

**FIELD VERIFY**

DESIGN DRAWINGS ARE SCHEMATIC. THIS CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING OR AWARD OF CONTRACT TO INSPECT EXISTING FIELD CONDITIONS. THIS CONTRACT SHALL INCLUDE ALL LABOR AND MATERIALS NECESSARY FOR FIELD MODIFICATIONS DUE TO EXISTING CONDITIONS.

THE CONTRACTOR SHALL CONTACT THE ARCHITECT, ENGINEER OR OWNER PRIOR TO BIDDING FOR INTERPRETATIONS AND CLARIFICATIONS OF THE DESIGN AND INCLUDE IN HIS BID ALL COSTS TO MEET THE DESIGN INTENT. CLARIFICATIONS MADE BY THE ARCHITECT, ENGINEER OR OWNER AFTER BIDDING WILL BE FINAL AND SHALL BE IMPLEMENTED AT CONTRACTOR'S COST.

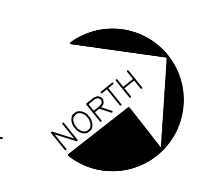
BIDDING CONTRACTORS SHALL HAVE A WORKING KNOWLEDGE OF LOCAL CODES AND ORDINANCES AND SHALL INCLUDE IN THEIR BIDS THE COSTS FOR ALL WORK INSTALLED IN STRICT ACCORDANCE WITH GOVERNING CODES. THE PLANS AND SPECIFICATIONS NOT WITHSTANDING, THE CONTRACTOR SHALL ALERT ARCHITECT, ENGINEER OR OWNER OF ANY APPARENT DISCREPANCIES BETWEEN GOVERNING CODES AND DESIGN INTENT.

**# KEYED NOTES:**

1. PROVIDE AND INSTALL CEILING DIFFUSER CD-1 AT CFM SHOWN. REFER TO AIR DEVICE SCHEDULE AND NECK SIZING CHART FOR SIZE AND TYPE.
2. PROVIDE AND INSTALL CEILING DIFFUSER CD-2 AT CFM SHOWN. REFER TO AIR DEVICE SCHEDULE AND NECK SIZING CHART FOR SIZE AND TYPE.
3. PROVIDE AND INSTALL SUPPLY GRILLE SG-1 AT CFM SHOWN. REFER TO AIR DEVICE SCHEDULE AND NECK SIZING CHART FOR SIZE AND TYPE. MOUNT TOP OF SUPPLY GRILLE AT 10'-0" A.F.F.
4. PROVIDE AND INSTALL RETURN GRILLE RG-1 AT CFM SHOWN. REFER TO AIR DEVICE SCHEDULE AND NECK SIZING CHART FOR SIZE AND TYPE.
5. PROVIDE AND INSTALL RETURN GRILLE RG-2 AT CFM SHOWN. REFER TO AIR DEVICE SCHEDULE AND NECK SIZING CHART FOR SIZE AND TYPE.
6. PROVIDE AND INSTALL RETURN GRILLE RG-3 AT CFM SHOWN. REFER TO AIR DEVICE SCHEDULE AND NECK SIZING CHART FOR SIZE AND TYPE. MOUNT TOP OF RETURN GRILLE AT 10'-0" A.F.F.
7. PROVIDE AND INSTALL DIGITAL TEMPERATURE CONTROLLER WITH THE HIGHEST CONTROL POINT LOCATED NO GREATER THAN 48" AFF. THERMOSTAT SHALL BE A/C EQUIPMENT MANUFACTURER'S RECOMMENDED THERMOSTAT PROVIDED AND INSTALLED BY MECHANICAL CONTRACTOR.
8. PROVIDE AND INSTALL CEILING MOUNTED EXHAUST FAN. ROUTE EXHAUST DUCT AT SIZE INDICATED UP THRU ROOF TO FACTORY ROOF CAP, UNLESS SHOWN OTHERWISE (MIN. 10'-0" FROM OSA INTAKES). REFER TO DETAIL 2/M3.
9. PROVIDE REMOTE DAMPER CONTROL. TYPICAL FOR ALL CONTROL DEVICES THAT ARE NOT ACCESSIBLE. REFER TO DETAIL 5/M3.
10. CONNECT 6"Ø EXHAUST DUCTS TO 10"Ø EXHAUST DUCT UP THROUGH ROOF TO FACTORY ROOF CAP.
11. ROUTE DUCTWORK UP ALONG EXTERIOR WALL AND SEAL PENETRATION INTO BUILDING WEATHER TIGHT. REFER TO DETAIL 8/M3.
12. MOUNT HVAC UNIT ON 4" HOUSEKEEPING PAD AND EXTEND CONDENSATE DRAIN BEYOND PAD. SLOPE PIPING AS REQUIRED AND DISCHARGE WITH A 90° ELBOW TURNED DOWN WITH A MIN. OF 3" ABOVE FINISHED GRADE. MAINTAIN SERVICE CLEARANCES FROM SECURITY FENCING.
13. CONTRACTOR TO PROVIDE FACTORY OUTSIDE AIR INTAKE AND BALANCE TO AIRFLOW LISTED IN OSA VENTILATION CALCULATION SCHEDULE ON SHEET M2.
14. FIELD ROUTE REFRIGERANT PIPING FROM OUTDOOR UNIT TO INDOOR UNIT. INSULATE WITH 1" ARMAFLEX INSULATION AND PROVIDE ALUMINUM JACKETING WHERE EXPOSED TO THE EXTERIOR. CONTRACTOR TO SEAL PIPING PENETRATION WEATHER TIGHT.
15. 3/4" CONDENSATE DRAIN DOWN IN WALL AND TERMINATE WITH A 90° ELBOW TURNED DOWN WITH 6" ABOVE FINISHED GRADE.
16. MOUNT CEILING CASSETTE UNIT IN CENTER OF ROOM AND PROVIDE 2x2' ACCESS PANEL. COORDINATE EXACT LOCATION WITH ARCHITECT AND OWNER PRIOR TO INSTALLATION.
17. MOUNT CONDENSING UNIT ON 4" HOUSEKEEPING PAD AND MAINTAIN SERVICE CLEARANCES FROM SECURITY FENCING.

**MECHANICAL FLOOR PLAN**

SCALE: 1/4" = 1'-0"

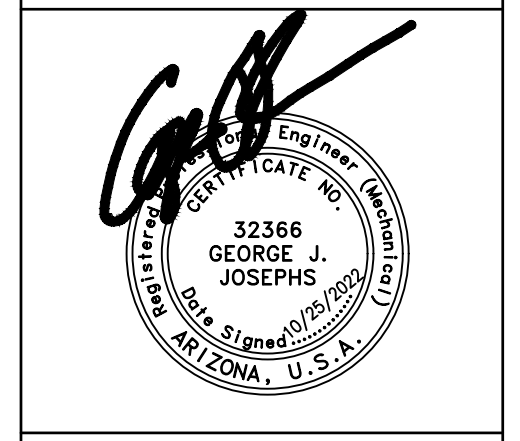


REVISION	DATE

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**EMT**  
 CONSULTING ENGINEERS  
 MECHANICAL & PLUMBING

AME PROJECT #22-103



PROJECT NUMBER:  
22-103

DATE:  
10/25/2022

DESIGNED BY:  
JHOCKING

DRAWN BY:  
JHOCKING

CHECKED BY:  
JROELFS

**RUSSELL GULCH LANDFILL  
 OFFICES / SCALES**  
 5891 Hope Ln, Globe, AZ 85501

100% PERMIT SET

SHEET TITLE:  
**MECHANICAL  
 FLOOR PLAN**

SHEET NUMBER:  
**M1**

PACKAGED GROUND-MOUNTED HEAT PUMP UNIT SCHEDULE (AIR-TO-AIR) R-410a																							
TAG #	MANUFACTURER	MODEL	AIR CAPACITIES				EER (SEER) / COP (HSPF)	CYCLE	EVAPORATOR ENTERING		AMBIENT CONDITION		COOLING/HEATING CAPACITIES (MBH)		MAIN UNIT ELECTRICAL CHARACTERISTICS						UNIT WEIGHT W/ ACC.	REMARKS	
			TOTAL CFM	OSA CFM	ESP IWG	BLOWER HP			DB	WB	DB	WB	SENSIBLE	TOTAL	MCA	COMP. RLA	ODF FLA	IDF FLA	MOCP	VOLT			PH
1	CARRIER	50GQCM05 (4t)	1,600	285	0.5	0.72	(16.2) / (8.3)	COOL HEAT	80 70	67 -	115 32	71 -	32.9 -	40.4 33.5	34.0	20.4 x 1	1.5 x 1	5.0	50	208	1	775 lbs.	1,2,3

- NOTE:  
 1. COORDINATE POWER REQUIREMENTS WITH ELECTRICAL CONTRACTOR.  
 2. PROVIDE TRUE 7 DAY DIGITAL DISPLAY PROGRAMMABLE THERMOSTAT AND ALL ASSOCIATED CONTROLS. CONTROL WIRING SHALL BE PLENUM RATED.  
 3. PROVIDE 2 SETS OF FARR 30/30 PLEATED FILTERS. FIRST SET FOR CONSTRUCTION AND AIR BALANCE, SECOND SET FOR OCCUPANCY.

OSA VENTILATION CALCULATION																
ZONE	OCCUPANCY CATEGORY (PEOPLE/FT. <sup>2</sup> )	TOTAL AREA (FT. <sup>2</sup> )	OCCUPANCY DENSITY (PEOPLE/FT. <sup>2</sup> )	ZONE POPULATION (PZ)	OSA REQ.'D PER PERSON (CFM)	OSA REQ.'D PER SQ.FT. (CFM)	BREATHING ZONE OSA (VBZ)(CFM)	ZONE AIR DISTRIBUTION EFFECTIVENESS (EZ)	ZONE OUTDOOR AIR FLOW (VOZ)(CFM)	ZONE PRIMARY AIR FLOW (VPZ)(CFM)	PRIMARY OUTDOOR AIR FRACTION (ZP=VOZ/VPZ)	SYSTEM VENTILATION EFFICIENCY (EV)	OCCUPANT DIVERSITY FACTOR (D)	UNCORRECTED OUTDOOR AIR INTAKE (VOU)	TOTAL OSA REQUIRED PER ASHRAE 62.1 (VOT)(CFM)	TOTAL OSA PROVIDED (CFM)
HP-1	OFFICE	431	5/1000	3	5	0.06	41	0.8	51	575	0.0887	0.9	1.0	145	161	285
	HALLWAY	236	-	-	-	0.06	14	0.8	18	140	0.1286					
	STORAGE	268	-	-	-	0.12	32	0.8	40	185	0.2162					
	BREAK ROOM	293	25/1000	8	5	0.06	58	0.8	72	590	0.122					

NOTE: VENTILATION SHALL BE BALANCED BY AN APPROVED METHOD. A BALANCE REPORT SHALL VERIFY THAT THE VENTILATION SYSTEM IS CAPABLE OF SUPPLYING THE AIRFLOW RATES REQUIRED BY 2012 IMC SECTION 403. SAID REPORT MUST BE PRESENTED TO THE ADMINISTRATIVE AUTHORITY.

OSA VENTILATION CALCULATION																
ZONE	OCCUPANCY CATEGORY (PEOPLE/FT. <sup>2</sup> )	TOTAL AREA (FT. <sup>2</sup> )	OCCUPANCY DENSITY (PEOPLE/FT. <sup>2</sup> )	ZONE POPULATION (PZ)	OSA REQ.'D PER PERSON (CFM)	OSA REQ.'D PER SQ.FT. (CFM)	BREATHING ZONE OSA (VBZ)(CFM)	ZONE AIR DISTRIBUTION EFFECTIVENESS (EZ)	ZONE OUTDOOR AIR FLOW (VOZ)(CFM)	ZONE PRIMARY AIR FLOW (VPZ)(CFM)	PRIMARY OUTDOOR AIR FRACTION (ZP=VOZ/VPZ)	SYSTEM VENTILATION EFFICIENCY (EV)	OCCUPANT DIVERSITY FACTOR (D)	UNCORRECTED OUTDOOR AIR INTAKE (VOU)	TOTAL OSA REQUIRED PER ASHRAE 62.1 (VOT)(CFM)	TOTAL OSA PROVIDED (CFM)
DU-1	OFFICE	119	5/1000	1	5	0.06	12	0.8	15	600	0.025	1	1.0	12	12	15

NOTE: VENTILATION SHALL BE BALANCED BY AN APPROVED METHOD. A BALANCE REPORT SHALL VERIFY THAT THE VENTILATION SYSTEM IS CAPABLE OF SUPPLYING THE AIRFLOW RATES REQUIRED BY 2012 IMC SECTION 403. SAID REPORT MUST BE PRESENTED TO THE ADMINISTRATIVE AUTHORITY.

CENTRIFUGAL EXHAUST FAN SCHEDULE (CEILING FAN)										
TAG #	MANUFACTURER	MODEL	AIR CAPACITIES			ELECTRICAL CHARACTERISTICS			UNIT WT	REMARKS
			TOTAL CFM	TSP IWG	BLOWER HP	AMPS	VOLT	PH		
1-2	BROAN	L100	95	0.25	FRACT.	0.7	120	1	10	1 2 3 5 1.3 SONES
3-4	BROAN	L100	95	0.25	FRACT.	0.7	120	1	10	1 2 3 4 1.3 SONES

1. PROVIDE AND INSTALL WITH GRAVITY BACKDRAFT DAMPER.  
 2. PROVIDE AND INSTALL VIBRATION ISOLATION PER MANUFACTURER'S RECOMMENDATIONS.  
 3. COORDINATE POWER REQUIREMENTS WITH ELECTRICAL CONTRACTOR.  
 4. THIS FAN SHALL BE CONTROLLED BY A LIGHT SWITCH OR OCC. SENSOR.  
 5. THIS FAN SHALL BE CONTROLLED BY A WALL SWITCH.

NOTES:  
 ALL WORK TO COMPLY WITH THE 2012 INTERNATIONAL MECHANICAL CODE, 2012 IMC, AND ALL GILA COUNTY ADOPTED CODES AND AMENDMENTS, IMC 106.3.1.  
 ALL WORK TO COMPLY WITH THE 2012 INTERNATIONAL ENERGY CONSERVATION CODE, 2012 IECC, AND ALL GILA COUNTY CODES AND AMENDMENTS, IECC C103.  
 HVAC EQUIPMENT TO MEET IECC C404.2.3. PROVIDE HVAC EQUIPMENT SUBMITTAL TO ARCHITECT OR ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ORDER OF EQUIPMENT, IMC 106.3.1.  
 MECHANICAL DESIGN IS INTENDED THAT THE AIR CONDITIONING SYSTEM WILL OPERATE CONTINUOUSLY TO MAINTAIN CURRENT VENTILATION REQUIREMENTS, IMC 403.2 & 403.3.  
 PROVIDE BUILDING INSPECTOR COPY OF FINAL AIR BALANCE REPORT, IMC 403.3, 403.4, 403.7.  
 SUBMIT FINAL AIR BALANCE REPORT TO BUILDING INSPECTOR FOR FINAL REVIEW AND APPROVAL, IMC 403.7.

AIR DEVICE SCHEDULE										
DEVICE TAG	DESCRIPTION	SIZE	NC MAX	MATERIAL	DAMPER	COLOR	MANUFACTURER	MODEL	FRAME	NOTES
CD-1	CEILING DIFFUSER	24x24"	30	STEEL	-	WHITE	TITUS	OMNI	LAY-IN	1
CD-2	CEILING DIFFUSER	24x24"	30	STEEL	-	WHITE	TITUS	OMNI	GYP.	1
SG-1	SUPPLY GRILLE	SEE NECK SIZING CHART	30	STEEL	OBJ	WHITE	TITUS	300RS	SURF.	2
RG-1	RETURN GRILLE	24x24"	30	STEEL	-	WHITE	TITUS	50F	LAY-IN	3
RG-2	RETURN GRILLE	24x24"	30	STEEL	-	WHITE	TITUS	50F	GYP.	3
RG-3	RETURN GRILLE	SEE NECK SIZING CHART	30	STEEL	OBJ	WHITE	TITUS	350RS	SURF.	2

- NOTES:  
 1. CEILING DIFFUSERS ARE FOUR WAY UNLESS INDICATED OTHERWISE.  
 2. REFER TO KEYED NOTES FOR MOUNTING HEIGHT.  
 3. PROVIDE 22x22" NECK SIZE WITH SQUARE TO ROUND ADAPTER. 1/2"x1/2"x1/2" GRID.

NECK SIZING CHART				
DEVICE TAG	NECK SIZE / CFM RANGE			
	0-199	200-399	400-599	600-900
CD-1	8"	10"	12"	14"
CD-2	8"	10"	12"	14"
SG-1	10x6"	12x8"	18x8"	18x12"
RG-1	8"	10"	12"	14"
RG-2	8"	10"	12"	14"
RG-3	10x6"	10x10"	18x10"	18x12"

NOTE:  
 USE NECK SIZES LISTED FOR RUN-OUTS, UNLESS NOTED OTHERWISE ON PLANS.

DUCTLESS SPLIT SYSTEM HEAT PUMP UNIT SCHEDULE (AIR-TO-AIR) R-410A																								
TAG #	TAG #	MANUFACTURER	MODEL INDOOR/OUTDOOR	AIR CAPACITIES				SEER RATING	HSPF	CYCLE	EVAPORATOR ENTERING		AMBIENT CONDITION		COOLING/HEATING CAPACITIES (MBH)		ELECTRICAL CHARACTERISTICS						UNIT WT	REMARKS
				TOTAL CFM	OA CFM	ESP IWG	IDF WATTS				DB	WB	DB	WB	SENSIBLE	TOTAL	MCA	COMPRESSOR RLA \ LRA	ODF FLA	IDF FLA	MOCP	VOLT		
1	3x3	MITSUBISHI	PLA-A18EA7	460 (LOW SPEED)	15	DUCTLESS	24.6	11.0	COOLING HEATING	80 70	67 60	115 47	67 43	18,000	19,000	1	-	-	-	28	208-230	1	50 99	1 2 3 4 5 6 7
		CEILING CASSETTE	PUZ-A18NKA7																					

- NOTES:  
 1. NO ALLOWANCE SHALL BE MADE FOR CONTRACTORS FAILURE TO COORDINATE WITH ALL TRADES PRIOR TO ANY WORK INCLUDING BUT NOT LIMITED TO STRUCTURAL AND ELECTRICAL AND ARCHITECTURAL.  
 2. CONDENSING UNITS SHALL BE SECURED TO PLATFORM/PAD TO PREVENT MOVEMENT CAUSED DAMAGE TO REFRIGERANT PIPING.  
 3. ALL REFRIGERATION PIPING SHALL BE SIZED PER MANUFACTURER'S REQUIREMENTS AND INCLUDE ALL REQUIRED ACCESSORIES.  
 4. THIS UNIT RECEIVES ITS POWER FROM THE OUTDOOR UNIT THROUGH A FIELD SUPPLIED INTERCONNECTING WIRE.  
 5. PROVIDE AND INSTALL MATCHING INTEGRAL / INTERNAL CONDENSATE PUMP.  
 6. PROVIDE AND INSTALL REMOTE DIGITAL THERMOSTAT. MOUNT THERMOSTAT AT ADA HEIGHT.  
 7. ALL CONTROL WIRING SHALL BE IN CONDUIT.  
 8. PROVIDE MANUFACTURERS MATCHING LINE-HIDE SET COVER SYSTEM WHERE REFRIGERANT PIPING CAN NOT BE CONCEALED WITH IN WALL.

HVAC SYMBOLS AND ABBREVIATIONS			
SINGLE LINE	DOUBLE LINE	DESCRIPTION	ABBR.
		NEW RECTANGULAR DUCTWORK (SUPPLY, RETURN, EXHAUST, RELIEF) REFER TO PLANS FOR SIZE	-
		TRANSITION	-
		NEW ROUND OR OVAL DUCTWORK (SUPPLY, RETURN, EXHAUST, RELIEF) REFER TO PLANS FOR SIZE	-
		EXISTING DUCTWORK	-
		45 DEG. TAP AT BRANCH DUCTS	-
		DUCT SPLIT WITH DAMPER: USE AT ELBOWS, TEES, AND WHERE INDICATED PER SMACNA (LATEST EDITION)	-
		CURVED ELBOW-MINIMUM RADIUS R: 1.5 WIDTH PER SMACNA (LATEST EDITION)	-
		90 DEG. ELBOW WITH SINGLE RADIUS TURNING VANES	-
		FLEXIBLE DUCT CONNECTION	FLEX
		VOLUME DAMPER WITH LOCKING QUADRANT	VD
		REMOTE DAMPER CONTROL	RDC
		SPIN-IN FLEX DUCT TAKE-OFF WITH VOLUME DAMPER	-
		SPLITTER DAMPER WITH LOCKING QUADRANT	S&Q
		SUPPLY AIR	SA
		EXHAUST AIR	EXH
		RETURN AIR	RA
		RELIEF AIR	REL
		OUTSIDE AIR	OSA
		CONNECTION OF NEW WORK TO EXISTING	P.O.C.
		TRANSFER AIR	TA
		EXHAUST REGISTER	ER
		ABOVE FINISHED FLOOR	AFF
		BELOW FINISHED FLOOR	BFF
		NOT TO SCALE	NTS
		SENSOR	S
		THERMOSTAT	T
		FIRE DAMPER	FD
		COMBINATION FIRE AND SMOKE DAMPER	CFS
		DUCT MOUNTED SMOKE DETECTOR	SD
		FIRE STAT (REFER TO SPECIFICATIONS FOR TEMP)	-
		OUTSIDE AIR TEMPERATURE SENSOR	-
		DOOR UNDERCUT (WITH SIZE)	-
		EXISTING	-
		RELOCATED	-
		BACK DRAFT DAMPER (ARROW DENOTES DIRECTION OF AIR FLOW)	BDD

REVISION

DATE

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AME PROJECT #22-103

PROJECT NUMBER: 22-103

DATE: 10/25/2022

DESIGNED BY: JHOCKING

DRAWN BY: JHOCKING

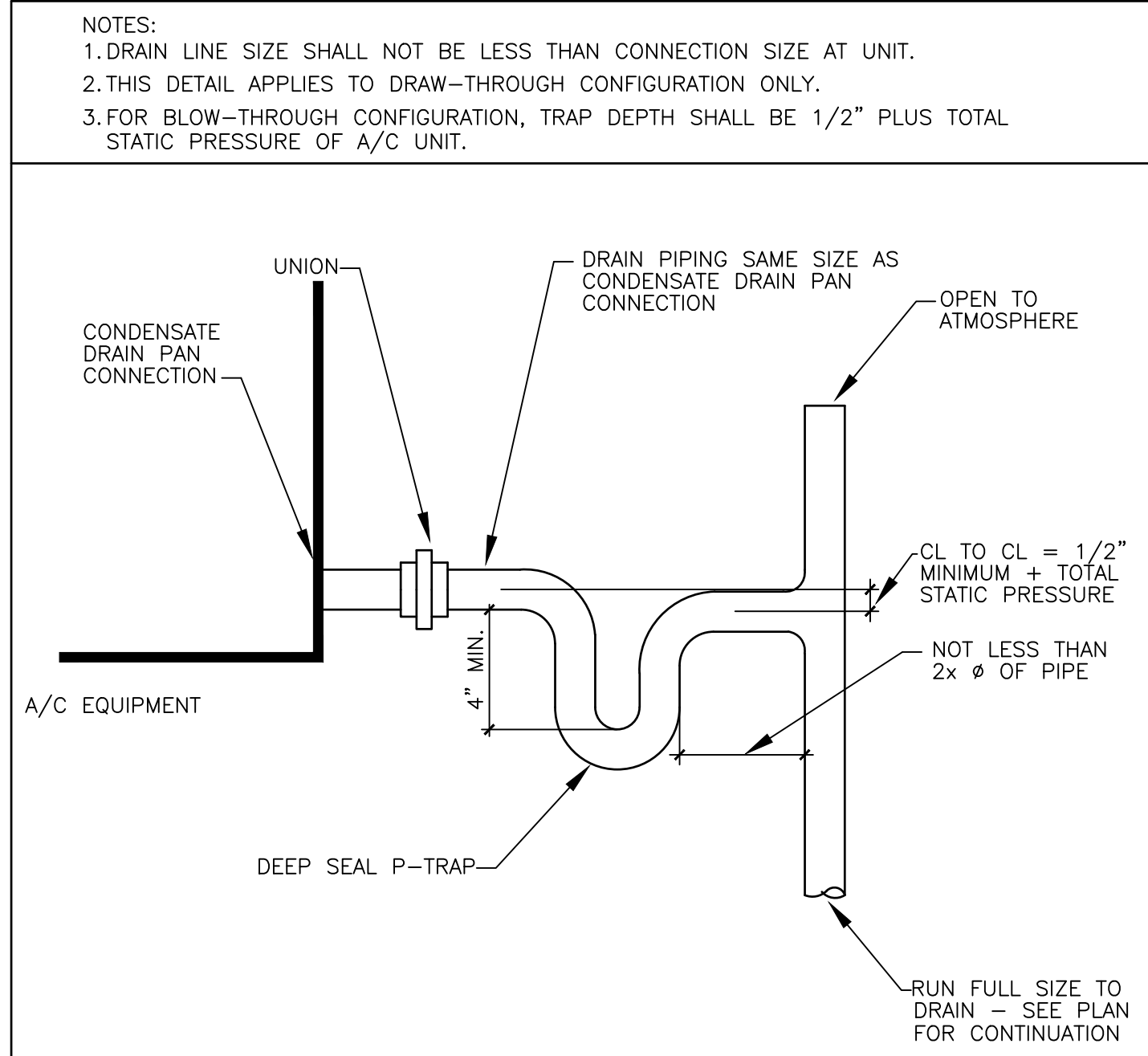
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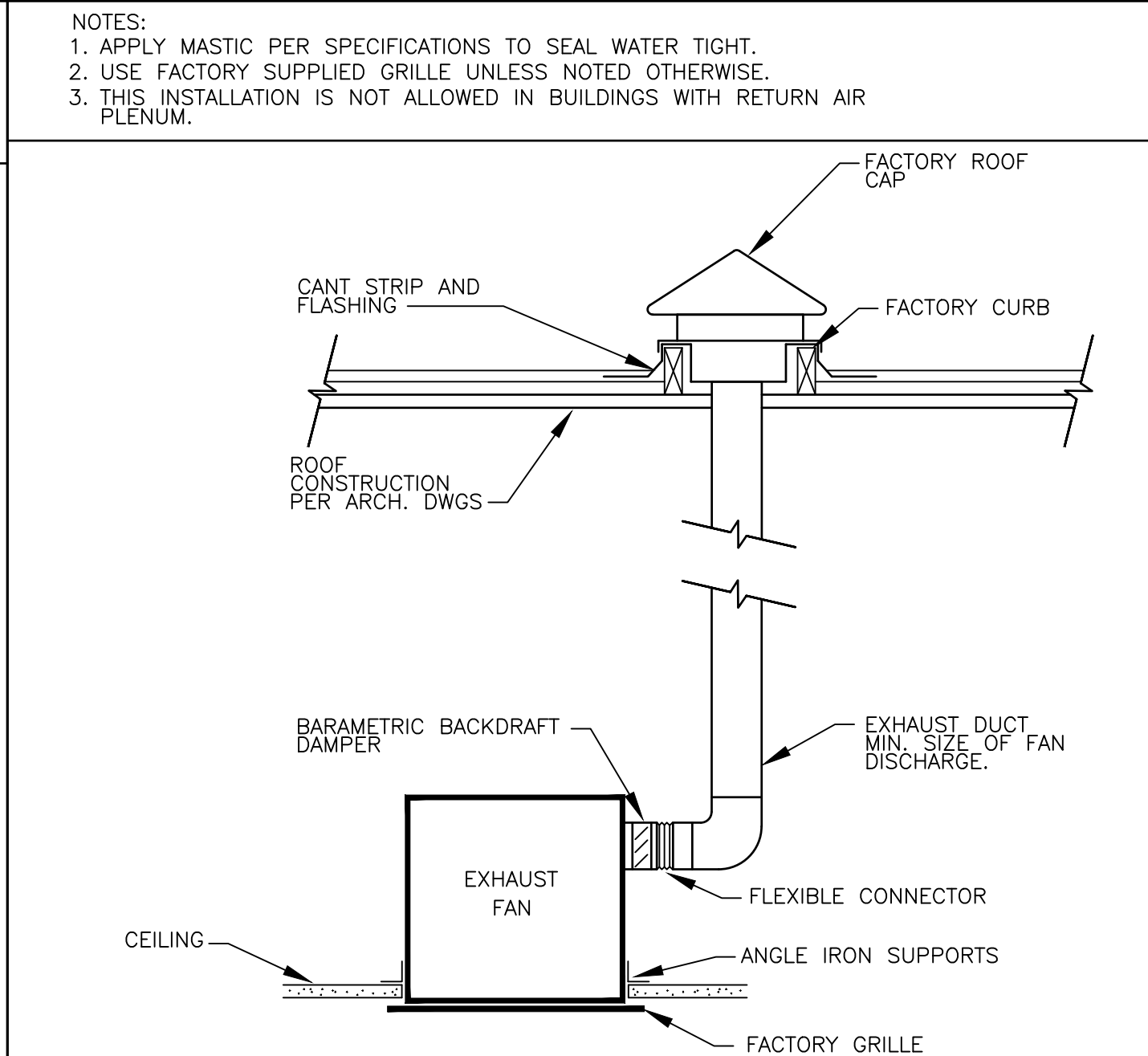
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SHEET TITLE: MECHANICAL SCHEDULES

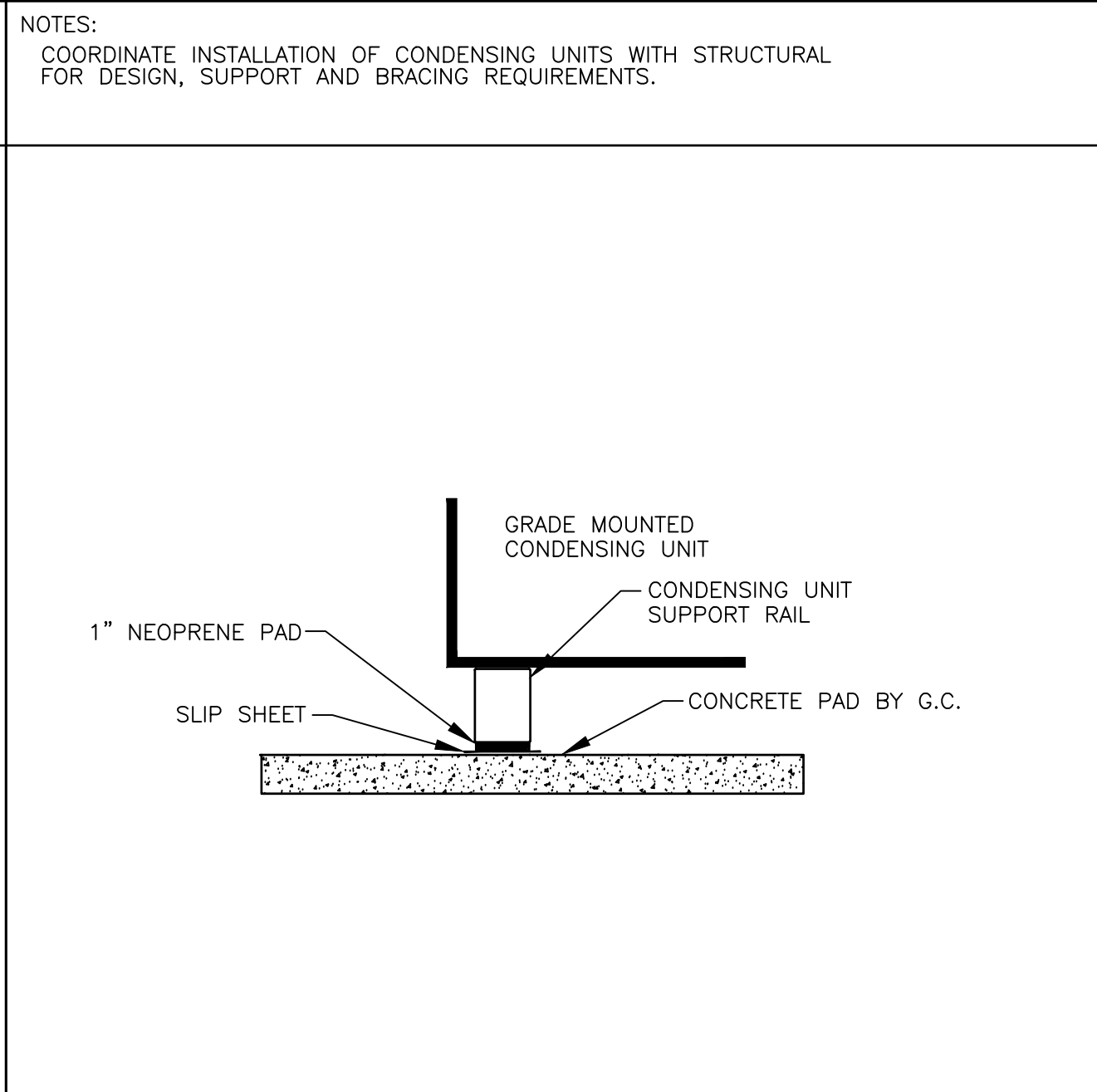
SHEET NUMBER: M2



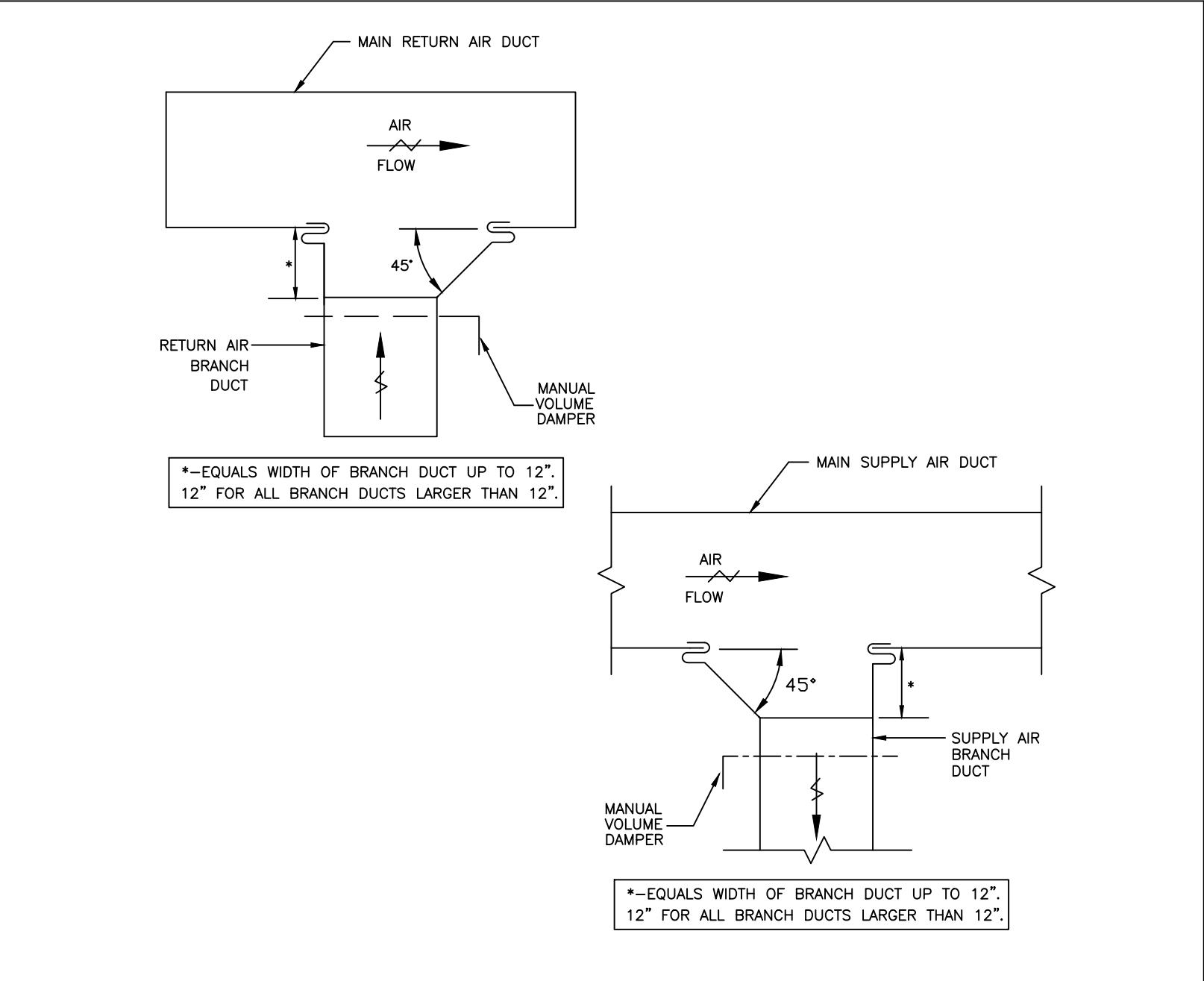
1 CONDENSATE DRAIN P-TRAP ASSEMBLY NOT TO SCALE



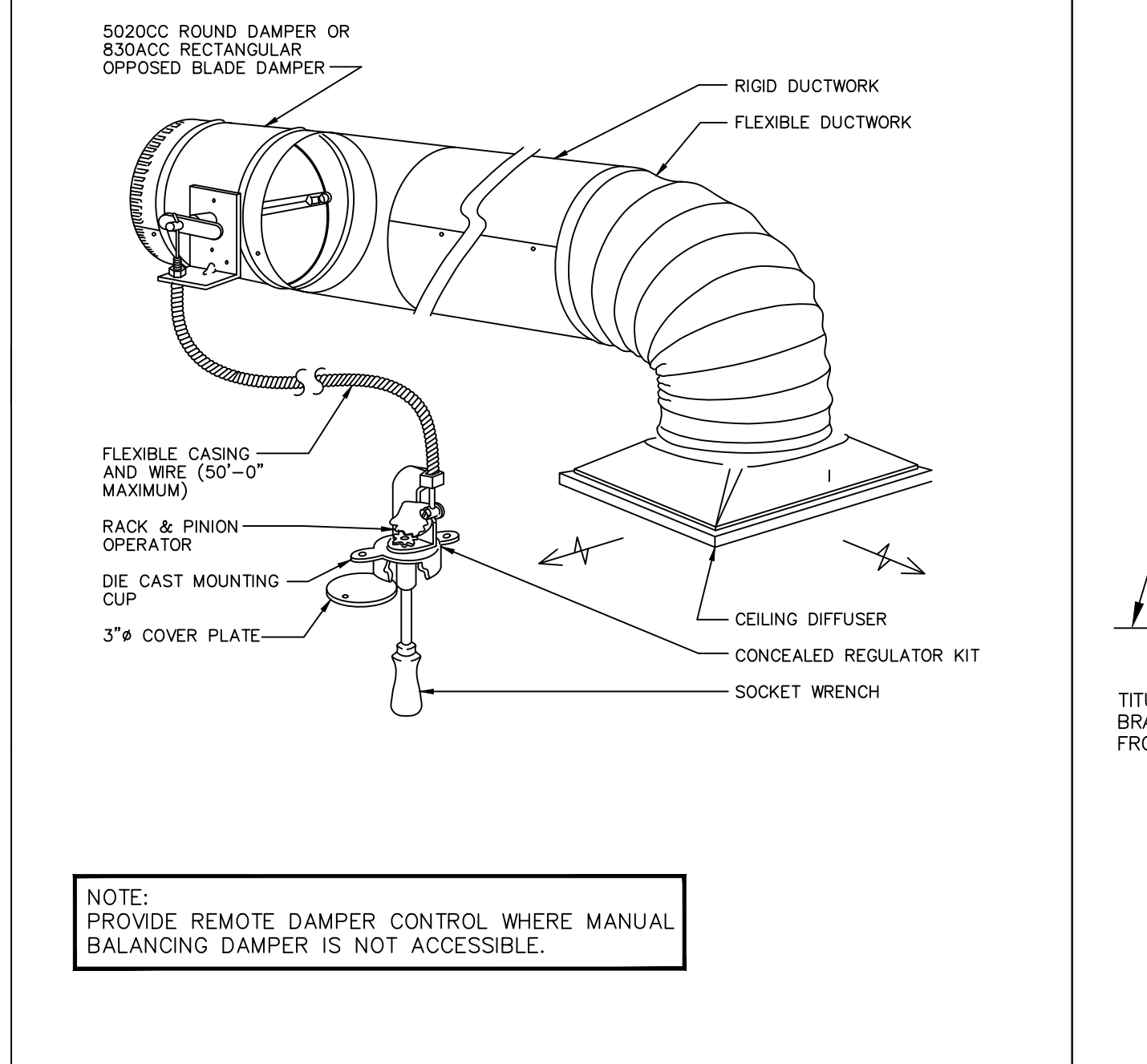
2 CEILING EXHAUST FAN NOT TO SCALE



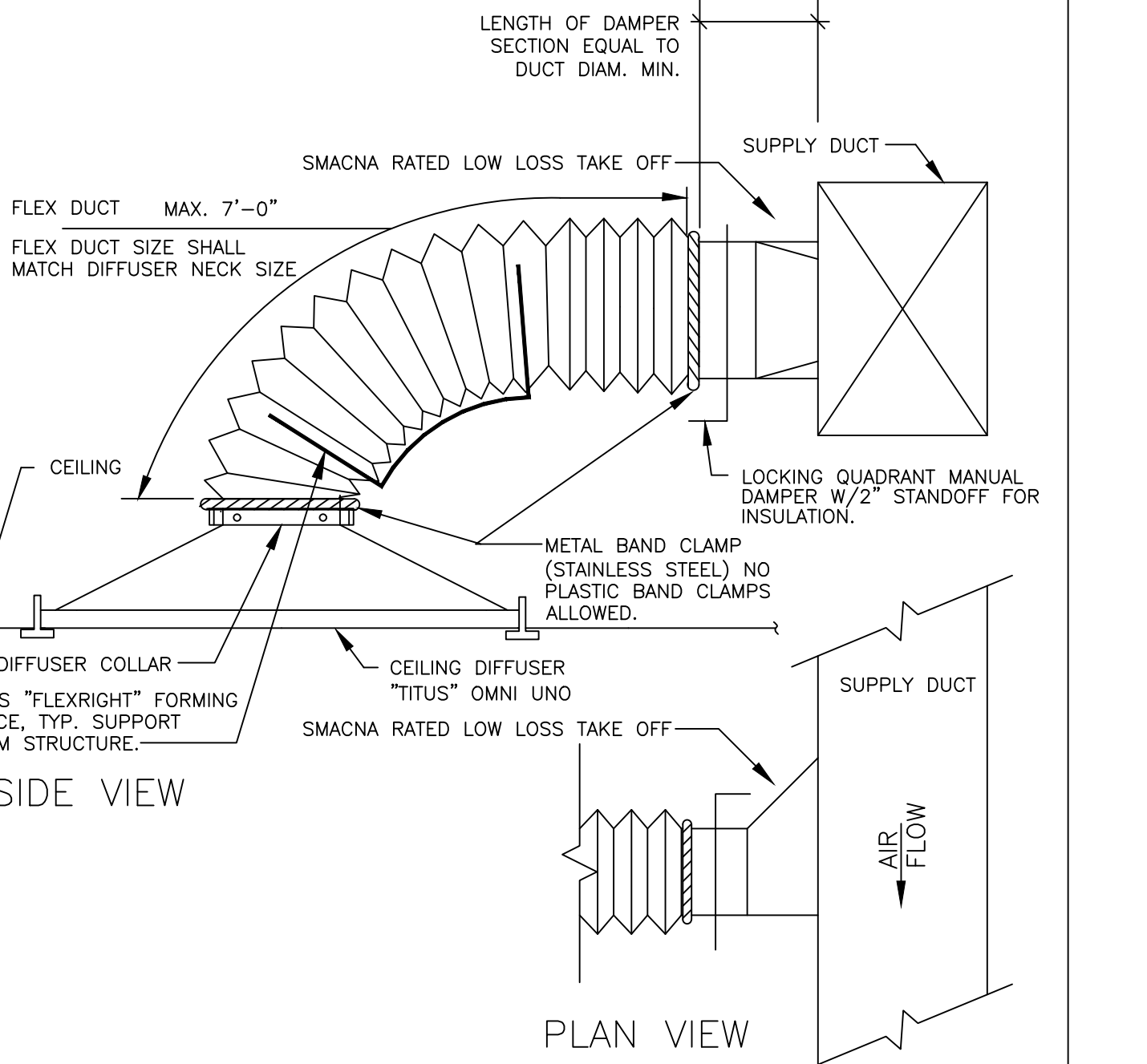
3 CONDENSING UNIT ON GRADE NOT TO SCALE



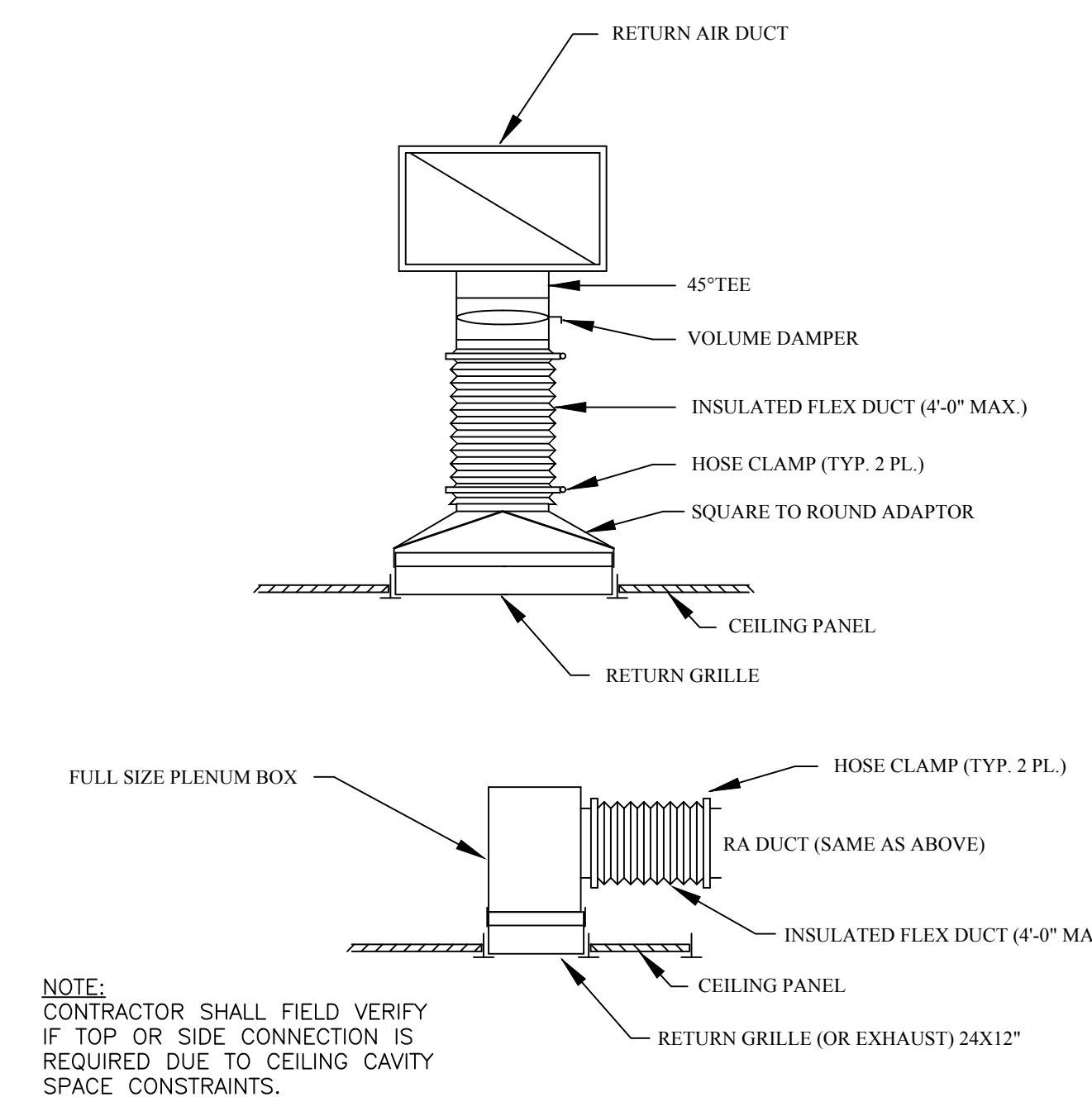
4 BRANCH DUCT TAKE-OFFS NOT TO SCALE



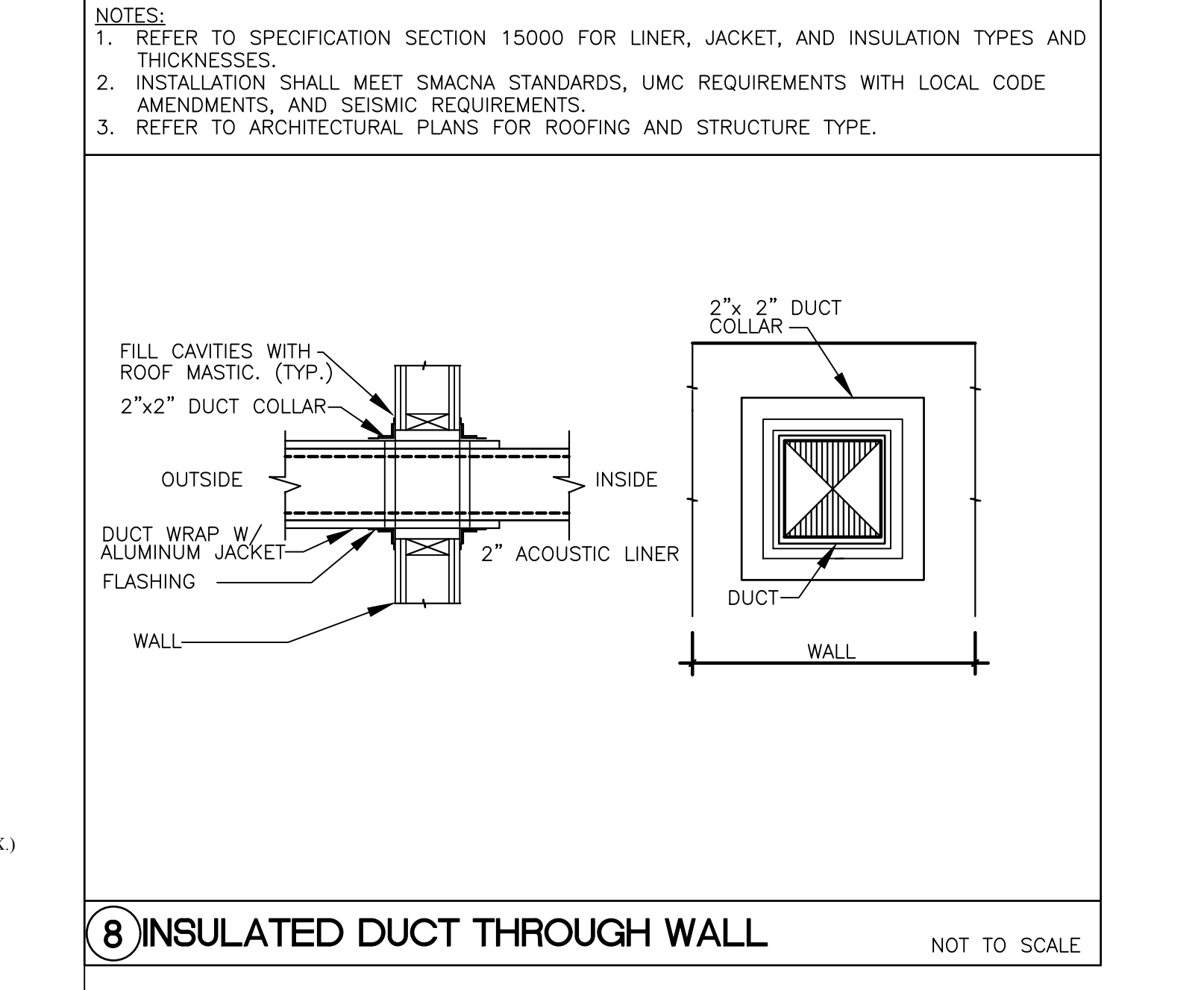
5 REMOTE DAMPER CONTROL DETAIL



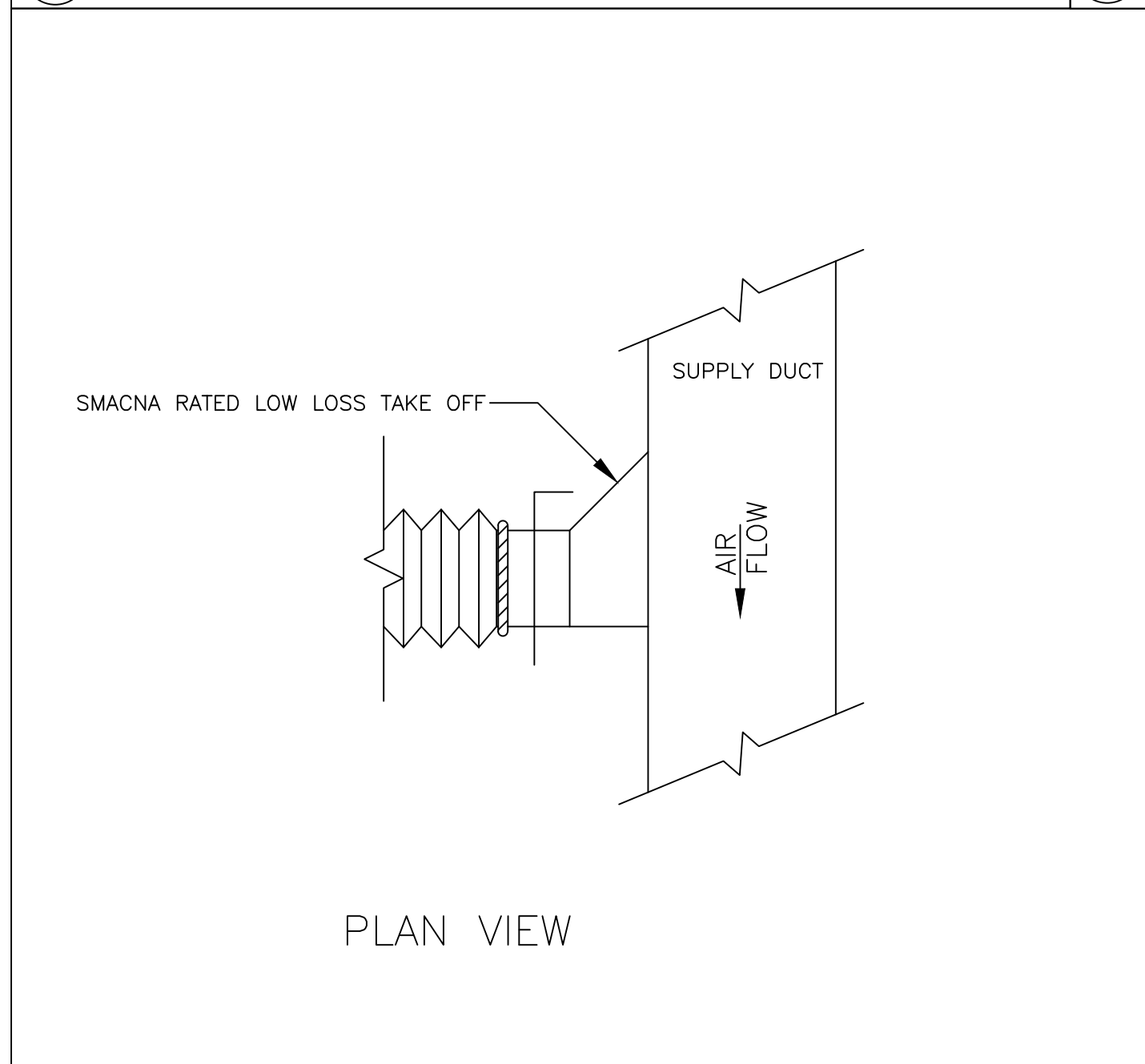
6 TYPICAL DIFFUSER CONNECTION NOT TO SCALE



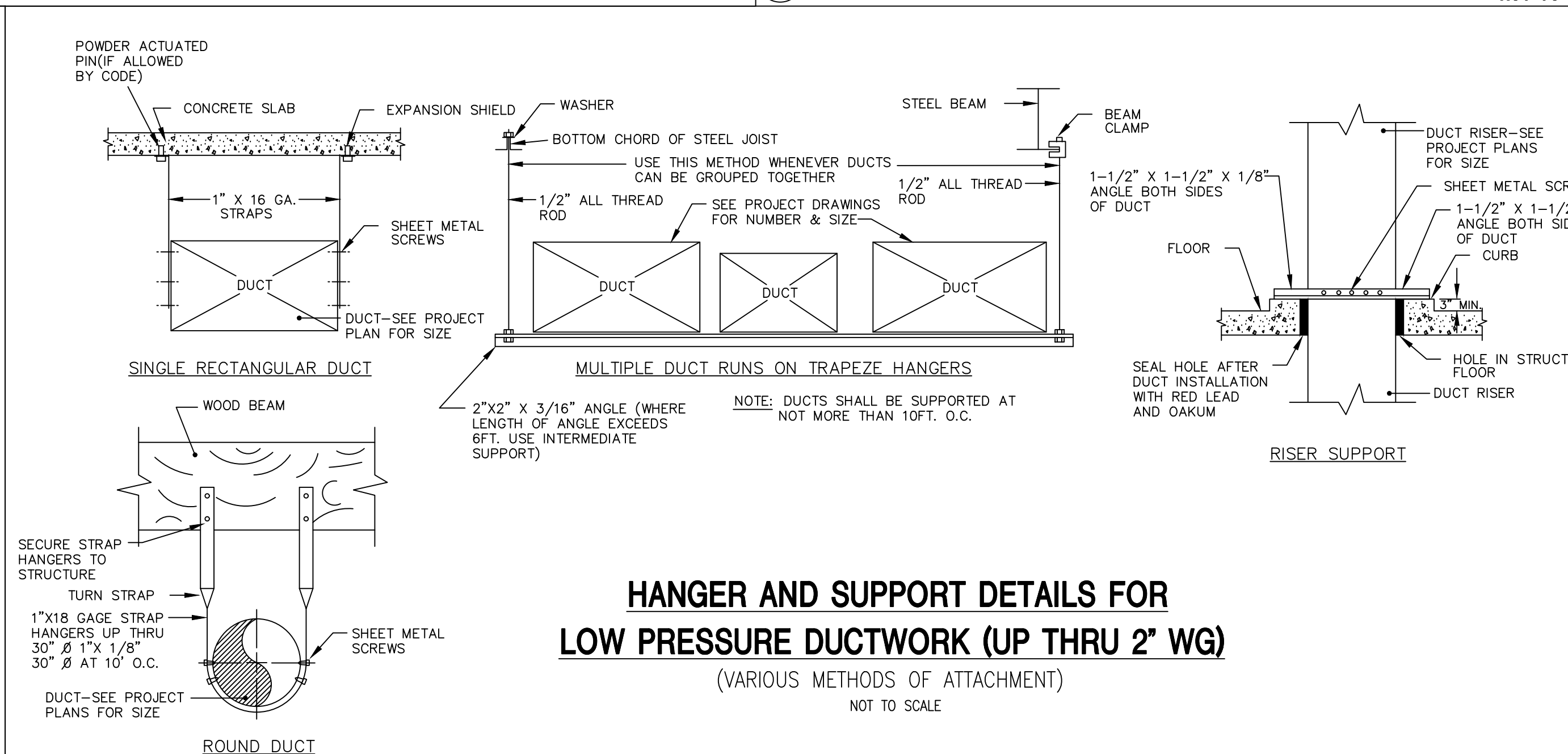
7 RETURN AIR CONNECTION DETAIL NOT TO SCALE



8 INSULATED DUCT THROUGH WALL NOT TO SCALE



9 SUPPLY AIR TAKEOFF NOT TO SCALE



10 DUCT SUPPORT DETAILS NOT TO SCALE

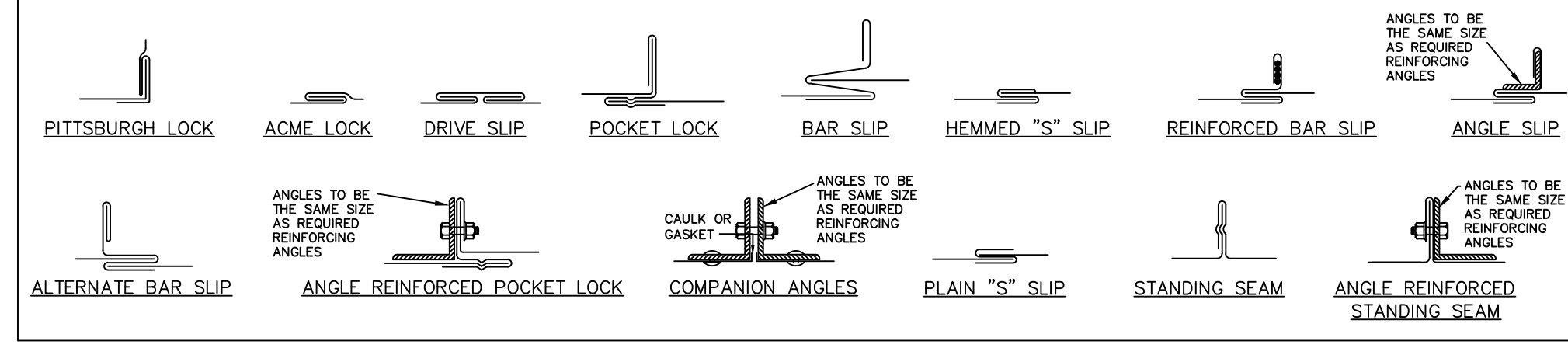
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ASSOCIATED MECHANICAL ENGINEERS, PLLC 1121 W. Warner Road, Suite 107 Tempe, AZ 85284 480.966.3964 MECHANICAL & PLUMBING	
PROJECT NUMBER:	22-103
DATE:	10/25/2022
DESIGNED BY:	JHOCKING
DRAWN BY:	JHOCKING
CHECKED BY:	JROELFS
<b>RUSSELL GULCH LANDFILL OFFICES / SCALES</b> 5891 Hope Ln., Globe, AZ 85501	
100% PERMIT SET SHEET TITLE: <b>MECHANICAL DETAILS</b>	
SHEET NUMBER: <b>M3</b>	

NOTE: CONTRACTOR HAS OPTION OF USING "DUCTMATE" OR "TDC" GASKETED AND FLANGED SYSTEMS FOR ALL RECTANGULAR DUCTWORK.  
4" CONSTRUCTION LISTED IN THE SPECIFICATION.

**THICKNESS & REINFORCING SCHEDULE - • LOW PRESSURE DUCTWORK**

\*NOTE: LOW PRESSURE DUCTWORK SHALL BE DUCTWORK IN WHICH THE PRESSURE DOES NOT EXCEED 2" WATER GAUGE.

GREATEST DUCT DIMENSION	STEEL DUCTS U.S. STANDARD GAUGE	ALUMINUM DUCTS B & S GAUGE	LONGITUDINAL SEAM	TRANSVERSE JOINT, SMALLEST DIMENSION	TRANSVERSE JOINT, GREATEST DIMENSION	REINFORCING (ALL DUCTS 18" THRU 54" SHALL BE CROSSBROKEN)
12" OR LESS	26	24(0.020)	DRIVE SLIP OR POCKET LOCK OR ACME LOCK	PLAIN "S" SLIP OR POCKET LOCK OR BAR SLIP	PLAIN "S" SLIP OR POCKET LOCK OR BAR SLIP	NONE REQUIRED
13" THRU 18"	24	22(0.025)	PITTSBURGH OR ACME LOCK	DRIVE SLIP OR POCKET LOCK OR BAR SLIP	PLAIN "S" SLIP OR POCKET LOCK OR BAR SLIP	NONE REQUIRED
19" THRU 30"	24	22(0.025)	PITTSBURGH OR ACME LOCK	HEMMED "S" SLIP OR BAR SLIP OR DRIVE SLIP OR 1" POCKET LOCK	HEMMED "S" SLIP OR BAR SLIP OR DRIVE SLIP OR 1" POCKET LOCK	IF TRANSVERSE JOINTS ARE LOCATED 4'-0" OR LESS ON CENTER NO REINFORCING IF ON 8'-0" CENTERS REINFORCE WITH 1"x1"x1/8" ANGLES AT 4 FT. O.C. FASTENED ON 8" CENTERS
31" THRU 42"	22	20(0.032)	PITTSBURGH OR ACME LOCK	DRIVE SLIP 18" OR LESS BAR SLIP OR REINFORCED BAR SLIP OR 1 1/2" POCKET LOCK	BAR SLIP OR REINFORCED BAR SLIP OR POCKET LOCK	IF TRANSVERSE JOINTS ARE LOCATED 4'-0" OR LESS ON CENTER NO REINFORCING IF ON 8'-0" CENTERS REINFORCE WITH 1"x1"x1/8" ANGLES AT 4 FT. O.C. FASTENED ON 8" CENTERS
43" THRU 54"	22	20(0.032)	PITTSBURGH LOCK	1 1/4" BAR SLIP, OR REINFORCED BAR SLIP, OR 1 1/2" POCKET LOCK	1 1/4" BAR SLIP, OR REINFORCED BAR SLIP, OR 1 1/2" POCKET LOCK	IF TRANSVERSE JOINTS ARE LOCATED 4'-0" OR LESS ON CENTER NO REINFORCING IF ON 8'-0" CENTERS REINFORCE WITH 1"x1"x1/8" ANGLES AT 4 FT. O.C. FASTENED ON 8" CENTERS
55" THRU 60"	20	18(0.040)	PITTSBURGH LOCK	1 1/4" BAR SLIP, OR REINFORCED BAR SLIP, OR 1 1/2" POCKET LOCK	1 1/4" BAR SLIP, OR REINFORCED BAR SLIP, OR 1 1/2" POCKET LOCK	IF TRANSVERSE JOINTS ARE LOCATED 4'-0" OR LESS ON CENTER NO REINFORCING IF ON 8'-0" CENTERS REINFORCE WITH 1"x1"x1/8" ANGLES AT 4 FT. O.C. FASTENED ON 8" CENTERS



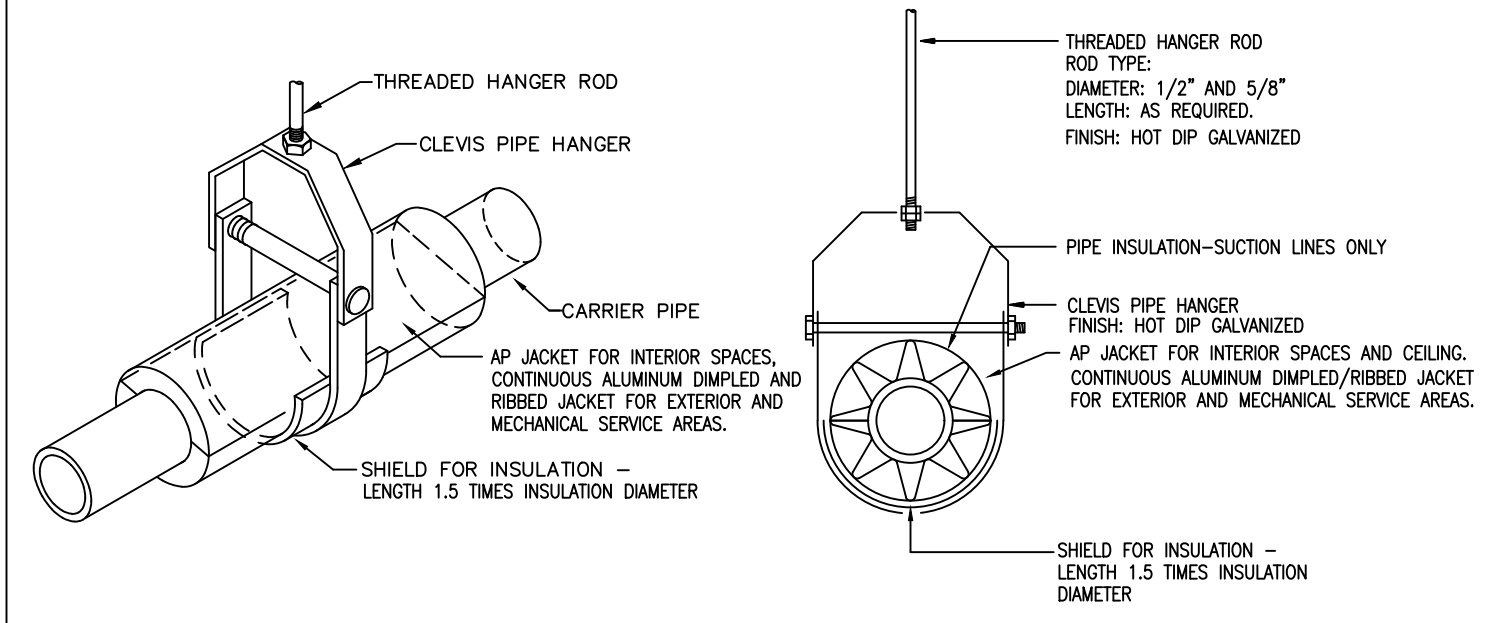
**DUCT CONSTRUCTION MINIMUM SHEET METAL THICKNESSES**

LOW PRESSURE DUCTWORK SHALL BE DUCTWORK IN WHICH THE PRESSURE DOES NOT EXCEED 2" WATER GAUGE.

RECTANGULAR DUCTS			
MAXIMUM SIZE (INCHES)	STEEL (MINIMUM THICKNESS, NOMINAL)	ALUMINUM (MINIMUM THICKNESS, NOMINAL)	
THROUGH 12	0.022 INCH (26 GAGE, GALV.)	0.020 INCH (NO. 24 B&S GAGE)	
13 THROUGH 30	0.028 INCH (24 GAGE, GALV.)	0.025 INCH (NO. 22 B&S GAGE)	
31 THROUGH 54	0.034 INCH (22 GAGE, GALV.)	0.032 INCH (NO. 20 B&S GAGE)	
55 THROUGH 84	0.040 INCH (20 GAGE, GALV.)	0.040 INCH (NO. 18 B&S GAGE)	
OVER 84	0.052 INCH (18 GAGE, GALV.)	0.051 INCH (NO. 16 B&S GAGE)	

ROUND DUCTS			
MAXIMUM SIZE (INCHES)	SPIRAL SEAM DUCT	LONGITUDINAL SEAM DUCT	FITTINGS
	STEEL (MINIMUM THICKNESS, NOMINAL)	STEEL (MINIMUM THICKNESS, NOMINAL)	STEEL (MINIMUM THICKNESS, NOMINAL)
THROUGH 12	0.019 INCH (28 GAGE, GALV.)	0.022 INCH (26 GAGE, GALV.)	0.022 INCH (26 GAGE, GALV.)
13 THROUGH 18	0.022 INCH (26 GAGE, GALV.)	0.028 INCH (24 GAGE, GALV.)	0.028 INCH (24 GAGE, GALV.)
19 THROUGH 28	0.028 INCH (24 GAGE, GALV.)	0.034 INCH (22 GAGE, GALV.)	0.034 INCH (22 GAGE, GALV.)
29 THROUGH 36	0.034 INCH (22 GAGE, GALV.)	0.040 INCH (20 GAGE, GALV.)	0.040 INCH (20 GAGE, GALV.)
37 THROUGH 52	0.040 INCH (20 GAGE, GALV.)	0.052 INCH (18 GAGE, GALV.)	0.052 INCH (18 GAGE, GALV.)

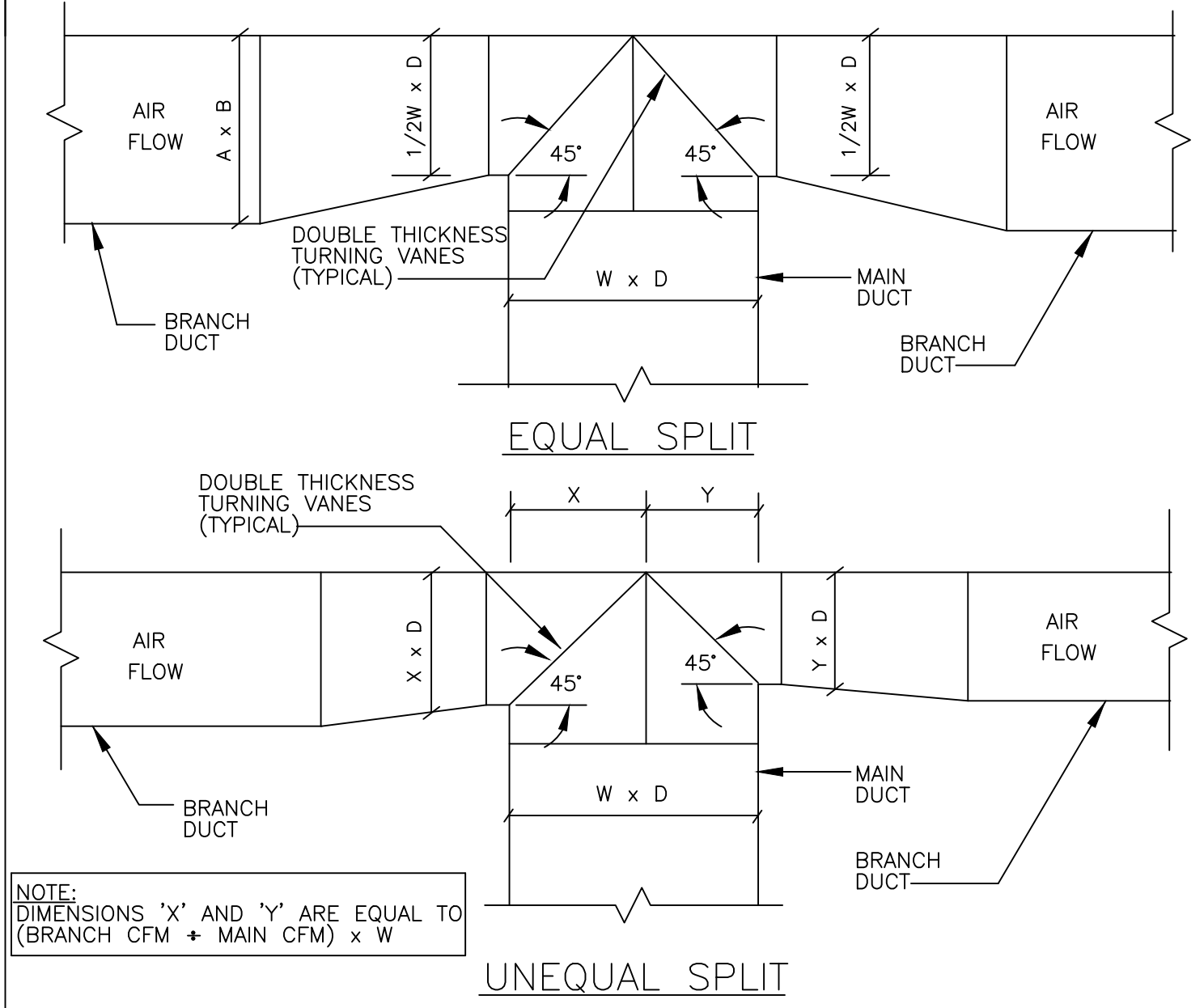


**1 PIPING SUPPORT DETAIL**

NOT TO SCALE

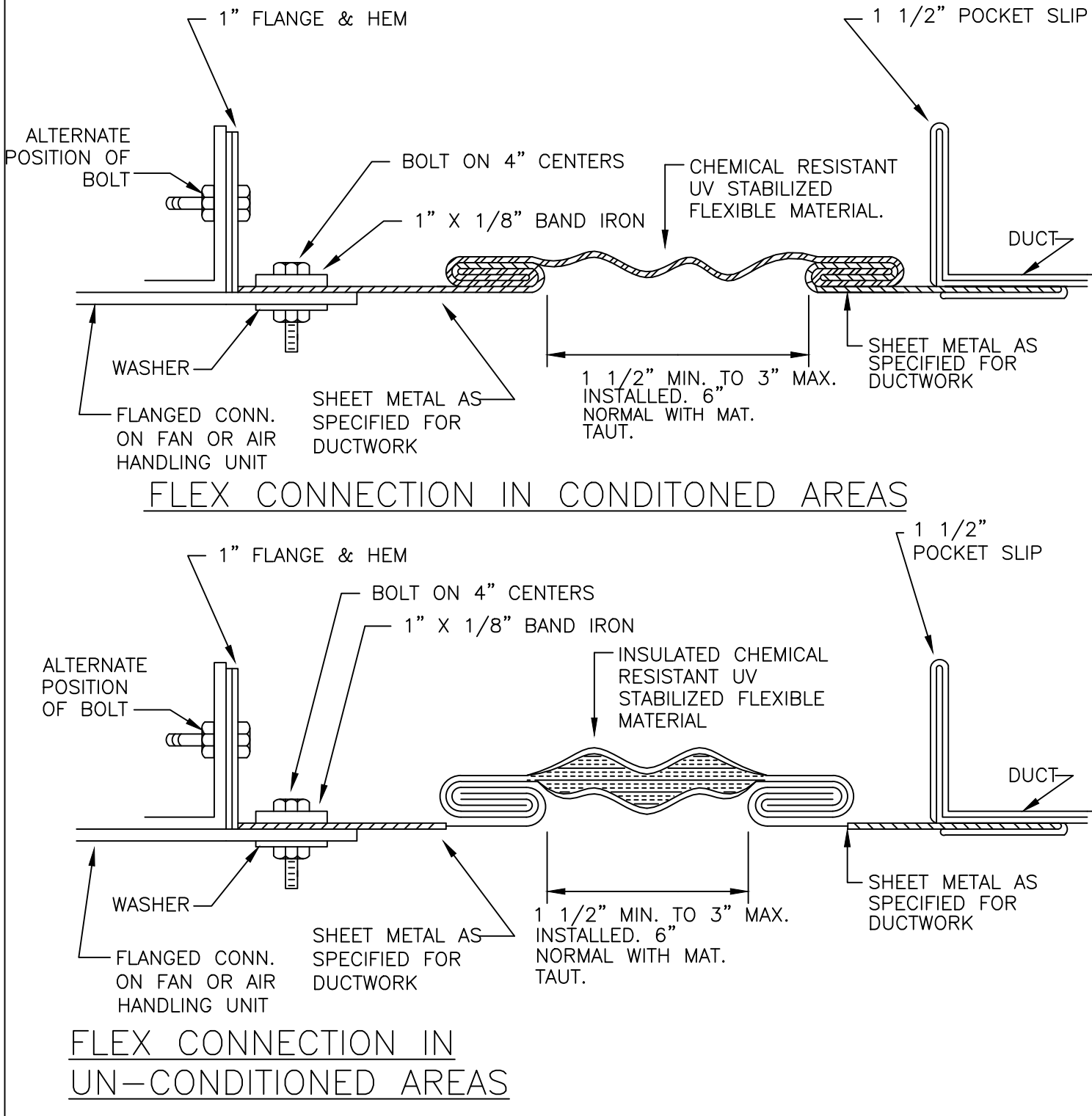
**2 DUCT CONSTRUCTION**

NOT TO SCALE



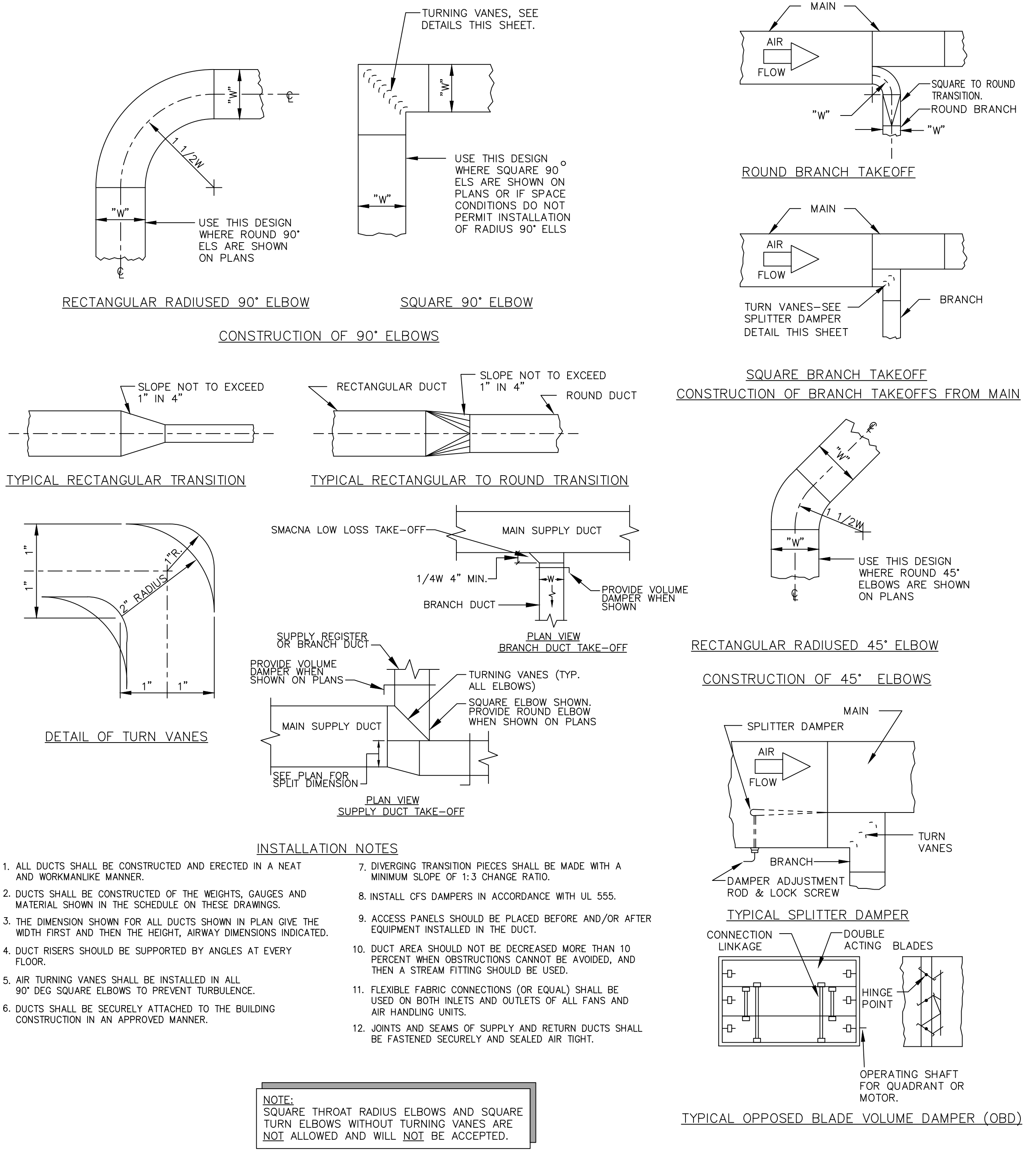
**3 DUCT TEE CONNECTION DETAIL**

NOT TO SCALE



**4 DUCT FLEX CONNECTION DETAIL**

NOT TO SCALE



**5 MECHANICAL DUCT DETAILS**

NOT TO SCALE

REVISION

DATE

ASSOCIATED MECHANICAL ENGINEERS, PLLC  
1121 W. Warner Road, Suite 107  
Tempe, AZ 85284  
480.966.3964 Fax  
480.966.3964 Pbx

AME PROJECT #22-103

PROJECT NUMBER: 22-103

DATE: 10/25/2022

DESIGNED BY: JHOCKING

DRAWN BY: JHOCKING

CHECKED BY: JROELFS

RUSSELL GULCH LANDFILL OFFICES / SCALES  
5891 Hope Ln, Globe, AZ 85501

100% PERMIT SET

SHEET TITLE: MECHANICAL DETAILS

SHEET NUMBER: M3.1

<p>SECTION 15000 MECHANICAL</p> <p>PART 1 GENERAL</p> <p>1.01 GENERAL PROVISIONS</p> <p>A. General Requirements of Mechanical Contracting: 1. Provide all labor, materials, equipment and services necessary for complete and operable installation of the Heating, Ventilating, Air Conditioning (HVAC) system in conformity with requirements of all Authorities having jurisdiction as indicated in the Contract Documents. 2. All Architectural drawings and specifications, fixture specifications, general, special and supplementary conditions, shall be considered a part of these specifications. 3. Prior to submitting bid, become thoroughly familiar with actual existing conditions and of the present installations to which connections must be made or which must be changed or altered. The intent of the work is shown on the drawings and described herein, and no consideration will be granted by reason of lack of familiarity on the part of the Contractor with actual physical conditions, requirements, and practices at the site. 4. Carefully check the documents of other sections to determine the requirements of any related work furnished and/or installed by that section. Provide the proper installation and/or connection. 5. Keep site free from surplus material, tools and rubbish at all times during construction period and, upon completion, leave site in clean condition. 6. Protect materials and equipment from all damage due to fire, theft, vandalism, weather, etc. 7. Repair any damage, at no extra cost to the Owner, caused to work of other sections. 8. Repair any damaged fireproofing, at no extra cost to the Owner, caused to integrity of original construction. 9. Contractor agrees that he and his subcontractors, agents, and employees will provide and maintain a safe place to work and that he and they will comply with all laws and regulations of any governmental authority having jurisdiction thereof. The Contractor agrees to indemnify, defend and hold harmless, Engineer, Owner and Architect from and against any liability, loss, damage or expense, including attorney's fees, arising from a failure or alleged failure on the part of Contractor, his and their agents, and employees to provide and maintain a safe place to work or to comply with all laws and regulations of any governmental authority having jurisdiction thereof. 10. Transmit all information required for work being performed by other sections in ample time for the proper installation and connection, and for the provision of all openings required in floors and walls. 11. Field drilling and cutting of holes in building structure required for work under this section shall be coordinated through the General Contractor and approved by Owner and Building Structural Engineer. Contractor shall bear all costs for such coordination, drilling, cutting and reinforcing costs. 12. Furnish and set all sleeves for the passage of piping through walls, roof and floors and elsewhere as will be required for the proper protection of each pipe passing through building surfaces. Coordinate this work with the General Contractor in order to properly expedite and perform this work. 13. Check the dimensional requirements of equipment to ensure that equipment can pass through the necessary areas to the location for installation. Include in bid costs for all work required, including any work required to move the equipment through the site to this final location. 14. Provide equipment tags per codes and authorities having jurisdiction. 15. Notify the General Contractor and Engineer in writing, within five days of award of contract, of the proposed delivery schedule of any equipment or material that may prevent the installation from being completed by the project completion date. 16. Submit a single guarantee stating that all portions of the work are in accordance with contract requirements. Guarantee all work against faulty and improper material and workmanship for a period of one year from date of final acceptance by Owner. Where guarantees or warranties for longer terms are specified by contract, such longer term shall apply. 17. Correct any deficiencies that may occur during the guarantee period, all to the satisfaction of the Owner, at no additional cost to the Owner within a reasonable time period. The Contractor shall be responsible for any damage caused by such deficiencies and repair thereof and reimburse the Owner for all costs incurred. Major Items of Work include: 1. Air conditioning systems: Supply, return and exhaust air distribution systems, including equipment, ductwork, supply air diffusers, return air grilles, exhaust air registers, controls and connections to existing work. 2. Thermal and acoustical insulation. 3. Pipe and piping accessories. 4. Vibration isolation. 5. Controls. 6. Testing and balancing of all systems. C. General Items: 1. Access Doors Panels: Provide concealed controls, dampers, valves and equipment requiring access with adequately sized access doors/panels. In removable type ceiling, provide access tile identification only. 2. Cutting and patching for mechanical work. 3. Insulation: Furnish insulation for all piping, equipment and ducts that permit heat loss or gain or form condensation. 4. Coordinate all new work with existing installations. 5. Condensate lines shall have no less than 1% minimum slope. 6. Make-up water for any industrial equipment shall first pass through an approved backflow prevention unit.</p> <p>1.02 REFERENCES</p> <p>A. The following published standards, codes, and specifications apply to all work within DIVISION 15. 1. ABC - Associated Air Balance Council. 2. ADC - Air Diffuser Council. 3. AMCA - Air Moving and Conditioning Association. 4. ANSI - American National Standards Institute. 5. ANSI - American National Standards Institute. 6. ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers. 7. ASME - American Society of Mechanical Engineers. 8. ASTM - American Society for Testing and Materials. 9. FM - Factory Mutual. 10. NEMA - National Electrical Manufacturer's Association. 11. NFPA - National Fire Protection Association. 12. OSHA - Occupational Safety and Health Act. 13. ISB - International Building Code. 14. UL - Underwriters' Laboratories, Inc. 15. IMC - International Mechanical Code. 16. IPC - International Plumbing Code. 17. National, State and Local Codes of all authorities having jurisdiction. 18. Local Utility Authorities.</p> <p>1.03 QUALITY ASSURANCE</p> <p>A. All equipment and accessories shall be the product of a company regularly engaged in the manufacture of that product for at least five years. B. All equipment and accessories shall be new and free from defects. C. Supply all equipment and accessories in compliance with the applicable standards listed in article 1.02 of this section and with all applicable national, state and local codes. D. All items of a given type shall be the products of the same manufacturer.</p> <p>1.04 DESCRIPTION OF CONTRACT DOCUMENTS</p> <p>A. Specifications: 1. Specifications, in general, describe quality and character of materials and equipment. 2. Specifications are of simplified form and include incomplete sentences. 3. Words or phrases such as "The Contractor shall," "shall be," "furnish," "provide," "a," "an," "the," and "all" etc. may be omitted for brevity. B. Drawings: 1. Drawings in general are diagrammatic and indicate scope, sizes, routing, locations, connections to equipment and methods of installation. The Drawings do not necessarily show all required offsets, obstructions or structural conditions. Locations on drawings may be distorted for purposes of clearness and legibility. 2. Scaled and figured dimensions are approximate and are for estimating purposes only, but shall be followed with sufficient accuracy to coordinate with other work and structural limitations. DO NOT SCALE DRAWINGS. 3. Before proceeding with work, check and verify all dimensions and carefully check space requirements with other work to ensure that all equipment and materials can be installed in spaces allotted. 4. The Contractor shall assume all responsibility for fitting of materials and equipment to other parts of equipment and structure. 5. The Contractor is responsible for installing the work in such a manner that it will conform to the structure and architectural elements, avoid obstructions, maintain headroom, leave adequate clearance for proper maintenance and repairs, and provide clearances and access required by codes. 6. Make adjustments that may be necessary or requested in order to resolve space problems, preserve headroom, and avoid architectural openings, structural members and work of other trades. 7. Make drawings and equipment required for relocated equipment. 8. ALL EQUIPMENT LOCATIONS SHOWN ON THESE PLANS SHALL BE COORDINATED WITH ACTUAL FIELD CONDITIONS PRIOR TO INSTALL. 9. Above items to be performed at no additional cost to the Owner. C. Immediately and formally notify the Architect requesting his interpretation and decision, including during bidding period, if any part of the Contract Documents appears unclear or contradictory. Do not proceed with such work without Architect's decision.</p> <p>1.05 PERMITS AND INSPECTIONS</p> <p>A. The contractor shall secure all approvals and pay all fees for all work installed. Certificate shall be delivered to owner before final payment will be made.</p> <p>1.06 PROJECT CONDITIONS</p> <p>A. Connections to Existing Work: 1. Install new work and connect to existing work with minimum interference to existing facilities. 2. Temporary shutdowns of existing services shall only occur at times not to interfere with normal operation of existing facilities and only with written consent of Owner. Shutdowns shall be performed at no additional cost to the Owner. 3. Maintain continuous operation of existing facilities as required with necessary temporary connections between new and existing work. HVAC, plumbing and fire protection systems shall not be interrupted. 4. Correct new work to existing work in neat and acceptable manner. Restore existing disturbed work to original condition including maintenance of wiring continuity as required. B. Removal and Relocation of Existing Work: 1. Disconnect, remove or relocate material, equipment, plumbing fixtures, piping and other work noted and required by removal or changes in existing construction. 2. Where existing pipes, conduits and/or ducts that are to remain prevent installation of new work as indicated, relocate, or arrange for relocation, of existing pipes, conduits and/or ducts. 3. Provide new material and equipment required for relocated equipment. 4. Plug or cap active piping or ductwork behind or below finish. 5. Do not leave long dead-end branches. Cap or plug in close as possible to active line. 6. Remove unused piping, ductwork and material. 7. Dispose of removed fixtures and equipment as directed.</p> <p>1.07 QUALITY ASSURANCE</p> <p>A. Materials shall be new and free from defects and listed by Underwriters' Laboratories, Inc. (or other approved testing and listing agency) or bearing their label. Conform to codes, standards and publications listed in paragraph 1.02 References.</p> <p>1.08 PRODUCT DELIVERY, HANDLING AND STORAGE</p> <p>A. Ship equipment in original packages, to prevent damaging or entrance of foreign matter. B. Handle and ship in accordance with manufacturer's recommendations. C. Provide protective coverings during construction. D. Replace at no expense to Owner, equipment or material damaged during storage or handling, as directed by Architect. E. Tag all items with weatherproof tag, identifying equipment by name and purchase order number. F. Include packing and shipping lists. G. Accessibility: 1. For operation, maintenance and repair. 2. Minor deviations are permissible. 3. Changes of magnitude or involving extra cost are not permissible without review. 4. Group concealed mechanical equipment requiring access with equipment freely accessible through access doors.</p>	<p>1.09 SUBMITTALS</p> <p>Provide electronic submittals in PDF format with descriptive data and equipment performance for products and materials listed below, prior to purchase and installation. Operation and Maintenance Manuals shall not be included in the submittal. Items to be submitted include but are not limited to the following: 1. Rooftop packaged units 2. Vibration isolation. 3. Dampers. 4. Insulation and lining. 5. Diffusers, grilles and registers. 6. Air test and balance. (Complete forms proposed for use in compiling and recording test and balance data.) 7. Control devices and systems. Voluntary alternate equipment, product or material submittals shall be presented during bidding period to Architect/Engineer prior approval. Bid preparations without prior engineering approval will be at the sole risk of the Contractor.</p> <p>1.10 MAINTENANCE MANUALS AND RECORD DRAWINGS</p> <p>A. Provide four (4) copies of operating and maintenance manual for Owner's use for each piece of equipment. Each manual shall be cross-referenced and numbered with as-built drawing descriptions. B. Deliver to Owner, one set of PDF documents showing work as actually installed. Label drawings "RECORD DRAWINGS." 1.11 SEISMIC SUPPORT (IF REQUIRED)</p> <p>A. Contractor shall support and brace all new HVAC, plumbing and fire protection systems in accordance with seismic code requirements.</p> <p>1.12 WARRANTY</p> <p>A. See General Condition of the Contract for general warranty provisions.</p> <p>1.13 INDEMNIFICATION</p> <p>A. See General Conditions of the Contract for Construction for indemnification provisions.</p> <p>PART 2 PRODUCTS</p> <p>2.01 PACKAGED &amp; SPLIT SYSTEM HEAT PUMPS</p> <p>A. Carrier B. Trane/Mitsubishi C. Daikin D. Prior approved equivalents</p> <p>2.02 EXHAUST FANS</p> <p>A. Broan B. Greenheck C. Penn D. Twin City Fan E. Prior approved equivalents</p> <p>2.03 GRILLES AND REGISTERS</p> <p>A. Titus B. Kreuzer C. Nalor D. Prior approved equivalents</p> <p>2.04 DAMPERS, FIRE DAMPERS, COMBINATION FIRE AND SMOKE DAMPERS</p> <p>A. Ruskin B. Greenheck C. Prior approved equivalents.</p> <p>2.05 DUCTWORK</p> <p>A. All ductwork, dampers, access doors, joints, hangers, stiffeners, fire/smoke dampers and fire retarding materials shall be in accordance with requirements of SMACNA (or IMC latest edition) "HVAC Duct Construction Standards," and all other authorities having jurisdiction. All sheet metal work shall have a pressure classification as follows: 1. Supply ducts downstream of terminal air units, air handling units and fans - 2 inches W.G. 2. Return and exhaust air ducts - 2 inches W.G. 3. Supply duct between main loop and inlet to terminal air unit - 4 inches W.G. B. Ductwork: Unless otherwise specified. 1. Cold rolled "commercial" quality hot dipped galvanized in accordance with ASTM No. M525-67. 2. Dimensions shown on drawings are clear inside dimensions. 3. Fittings: Same gauge and construction as ducts. Elbows shall have centerline radius not less than 1.5 times width. 4. Ducts with transverse and longitudinal bracings in accordance with SMACNA (or IMC latest edition). 5. Fiberglass ductboard not allowed. 6. Closure duct shall be minimum 16 GA steel, welded and tested per IMC requirements or 18 GA stainless steel, welded and tested per requirements. 7. Evaporative cooler duct shall be SMACNA aluminum. C. Flexible Ductwork: 1. The flexible duct for connection of ceiling air diffusers to sheet metal duct shall be class 1 factory fabricated and assembly consisting of inner sleeve, insulation and an outer moisture barrier. The inner sleeve shall be an elastomeric compound reinforced with woven fiberglass banded to a vinyl coated spring steel wire supporting helix. A minimum R6 fiberglass insulating blanket shall encase the inner sleeve and be sheathed with an outer moisture barrier of a reinforced metalized Mylar/propylene laminate, or equivalent. 2. Acoustical performance of the flexible duct shall be in accordance with Air Diffusion Council Flexible Air Duct Test FD72R1, paragraph 3.2.1, Sound Attenuation. 3. Other methods as detailed on drawings. 4. Flexible ductwork to be a maximum of 7 ft. in length UNO. On runs requiring over 7 ft., install balance of duct run in sheet metal with standard sized metal fittings. 5. All connections shall be airtight joints, fastened with clamps and sealed with sealing compound and tape. 6. Flexible duct bends shall be installed with centerline radius not less than 1.5 time diameter and shall not be crushed to fit limited clearance. D. Access Doors: 1. Furnish access door of sufficient size as required, for access, inspection, maintenance, and replacement to all instruments, controls and equipment. Access doors shall be rated for the system static pressure. E. Dampers: 1. Furnish all dampers necessary for proper control and balancing of air distribution as follows: a. All ducts which branch split 2 or more branches to serve supply diffusers. b. At each supply, return and exhaust branch duct, as far away from each outlet and inlet as possible. c. Where indicated on the Drawings. d. Field fabricated dampers are not acceptable. F. Fire/smoke dampers shall be designed and constructed in accordance with NFPA Standard 90A and UL Standard 555 and UL Standard 555S and shall be so labeled with a permanent identification. Fire/smoke dampers shall be out-of-air stream type with a factory supplied sleeve. G. Turning vanes shall be galvanized steel, single thickness turning vanes with 2 in. inside radius for all square elbows, unless otherwise noted. Turning vanes shall be braced, reinforced and supported as per the latest SMACNA manual.</p> <p>2.06 AIR OUTLETS AND INLETS</p> <p>A. All diffusers, grilles and registers shall be of type and capacity as indicated on drawings. Diffusers shall have no visible screw heads or connections. B. Balancing dampers shall be provided in the branch duct as far as possible from all supply and return air devices and shall be adjustable and accessible. C. Supply air diffuser plenums shall be lined with 1" lining unless otherwise noted.</p> <p>2.07 ROOM THERMOSTATS</p> <p>A. Unless otherwise noted, room thermostats shall match the base building standards. B. Thermostats shall be electronic.</p> <p>2.08 ESCUTCHEONS</p> <p>A. Provide exposed piping with escutcheons where passing through walls, ceilings or partitions. B. Provide sleeving for all piping that penetrates floor slabs.</p> <p>2.09 HVAC WATER PIPING - (INCLUDING CONDENSATE DRAIN)</p> <p>A. Pipe shall be seamless copper tubing, Type L, cold drawn, hard temper, ASTM B88. B. Fittings shall be wrought copper solder sweat type. ANSI B16.22 or brass castings, ANSI B16.18. C. Joints shall be 95-5 (tin and antimony) solder. D. Connection between dissimilar metals shall be isolated by means of approved dielectric fitting. E. Testing: 1. HVAC: a. Less than 100 psi operating pressure: 1) Test hydrostatically to 150 psi. b. Over 100 psi operating pressure: 1) Test hydrostatically to 1-1/2 times operating pressure. 2) Never exceed test pressure ANSI B16.1 basis. c. Duration: 2 hours: 1) With system valves capped and pressure apparatus disconnected: a) Pressure change: none. b) Compensate for temperature change. d. Leaks and defects: 1) Repair or replace as directed. 2) Without additional cost. e. Notify the Architect in writing one week before test. f. Furnish written report and certification that tests have been satisfactorily completed.</p> <p>2.10 SUPPORTS AND ANCHORS</p> <p>A. Pipe Hangers, Supports, and Guides: 1. General: a. Assure adequate support for pipe and contents. b. Prevent vibration or swaying. c. Provide for expansion and contraction. d. Supports of wire, rope, wood, chain, strap perforated bar or any other makeshift device not permitted. e. Comply with applicable requirements at ANSI B31.1.0 and B31.2 for piping. f. Support piping so that equipment is not stressed by piping weight of expansion. g. Hangers and supports shall have minimum safety factor of three (3), based on ultimate tensile or compressive strength, as applicable, of material used. h. Prime coat exposed steel hangers and supports: 1) Hangers and supports located in crawl spaces, pipes shafts and suspended ceiling spaces are not considered exposed. 2. Horizontal piping, except as noted: a. Adjustable clevis type and rod: 1) All services at or below 250 deg F.</p>	<p>1) Pipe stand, bracket, trapeze or other equivalent structural support. 2) Rollers not required where spring hangers are called for. c. Trapeze hangers: 1) Guide individual pipes on trapezes with 1/4 inch U-bolt or Superstrut 702 pipe clamp. d. install thermal hanger shield at each support point. d. Threaded steel rods: 1) 2 in vertical adjustment with 2 nuts each end for positioning and locking. 2) Size to 12 in IPS:</p> <table border="1"> <tr> <td>Pipe, IPS</td> <td>Rod</td> </tr> <tr> <td>To 2 in.</td> <td>3/8"</td> </tr> <tr> <td>2-1/2 and 3 in.</td> <td>1/2"</td> </tr> <tr> <td>4 in. to 12 in.</td> <td>5/8"</td> </tr> </table> <p>3. Install Pipe isolators between hangers and: a. Uninsulated copper tubing. b. Wherever any pipe requires sound and vibration isolation. 4. Steel support components shall be separated from copper piping with plastic tape. 5. Spring Supports for Piping: a. Minimum static deflection shall be 1 inch unless noted otherwise.</p> <p>6. Miscellaneous Steel: a. Provide miscellaneous steel members, beams, brackets, etc., for support of work in this division unless specifically included in other divisions.</p> <p>B. Pipe Support Spacing: 1. Maximum spacing for horizontal piping:</p> <table border="1"> <tr> <td>Type of Pipe</td> <td>Size</td> <td>Max. Spacing</td> </tr> <tr> <td>Steel or Brass</td> <td>3/4" and smaller 1" and larger</td> <td>10 ft. 12 ft.</td> </tr> <tr> <td>Copper</td> <td>1-1/2" and smaller 2 in. and larger</td> <td>6 ft. 10 ft.</td> </tr> <tr> <td>No hub CI (Notes 1,2,3,4,5)</td> <td>All</td> <td>Every other joint, unless over 4 feet, then support each joint.</td> </tr> </table> <p>Spacing Notes: Note 1. Typical of cast iron and duriron. Note 2. Support adjacent to joint, not to exceed eighteen (18) inches. Note 3. Brace at not more than forty (40) foot intervals to prevent horizontal movement. Note 4. Support at each horizontal branch connection. Note 5. hangers shall not be placed on coupling. Note 6. Additional supports at: a. Changes in direction. b. Branch piping and runouts over 5 ft. c. Concentrated loads due to valves, strainers and other similar items. d. At valves 4 in. and larger in horizontal piping. e. Support piping on each side of valve. 2. Brace hubless piping to prevent horizontal and/or vertical movement. 3. Parallel piping on trapezes: a. Maximum spacing to be that of pipe requiring closest spacing. 4. Support standpipes and fire sprinkler piping in accordance with NFPA. C. Attachment to Structure: 1. Steel Beam Anchors: a. Approved beam or channel clamps. b. Do not cut or weld to structural steel without written approval of Owner and Structural Engineer. c. Other methods as detailed on drawings. 2. Steel Deck Anchors: No attachment to metal deck permitted without written approval of Owner's representative. a. Concrete filled: as specified above. 3. Side Wall Supports: a. Concrete walls: As specified for hangers. b. Stud Walls: 1) Toggle bolts. 2) Studs welded to structural studs. 3) Lag screws into wood backing. 4) Other methods. 4. Support Spreaders: a. Install spreaders spanning between structural members when hangers fall between them, and hanger load is too great for slab or deck attachment. b. Spreaders may be one of methods listed below, or combination of both as required: 1) Fabricated from structural channel: a) End fittings bolted or welded. b) Secure to structural members: (1) As required by construction. (2) As approved by Structural Engineer. 2) Formed channels with fittings, similar to Superstrut: a) Submit manufacturer's calculations for installation. D. Duct Hangers and Supports: 1. General: a. Support horizontal ducts with hangers of size and spacing as indicated in pertinent SMACNA Duct Construction Standards. 2. Horizontal Duct Supports: a. Install hangers at each change in direction of duct. b. Strap hangers: 1) Extend strap down both sides of ducts. 2) Turn under bottom one inch minimum. 3) Metal screw hangers to : a) Bottom of duct. b) Upper and lower sides of ducts. c) Not more than 12 inches on center. c. Angle hangers: 1) Provide angle hangers formed by extended vertical bracing angles.</p> <p>2.11 ACCESS DOORS</p> <p>A. Provide equipment and concealed valve access, except in removable tile ceilings and approved by local code, with adequate size access doors for inspection and maintenance. Coordinate with the general contractor.</p> <p>2.12 INSULATION AND LINING</p> <p>A. Materials: 1. Insulation, jackets, facings, adhesives, coatings, and accessories shall have a fire hazard rating by Underwriters Laboratories, Inc. Clearer tunnel test method for fire hazard classification of building materials, standard UL 723, ASTM E84, NFPA 225. a. Flamespread: Maximum 25. b. Fuel contributed and smoke developed: Maximum 50. c. Flameproofing treatments subject to deterioration due to moisture or humidity not acceptable. 2. Insulation shall be Manville, or equal. 3. Label as required by code. B. All insulation applied according to manufacturer's published recommendations. C. Insulate all piping, ductwork and equipment, except as follows: 1. Vents, overflow, cold water, drain and relief piping slope to positive drain. D. Type of Insulation: 1. Duct insulation: Glass fiber with aluminum foil facing, Manville R-Series Microtite. (Minimum R6 for ductwork located in unconditioned space within the building, minimum R8 for all ductwork outside of the insulated envelope. Minimum "R" insulation for ductwork located within indirectly conditioned space. PROVIDE INSULATION AS REQUIRED TO OBTAIN R VALUES. In these R Values, in zones 5 through 8, increase to R12 instead of R8. 2. Duct lining: 1" THICK (15' from unit SA and RA) coated on air side with a fire resistant black neoprene coating). Manville Linacoating RC. 3. Duct outside: Insulate to minimum R8. Cover with 28 gauge aluminum jacket with seams sealed water tight. CONDITIONED SPACE DEFINED BY THE INTERNATIONAL ENERGY CONSERVATION CODE. An area, room or space that is enclosed within the building thermal envelope and is directly or indirectly heated or cooled. Spaces are indirectly heated or cooled where they communicate through openings with conditioned spaces, where they are separated from conditioned spaces by uninsulated walls, floor or ceilings, or where the contain uninsulated ducts, piping or other sources of heating or cooling.</p>	Pipe, IPS	Rod	To 2 in.	3/8"	2-1/2 and 3 in.	1/2"	4 in. to 12 in.	5/8"	Type of Pipe	Size	Max. Spacing	Steel or Brass	3/4" and smaller 1" and larger	10 ft. 12 ft.	Copper	1-1/2" and smaller 2 in. and larger	6 ft. 10 ft.	No hub CI (Notes 1,2,3,4,5)	All	Every other joint, unless over 4 feet, then support each joint.	<p>2.13 IDENTIFICATION</p> <p>A. An identification label shall be provided for all new mechanical equipment installed.</p> <p>PART 3 EXECUTION</p> <p>3.01 INSTALLATION OF THE WORK</p> <p>1. It is the responsibility of the Contractor to install the work in such a manner that it will be at the highest elevation possible, conform to the structure, avoid obstructions, maintain headroom, leave adequate clearances for light fixtures, return air pathways, maintenance and repairs, and provide clearance and access as required by codes. Nothing shall be installed below ceiling level without Architect's written consent. 2. Above items to be performed at no additional cost to the Owner. 3. Proceed as rapidly as the building construction will permit. 4. Thoroughly clean items before installation. Cap openings to exclude dirt until final connections have been made. 5. Cut materials accurately, work into place without springing or forcing, properly clear windows, doors and other openings. Excessive cutting or other weakening of the building structure will not be permitted. 6. Manufacturer's drawings and instructions shall be followed in all cases where the makers of devices and equipment furnish directions or details not shown on the drawings or described in the specifications. 7. Drawings are not intended to be scaled, but shall be followed with sufficient accuracy to coordinate with other work and structural limitations. 8. All work shall be properly supported from building structure and/or framing in an approved manner, independent of the ceiling support system. Where overhead construction does not permit direct fastening of supports, furnish additional framing. 9. All equipment shall be securely fastened to building construction with approved supports. 10. Refer to architectural drawings for exact location of diffusers, grilles, registers and thermostats (if depicted). If thermostats are not depicted specifically on Architect's drawings, obtain Architect's approval for locations prior to installation. 11. Coordinate the work of this section with the work of other sections in ample time for proper installation and connection. 12. Carefully check space requirements, including servicing space requirements, with other sections to ensure that all equipment and materials can be installed in the spaces allotted therefor. 13. Prepare drawings, attend meetings, obtain all approvals required by all authorities having jurisdiction, conduct required tests and obtain required permits.</p> <p>B. General: 1. Painting: a. Paint: 1) Best grade for its purpose. 2) Deliver in original sealed containers. 3) Apply in accordance with manufacturer's instructions. 4) Colors: As selected by Architect. b. Galvanized iron primer. c. Hot dipped galvanized or dipped in zinc chromate. d. Zinc chromate with finish to match surroundings. 2. Cleaning: a. Brush and clean work prior to concealing, painting and acceptance. b. Painted exposed work soiled or damaged: Clean and repair to match adjoining work before final acceptance. c. Remove debris from inside and outside of material and equipment. 3. Cutting and Patching: As required for new work.</p> <p>3.02 CONTROL DEVICES</p> <p>A. All control devices not specified to be furnished or installed under the Electrical sections shall be provided under this section. 1. Contractor shall provide and install duct mounted smoke detector in return duct of each unit of an air moving system that exceeds 2,000 cfm. Detector shall be wired to shut down all unit blowers in that zone upon detection of smoke. Contractor shall provide and install remote led indicator/test station mounted in ceiling directly below unit for each duct mounted smoke detector installed. Detector and indicator installed by mechanical, wired by electrical. Detector shall activate a visible and audible supervisory signal at a constantly supervised location. Coordinate with fire alarm contractor if applicable.</p> <p>3.03 TESTING AND BALANCING</p> <p>A. General: 1. Adjustment: Each piece of equipment and all of the systems shall be adjusted to insure proper functioning of all controls, and shall be left in operating condition. 2. Preliminary Operation: The Owner reserves the right to operate any systems or equipment prior to final completion and acceptance of the work. Such preliminary operation shall not be construed as an acceptance of any work. B. Air Distribution Systems: 1. Balance and adjust air distribution system to quantities indicated on drawings in accordance with Associated Air Balance Council (AABC) manual, latest edition, or National Environmental Balancing Bureau (NEBB) manual, latest edition. 2. Balancing and testing shall be performed and supervised by a certified independent firm specializing in testing and balancing. Firm shall be a member of AABC. Test reports shall be submitted in bound folders and on AABC type report forms. All diffusers shall be identified by designations on drawings. 3. Submit final test and balance report to the inspector prior to issuance of the certificate of occupancy. Smoke detectors associated with smoke dampers and HVAC shutoffs shall be tested by an approved testing agency or a qualified third party special inspector. The special inspector/testing agency shall be an independent third party individual or firm and shall not be the installing contractor. A professional engineer must submit a final signed and sealed report to the mechanical inspector prior to city issuance of final inspection approval or occupied approval, including conditional occupancy approval. 3. Diffuser air delivery shall not be less than nor exceed by more than 10% the air delivery indicated on the plans. 4. Upon completion of the installation, Contractor shall rebalance any air distribution system affected by the renovation, including terminal air units and air outlets. C. HVAC Hydronic Systems (Mechanical contractor is responsible for pressure testing and repair): 1. Less than 100 psi operating pressure: a. Test hydrostatically to 150 psi. 2. Over 100 psi operating pressure: a. Test hydrostatically to 1-1/2 times operating pressure. b. Never exceed test pressure ANSI B16.1 basis. n 3. Duration: 2 hours: a. With system valves capped and pressure apparatus disconnected: b. Pressure change: none. c. Compensate for temperature change. 4. Leaks and defects: a. Repair or replace as directed. b. Without additional cost. 5. Notify the Architect in writing one week before test. 6. Furnish written report and certification that tests have been satisfactorily completed. D. Refrigerant systems Test and Evacuation (Mechanical contractor is responsible for testing and repair): 1. Test piping using dry and oil free nitrogen to 300 psi on high side, 150 psi on low side. Maintain pressure for 2 hours with no leakage. 2. Evacuate using high vacuum pump and certified micron gage. Reduce absolute pressure to 300 microns. Charge system with proper refrigerant until pressure of 0 psi is obtained. Repeat procedure two more times. On fan evacuation keep at 300 microns for 2 hours before final charge. 3. Never exceed test pressure ANSI B16.1 basis. Leaks and defects: 1) Repair or replace as directed. 2) Without additional cost.</p> <p>3.04 PROJECT CLOSE-OUT</p> <p>A. After final operation for inspection and acceptance, deliver all copies of operation instructions, maintenance manuals and parts descriptions to the Architect. B. All tools supplied with the equipment for maintenance shall be tagged and temporarily secured to the unit, or turned over to the Owner. END OF SECTION</p> <p>AME PROJECT No. 22-103 RUSSELL GULCH LANDFILL OFFICES / SCALES</p>	<p>REVISION</p> <p>DATE</p> <p>ASSOCIATED MECHANICAL ENGINEERS, PLLC 1121 W. Warner Road, Suite 107 Tempe, AZ 85284 480-966-3964 Fax 480-966-3964 Fax</p> <p>AME PROJECT #22-103 RUSSELL GULCH LANDFILL OFFICES / SCALES MECHANICAL / PLUMBING</p> <p>PROJECT NUMBER: 22-103</p> <p>DATE: 10/25/2022</p> <p>DESIGNED BY: JHOCKING</p> <p>DRAWN BY: JHOCKING</p> <p>CHECKED BY: JROELFS</p> <p>RUSSELL GULCH LANDFILL OFFICES / SCALES 5891 Hope Ln., Globe, AZ 85501</p> <p>100% PERMIT SET</p> <p>SHEET TITLE: MECHANICAL SPECIFICATIONS</p> <p>SHEET NUMBER: M4</p>
Pipe, IPS	Rod																							
To 2 in.	3/8"																							
2-1/2 and 3 in.	1/2"																							
4 in. to 12 in.	5/8"																							
Type of Pipe	Size	Max. Spacing																						
Steel or Brass	3/4" and smaller 1" and larger	10 ft. 12 ft.																						
Copper	1-1/2" and smaller 2 in. and larger	6 ft. 10 ft.																						
No hub CI (Notes 1,2,3,4,5)	All	Every other joint, unless over 4 feet, then support each joint.																						