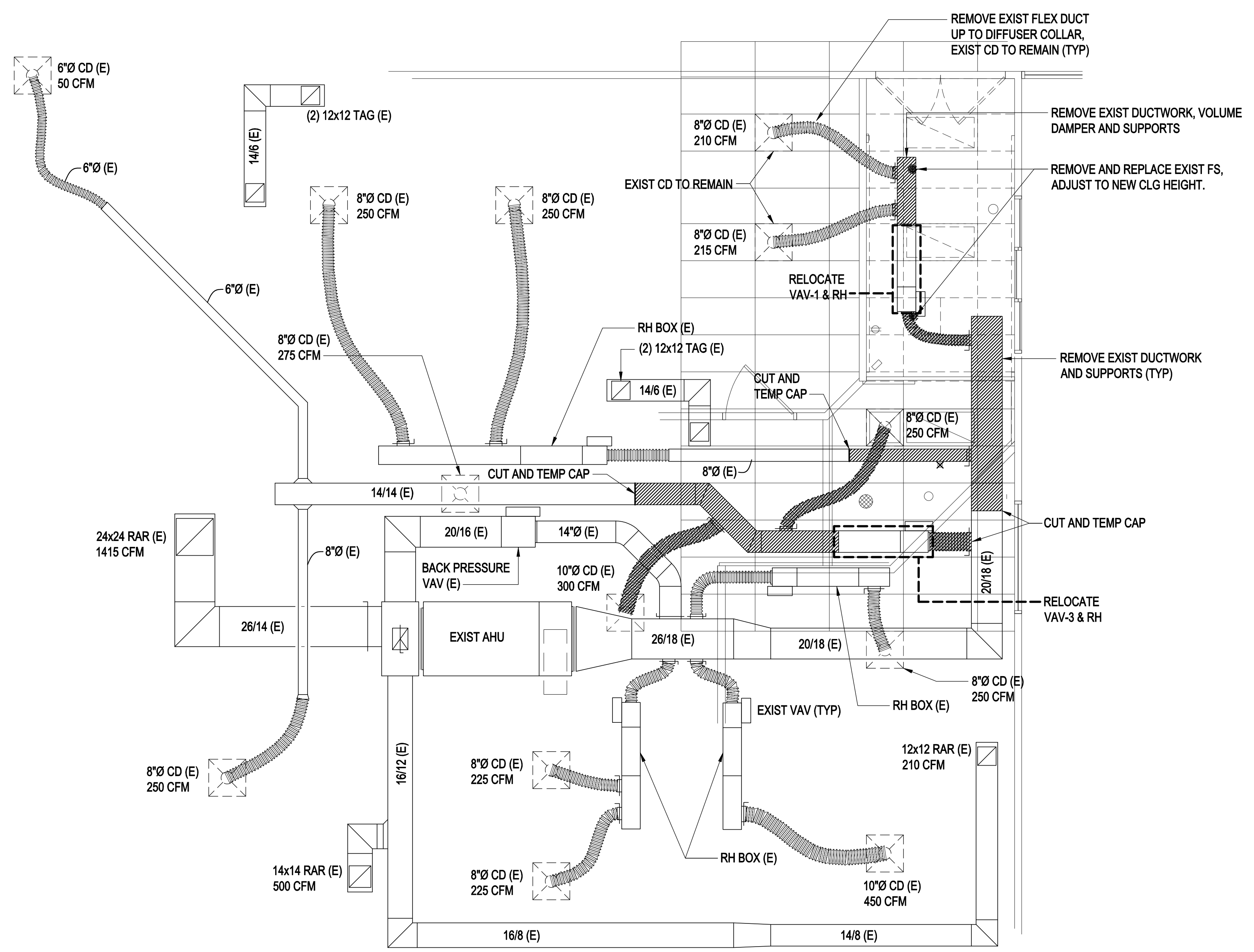
4 of 11 SHTS



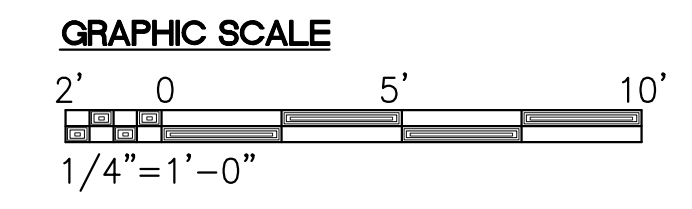
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1 PARTIAL MECHANICAL DEMO PLAN  
M-2 1/4" = 1'-0"



NICHOLAS J. ALDRY  
LICENSED PROFESSIONAL ENGINEER  
No. 10018-M  
HAWAII, U.S.A.

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*Nicholas Aldry*  
SIGNATURE

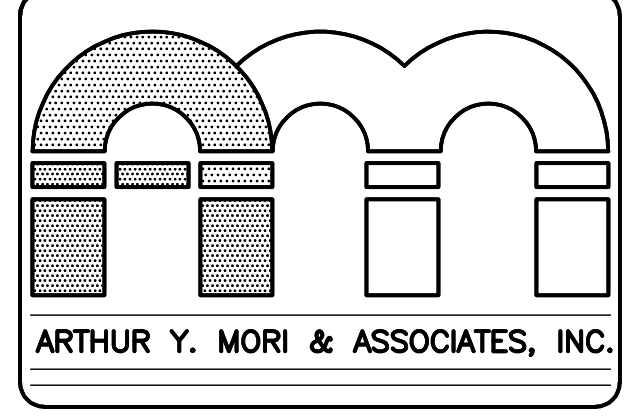
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NO.	REVISION
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SHEET  
M-2  
October 11, 2019  
5 OF 11 SHTS

SHEET TITLE  
PARTIAL MECHANICAL DEMO PLAN



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SHEET TITLE  
PARTIAL MECHANICAL PLAN

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*Nicholas J. Aldred*  
SIGNATURE

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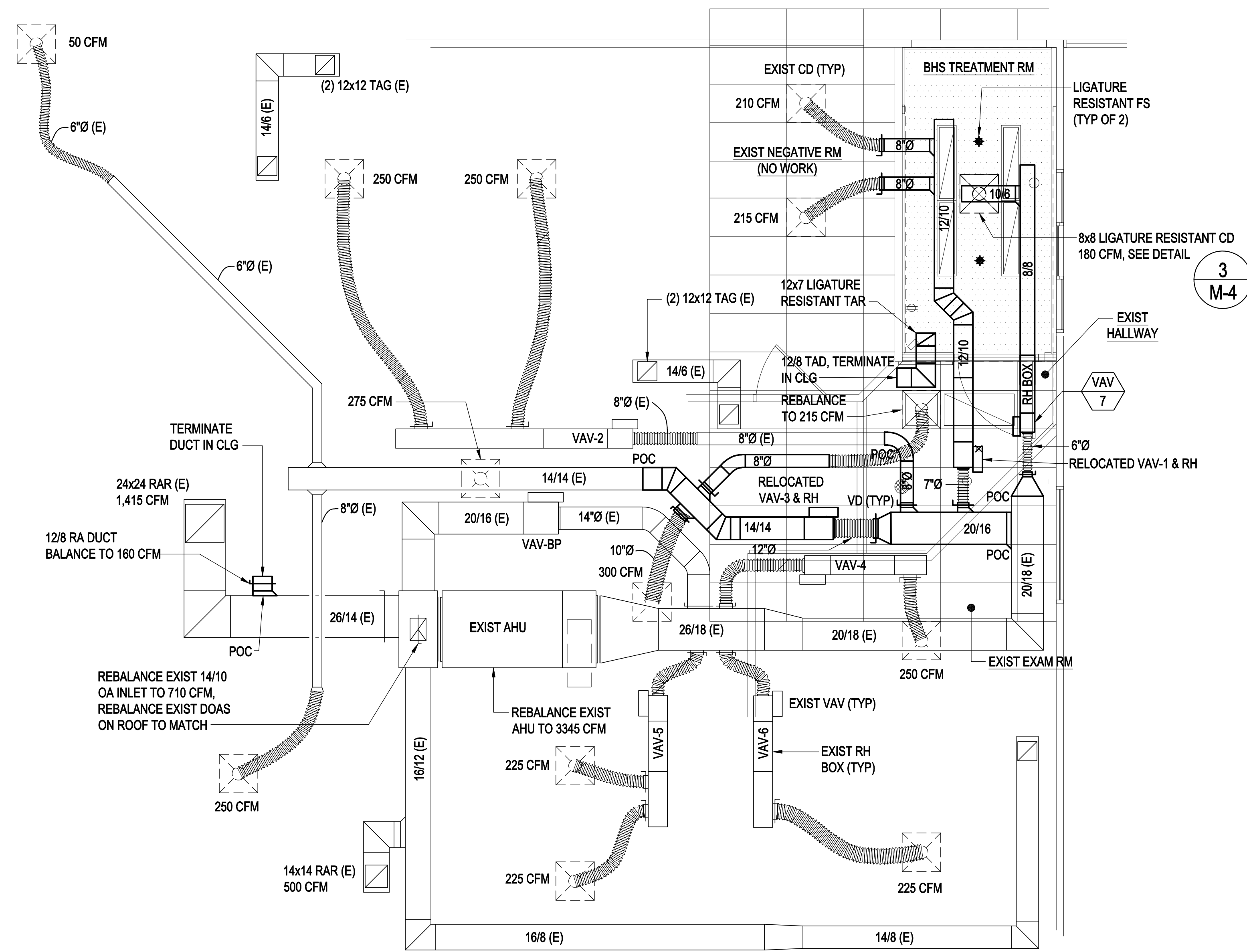
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JOB NO. -

SHEET  
**M-3**  
October 11, 2019  
6 of 11 SHTS

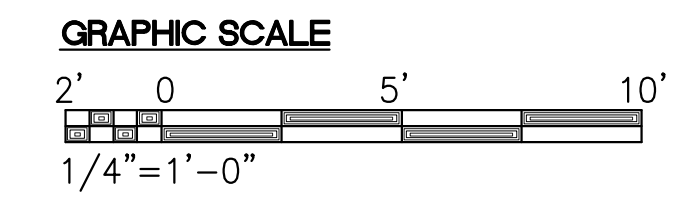
VAV BOXES							
BOX LABEL	MODEL	AREA SERVED	DESIGN CFM	MIN CFM	INLET SIZE (INCHES)	3-STAGE ELECTRIC REHEAT (KW)	V/Ø/HZ
VAV-1 (E)	DESV 332X-07	NEGATIVE RM.	425	330	7	2.0	208/3/60
VAV-2 (E)	DESV 332X-08	TRAUMA RM.	500	475	8	3.0	208/3/60
VAV-3 (E)	DESV 332X-12	COMMON AREA	1090	-	12	1.5	208/3/60
VAV-4 (E)	DESV 332X-06	EXAM RM.	250	110	6	1.5	208/3/60
VAV-5 (E)	DESV 332X-08	WAITING RM.	450	416	8	3.0	208/3/60
VAV-6 (E)	DESV 332X-08	RECEPTION	450	-	8	1.5	208/3/60
VAV-BP (E)	DESV 332X-14	BYPASS	-	-	14	-	208/3/60
VAV-7	DESV-06	TREATMENT RM	180	110	6	1.5	208/3/60

NOTE:  
FIELD VERIFY AND MATCH EXISTING CONTROLS FOR NEW VAV (DRAWINGS INDICATE UNITED ENERTECH VVT CONTROL SYSTEM WITH ACTUATORS ADDED TO VAVS).



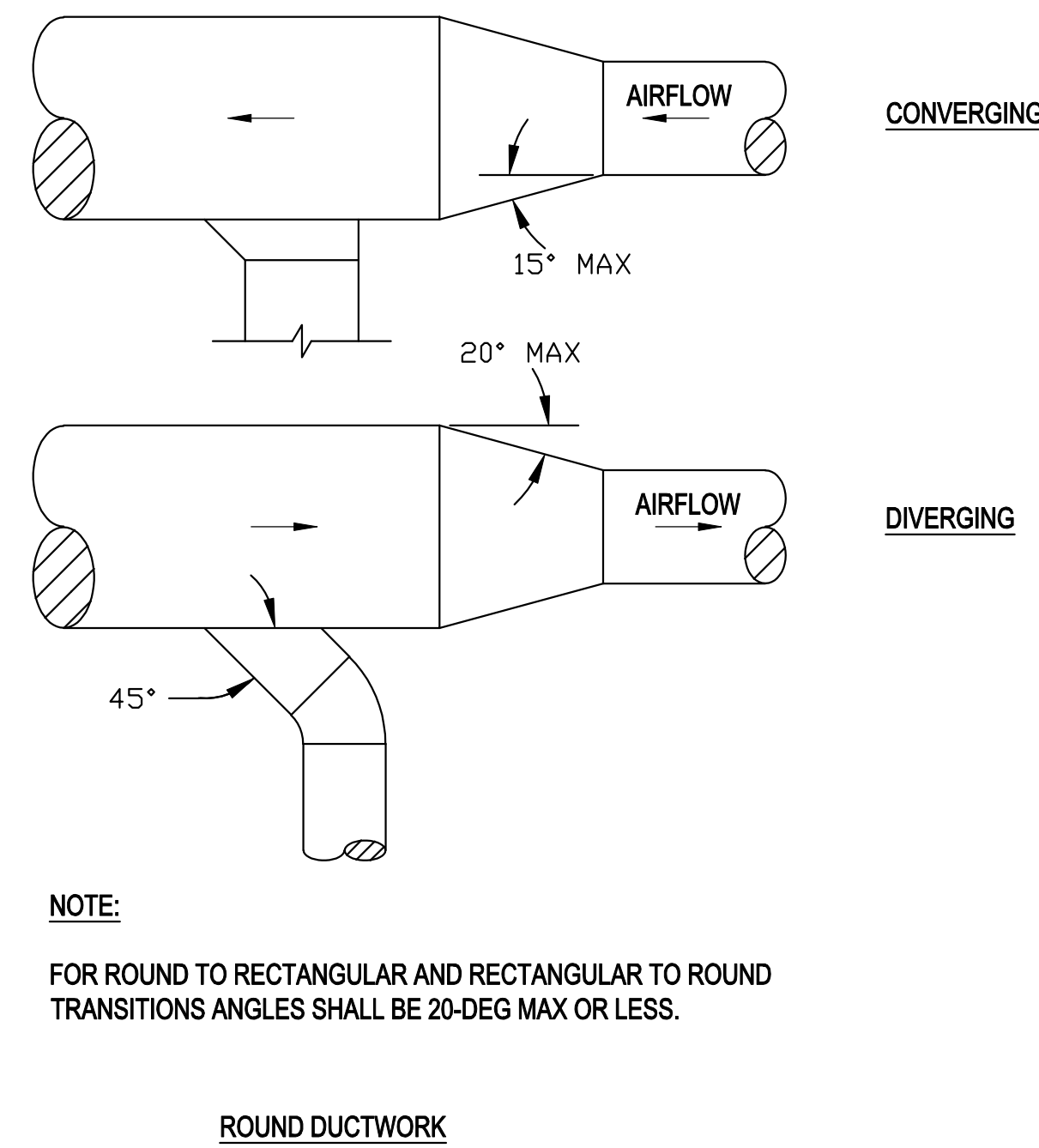
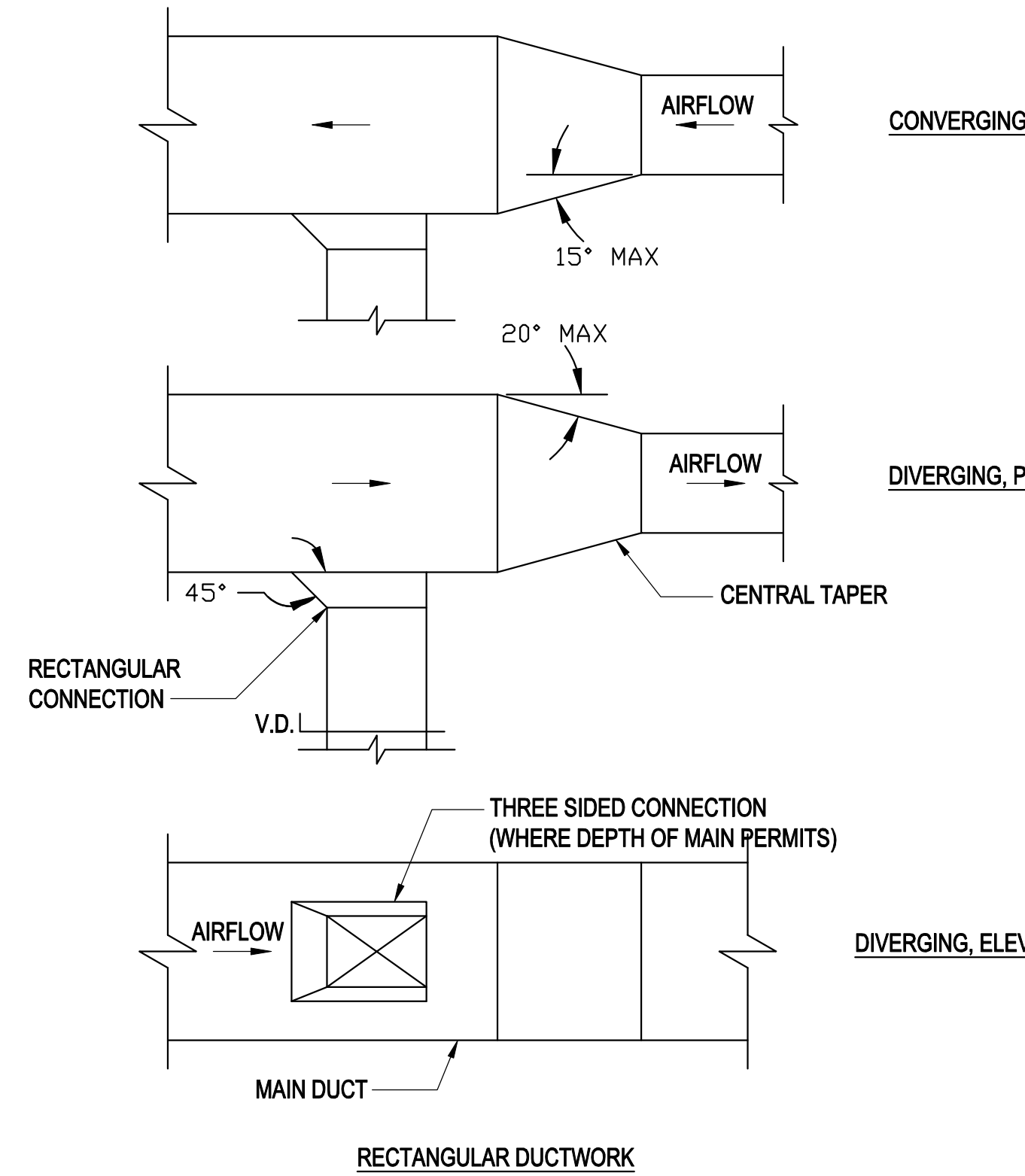
NOTE:  
REBALANCE EXIST DOAS ON ROOF TO MATCH

**1 MECHANICAL PLAN**  
M-3  
1/4" = 1'-0"



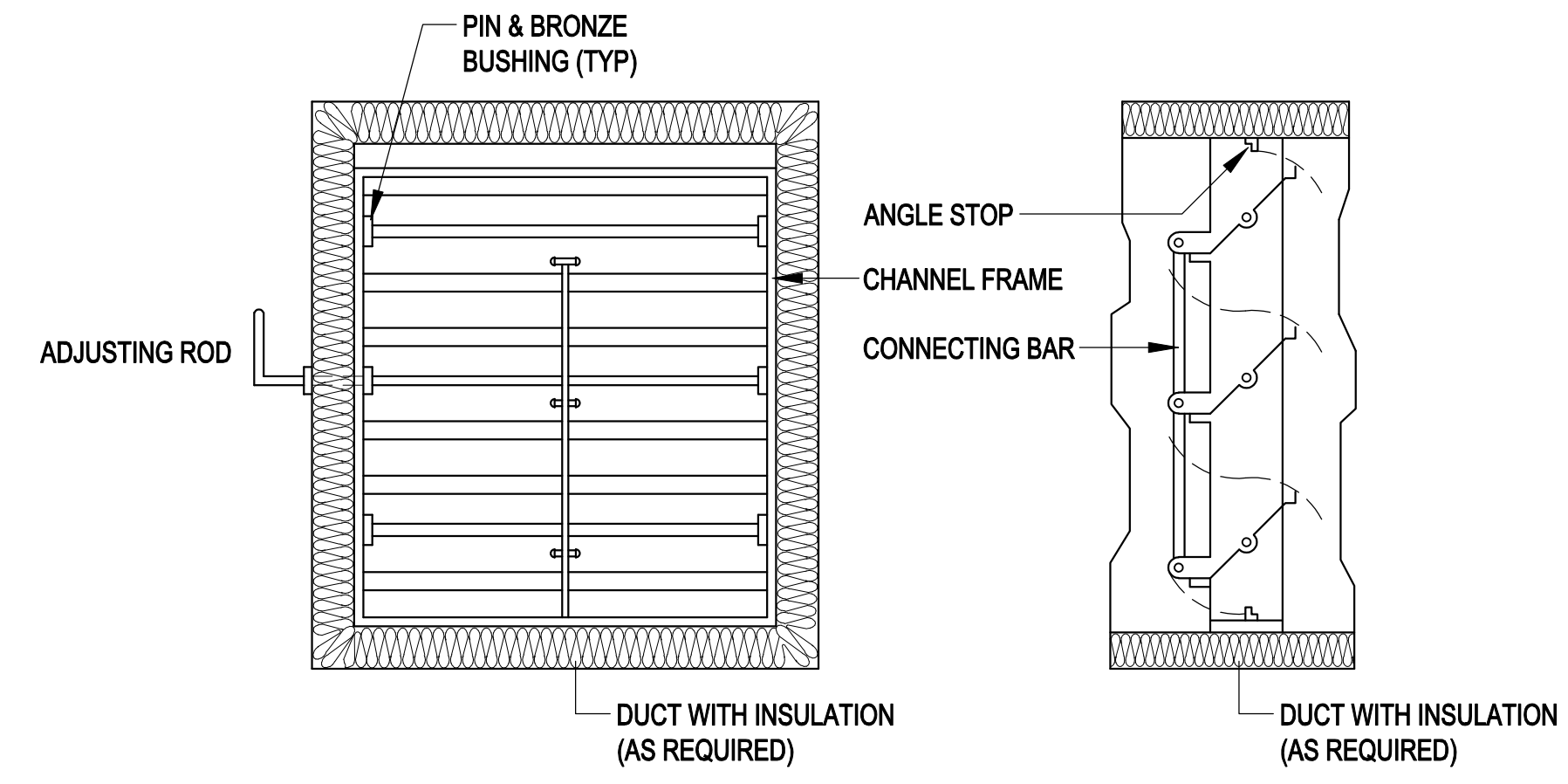
# VARIABLE AIR VOLUME BOX

MARK NO.	NOMINAL CFM	MINIMUM CFM	CFM RANGE	MINIMUM INLET SIZE (INCHES)	MINIMUM OUTLET SIZE (INCHES)	ELECTRIC REHEAT (KW)	V/Ø/HZ	REMARKS
VAV 7	180	110	0-500	6	8	1.5	208/3/60	TITUS DESV-06 WITH REHEAT OR APPROVED EQUIVALENT.

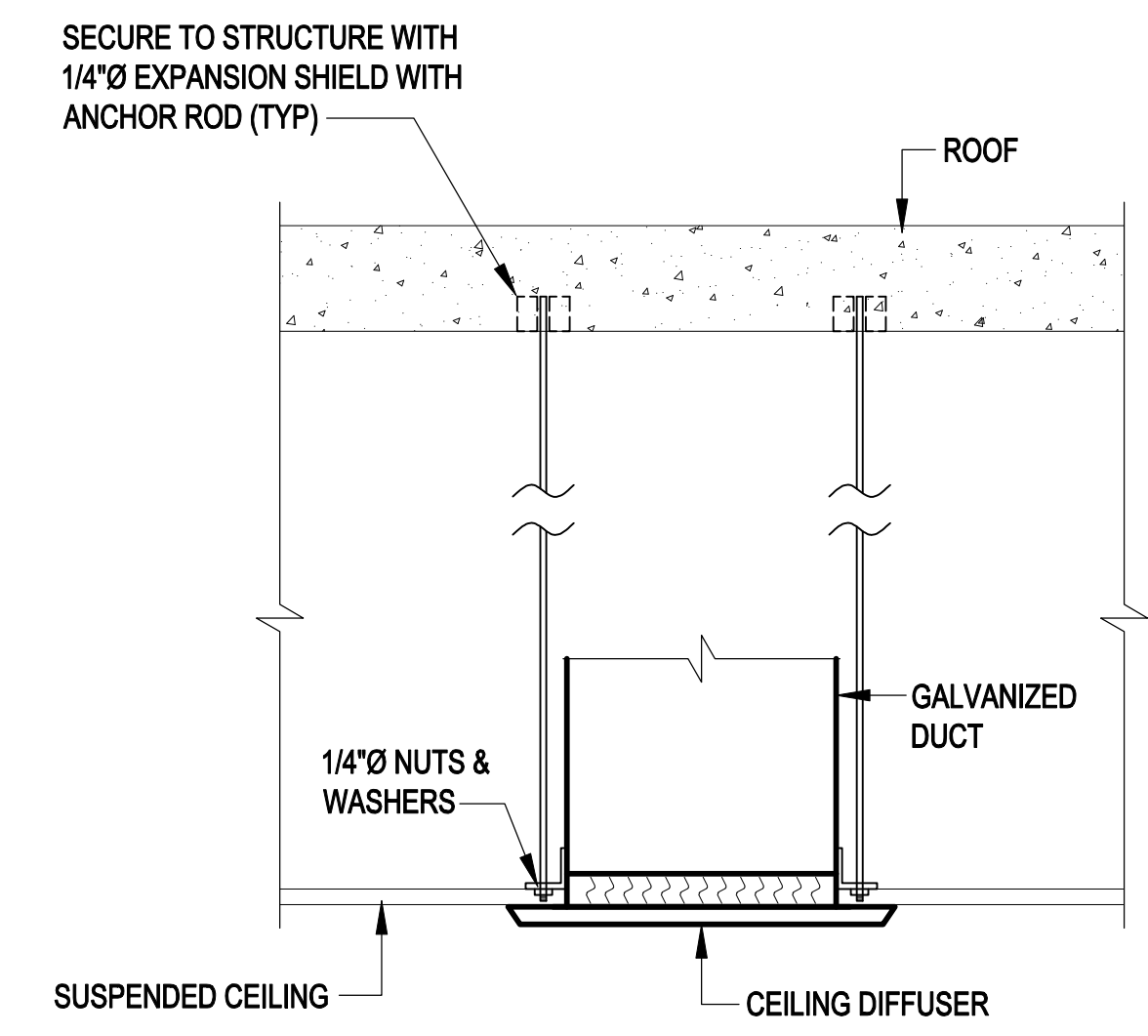


**NOTE:**  
FOR ROUND TO RECTANGULAR AND RECTANGULAR TO ROUND TRANSITIONS ANGLES SHALL BE 20-DEG MAX OR LESS.

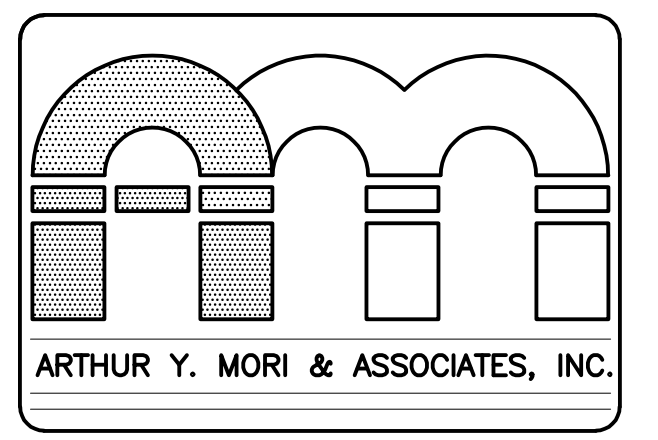
**1 TYPICAL BRANCH TAKE-OFFS AND TRANSITIONS**  
M-4 NOT TO SCALE



**2 VOLUME DAMPER**  
M-4 NOT TO SCALE



**3 LIGATURE RESISTANT GRILL**  
M-4 NOT TO SCALE



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SHEET TITLE  
MECHANICAL EQUIPMENT SCHEDULE AND DETAILS

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*Nicholas Aldry*  
SIGNATURE

NOTE:  
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NO.	REVISION
△	
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△	

JOB NO. -



## MECHANICAL SPECIFICATION:

- THE INSTALLATION SHALL COMPLY WITH THE PLUMBING CODE OF KAUAI COUNTY, THE FIRE MARSHAL'S REGULATIONS OF THE STATE OF HAWAII, THE REGULATIONS OF THE DEPARTMENT OF HEALTH OF THE STATE OF HAWAII, THE REQUIREMENTS OF THE NATIONAL FIRE PROTECTION ASSOCIATION, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA), AND OTHER APPLICABLE CODES.
- CHECK ALL DIMENSIONS AT THE SITE AND ESTABLISH ALL APPROPRIATE EXISTING CONDITIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ACCURACY OF ALL DIMENSIONS AND FITTING OF ALL EQUIPMENT AND MATERIALS INTO THE AVAILABLE SPACE. WHERE NEW WORK CONNECTS TO EXISTING WORK, VERIFY THE EXACT LOCATION OF EXISTING WORK PRIOR TO ANY PREFABRICATION OF NEW CONNECTING WORK.
- THE CONTRACTOR SHALL GUARANTEE ALL NEW EQUIPMENT FURNISHED BY HIM AND THE INSTALLATION FOR A PERIOD OF 12 MONTHS FROM THE DATE OF FINAL WRITTEN ACCEPTANCE, WHICH PERIOD SHALL START FOLLOWING 30 DAYS OF TROUBLE-FREE OPERATION, AGAINST DEFECTS IN MATERIALS, DESIGN, PERFORMANCE, AND WORKMANSHIP. GUARANTEES SHALL BE SUPPORTED BY MANUFACTURER'S WRITTEN WARRANTIES.
- ALL WORK REQUIRING SHUTDOWN OF THE EXISTING AIR CONDITIONING SYSTEMS SHALL BE DONE ONLY UPON APPROVAL BY THE FACILITY ENGINEER. PROVIDE FIVE (5) DAYS ADVANCE NOTICE PRIOR TO ANY SHUTDOWN.
- SUBMITTALS: SUBMIT THE FOLLOWING IN ACCORDANCE WITH REQUIREMENTS SPECIFIED HEREIN.
  - SHOP DRAWINGS: PROVIDE FOUR (4) SETS OF SHOP DRAWINGS FOR AIR CONDITIONING AND VENTILATION SYSTEMS FOR REVIEW AND APPROVAL. VERIFY ALL CONSTRUCTION DIMENSIONS (INCLUDING BUT NOT LIMITED TO STRUCTURAL CONDITIONS, MECHANICAL CONNECTION POINTS WITH EXISTING UTILITY SYSTEMS, AND OBSTRUCTIONS TO INSTALLATION). THE SHOP DRAWINGS SHALL INDICATE CONSTRUCTION SIZE, ARRANGEMENT, OPERATING CLEARANCES, PERFORMANCE CHARACTERISTICS AND CAPACITY OF EACH ITEM OF EQUIPMENT INSTALLED. THE SHOP DRAWINGS SHALL BE COORDINATED WITH ALL TRADES AFFECTING AND AFFECTED BY THE AIR CONDITIONING, VENTILATION AND PLUMBING INSTALLATION. PARTICULAR CARE SHALL BE GIVEN TO COORDINATION OF DUCTWORK WITH LIGHT FIXTURES, CABLE TRAYS (IF PROVIDED) AND STRUCTURAL ELEMENTS. INDICATE ALL ELEMENTS ON THE SHOP DRAWINGS FOR PROPER COORDINATION OF ALL WORK. MECHANICAL FLOOR PLANS AT 1/4" PER FOOT SCALE (MINIMUM) AND DIAGRAMS SHALL BE PROVIDED. SHOP DRAWINGS SHALL BE NEAT AND LEGIBLE. FAILURE TO COMPLY WITH THE ABOVE REQUIREMENTS MAY BE GROUNDS FOR REJECTION AND DELAY SHOP DRAWING APPROVAL; ANY DELAYS DUE TO THIS REASON SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
 

APPROVAL RENDERED ON SHOP DRAWINGS SHALL NOT BE CONSIDERED AS A GUARANTEE OF MEASUREMENTS OR BUILDING CONDITIONS. WHERE DRAWINGS ARE APPROVED, SAID APPROVAL DOES NOT IN ANY WAY RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITY OF FURNISHING MATERIALS OR PERFORMING WORK AS REQUIRED BY THE CONTRACT DRAWINGS AND SPECIFICATIONS. ANY DEVIATION FROM SHOP DRAWINGS SHALL REQUIRE PRIOR APPROVAL FROM THE ENGINEER, AND SHALL BE CLEARLY INDICATED BY CLOUDS ON THE REVISED SHOP DRAWINGS.
  - ACCOMPANYING THE SHOP DRAWINGS, SUBMIT FOUR (4) SETS OF A COMPLETE LIST OF MATERIALS AND EQUIPMENT PROPOSED TO BE FURNISHED AND INSTALLED UNDER THIS PORTION OF THE WORK, GIVING MANUFACTURER'S NAME, CATALOG NUMBER AND CATALOG CUT FOR EACH ITEM WHERE APPLICABLE. COMPLETELY DESCRIBING THE PHYSICAL CHARACTERISTICS, OPERATING CAPACITIES AND DIMENSIONS OF EACH PIECE OF EQUIPMENT TO BE INSTALLED
 

PROPERLY LABEL EACH ITEM INDICATING SPECIFIC SERVICE FOR WHICH MATERIAL OR EQUIPMENT IS TO BE USED, PARAGRAPH NUMBER OF SPECIFICATIONS GOVERNING, CONTRACTOR'S NAME, AND NAME OF PROJECT. CATALOGS, PAMPHLETS OR OTHER DOCUMENTS SUBMITTED TO DESCRIBE ITEMS ON WHICH APPROVAL IS BEING REQUESTED SHALL BE SPECIFIC AND IDENTIFICATION IN CATALOG, PAMPHLET, ETC., OF ITEM SUBMITTED SHALL BE CLEARLY MADE IN INK. DATA OF A GENERAL NATURE WILL NOT BE ACCEPTED.
- PROVIDE SITE-MAINTAINED RECORD DRAWINGS.
 

INDICATE LOCATION OF ISOLATING VALVES AND ITEMS REQUIRING MAINTENANCE OR INSPECTION. INDICATE INVERT AND SLOPE OF DRAINAGE PIPING AT LOCATIONS SO THAT THE INVERT CAN BE CALCULATED FOR ANY POINT IN THE SYSTEM. SUBMIT AS-BUILT DRAWINGS FOR REVIEW PRIOR TO FINAL INSPECTION. INDICATE LOCATION AND SIZES OF AIR CONDITIONING DUCTWORK AND PIPING AND EQUIPMENT.
- OPERATING AND MAINTENANCE MANUALS: FURNISH OPERATING AND MAINTENANCE MANUALS ON ALL EQUIPMENT FURNISHED, BOUND BETWEEN HARD COVERS. INCLUDE FOR ALL EQUIPMENT THE MANUFACTURER'S NAME, MODEL AND SERIAL NUMBER, INCLUDING CONTROL DIAGRAMS AND SOURCE OF SERVICE AND REPLACEMENT PARTS.
- WORK WHICH DISTURBS ANYBODY, E.G. CORING OF ROOF SLAB, SHALL BE DONE AFTER NORMAL WORKING HOURS. OBTAIN APPROVAL BY THE FACILITY ENGINEER PRIOR TO SUCH WORK.
- EXISTING BEAM AND STRUCTURAL MEMBERS SHALL NOT BE CORED OR PENETRATED UNLESS APPROVED BY THE STRUCTURAL ENGINEER.

## AIR CONDITIONING AND VENTILATION SYSTEMS:

- VARIABLE AIR VOLUME UNIT
  - SINGLE DUCT, PRESSURE INDEPENDANT, VARIABLE VOLUME TERMINAL WITH INTEGRAL, FACTORY ELECTRIC REHEAT COIL (COMPLETE WITH SAFETY CONTROLS, AIRFLOW SENSORS, OVERLOADS, ETC) AND DIRECT DIGITAL CONTROLS. FIELD VERIFY AND MATCH EXISTING CONTROLS (DRAWINGS INDICATE UNITED ENERTECH VVT CONTROL SYSTEM WITH ACTUATORS ADDED TO VAVS).
  - THE TERMINAL CASING SHALL BE MINIMUM 22-GAUGE GALVANIZED STEEL, INTERNALLY LINED WITH DUAL DENSITY INSULATION. ALL EXPOSED INSULATION EDGES SHALL BE COATED WITH NFPA 90A APPROVED SEALANT TO PREVENT ENTRAINMENT OF FIBERS IN THE AIRSTREAM. THE DISCHARGE CONNECTION SHALL BE SLIP AND DRIVE CONSTRUCTION FOR ATTACHMENT TO METAL DUCTWORK.
  - THE DAMPER SHALL BE HEAVY GAUGE STEEL WITH SHAFT ROTATING IN SELF-LUBRICATING BEARINGS. NYLON BEARINGS ARE NOT ACCEPTABLE. SHAFT SHALL BE CLEARLY MARKED ON THE END TO INDICATE DAMPER POSITION. THE DAMPER SHALL INCORPORATE A MECHANICAL STOP TO PREVENT OVERSTROKING.
  - ACTUATORS SHALL BE CAPABLE OF SUPPLYING AT LEAST 35-INCH LBS. OF TORQUE TO THE DAMPER SHAFT AND SHALL BE MOUNTED EXTERNALLY FOR SERVICE ACCESS. TERMINALS WITH INTERNAL ACTUATOR MOUNTING OR LINKAGE CONNECTION MUST INCLUDE GASKETED ACCESS PANEL, REMOVABLE WITHOUT DISTURBING DUCTWORK. CASING WITH ACCESS PANEL SHALL BE CONSTRUCTED TO HOLD LEAKAGE TO THE MAXIMUM VALUES SHOWN IN THE CASING LEAKAGE TABLE.
  - MANUFACTURER: TITUS OR APPROVED EQUAL.
- DUCTWORK COMPONENTS:
  - ALL METAL DUCTWORK CONSTRUCTION, INCLUDING ALL FITTINGS AND COMPONENTS, SHALL COMPLY WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS UNLESS OTHERWISE SPECIFIED. DUCTWORK SHALL MEET THE REQUIREMENTS FOR SEAL CLASS C. SEALANTS SHALL BE SUITABLE FOR THE PRESSURE RANGE AND AMBIENT TEMPERATURES OF THE SYSTEM. PRESSURE SENSITIVE TAPE SHALL NOT BE USED AS A SEALANT.
  - FLEXIBLE DUCT SHALL BE UL 181, CLASS 1 LABELED AND SHALL NOT EXCEED SIX (6) FEET IN LENGTH AND PROVIDED TO CONNECT BETWEEN RIGID DUCTS AND OUTLETS. FLEXIBLE DUCT SHALL BE INTERLOCKING SPIRAL OR HELICALLY CORRUGATED TYPE CONSTRUCTED OF ZINC-COATED STEEL OR CORROSION RESISTANT STEEL AND HAVE 1 INCH THICK FACTORY INSTALLED INSULATION WITH VAPOR BARRIER.
  - FLEXIBLE DUCTWORK CONNECTOR AND BE NEOPRENE INPREGNATED FIBERGLASS OR OTHER MATERIAL SUITABLE FOR OUTSIDE INSTALLATION. FLEXIBLE CONNECTORS SHALL BE PROTECTED FROM THE SUN BY A DUCT HOOD.
  - VOLUME DAMPERS SHALL BE TWO GAUGES HEAVIER THAN THE DUCT IN WHICH THEY ARE INSTALLED AND SHALL BE REINFORCED TO PREVENT VIBRATION AND NOISE. PROVIDE VOLUME DAMPERS AS REQUIRED FOR BALANCING OF THE SYSTEM.
- SUPPLY TERMINALS
  - ALL TERMINALS SHALL BE LIGATURE RESISTANT.
  - FOR CEILING MOUNTED DIFFUSERS USE ANEMOSTAT SSV432-8 OR APPROVED EQUIVALENT.

- TRANSFER AIR GRILLES
  - ALL TRANSFER AIR GRILLES SHALL BE LIGATURE RESISTANT.
  - FOR BOTH WALL AND CEILING MOUNTED GRILLES, USE ANEMOSTAT SSV49-A1 OR APPROVED EQUIVALENT.
- VOLUME DAMPERS SHALL BE INSTALLED AS SHOWN AND AS REQUIRED FOR AIR BALANCING OF THE SYSTEM. VOLUME DAMPERS SHALL BE TWO GAUGES HEAVIER THAN THE DUCT IN WHICH THEY ARE INSTALLED AND SHALL BE REINFORCED TO PREVENT VIBRATION AND NOISE.
- DUCTWORK INSULATION:
  - INSULATE ALL OUTSIDE AIR/SUPPLY AIR DUCTWORK WITH MINIMUM OF 1 INCH RIGID INSULATION ON THE EXTERIOR OF THE DUCTS. INSULATION SHALL MEET THE FLAME SPREAD AND SMOKE-DEVELOPED RATING OF 25/50.
  - DUCT INSULATION SHALL BE RIGID MINERAL FIBER INSULATION CONFORMING TO ASTM C 612, CLASS 2, 6 POUNDS PER CUBIC FOOT NOMINAL DENSITY, 1 INCH THICK.
  - PROVIDE A FACTORY APPLIED ALL PURPOSE JACKET WITH INTEGRAL VAPOR BARRIER CONFORMING TO ASTM C 1136, AS REQUIRED BY THE SERVICE. ALL PURPOSE JACKET SHALL HAVE A MAXIMUM WATER VAPOR PERMEANCE OF 0.05 PERM PER ASTM E96, PUNCTURE RESISTANCE OF NOT LESS THAN 50 BEECH UNITS AND A TENSILE STRENGTH OF NOT LESS THAN 35 POUNDS-FORCE PER INCH OF WIDTH IN ACCORDANCE WITH ASTM D 828.
- PIPE SUPPORTS AND HANGERS:
  - DESIGN SUPPORTS FOR STRENGTH AND RIGIDITY TO SUIT LOADING, SERVICE AND IN A MANNER, WHICH WILL NOT UNDULY STRESS THE BUILDING CONSTRUCTION.
  - SUPPORT HORIZONTAL OVERHEAD PIPES WITH CLEVIS OR ROLL, SINGLE OR MULTIPLE TYPE HANGERS, RODS, INSERTS, CLAMPS OR OTHER APPROVED METHODS OF SUSPENSION SUITABLE FOR TYPE OF EXISTING BUILDING CONSTRUCTION.
- CONTROLS:
  - CONTROLLER: PROGRAMMABLE CONTROLLER SHALL HAVE A WIDE SCREEN LIQUID CRYSTAL DISPLAY AND HAVE THE FOLLOWING FUNCTIONS:
    - TEMPERATURE SETTING FOR EACH ZONE.
    - ON/OFF CONTROL.
    - INDICATION OF OPERATING CONDITION.
    - 7-DAY TIME CLOCK.
    - AUTO RE-START AFTER LOSS OF POWER.
    - CONTROL OF EXTERNAL EQUIPMENT (EXHAUST FAN)
- CLEANING AND ADJUSTING: INSIDE OF EQUIPMENT, DUCTS, AND CASING SHALL BE THOROUGHLY CLEANED OF DEBRIS AND BLOWN FREE OF SMALL PARTICLES OF RUBBISH AND DUST AND THEN SHALL BE VACUUM CLEANED BEFORE INSTALLING OUTLET FACES. EQUIPMENT SHALL BE WIPE CLEAN, WITH TRACES OF OIL, DUST, DIRT, OR PAINT SPOTS REMOVED. SYSTEM SHALL BE MAINTAINED IN THIS CLEAN CONDITION UNTIL FINAL ACCEPTANCE. BEARINGS SHALL BE PROPERLY LUBRICATED WITH OIL OR GREASE AS RECOMMENDED BY THE MANUFACTURER. BELTS SHALL BE TIGHTENED TO PROPER TENSION. CONTROL VALVES AND OTHER MISCELLANEOUS EQUIPMENT REQUIRING ADJUSTMENT SHALL BE ADJUSTED TO SETTING INDICATED OR DIRECTED. FANS SHALL BE ADJUSTED TO THE SPEED INDICATED BY THE MANUFACTURER TO MEET SPECIFIED CONDITIONS.
- BALANCING AND TESTING OF MECHANICAL SYSTEM: AT THE COMPLETION OF THE INSTALLATION WORK, THE AIR CONDITIONING AND VENTILATION SYSTEMS SHALL BE ADJUSTED, BALANCED AND TESTED.
- TEST AND BALANCE REPORT: UPON COMPLETION OF ALL BALANCING WORK, THE CONTRACTOR SHALL SUBMIT FOUR (4) COPIES OF A TEST AND BALANCING REPORT WHICH SHALL INCLUDE ALL DATA SPECIFIED HEREIN.
  - AIR SYSTEM DATA
 

EXISTING AHU, EXISTING DOAS, EXISTING AND NEW VAVS

INSTALLATION DATA:

    - MANUFACTURER AND MODEL
    - SIZE
    - MOTOR H.P., VOLTAGE, PHASE, CYCLES AND FULL LOAD AMPS

DESIGN DATA: DATA LISTED IN SCHEDULES ON DRAWINGS AND SPECIFICATIONS.

RECORDED DATA:

    - AIR QUANTITIES, CFM
    - STATIC PRESSURE, INCHES WATER GAGE
    - R.P.M.
    - MOTOR OPERATING AMPS
    - ENTERING AND LEAVING AIR CONDITIONS, °F (DB AND WB)
    - VFD INITIAL SETPOINT

DUCT SYSTEMS:

DUCT AIR QUANTITIES - MAIN, SUBMAINS, BRANCHES, OUTDOOR AIR, TOTAL AIR, AND RETURN AIR:

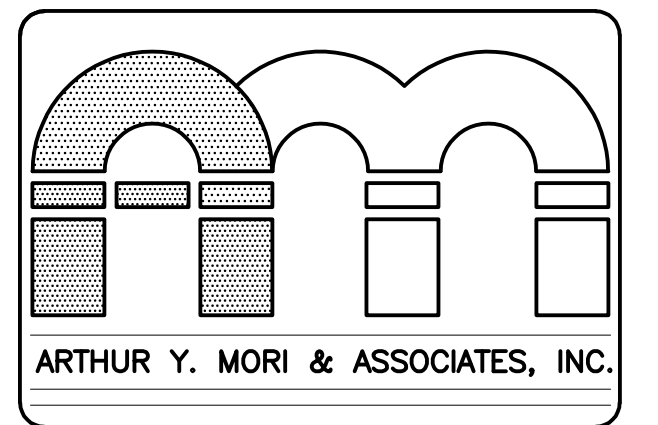
    - DUCT SIZES
    - AVERAGE VELOCITY, FPM
    - RECORDED AIR QUANTITIES, CFM
    - DESIGN AIR QUANTITIES, CFM

INDIVIDUAL AIR TERMINALS:

    - TERMINAL IDENTIFICATION (SUPPLY, RETURN OR EXHAUST, LOCATION AND NUMBER DESIGNATION)
    - DESIGN AND RECORDED AIRFLOW QUANTITIES - CFM
    - APPLICABLE FACTOR FOR APPLICATION, VELOCITY, AREA, ETC.
    - DESIGN AND RECORDED VELOCITIES - FPM (STATE "CORE", "INLET", ETC., AS APPLICABLE)

## FIRE SPRINKLER SYSTEM:

- NOTIFY THE HOSPITAL ENGINEER AND OBTAIN APPROVAL PRIOR TO COMMENCEMENT OF ANY WORK ON THE SYSTEM.
- EXISTING PIPING SHALL BE MODIFIED TO SUIT NEW LOCATIONS OF FIRE SPRINKLER HEADS AS INDICATED ON THE DRAWINGS. PIPE MATERIAL SHALL MATCH EXISTING.
- PROVIDE ALL NEW SPRINKLER HEADS FOR THE SPACE. SPRINKLER HEADS SHALL BE DATED FOR ORDINARY HAZARD OCCUPANT CLASSIFICATION AND SHALL BE OF THE LIGATURE RESISTANT INSTITUTIONAL TYPE, TYCO RAVEN MODEL TY3281 OR APPROVED EQUIVALENT.



ARTHUR Y. MORI & ASSOCIATES, INC.

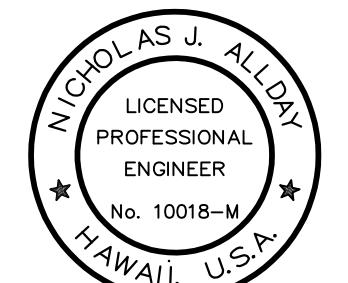
ARCHITECTS AIA  
1314 SOUTH KING / SUITE 955  
HONOLULU, HAWAII 96814

EMERGENCY DEPARTMENT  
BHS TREATMENT ROOM

MAHELOVA MEDICAL CENTER  
4800 KAWAHAU ROAD  
KAPAA, HI 96746

TMK: 4 - 6 - 014 : 030

SHEET TITLE  
MECHANICAL SPECIFICATIONS



LICENSE EXPIRE: 4/30/20

This work was prepared by me or under my supervision and construction of this project will be under my observation (observation of construction as defined in Section 16-115 of the Hawaii Administrative Rules, Department of Commerce and Consumer Affairs entitled Professional Engineers, Architects and Surveyors of the State of Hawaii).

NOTE:  
Contractor to check and verify all dimensions at job before proceeding with work.

NO.	REVISION
△	
△	
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△	
JOB NO.	-

SHEET  
**M-5**  
October 11, 2019  
8 of 11 SHTS