



PHARR POLICE STATION HVAC REPLACEMENTS
1900 S CAGE BLVD, PHARR, TX 78577

PROJECT CONTACTS:

RO ENGINEERING 956-292-3336
CITY OF PHARR 956-402-4000
CITY OF PHARR ENGINEERING 956-402-4221

CITY COMMISSION

DR. AMBROSIO "AMOS" HERNANDEZ.....	MAYOR
ELEAZAR GUAJARDO.....	COMMISSIONER PLACE 1
ROBERTO "BOBBY" CARRILLO.....	COMMISSIONER PLACE 2
RAMIRO CABALLERO.....	COMMISSIONER PLACE 3
DANIEL CHAVEZ.....	COMMISSIONER PLACE 4
RICARDO MEDINA.....	COMMISSIONER PLACE 5
MARIO A. BRACAMONTES.....	COMMISSIONER PLACE 6

CONSTRUCTION NOTES:

1. CONTRACTOR SHALL OBTAIN ELECTRICAL PERMITS PRIOR TO CONSTRUCTION.
2. THE CONTRACTOR SHALL CALL 1-800-DIGTESS PRIOR TO ANY EXCAVATION OR DIGGING.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND IDENTIFYING ALL UNDERGROUND UTILITIES PRIOR TO STARTING ANY WORK.
4. ALL ELECTRICAL WIRING AND CONDUIT SHALL BE CONCEALED AS TO PREVENT VANDALISM.
5. THE CONTRACTOR SHALL BRING TO THE ATTENTION OF THE ENGINEER ANY CONFLICT AT THE JOB SITE PRIOR TO CONSTRUCTION.

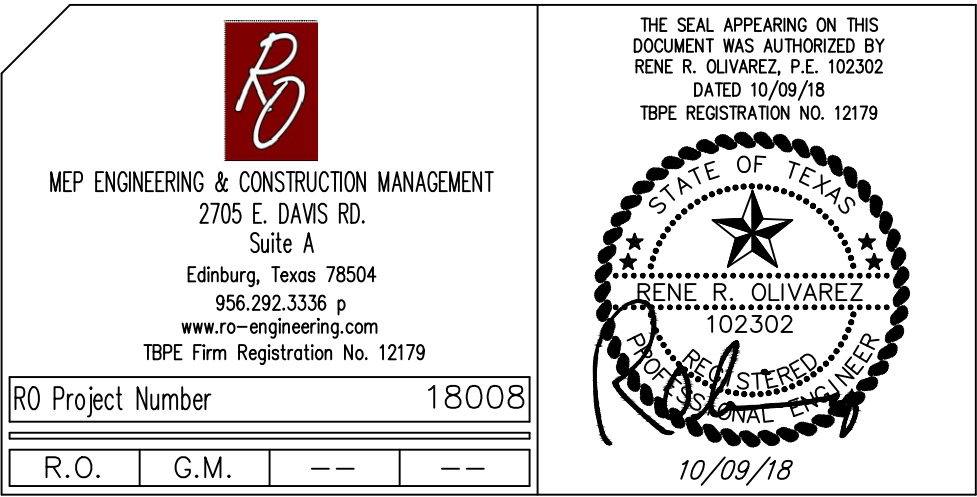
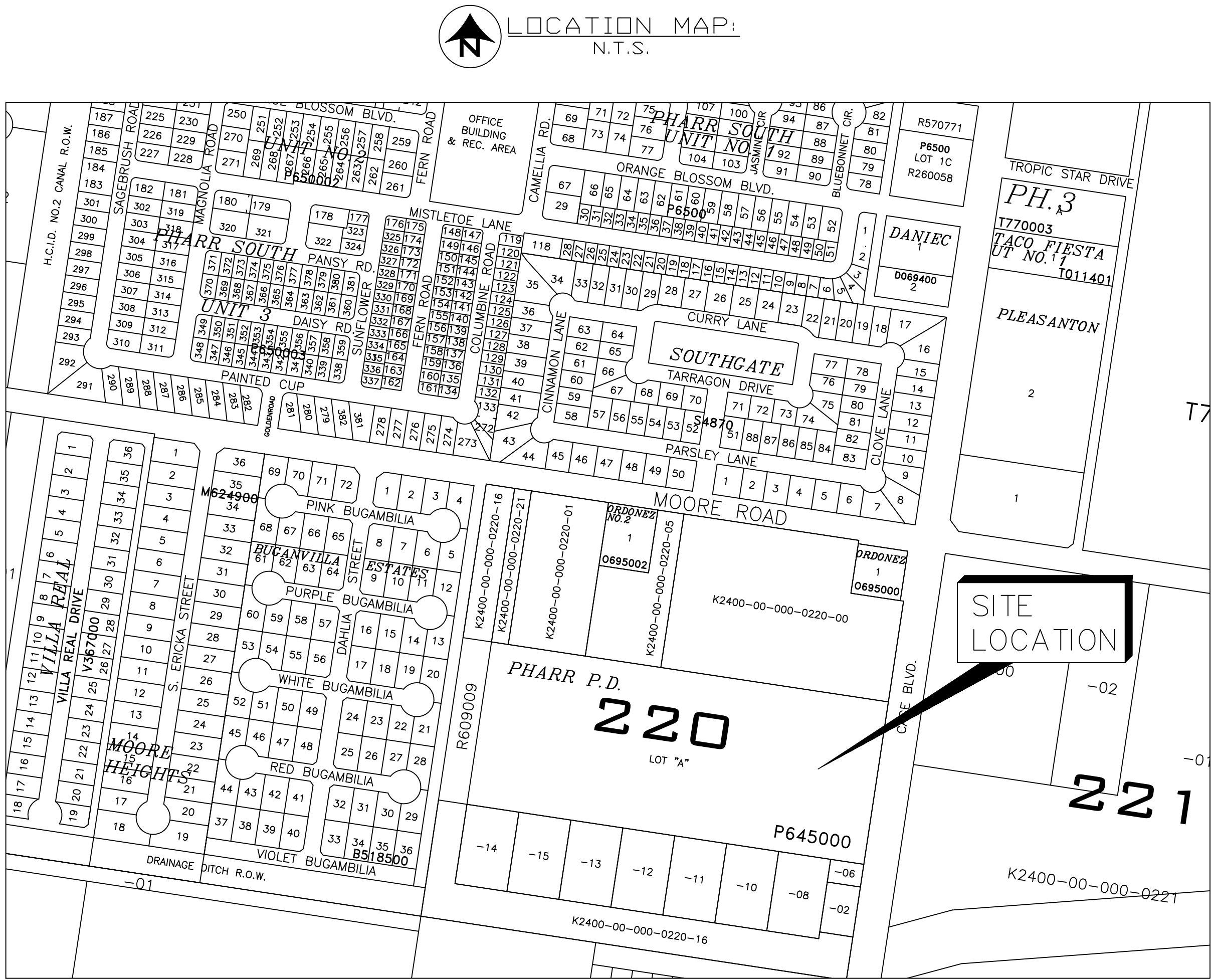
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GENERAL NOTES:

1. CAUTION: GAS, FIBER OPTIC, TELEPHONE, ELECTRIC, AND CITY OF PHARR UTILITIES EXIST WITHIN THE LIMITS OF CONSTRUCTION OF THIS PROJECT. NOTIFY RESPECTIVE UTILITY COMPANIES. ANY DRAINAGE TO PUBLIC OR PRIVATE LINES SHALL BE REPAIRED IN ACCORDANCE WITH THE RESPECTIVE UTILITY COMPANY REQUIREMENTS. COST FOR SUCH REPAIRS SHALL BE SUBSIDIARY TO OTHER BID ITEMS OF THE PROJECT PROPOSAL.
2. THERE SHALL BE MINIMUM INTERRUPTION OF TRAFFIC AND ACCESS TO ADJACENT RESIDENTS ALONG THE PROJECT SITE. IF ROADS ARE TO BE CLOSED, THE CITY OF EDINBURG FIRE AND POLICE DEPARTMENTS SHALL BE NOTIFIED AT LEAST 48 HOURS BEFORE SUCH CLOSING.
3. CONTRACTOR TO FIELD VERIFY ALL SITE DIMENSIONS PRIOR TO COMMENCING IMPROVEMENTS.
4. CONTRACTOR TO INSTALL AS PER MANUFACTURER RECOMMENDATIONS.
5. CONTRACTOR SHALL COORDINATE POWER OUTAGES WITH CITY OFFICIALS AND POWER COMPANY.



DUCT SYMBOLS

DOUBLE LINE SYMBOL	DESCRIPTION	SINGLE LINE SYMBOL
	DUCT- FIRST NUMBER IS VISIBLE DIMENSION.	
	MITERED ELBOW W/TURNING VANES	
	RADIUS ELBOW W/VANE(S) (1.5=R/D STANDARD)	
	DUCT SECTION, POSITIVE PRESSURE	
	DUCT SECTION, NEGATIVE PRESSURE	
	DUCT & AIRFLOW UP(LEFT) POSITIVE PRESSURE	
	DUCT & AIRFLOW DN(RIGHT) POSITIVE PRESSURE	
	DUCT & AIRFLOW UP(LEFT) NEGATIVE PRESSURE	
	DUCT & AIRFLOW DN(RIGHT) NEGATIVE PRESSURE	
	DUCT & AIRFLOW UP(LEFT) NEG./POS. PRESSURE	
	DUCT & AIRFLOW DN(RIGHT) NEG./POS. PRESSURE	
	CHANGE OF ELEVATION=RISE (R), DROP (D)	
	DUCT W/INTERNAL LINING	
	CLEAR INTERIOR DIMENSIONS SHOWN	
	ACCESS DOOR-SIDE (L), BOTTOM (M), TOP (R)	
	FLEXIBLE CONNECTOR	
	FLEXIBLE DUCT	
	FD- FIRE DAMPER, SD- SMOKE DAMPER, FSD- FIRE/SMOKE DAMPER.	
	MANUAL VOLUME DAMPER-SPECIFIC TYPE, NO LABEL-BUTTERFLY, OBD-OPPOSED BLADED DAMPER, PBD-PARALLEL BLADE DAMPER	
	MOTORIZED DAMPER OR ZONE CONTROL DAMPER	
	BRANCH TAP-W/45 DEG. ENTRY	
	BRANCH TAP-CONICAL SPIN-IN	
	BRANCH TAP-STRAIGHT SPIN-IN	
	TRANSITION	
	EXISTING DUCTWORK TO BE DEMOLISHED	
	EXISTING DUCTWORK TO REMAIN	
	HVAC - EQUIP AS NOTED	
	AIR DEVICE, SUPPLY- CEILING. CLEAR	
	AIR DEVICE TAG SPIN-IN DIMENSION AIRFLOW (CFM)	
	AIR DEVICE, RETURN- CEILING.	
	AIR DEVICE, EXHAUST- CEILING.	
	AIR DEVICE, SUPPLY- SIDEWALL.	
	AIR DEVICE, RETURN/EXHAUST- SIDEWALL.	

ABBREVIATIONS

A	ABV	ABOVE
	AC	ALTERNATING CURRENT / ABOVE CEILING
	ACMPR	AIR COMPRESSOR
	ACU	AIR CONDITIONING UNIT
	AF	ABOVE FINISHED FLOOR
	AFMS	AIR FLOW MEASURING STATION
	AHU	AIR HANDLING UNIT
	AMB	AMBIENT
	AMP	AMPERE
	ANSI	"AMERICAN NATIONAL STANDARDS INSTITUTE"
	APPROX.	APPROXIMATE
	ARI	AMERICAN REFRIGERATION INSTITUTE
	ASHRAE	"AMERICAN SOCIETY OF HEATING, REFRIGERATION, and AIR CONDITIONING ENGINEERS"
	ASME	"AMERICAN SOCIETY OF MECHANICAL ENGINEERS"
	ASTM	"AMERICAN SOCIETY OF PLUMBING ENGINEERS"
	AVG	"AMERICAN SOCIETY FOR TESTING AND MATERIALS"
	AWWA	AVERAGE
		"AMERICAN WATER WORKS ASSOCIATION"
B	BARO	BOILER
	BAROPR	BAROMETRIC
	BF	BAROMETRIC PRESSURE
	BFC	BELOW FLOOR
	BG	BELOW FINISHED CEILING
	BHP	BELOW GRADE
	BOD	BRAKE HORSEPOWER
	BOM	BOTTOM OF DUCT
	BOP	BILL OF MATERIAL
	BTU	BOTTOM OF PIPE
		BRITISH THERMAL UNIT
C	CCL	COOLING COIL
	CCW	COUNTERCLOCKWISE
	CD	CONDENSATE DRAIN
	CFH	CUBIC FEET PER HOUR
	CFM	CUBIC FEET PER MINUTE
	CH	CHILLER
	CHP	CHILLER WATER PUMP
	CHR	CHILLED WATER RETURN
	CHS	CHILLED WATER SUPPLY
	CLR	CLOSED CIRCUIT COOLER
	CMPR	COMPRESSOR
	CR	CONDENSATE RETURN
	CRU	COMPUTER ROOM UNIT
	CT	COOLING TOWER
	CU	CONDENSING UNIT
	CU.FT.	CUBIC FEET
	CU.IN.	CUBIC INCH
	CV	CONSTANT VOLUME
	CXD	CARBON DIOXIDE SENSOR
	CWP	CONDENSER WATER PUMP
	CWR	CONDENSER WATER RETURN
	CWS	CONDENSER WATER SUPPLY
D	dB	DECIBEL
	DBT	DRY BULB TEMPERATURE
	DC	DIRECT CURRENT
	DDC	DIRECT DIGITAL CONTROL
	DEG	DEGREE
	DENS	DENSITY
	DIA.	DIAMETER
	DIFF	DIFFERENCE or DELTA
	DN	DOWN
	DP	DEEP
	DPT	DEW POINT TEMPERATURE
E	E/A	EXHAUST AIR
	EA	EACH
	EAT	ENTERING AIR TEMPERATURE
	EDH	ELECTRIC DUCT HEATER
	EF	EXHAUST FAN
	EFF	EFFICIENCY
	ENTH.	ENTHALPY
	EOD	EMERGENCY OVERFLOW DRAIN
	ET	EXPANSION TANK
	EVP	EVAPORATIVE COOLER
	EWT	ENTERING WATER TEMPERATURE
	EXP	EXPANSION
F	F	FAHRENHEIT
	FCU	FAN COIL UNIT
	FLR.	FLOOR
	FOB	FLAT ON BOTTOM
	FOT	FLAT ON TOP
	FFM	FEET PER MINUTE
	FPS	FEET PER SECOND
	FTU	FAN POWERED TERMINAL UNIT
	FRN	FURNACE
	FT	FEEET OF WATER GAGE
	FT.W.G.	FACE VELOCITY
	FVEL	
G	GAL.	GALLONS
	GPH	GALLONS PER HOUR
	GPM	GALLONS PER MINUTE
	GR	GRAINS
H	HCL	HEATING COIL
	HD	HOOD
	HGT	HEIGHT
	HP	HORSEPOWER
	HPS	HIGH PRESSURE STEAM
	HR	HOUR
	HUM	HUMIDIFIER
	HWP	HOT WATER PUMP
	HWR	HOT WATER RETURN
	HWS	HOT WATER SUPPLY
	HZ	HERTZ
I	ID	INSIDE DIAMETER
	IH	INTAKE HOOD
	IN.	INCH
	IN.W.G.	INCHES OF WATER GAGE
	IRH	INFRARED HEATER
J		

ABBREVIATIONS

K	KHE	KITCHEN HOOD EXHAUST
	kW	KILOWATTS
	kwh	KILOWATT HOUR
L	L-#	LOUVER DESIGNATION
	LAT	LEAVING AIR TEMPERATURE
	LBS.	POUNDS
	LIQ	LIQUID
	LPS	LOW PRESSURE STEAM
	LWT	LEAVING WATER TEMPERATURE
M	MAKEUP AIR	
	MA	MAXIMUM
	MAX.	THOUSAND BTU/HR.
	MBH	MINIMUM CIRCUIT AMPACITY
	MCA	THOUSAND CUBIC FEET
	MCF	MINIMUM or MINUTES
	MIN.	MAXIMUM OVERCURRENT PROTECTION
	MOC	MEDIUM PRESSURE STEAM
	MPS	"MANUFACTURERS' STANDARDIZATION SOCIETY of the Valves and Fittings Industry, Inc."
	MSS	
N	N/A	NOT APPLICABLE
	NC	NOISE CRITERIA
	N.C.	NORMALLY CLOSED
	NEBB	NATIONAL ENVIRONMENTAL BALANCING BUREAU
	N.I.C.	NOT IN CONTRACT
	N.O.	NORMALLY OPEN
	N.T.S.	NOT TO SCALE
O	O/A	OUTSIDE AIR
	OD	OUTSIDE DIAMETER
	OSHA	OCCUPATIONAL SAFETY and HEALTH ADMINISTRATION
	OZ	OUNCE
P	PD	PRESSURE DIFFERENCE
	PH	PHASE
	PPM	PART PER MILLION
	PPH	PRIMARY PRESSURE
	PPRESS.	PRESSURE
	PSI	POUNDS PER SQUARE INCH
	PSIA	"PSI, ABSOLUTE"
	PSIG	"PSI, GAGE"
Q		
R	R	THERMAL RESISTANCE
	R-22	REFRIGERANT-22
	R/A	RETURN AIR
	RCVR	RECEIVER
	RD	ROOF DRAIN
	RE: 1/M-xx	"REFER TO DETAIL NO.1, SHEET M-xx"
	RECIRC.	RECIRCULATE
	RF	RETURN FAN
	REL	RELIEF HOOD
	RLN	REFRIGERANT LIQUID
	RPM	REVOLUTIONS PER MINUTE
	RPS	REVOLUTIONS PER SECOND
	RS	REFRIGERANT SUCTION
	RTU	ROOFTOP UNIT
	RV	RELIEF VENT
S	S	SECOND
	s	SOUND ATTENUATOR
	S/A	SUPPLY AIR
	SAT	SATURATION
	SD	SMOKE DETECTOR
	SF	SUPPLY FAN
	SG	SPECIFIC GRAVITY
	SMACNA	"SHEET METAL and AIR CONDITIONING" "CONTRACTORS' NATIONAL ASSOCIATION"
	SP	STATIC PRESSURE
	SPEC.	SPECIFICATION
	SQ.FT.	SQUARE FEET
	SUCT.	SUCTION
T	T	TEMPERATURE DIFFERENCE
	TEMP	TEMPERATURE
	TONS	TONS OF REFRIGERATION
	TSTAT	THERMOSTAT
	TU	TERMINAL UNIT
U	U	HEAT TRANSFER COEFFICIENT
	U/C	UNDER COUNTER
	UG	UNDERGROUND
	UH	UNIT HEATER
	U.N.O.	UNLESS NOTED OTHERWISE
	UV	UNIT VENTILATOR
V	V	VOLTS
	VA	VOLT AMPERE
	VAC	VACUUM
	VAR	VARIABLE
	VAV	VARIABLE AIR VOLUME
	VEL	VELOCITY
	VENT.	VENTILATION
	VERT.	VERTICAL
	VFD	VARIABLE FREQUENCY DRIVE
	VOL.	VOLUME
	VP	VELOCITY PRESSURE
	VTR	VENT THRU ROOF
W	W	WITH
	W/O	WITHOUT
	W	WATTS
	WB	WET BULB
	WBT	WET BULB TEMPERATURE
	WT	WEIGHT
X		
Y	YCO	YARD CLEANOUT
	YD	YARD
	YR	YEAR
Z	ZN	ZONE

GENERAL MECHANICAL NOTES AND SPECIFICATIONS:

GENERAL

- COORDINATE WORK AMONG ALL DISCIPLINES. IT IS NOT THE INTENT OF THESE DOCUMENTS TO DICTATE WHO MUST DO THE WORK. ALL WORK SHOWN IS THE RESPONSIBILITY OF THE (PRIME) CONTRACTOR.
- FIELD VERIFY ALL CONDITIONS AND MEASURE DIMENSIONS WITHIN THE BUILDING PRIOR TO ORDERING EQUIPMENT AND/OR PROCEEDING WITH INSTALLATION.
- ALL EQUIPMENT SHALL BE FACTORY TESTED, AND CONTRACTOR SHALL VERIFY THEIR CONDITION PRIOR TO INSTALLATION. CONTRACTOR IS RESPONSIBLE FOR EQUIPMENT DAMAGED DURING MOVING AND INSTALLATION.
- EQUIPMENT FOUND DEFECTIVE PRIOR TO FINAL ACCEPTANCE SHALL BE REPLACED AT NO COST TO OWNER.
- SUBMISSION OF BID PROPOSAL IS CONSIDERED AN ACKNOWLEDGEMENT THAT CONTRACTOR VISITED SITE, AND VERIFIED ALL EXISTING CONDITIONS, AND INCLUDED ANY MODIFICATIONS TO EXISTING AND NEW WORK REQUIRED FOR INSTALLATION OF A COMPLETE AND OPERATIONAL MECHANICAL SYSTEM.
- COORDINATE WITH OWNER AND ENGINEER FOR ANY DISRUPTION IN UTILITY SERVICES, PARTICULARLY THOSE THAT MIGHT AFFECT OTHER BUILDINGS IN THE CAMPUS.
- CONTRACTOR SHALL NOT PROCEED WITH ANY WORK INVOLVING A CHANGE IN PROJECT SCOPE OR COST WITHOUT FIRST HAVING OBTAINED ENGINEER'S APPROVAL IN WRITING. UNLESS ENGINEER HAS AGREED TO SUCH CHANGE PRIOR TO IT BEING DONE, AND HAS AGREED THAT AN INCREASE IN COST ASSOCIATED WITH SUCH CHANGE IS WARRANTED; CONTRACTOR WILL NOT BE REIMBURSED FOR SUCH CHANGE.
- TESTING, ADJUSTING AND BALANCING (TAB) CONTRACTOR SHALL BE RETAINED BY THE PRIME CONTRACTOR. TAB SHALL NOT BE A PART OF THE MECHANICAL CONTRACT.

CODES AND ORDINANCES

- PERFORM ALL WORK PER LATEST VERSION OF INTERNATIONAL MECHANICAL CODE, AND APPLICABLE LOCAL CODES AND ORDINANCES, UNLESS DRAWINGS OR SPECIFICATIONS HAVE MORE STRINGENT REQUIREMENTS.
- CONTRACTOR IS RESPONSIBLE FOR ALL PERMITS AND FEES ASSOCIATED WITH PROJECT, INCLUDING FEES FOR INSPECTIONS, APPLICATIONS, AND PROVISION OF NEW SERVICES.
- NOTIFY ENGINEER OF ANY ASPECTS OF DESIGN WHICH ARE THOUGHT TO BE IN NONCOMPLIANCE WITH APPLICABLE CODES.

COORDINATION

- REFER TO ARCHITECTURAL AND STRUCTURAL PLANS FOR DETAILS OF CONSTRUCTION, INCLUDING BEAMS, FLOOR AND WALL PENETRATIONS, CHASES, AND REFLECTED CEILING PLANS. VERIFY OPENING SIZES WITH EQUIPMENT FURNISHED.
- COORDINATE ALL WORK WITH OTHER TRADES; COORDINATE SCHEDULE OF WORK WITH ALL SUB-CONTRACTORS TO ACHIEVE SMOOTH FLOW OF CONSTRUCTION.
- CONTRACTOR SHALL REVIEW COMPLETE DOCUMENTS PRIOR TO SUBMITTAL OF PROPOSAL TO GAIN COMPLETE UNDERSTANDING OF PROJECT SCOPE, WORK BY OTHERS, AND MECHANICAL WORK ASSOCIATED WITH OTHER DISCIPLINES.
- ENGINEER/ ARCHITECT MUST BE GIVEN AT LEAST A TEN (10) WORKING DAY NOTICE TO PERFORM ALL TYPES OF INSPECTIONS. COORDINATE WORK SCHEDULE WITH ARCHITECT AND ENGINEER TO PLAN ACCORDINGLY FOR APPROPRIATE INSPECTIONS.

ECONOMIZER.

- FOR SYSTEMS THAT REQUIRE ECONOMIZER, MECHANICAL CONTRACTOR SHALL PROVIDE A CONTROLLER EQUAL TO HONEYWELL JADE ECONOMIZER MODULE W7220 ONLY IF IT'S NOT INCLUDED IN MECHANICAL CONTROLS. REFER TO ECONOMIZER DETAIL FOR ADDITIONAL INFORMATION.

METAL AND FLEXIBLE DUCTS

- DRAWINGS ARE DIAGRAMMATIC IN NATURE. FOR CLARITY SAKE, MOST DUCT OFFSETS/RISES/DROPS ARE NOT SHOWN. RECTANGULAR AND ROUND DUCTWORK SHALL BE GALVANIZED STEEL. SIZES SHOWN ARE INSIDE CLEAR DIMENSION.
- VERIFY BOTTOM OF DUCT ELEVATION AND COORDINATE WITH OTHER TRADES.
- CONSTRUCT AND LEAKAGE TEST ALL DUCTWORK BASED ON SMACNA REQUIREMENTS. COORDINATE PRESSURE CLASSES WITH EQUIPMENT SCHEDULES.
- ALL GALVANIZED SHEET METAL DUCT WORK SHALL COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS--METAL AND FLEXIBLE".
- USE 2" GLASS FIBER-REINFORCED FABRIC JOINT AND SEAM TAPE. USE WATER BASED JOINT AND SEAM SEALER. USE FIRE RESISTANT SEALER FOR FILLING OPENINGS AROUND DUCT PENETRATIONS THROUGH WALLS. ACCEPTABLE PRODUCTS ARE DOW CORNING, FIRE STOP FOAM AND FIRE STOP SEALER OR EQUAL.
- USE SHEET METAL SCREWS OR BLIND RIVETS COMPATIBLE WITH DUCT MATERIALS WHEN SECURING ALL DUCTWORK TO STRUCTURE.
- FLEXIBLE DUCT MAY BE USED TO CONNECT TO SUPPLY DIFFUSERS. MAXIMUM LENGTH OF FLEXIBLE DUCT LIMITED TO 6 FEET. PROVIDE FLEXMASTER TYPE BM UL 181 CLASS I AIR DUCT OR EQUAL. FLEXIBLE DUCT SHALL HAVE MIN. R-8 INSULATING VALUE.
- FLEXIBLE DUCT CLAMP SHALL BE OF STAINLESS STEEL BANDS WITH CADMIUM PLATED HEX SCREW TO TIGHTEN BAND WITH WORM GEAR ACTION.
- PROVIDE TURNING VANES IN ALL SPLITS, TEES AND SWEPT 90 DEGREE ANGLE DUCT FITTINGS. MANUFACTURER'S TURNING VANES TO BE 1-1/2" WIDE; DOUBLE VANE, CURVED BLADES OF GALVANIZED SHEET STEEL SET 1/4" O.C. ACCEPTABLE MANUFACTURER'S ARE DUCTMATE INDUSTRIES, METALWARE, WARD INDUSTRIES OR EQUAL.
- WHERE RECTANGULAR TEE FITTINGS ARE SHOWN, PROVIDE FITTING WITH ADJUSTABLE DIVIDER SHEET AND TURNING VANES.
- WHERE RECTANGULAR MAIN AND BRANCH CONNECTIONS ARE SHOWN, PROVIDE EXTRACTOR VANES.
- PROVIDE MANUAL VOLUME CONTROL DAMPERS WHERE SHOWN ON DRAWINGS. DAMPERS TO HAVE NEOPRENE BLADE SEALS AND GALVANIZED STEEL FRAMES, TIE BARS, DAMPER AND BRACKETS. ACCEPTABLE MANUFACTURER'S ARE RUSKIN CO., NAILOR INDUSTRIES, FLEXMASTER OR EQUAL.
- ABOVE INACCESSIBLE CEILINGS AND WHERE DUCT CONFIGURATION DOES NOT ALLOW FOR INSTALLATION OF DAMPER IN DUCTWORK OR DIFFUSER, PROVIDE REMOTE MANUAL DAMPER BY YOUNG REGULATOR, (BOWDEN CABLE CONTROL SYSTEM). CONTRACTOR MAY PROVIDE OPPOSED BLADE DAMPER THAT IS INTEGRAL TO GRID WITH ENGINEER'S APPROVAL.

INSULATION

- DUCT WRAP INSULATION SHALL BE MINERAL FIBER INSULATION. ALL SERVICE JACKETING MANUFACTURED FROM KRAFT PAPER, REINFORCING SCIRM, ALUMINUM FOIL AND VINYL FILM. ACCEPTABLE MANUFACTURER'S ARE CERTAINTED, KNAUF OR OWENS-CORNING. INSTALL DUCT WRAP INSULATION PER MANUFACTURER'S INSTRUCTIONS.

INTERIOR DUCTWORK TO BE INSULATED WITH DUCT WRAP INSULATION. ALL SUPPLY DUCTS TO HAVE 3" MIN. THICKNESS (R-8) INSULATION AND ALL RETURN AND OUTSIDE AIR DUCTS TO HAVE 2" MIN. INSULATION.

GENERAL ELECTRICAL NOTES AND SPECIFICATIONS:

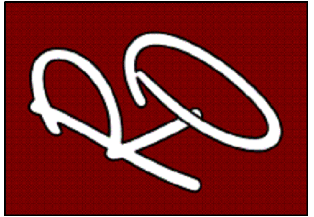
- CONDUCTOR SIZES INDICATED ASSUME NO MORE THAN (3) SINGLE POLE BRANCH CIRCUITS IN EACH CONDUIT. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DE-RATE CONDUCTORS PER NEC TABLE 310.15(B)(2)(a) FOR CONDUITS WITH MORE THAN (3) CURRENT "CARRYING CONDUCTORS". THE NEUTRAL CONDUCTOR SHALL BE CONSIDERED "CURRENT CARRYING" FOR ALL BRANCH CIRCUITS SERVING MORE THAN (4) COMPUTERS.
- ALL EQUIPMENT SHALL HAVE A LOCAL DISCONNECTING MEANS, EITHER CORDED PLUG AND RECEPTACLE OR SWITCHED DISCONNECT. VERIFY FROM EQUIPMENT SUBMITTED OR RELOCATED IF DIRECT CONNECT OR RECEPTACLE. IF DIRECT CONNECT, PROVIDE SWITCH AS PER NEC OTHERWISE, PROVIDE RECEPTACLE, CORD PLUG AS REQUIRED BY EQUIPMENT SUBMITTAL.
- FIRESTOP ALL CONDUIT PENETRATIONS IN RATED WALLS. SEE ARCHITECTURAL FOR WALL RATINGS. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO SHEET ROCK AND REPAIR.
- PROVIDE FIRE RATED SLEEVES IN ALL FLOOR PENETRATIONS.
- PROVIDE A DUCT-MOUNTED SMOKE DETECTOR ON THE RETURN SIDE OF ALL RTU'S, AHU'S, AND FCU'S RATED AT 2000 CFM SUPPLY AND OVER. PROVIDE A DUCT-MOUNTED SMOKE DETECTOR ON THE RETURN AND SUPPLY SIDE OF ALL MECHANICAL EQUIPMENT RATED AT 10,000 CFM AND OVER. CONNECT FOR AUTOMATIC SHUTDOWN OF UNIT AND ALARM TO FACP (WHERE APPLICABLE). REFER TO MECHANICAL EQUIPMENT SCHEDULES FOR CFM RATINGS.
- REFER TO MECHANICAL EQUIPMENT ELECTRICAL CONNECTION SCHEDULE FOR CIRCUITING, SIZE OF CONDUCTORS, DISCONNECTS AND ALL CONNECTION REQUIREMENTS.
- COORDINATE EQUIPMENT LOCATION WITH MECHANICAL PLAN.
- PROVIDE DISCONNECTS (FUSED AND NON-FUSED) FULL RATING OF EQUIPMENT PROTECTED. COORDINATE SIZES WITH EQUIPMENT SUBMITTED. PROVIDE FUSED DISCONNECTS FOR ALL MULTIPLE PIECES OF EQUIPMENT ON THE SAME CIRCUIT. DISCONNECTS AND FUSES SHALL BE EQUAL TO OR GREATER THAN THE FEEDER/BREAKER SIZE. SIZE LOAD SIDE OF DISCONNECTS FOR EQUIPMENT AS LISTED.
- MOUNT DISCONNECTS ON UNISTRUT SUPPORTS. PROVIDE UNISTRUT RACKS FOR DISCONNECTS ON ROOF AS DETAILED. DISCONNECTS LOCATED ABOVE CEILING SHALL BE SUPPORTED FROM STRUCTURE.
- PROVIDE A WEATHERPROOF, GFCI RECEPTACLE ON UNISTRUT RACKS FOR ROOF MOUNTED EQUIPMENT SO THAT EACH UNIT IS NO MORE THAN 25' FROM MECHANICAL EQUIPMENT. CIRCUIT ROOF MOUNTED RECEPTACLES FROM A 20A/1P SPARE CIRCUIT BREAKER IN THE NEAREST 120/208V PANEL BELOW. CIRCUIT NO MORE THAN (5) RECEPTACLES PER 20A CIRCUIT.
- ON CIRCUITS GREATER THAN 20A, FEEDING MULTIPLE PIECES OF EQUIPMENT, PROVIDE FUSED DISCONNECTS (SIZED FOR EQUIPMENT PROTECTING). PROVIDE FULL SIZED FEEDERS FROM BRANCH CIRCUIT BREAKER TO EQUIPMENT DISCONNECT WITH CONDUCTORS QUANTITIES AS INDICATED ON MECHANICAL EQUIPMENT ELECTRICAL SCHEDULE.
- PENETRATE ROOFS AS PER ROOFING GUIDELINES AND GANG CONDUIT TOGETHER. SUPPORT ROOFTOP CONDUIT WITH NEOPRENE BLOCKS WITH INTEGRAL UNISTRUT. SECURE CONDUIT TO BLOCKS ON ROOF.
- PROVIDE SEALTITE WITH WP FITTINGS TO MECHANICAL EQUIPMENT, MAX DISTANCE 48". DO NOT USE CONDUITS.
- PROVIDE NEMA 3R DISCONNECTS FOR ALL EXTERIOR LOCATIONS AND NEMA 1 DISCONNECTS FOR ALL INTERIOR, DRY LOCATIONS.
- POWER AND DATA REQUIREMENTS FOR HVAC CONTROLLERS ARE SHOWN ON B.A.S. SHEETS.
- ALL EQUIPMENT CONNECTION POINTS ARE DIAGRAMMATIC IN NATURE. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH EQUIPMENT INSTALLER FOR EXACT POINT OF CONNECTION. EXTEND FEEDERS IN CONDUIT AS REQUIRED.

ELECTRICAL DEMOLITION NOTES: (APPLIES TO ALL DEMOLITION SHEETS)

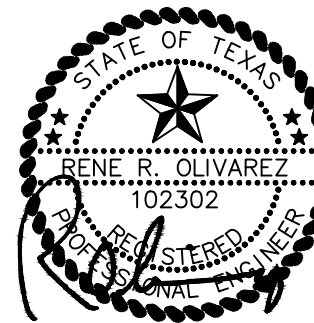
- GENERAL: EXCEPT FOR ITEMS OR MATERIALS INDICATED TO BE REUSED, SALVAGED, REINSTALLED, OR OTHERWISE INDICATED TO REMAIN OWNER'S PROPERTY, REMOVE DEMOLISHED MATERIALS FROM PROJECT SITE AND LEGALLY DISPOSE OF THEM IN AN EPA-APPROVED LANDFILL. DO NOT ALLOW DEMOLISHED MATERIALS TO ACCUMULATE ON-SITE REMOVE FROM OWNER OCCUPIED AREAS DAILY. REMOVE AND TRANSPORT DEBRIS IN A MANNER THAT WILL PREVENT SPILLAGE ON ADJACENT SURFACES AND AREAS.
- REMOVED AND REINSTALLED ITEMS: CLEAN AND REPAIR ITEMS TO FUNCTIONAL CONDITION ADEQUATE FOR INTENDED REUSE. PAINT EQUIPMENT TO MATCH NEW EQUIPMENT. PACK OR CRATE ITEMS AFTER CLEANING AND REPAIRING. IDENTIFY CONTENTS OF CONTAINERS. PROTECT ITEMS FROM DAMAGE DURING TRANSPORT AND STORAGE. REINSTALL ITEMS IN LOCATIONS INDICATED. COMPLY WITH INSTALLATION REQUIREMENTS FOR NEW MATERIALS AND EQUIPMENT. PROVIDE CONNECTIONS, SUPPORTS, AND MISCELLANEOUS MATERIALS NECESSARY TO MAKE ITEM FUNCTIONAL FOR USE INDICATED.
- EXISTING ITEMS TO REMAIN: PROTECT CONSTRUCTION INDICATED TO REMAIN AGAINST DAMAGE AND SOILING DURING SELECTIVE DEMOLITION. WHEN PERMITTED BY ARCHITECT, ITEMS MAY BE REMOVED TO A SUITABLE, PROTECTED STORAGE LOCATION DURING SELECTIVE DEMOLITION AND REINSTALLED IN THEIR ORIGINAL LOCATIONS AFTER SELECTIVE DEMOLITION OPERATIONS ARE COMPLETE.
- COORDINATE ALL DEMO ACTIVITIES WITH OWNER AND ARCHITECT AND PROVIDE 10 DAYS NOTICE FOR ANY POWER OUTAGES.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAVE VERIFIED EXISTING JOB-SITE CONDITIONS DURING THE BIDDING PERIOD TO OBTAIN THE SCOPE OF ELECTRICAL WORK INVOLVED AS A RESULT OF ARCHITECTURAL MODIFICATIONS TO THE EXISTING STRUCTURE. THE SCOPE OF THE WORK SHALL INCLUDE MATERIALS AND OUTLETS, CONSISTING OF FIXTURES, DEVICES, EQUIPMENT OR APPARATUS, WHICH MUST BE REROUTED, RELOCATED OR REMOVED EITHER TEMPORARILY OR PERMANENTLY, OR WHICH MUST BE PROVIDED, SO THAT THE INDICATED REMODELING MAY BE ACCOMPLISHED. NOT ALL EXISTING OUTLETS ARE NECESSARILY INDICATED ON THE DRAWINGS.
- PROVIDE ALL APPURTENANCES REQUIRED TO REROUTE, RELOCATED, REMOVE OR REINSTALL ALL ITEMS DESCRIBED IN THESE NOTES.
- AT THE COMPLETION OF THE PROJECT, THERE SHALL BE NO ABANDONED, CONTROLS, WIRING CONDUIT, ELECTRICAL EQUIPMENT, OR CONTRACTOR SHALL REMOVE ABANDONED MATERIALS DESCRIBED HEREINABOVE.
- CONTRACTOR SHALL MAKE SAFE ALL AREAS OF THE EXISTING STRUCTURE WHICH ARE TO BE DEMOLISHED BY DISCONNECTING FEEDERS AND SERVICES TO DEMO'D AREAS.

ENGINEERING, PLLC

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THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY
RENE R. OLIVAREZ, P.E. 102302
DATED 10/09/18
TBPB REGISTRATION NO. 12179



10/09/18

PHARR POLICE STATION
HVAC REPLACEMENT

1900 S CAGE BLVD
PHARR, TX 78577

PROJECT NAME

PROJECT LOCATION

DESCRIPTION

DATE

NO.

PROJECT NO.: 18008

DRAWN BY: G.M.

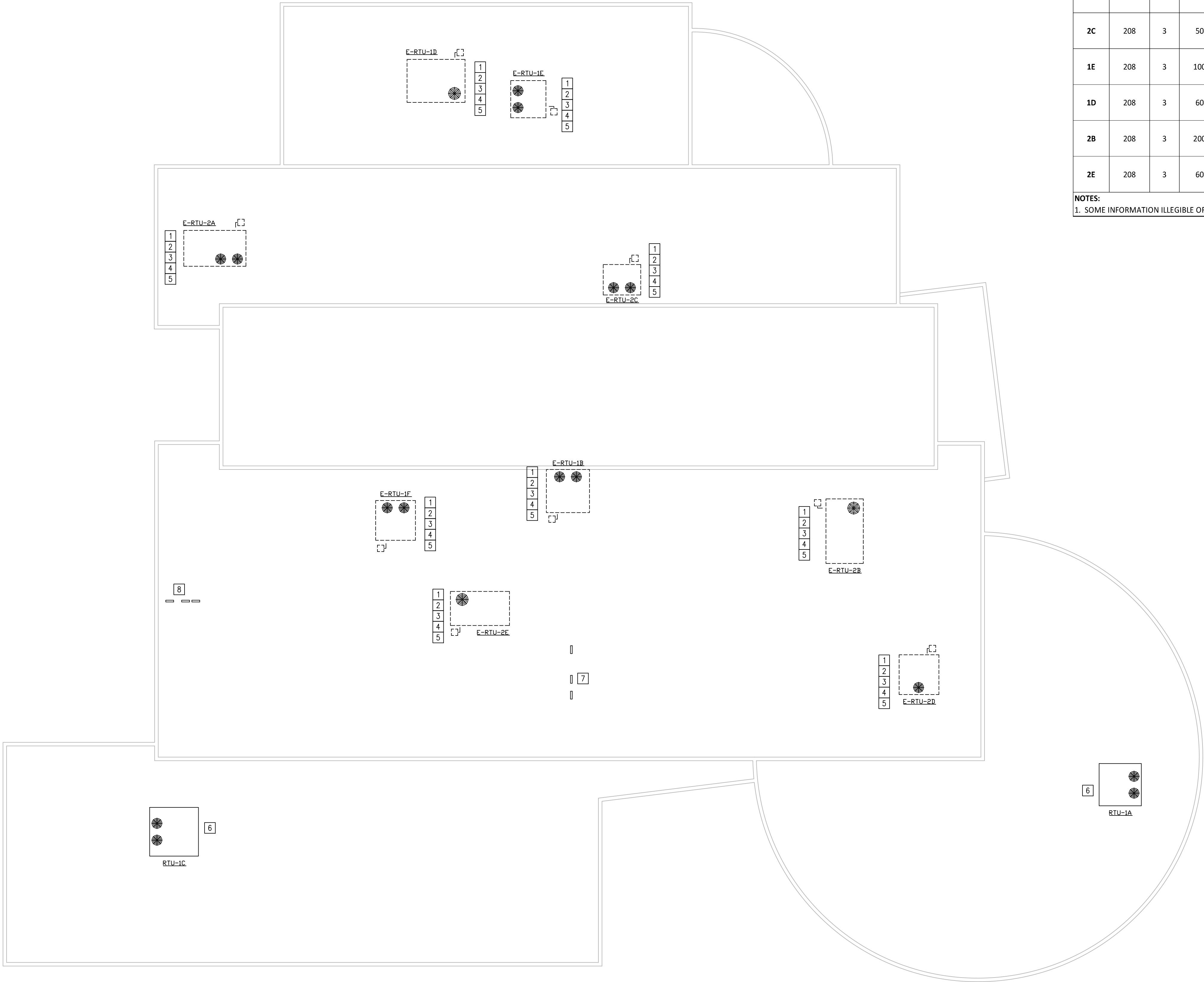
CHECKED BY: R.O.

SHEET TITLE:

MECHANICAL SYMBOLS
& ABBREVIATIONS

S H E E T

M0.0



1 ROOF MECHANICAL DEMO PLAN
3/32" = 1'-0"

EXISTING MECHANICAL EQUIPMENT SCHEDULE CITY OF PHARR - POLICE STATION									
UNIT TAG	VOLTAGE	PHASE	EXISTING BREAKER	MANUFACTURER	MODEL	SERIAL NO.	TONS	REFRIGERANT	NOTES
2D	208	3	60	AAON	RK-03-2-E1	-	3	R-22	1
1B	208	3	60	AAON	RK-06-2-F0-000: OJDUAOD000000X	200212-AKCE06773	6	R-22	-
1F	208	3	60	AAON	RK-06-2-F0-000	200212-AKCE06777	6	R-22	-
2A	208	3	50	AAON	RK-06-2-E1	-	6	R-22	1
2C	208	3	50	AAON	RK-06-2-F0-000: OKDUA0D000000B	200212-AKCE06777	6	R-22	-
1E	208	3	100	AAON	RK-07-2-F0-1C2:00DUAOD0J0000X	200212-AKEF09043	7	R-22	-
1D	208	3	60	AAON	RK-08-2-F0-000:	200212-AKCH0077	8	R-22	-
2B	208	3	200	AAON	RK-08-2-F0-1D2: YAJUAOD0N000CX	200212-AKER09041	8	R-22	-
2E	208	3	60	AAON	RK-08-2-F0-000	200212-ANCHC0772	8	R-22	-

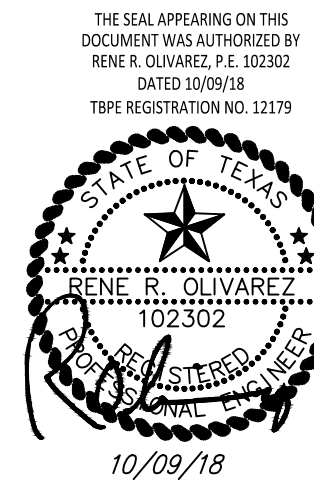
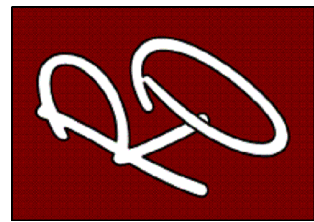
NOTES:
1. SOME INFORMATION ILLEGIBLE OR INACCESSIBLE.

GENERAL DEMOLITION NOTES

- A. COORDINATE DEMOLITION WORK WITH ELECTRICAL AND OTHER DISCIPLINES AS REQUIRED.
- B. EQUIPMENT LOCATIONS ARE SHOWN APPROXIMATELY. VERIFY ALL DIMENSIONS AND LOCATIONS AT JOB SITE PRIOR TO BID.
- C. IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAVE VERIFIED EXISTING JOBSITE CONDITIONS DURING THE BIDDING PERIOD, SO THEY WILL HAVE DISCOVERED THE FULL SCOPE OF WORK INVOLVED WITH THE REPLACEMENT OF EQUIPMENT. THE SCOPE OF THE WORK SHALL INCLUDE ALL MATERIALS FOR A COMPLETE INSTALLATION INCLUDING DEVICES, EQUIPMENT, OR APPARATUS WHICH MUST BE REROUTED, RELOCATED, OR REMOVED EITHER TEMPORARILY OR PERMANENTLY, OR WHICH MUST BE PROVIDED TO ACCOMMODATE THE INDICATED MECHANICAL SYSTEMS AND B.A.S.. NOT ALL EXISTING CONDITIONS ARE NECESSARILY INDICATED ON THE DRAWINGS.
- D. WHEN AN EQUIPMENT IS IDENTIFIED TO BE REMOVED, THE OWNER HAS FIRST RIGHT OF REFUSAL BEFORE DISPOSING OF THAT EQUIPMENT.
- E. PROVIDE ALL NECESSARY CLEAR PATH TO MOVE DEMOLISHED EQUIPMENT OUT OF THE FACILITY AS WELL TO BRING NEW EQUIPMENT INTO THE BUILDING. MODIFY EXISTING PIPING, DUCTWORK CONDUITS, AS REQUIRED TO COMPLETE THE DEMOLITION.
- F. THE "EXISTING" MECHANICAL SYSTEMS INDICATED ON THIS SHEET ARE BASED ON THE INFORMATION AVAILABLE AND MAY BE INCOMPLETE AND INACCURATE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ACTUAL CONDITIONS AND MAKE SUITABLE ADJUSTMENTS AS NECESSARY, TO ACCOMMODATE NEW WORK, AT NO EXTRA COST TO THE OWNER. CONDITIONS DIFFERENT TO THOSE INDICATED SHALL BE INCORPORATED INTO THE CONSTRUCTION DOCUMENTS. NOTE THAT ANY UNCOVERED SYSTEMS MUST BE CAREFULLY IDENTIFIED PRIOR TO MODIFICATIONS.
- G. CONTRACTOR SHALL COORDINATE HIS WORK WITH ALL TRADES AND INCLUDE ANY MODIFICATIONS NEEDED TO ACCOMMODATE THEIR WORK.
- H. EXISTING DUCTWORK TO REMAIN AND BE REUSED.

KEYED NOTES: DEMOLITION

- 1 EXISTING MECHANICAL EQUIPMENT TO BE REMOVED AND REPLACED WITH NEW UNITS. REFER TO SHEET M1.0 FOR NEW SCOPE OF WORK. VERIFY EXACT LOCATION ON SITE.
- 2 CONTRACTOR SHALL ENSURE THAT EXISTING CONDENSATE LINE IS FREE OF CLOGS AND DRAINS TO PROPER OUTLET.
- 3 EXISTING DISCONNECT SERVING UNIT TO BE REMOVED AND REPLACED, SEE SHEET M1.0.
- 4 EXISTING BREAKER AS SHOWN PER THE "EXISTING MECHANICAL EQUIPMENT SCHEDULE" ABOVE. SURVEY OF EXISTING WIRE WAS NOT CONDUCTED. CONTRACTOR SHALL CONDUCT SURVEY OF EXISTING WIRE SERVING UNITS AND MAKE NO ASSUMPTIONS ABOUT EXISTING WIRE SIZE WHEN IT COMES TO DOWNGRADING OR UPGRADING THE BREAKER.
- 5 REMOVE EXISTING THERMOSTAT, PATCH WALL, AND PREPARE SURFACE FOR NEW BUILDING AUTOMATION SPACE TEMPERATURE AND HUMIDITY THERMOSTAT.
- 6 EXISTING RTU TO REMAIN.
- 7 APPROXIMATE LOCATION OF PANELS IN 1ST FLOOR ELECTRICAL ROOM 1064
- 8 APPROXIMATE LOCATION OF PANELS IN 2ND FLOOR ELECTRICAL ROOM 2047.



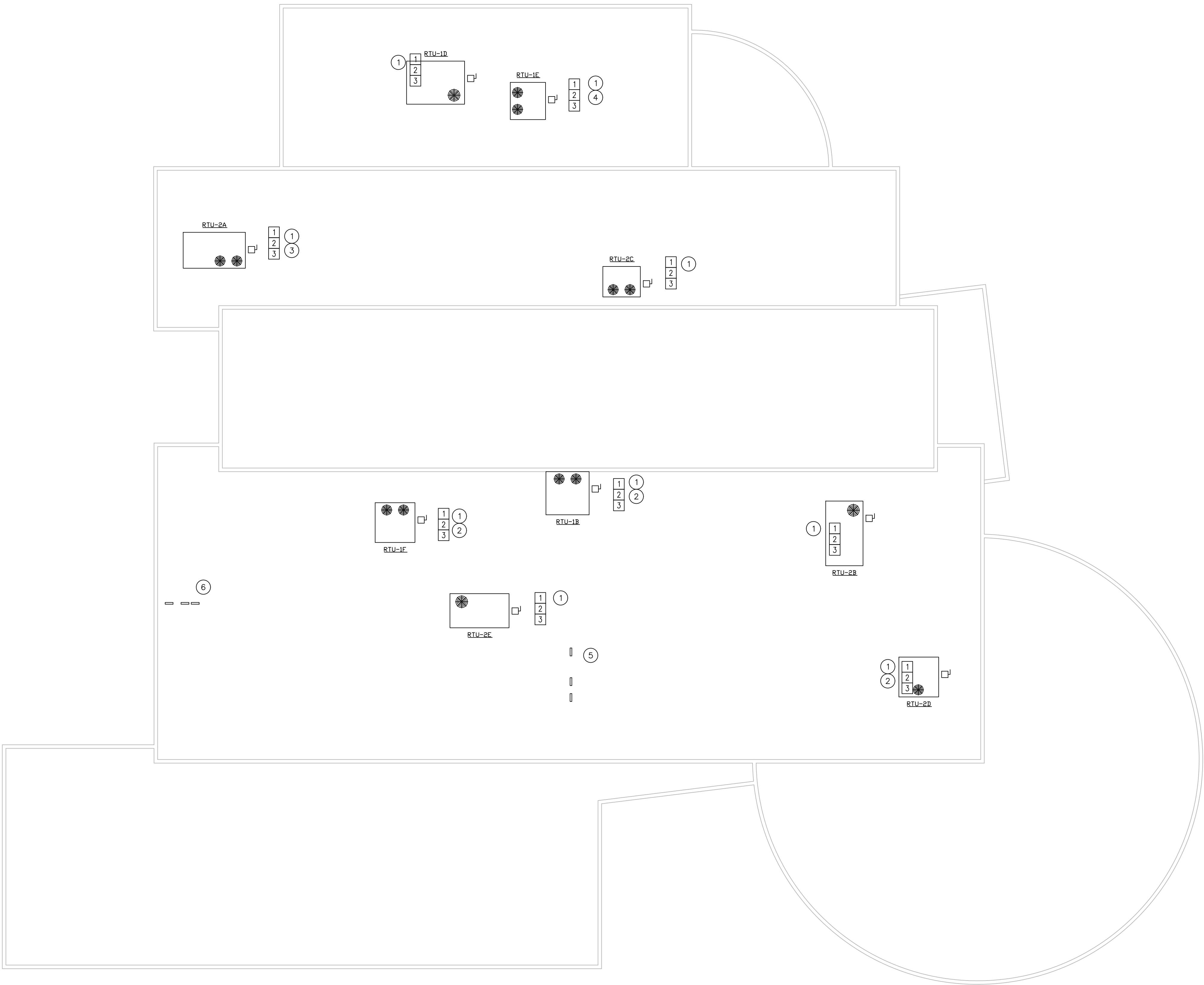
PHARR POLICE STATION
HVAC REPLACEMENT

1900 S CAGE BLVD
PHARR, TX 78577

NO.	DATE	DESCRIPTION
1	10/09/2018	

PROJECT NO.: 18008
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SHEET
MD1.0



1 ROOF MECHANICAL PLAN
3/32" = 1'-0"

MECHANICAL GENERAL NOTES

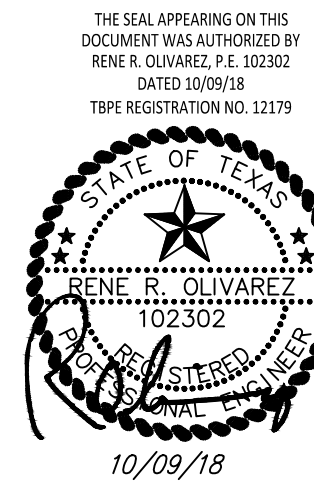
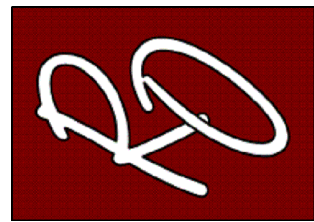
- A. THE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL LOCATION OF EQUIPMENT. IT IS THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS THAT EQUIPMENT BE REPLACED, TESTED AND READY FOR OPERATION WHETHER OR NOT EVERY ITEM OF EQUIPMENT, ACCESSORY, DEVICE, ETC. IS SHOWN. REFERENCE SHALL BE MADE TO THE FULL DRAWING PACKAGE. THE MECHANICAL SUBCONTRACTOR SHALL, WITHOUT EXTRA CHARGE, MAKE REASONABLE MODIFICATIONS IN THE LAYOUT AS NEEDED TO PREVENT CONFLICTS WITH OTHER TRADES, OR FOR PROPER EXECUTION OF THE WORK. FIELD VERIFY ALL DIMENSIONS BEFORE FABRICATING DUCTWORK.
- B. ALL NEW A/C EQUIPMENT SHALL BE CLEANED AFTER THE FINISHING OF DRYWALL AND PRIOR TO THE RELEASE OF BUILDING TO OWNER. MECHANICAL CONTRACTOR TO PROVIDE DOCUMENTATION WITH DATE AND TIME OF UNIT CLEANING.
- C. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO SUBMITTALS.
- D. CONTRACTOR SHALL COORDINATE EQUIPMENT WEIGHTS AND SUPPORTS BASED ON ACTUAL EQUIPMENT SELECTED.
- E. FIELD VERIFY SIZES OF ROOF CURB ADAPTERS AND PROVIDE SHOP DRAWINGS PRIOR TO SUBMITTALS. REFER TO SHEET M2.0 DETAIL NO.2.
- F. FIELD COORDINATE ALL NEW DUCTWORK TRANSITION AND INCLUDE IN SHOP DRAWINGS. REFER TO SHEET M2.0 DETAIL NO.2.
- G. EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE VERIFIED WITH THE ACTUAL EQUIPMENT SELECTED VENDOR DRAWINGS.
- H. MECHANICAL EQUIPMENT SCHEDULE ON SHEET M2.0.

KEYED NOTES: MECHANICAL

- 1 COORDINATE FINAL LOCATION OF EQUIPMENT WITH OWNER AND ENGINEER OF RECORD.
- 2 ALL CONDENSATE DRAINS SHALL MATCH EXISTING MATERIALS AND DRAIN TO EXISTING DRAIN SYSTEM. CONTRACTOR SHALL ENSURE THAT EXISTING CONDENSATE LINE IS FREE OF CLOGS AND DRAINS TO PROPER OUTLET.
- 3 PROVIDE ADAPTER CURBS TO FIT INTO EXISTING CURBS PROVIDED BY APPROVED MANUFACTURER. CONTRACTOR TO EXTEND AND ADAPT DUCTWORK FROM EXISTING DUCT TO NEW MECHANICAL UNIT. FIELD VERIFY AND PROVIDE SHOP DRAWINGS.

KEYED NOTES: ELECTRICAL

- 1 REPLACE EXISTING 3 POLE CIRCUIT BREAKER SERVING EXISTING UNIT WITH NEW 3 POLE CIRCUIT BREAKER MATCHING THE MOCF OF NEW UNIT. NEW BREAKER MUST MATCH EXISTING PANEL MANUFACTURER AND AIC RATING.
- 2 ROUTE CIRCUIT TO EXISTING PANEL SERVING EXISTING HVAC UNIT USING (3) #8 CONDUCTORS AND (1) #8 GROUND IN (1) 3/4" EMT CONDUIT.
- 3 PROVIDE NEW 60A/3P/NF/N1 DISCONNECT.
- 4 PROVIDE NEW 100A/3P/NF/N1 DISCONNECT.
- 5 APPROXIMATE LOCATION OF PANELS IN 1ST FLOOR ELECTRICAL ROOM 1064.
- 6 APPROXIMATE LOCATION OF PANELS IN 2ND FLOOR ELECTRICAL ROOM 2047.



PHARR POLICE STATION
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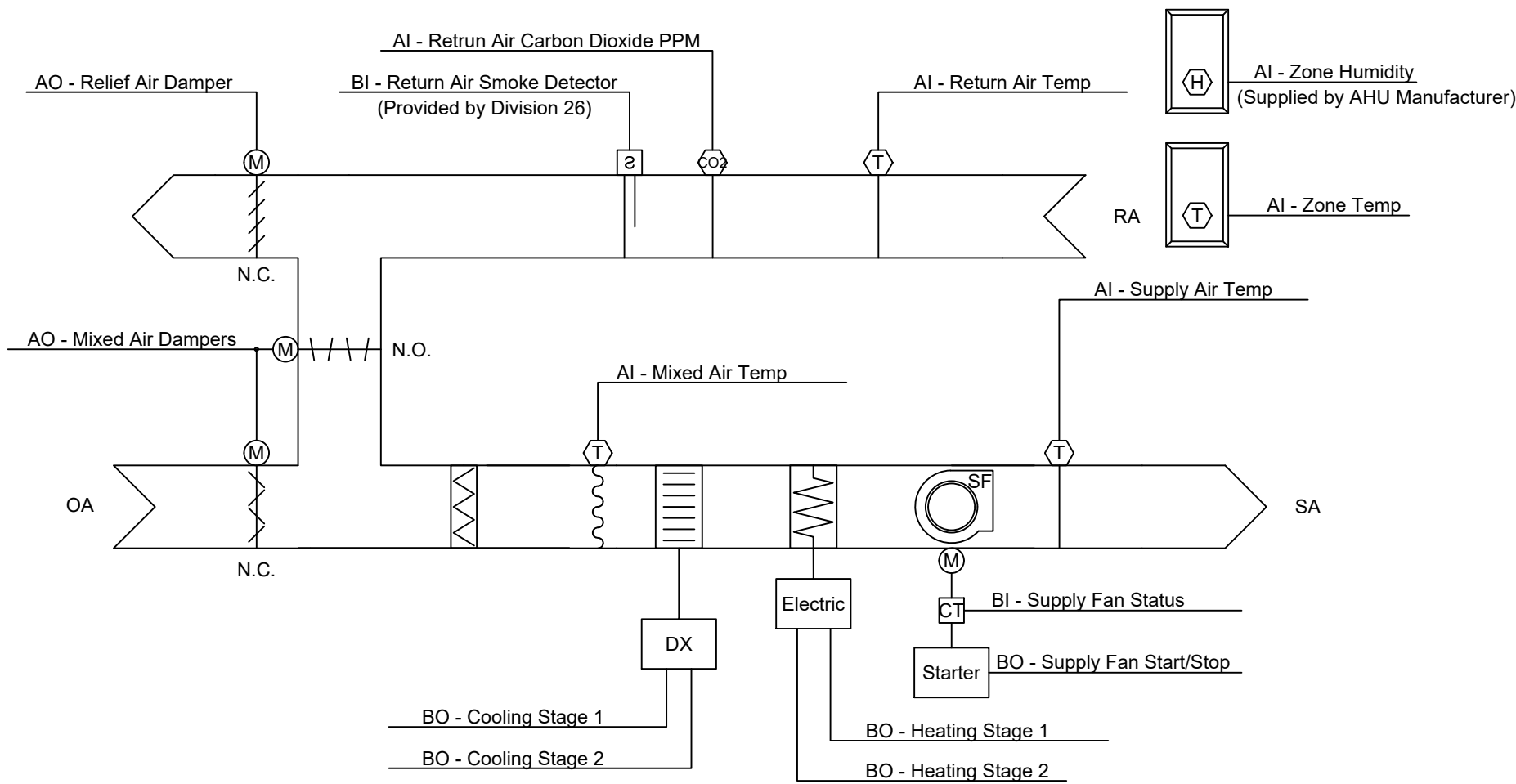
SHEET TITLE:

ROOFTOP UNIT
MECHANICAL
PLAN

S H E E T

M1.0

ROOF TOP UNIT SCHEDULE																								
UNIT TAGS				COOLING COIL PERFORMANCE								HEATING COIL PERFORMANCE				COOLING		ELECTRICAL DATA			UNIT INFO			NOTES
TAG	CFM	OA	ESP	GROSS COOLING CAPACITY	SENSIBLE COOLING CAPCAITY	EAT DB	EAT WB	LAT DB	LAT WB	MBH	STAGES	EAT	LAT	EER	IEER	VOLTAGE	MCA	MOCp	MFG	WEIGHT	MODEL NUMBER			
	CFM	CFM	IN H2O																			MBH	MBH	
RTU-2D	710	180	0.5	36.62	28.51	80	67	59.31	57.65	42.21	2	60	91.45	13	20.1	230/3	39	40	TRANE	881	TZC036	ALL		
RTU-1B	1530	420	0.5	71.01	57.5	80	67	58.65	57.8	30.74	2	60	71.79	12.8	23.2	230/3	39	50	TRANE	1108	TZC072	ALL		
RTU-1F	2310	315	0.5	71.01	57.5	80	67	58.65	57.8	30.74	2	60	71.79	12.8	23.2	230/3	39	50	TRANE	1108	TZC072	ALL		
RTU-2A	2660	800	0.5	71.01	57.5	80	67	58.65	57.8	30.74	2	60	71.79	12.8	23.2	230/3	39	50	TRANE	1108	TZC072	ALL		
RTU-2C	2000	320	0.5	71.01	57.5	80	67	58.65	57.8	30.74	2	60	71.79	12.8	23.2	230/3	39	50	TRANE	1108	TZC072	ALL		
RTU-1E	2650	335	0.5	92.38	73.69	80	67	58.54	57.56	93.44	2	60	88.3	12.8	22.4	230/3	91	100	TRANE	1127	TZC090	ALL		
RTU-1D	2810	870	0.5	102.7	83.77	80	67	59.09	58.05	30.74	2	60	68.32	12.6	22.5	230/3	42	60	TRANE	1127	TZC102	ALL		
RTU-2B	3490	710	0.5	102.7	83.77	80	67	59.09	58.05	30.74	2	60	68.32	12.6	22.5	230/3	42	60	TRANE	1127	TZC102	ALL		
RTU-2E	3400	1100	0.5	102.7	83.77	80	67	59.09	58.05	30.74	2	60	68.32	12.6	22.5	230/3	42	60	TRANE	1127	TZC102	ALL		
NOTES:																								
1. SINGLE POINT POWER WITH INTEGRAL NON-FUSED DISCONNECT SWITCH.																								
2. DOUBLE WALL CONSTRUCTION WITH MINIMUM 1" FOAM INSULATION.																								
3. PROVIDE HINGED ACCESS DOORS.																								
4. RECIRCULATION DAMPER FOR UN-OCCUPIED MODE.																								
5. DIRTY FILTER SENSOR ON OUTDOOR AND EXHAUST AIR.																								
6. 120V GFCI SERVICE OUTLET, FACTORY MOUNTED, FACTORY WIRED.																								
7. APPROVED MANUFACTURES SHALL THEIR HIGHEST EFFICIENCY ALTERNATIVE WITH SCHEDULED IEER VALUES OR GREATER.																								
8. RTU MANUFACTURER IS RESPONSIBLE FOR MEETING ALL REQUIREMENTS DETAILED IN THE CONTROLS DIAGRAMS AND SEQUENCES OF OPERATION PUBLISHED IN THESE CONSTRUCTION DOCUMENTS.																								
9. PROGRAMMABLE ROOM TEMPERATURE SENSOR AND DUCT MOUNTED HUMIDITY SENSOR FOR ENHANCED DEHUMIDIFICATION SEQUENCE.																								
10. PROVIDE WITH INVERTER SPEED COMPRESSORS TO MODULATE TO A MINIMUM CAPACITY OF 25% OR LESS AND MAINTAIN HIGH PART LOAD EFFICIENCY.																								
11. PROVIDE UNITS WITH VARIABLE SPEED FANS TO MODULATE TO ROOM TEMP FOR SINGLE ZONE VAV.																								
12. 2015 IECC - ECONOMIZER REQUIRED ON INDIVIDUAL DX COOLING UNITS GREATER THAN 54,000 BTU/H.																								
13. PROVIDE CURB ADAPTERS TO FIT INTO EXISTING CURBS PROVIDED BY APPROVED MANUFACTURER.																								
14. PROVIDE UNITS WITH FROSTAT, AND FACTORY HAIL GUARDS.																								
15. PROVIDE BACNET COMMUNICATION CARD FOR CONTROLS INTERFACE.																								
16. PROVIDE MINIMUM 5 YEAR PARTS WARRANTY.																								



RUN CONDITIONS - SCHEDULED:
THE UNIT SHALL RUN ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN THE FOLLOWING MODES:
OCCUPIED MODE: THE UNIT SHALL MAINTAIN
• A 75°F (ADJ.) COOLING SETPOINT
• A 68°F (ADJ.) HEATING SETPOINT.
UNOCCUPIED MODE (NIGHT SETBACK): THE UNIT SHALL MAINTAIN
• A 85°F (ADJ.) COOLING SETPOINT.
• A 55°F (ADJ.) HEATING SETPOINT.
ALARMS SHALL BE PROVIDED AS FOLLOWS:
• HIGH ZONE TEMP: IF THE ZONE TEMPERATURE IS GREATER THAN THE COOLING SETPOINT BY 4°F (ADJ.).
• LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY 4°F (ADJ.).

ZONE OPTIMAL START:
THE UNIT SHALL USE AN OPTIMAL START ALGORITHM FOR MORNING START-UP. THIS ALGORITHM SHALL MINIMIZE THE UNOCCUPIED WARM-UP OR COOL-DOWN PERIOD WHILE STILL ACHIEVING COMFORT CONDITIONS BY THE START OF SCHEDULED OCCUPIED PERIOD.

RETURN AIR SMOKE DETECTION:
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A RETURN AIR SMOKE DETECTOR STATUS.

SUPPLY FAN:
THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
• SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
• SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

COOLING STAGES:
THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND STAGE THE COOLING TO MAINTAIN ITS COOLING SETPOINT. TO PREVENT SHORT CYCLING, THERE SHALL BE A USER DEFINABLE (ADJ.) DELAY BETWEEN STAGES, AND EACH STAGE SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

THE COOLING SHALL BE ENABLED WHENEVER:
• OUTSIDE AIR TEMPERATURE IS GREATER THAN 60°F (ADJ.).
• AND THE ECONOMIZER IS DISABLED OR FULLY OPEN.
• AND THE ZONE TEMPERATURE IS ABOVE COOLING SETPOINT.
• AND THE SUPPLY FAN STATUS IS ON.
• AND THE HEATING IS NOT ACTIVE.

ECONOMIZER:
THE CONTROLLER SHALL MEASURE THE MIXED AIR TEMPERATURE AND MODULATE THE ECONOMIZER DAMPERS IN SEQUENCE TO MAINTAIN A SETPOINT 2°F (ADJ.) LESS THAN THE SUPPLY AIR TEMPERATURE SETPOINT. THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A MINIMUM ADJUSTABLE POSITION OF 20% (ADJ.) OPEN WHENEVER OCCUPIED.
THE ECONOMIZER SHALL BE ENABLED WHENEVER:
• OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.)
• AND THE OUTSIDE AIR ENTHALPY IS LESS THAN 22 BTU/LB (ADJ.)
• AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE THE RETURN AIR TEMPERATURE.
• AND THE OUTSIDE AIR ENTHALPY IS LESS THAN THE RETURN AIR ENTHALPY.
• AND THE SUPPLY FAN IS ON.
THE ECONOMIZER SHALL CLOSE WHENEVER:
• MIXED AIR TEMPERATURE DROPS FROM 40°F TO 35°F (ADJ.)
• OR ON LOSS OF SUPPLY FAN STATUS.
THE OUTSIDE AND EXHAUST AIR DAMPERS SHALL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN WHEN THE UNIT IS OFF. IN OPTIMAL START UP THE RETURN AIR DAMPER SHALL OPERATE AS DESCRIBED IN THE OCCUPIED MODE EXCEPT THAT THE OUTSIDE AIR DAMPER SHALL MODULATE TO FULLY CLOSED.

THE RELIEF DAMPER SHALL OPEN LINEARLY IN RELATION TO THE ECONOMIZER DAMPER POSITION. THE RELIEF DAMPER SHALL OPEN 20%(ADJ.) WHEN THE ECONOMIZER DAMPER IS OPEN 40%. THE RELIEF DAMPER SHALL OPEN 80%(ADJ.) WHEN THE ECONOMIZER DAMPER IS OPEN 100%.

MINIMUM OUTSIDE AIR VENTILATION - CARBON DIOXIDE (CO2) CONTROL:
WHEN IN THE OCCUPIED MODE, THE CONTROLLER SHALL MEASURE THE RETURN AIR CO2 LEVELS AND MODULATE THE OUTSIDE AIR DAMPERS CLOSED AND RETURN AIR DAMPERS OPEN AT A RATE OF 2% EVERY 10 MINUTES, TO MAINTAIN CO2 CONCENTRATIONS BELOW A CO2 SETPOINT OF 750 PPM (ADJ.). IN THE EVENT THE CO2 LEVEL IN THE ZONE(S) EXCEEDS THE CO2 SETPOINT, THE OUTSIDE AIR DAMPER SHALL MODULATE IN CONJUNCTION WITH THE RETURN AIR DAMPER AT AN IDENTICAL RATE, TO INCREASE THE OUTSIDE AIR PERCENTAGE THROUGH THE ROOF TOP UNIT UP TO THE SCHEDULED MINIMUM O.A.

MIXED AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE MIXED AIR TEMPERATURE.
ALARMS SHALL BE PROVIDED AS FOLLOWS:
• HIGH MIXED AIR TEMP: IF THE MIXED AIR TEMPERATURE IS GREATER THAN 90°F (ADJ.).
• LOW MIXED AIR TEMP: IF THE MIXED AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

RETURN AIR CARBON DIOXIDE (CO2) CONCENTRATION MONITORING:
THE CONTROLLER SHALL MEASURE THE RETURN AIR CO2 LEVELS.
ALARMS SHALL BE PROVIDED AS FOLLOWS:
• HIGH RETURN AIR CARBON DIOXIDE CONCENTRATION: IF THE RETURN AIR CO2 CONCENTRATION IS GREATER THAN 1000PPM (ADJ.) WHEN IN THE OCCUPIED MODE.

SPACE HUMIDITY:
THE CONTROLLER SHALL MONITOR THE SPACE HUMIDITY AND USE AS REQUIRED FOR ECONOMIZER CONTROL OR HUMIDITY CONTROL.
ALARMS SHALL BE PROVIDED AS FOLLOWS:
• HIGH SPACE HUMIDITY: IF THE SPACE HUMIDITY IS GREATER THAN 70% (ADJ.).
• LOW SPACE HUMIDITY: IF THE SPACE HUMIDITY IS LESS THAN 35% (ADJ.).

RETURN AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE RETURN AIR TEMPERATURE.
ALARMS SHALL BE PROVIDED AS FOLLOWS:
• HIGH RETURN AIR TEMP: IF THE RETURN AIR TEMPERATURE IS GREATER THAN 90°F (ADJ.).
• LOW RETURN AIR TEMP: IF THE RETURN AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

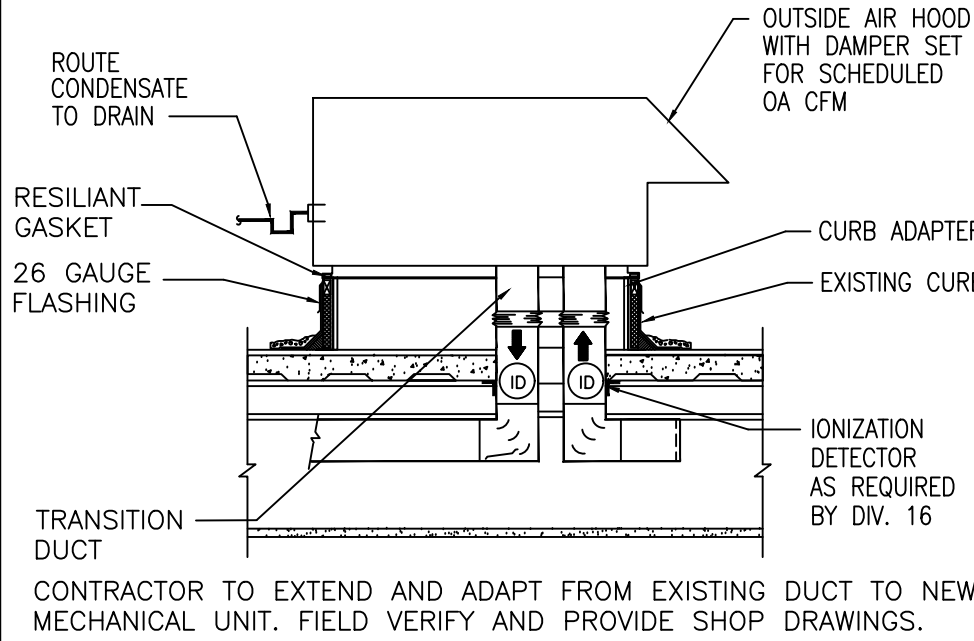
SUPPLY AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE.
ALARMS SHALL BE PROVIDED AS FOLLOWS:
• HIGH SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS GREATER THAN 120°F (ADJ.).
• LOW SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

ECONOMIZER FAULT DETECTION AND DIAGNOSTICS:
• OA, SA AND RA TEMPERATURE SENSORS MUST BE PERMANENTLY INSTALLED.
• TEMP. SENSORS MUST HAVE AN ACCURACY OF +2°F OVER THE RANGE OF 40° TO 80°F.
• REFRIGERANT PRESSURE SENSORS, WHERE USED, MUST HAVE AN ACCURACY OF +-3° OF FULL SCALE.
• UNIT CONTROLLER MUST BE CAPABLE OF PROVIDING SYSTEM STATUS, MANUALLY INITIATING EACH OPERATING MODE AND REPORTING FAULTS TO A FAULT MANAGEMENT APPLICATION.
• FDD SYSTEM MUST BE CAPABLE OF DETECTING AIR TEMPERATURE SENSOR FAULT, ECONOMIZER FAULTS, DAMPER NOT MODULATING AND EXCESS OUTDOOR AIR.

1

RTU ECONOMIZER ELECTRIC HEAT

NTS

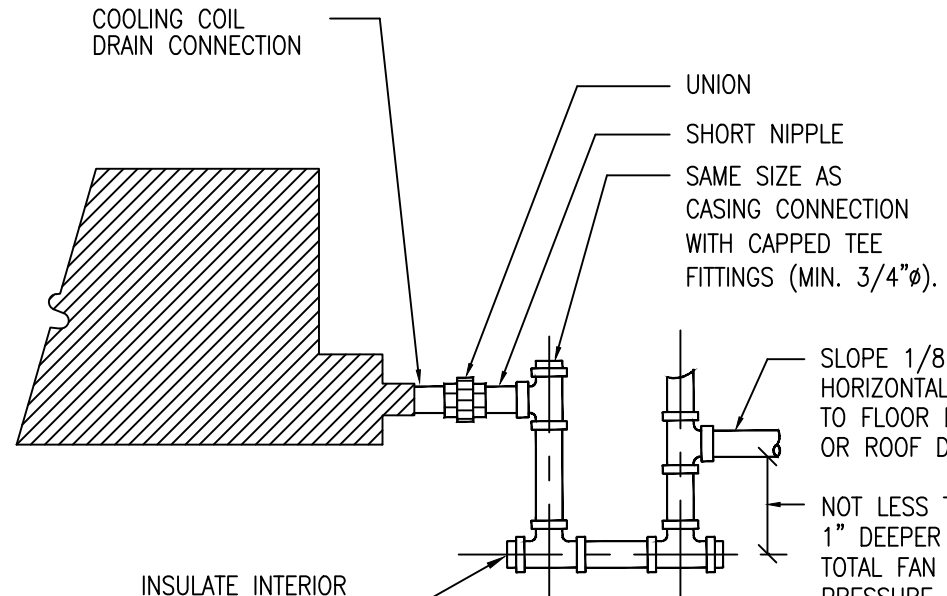


NOTE: ALL CONDENSATE DRAIN PIPING SHALL MATCH EXISTING MATERIAL.

2

ROOF TOP UNIT MOUNTING DETAIL

NTS

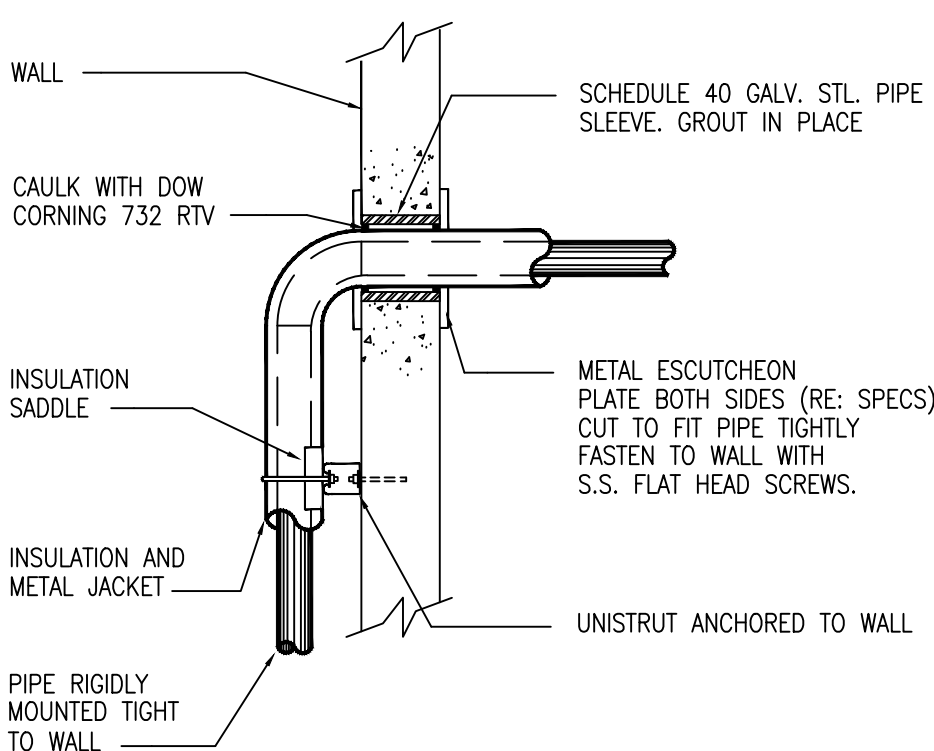


NOTE:
1. MAINTAIN MINIMUM 1" AIR GAP AT FLOOR DRAIN OR ROOF DRAIN.
2. ALL CONDENSATE DRAIN PIPING SHALL MATCH EXISTING MATERIAL.

3

COOLING COIL CONDENSATE DRAIN

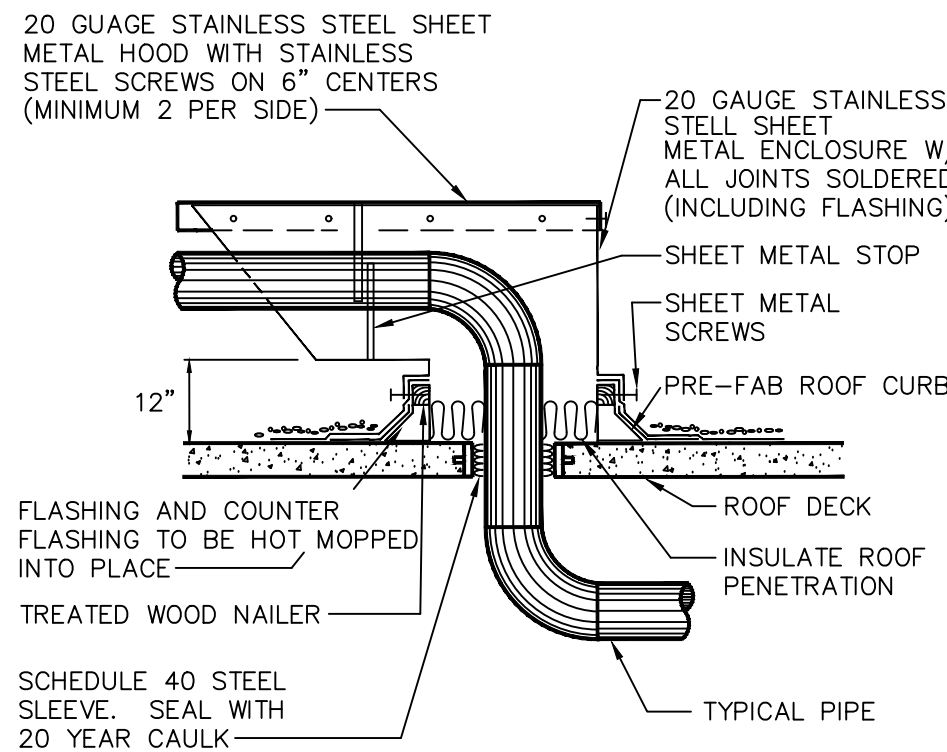
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4

PIPE ENTRY THROUGH EXTERIOR WALL

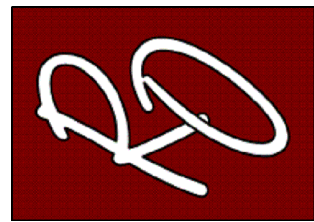
NTS



5

PIPING ROOF PENETRATION

NTS



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY
RENE R. OLIVAREZ, P.E. 102302
DATED 10/09/18
TBPB REGISTRATION NO. 12179



10/09/18

PHARR POLICE STATION
HVAC REPLACEMENT

1900 S CAGE BLVD
PHARR, TX 78577

PROJECT NAME

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NO.

1

PROJECT NO.: 18008

DRAWN BY: G.M.

CHECKED BY: R.O.

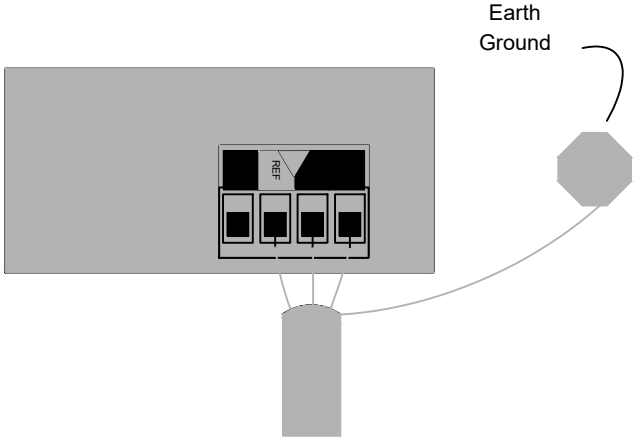
SHEET TITLE:

MECHANICAL
SCHEDULE & DETAILS

S H E E T

M2.0

BUILDING AUTOMATION SYSTEM

Category	Rules / Maximums Allowed
General	Typically daisy-chained; branch or star configuration acceptable when repeaters are used. See End of Line Switching and Repeater Guideline graphic.
Number of Devices	<p>When all of the devices connected on the FC Bus are Metasys FECs, VMAs, and/or IOMs, the device and bus segment limits are:</p> <p>100 devices total per FC Bus (maximum) 3 bus segments per FC Bus (maximum) 50 devices per bus segment (maximum, not to exceed 100 devices per FC Bus)</p> <p>When one or more TEC26xx Series thermostat or third-party MS/TP device is connected on the FC Bus, the device and bus segment limits are:</p> <p>64 devices total per FC Bus (maximum) 3 bus segments per FC Bus (maximum) 32 devices per bus segment (maximum, not to exceed 64 devices per FC Bus)</p> <p>Note: Metasys MS/TP devices generate less data traffic than third-party MS/TP devices and TEC26xx thermostats. Connecting third-party devices or TEC26xx thermostats to the FC Bus increases data traffic, reduces bus performance, and reduces the number of devices that can be connected to the bus. Bus segments on an FC Bus are connected with repeaters (only). Up to two cascaded repeaters may be applied to an FC Bus (to connect three bus segments).</p>
Line Length and Type	<p>When all of the devices connected on the FC Bus are Metasys FECs, VMAs, and/or IOMs, the cable length limits are:</p> <p>Each bus segment can be up to 1520 m (5000 ft) in length (using 22 AWG 3-wire twisted, shielded cable). Each FC Bus can be up to 4750 m (15,000 ft) in length (using 22 AWG 3-wire twisted, shielded cable).</p> <p>When one or more TEC26xx Series thermostat or third-party MS/TP device is connected on the FC Bus, the device and bus segment limits are:</p> <p>Each bus segment can be up to 1220 m (4000 ft) in length (using 22 AWG 3-wire twisted, shielded cable) Each FC Bus can be up to 3660 m (12,000 ft) in length (using 22 AWG 3-wire twisted, shielded cable). When using fiber-optic connections: 2,010 m (6,600 ft.) between two fiber modems 22 AWG Stranded, 3-Wire Twisted, Shielded Cable</p>
Cable	22 AWG stranded, 3-wire, twisted shielded cable
EOL Termination	<p>End-of-Line (EOL) termination is required on the FC Bus to reduce signal reflection when data transmissions reach the end of a bus segment and bounce back. EOL termination is built into some Metasys FC devices and is enabled with a switch or jumper on the device.</p> <p>EOL Termination on NAEs An EOL switch on an NAE enables EOL termination. For those NAEs with two FC Bus connections, two EOL double-pole switches are provided. Set the EOL switch to the ON (up) position to set the controller as an EOL termination device.</p> <p>EOL Termination on Switch-Terminating Devices Some field controllers have an EOL switch or jumper. Such devices include FECs, IOMs, VMAs, ZFR1810s, and repeaters. Set the EOL termination to On for any of these devices when it is the last device on a bus segment.</p> <p>EOL Termination on Devices Without EOL Provision For the devices such as TECs and third-party controllers in which no EOL provision is provided, install the MS-BACEOL-0 RS485 End-of-Line Terminator at the device if at the end of the bus segment.</p> <p>EOL Termination Across the FC Bus The FC Bus may consist of up to three bus segments. Each bus segment on an FC Bus requires two EOL termination devices, one at each end of the bus segment. All other devices on the FC Bus should have their EOL termination disabled (EOL switches Off) . If only one device on an FC segment has an EOL termination, it must be set to On.</p> <p>EOL on FC Bus Repeater When using repeaters in the FC Bus, set the EOL jumpers based on the position of the repeater in the run.</p>
<div><div></div><div><p>SHIELD GROUNDING</p><p>The shield should be earth grounded at one and only one point for the entire bus segment. (Preferably in the NAE Panel.) The shield screws on the controllers are simply a convenient way to continue the daisy chain of the bus. They are not attached to earth ground. You can use the shield terminal or twist together the shield and tape back at each controller.</p></div></div>	

RECOMMENDED MSTP FIELD CONTROLLER BUS CABLE					
Type	Typical Usage	Anixter #	Belden #	pF/ft	Area
22/3c Shielded Plenum	Open Plenum Installations. 38400+ Baud RS-485 Communication.	CBL-22/3-FC-PLN	6501FE	25	0.014
22/3c Shielded PVC	EMT (Raceway) Installations. 38400+ Baud RS-485 Communication.	CBL-22/3-FC-PVC	5501FE	31	0.015

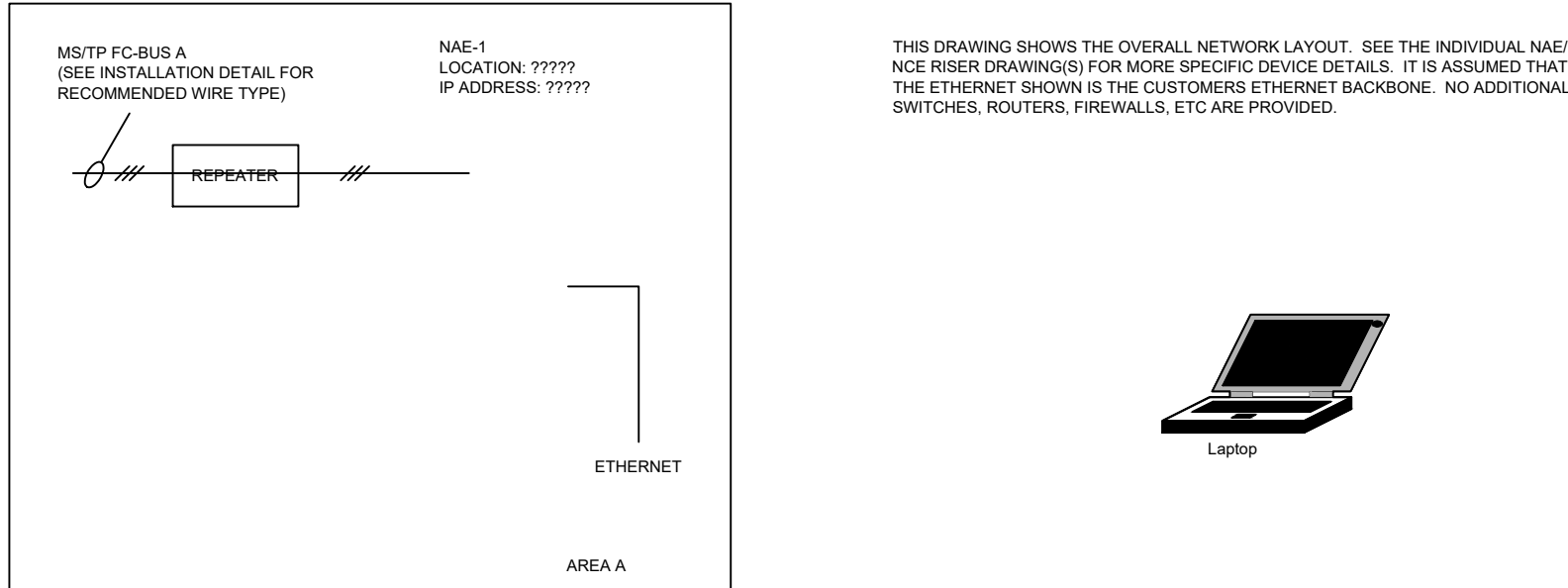
RECOMMENDED MSTP SENSOR ACTUATOR BUS CABLE					
Type	Typical Usage	Anixter #	Belden #	pF/ft	Area
22/2pr Shielded Plenum	Open Plenum Installations. 38400+ Baud RS-485 Communication.	CBL-22/2P-SA-PLN	6541FE	33	0.033
22/2pr Shielded PVC	EMT (Raceway) Installations. 38400+ Baud RS-485 Communication.	CBL-22/2P-SA-PVC	5541FE	31	0.034

METASYS MSTP NETWORK INSTALLATION DETAILS

The information in this document is not intended to replace the published Technical Product Literature for the Johnson Controls systems and products presented. The installation instructions that are packed with products, and the Technical Bulletins and Product Bulletins released with Johnson Controls systems and products supersede the information on this page. It is the responsibility of the product installer and product user to obtain and follow the product installation, operation, and safety procedures provided with the products or project specific information required by specification or local codes.

END OF THE LINE SWITCHING AND
REPEATER GUIDELINES

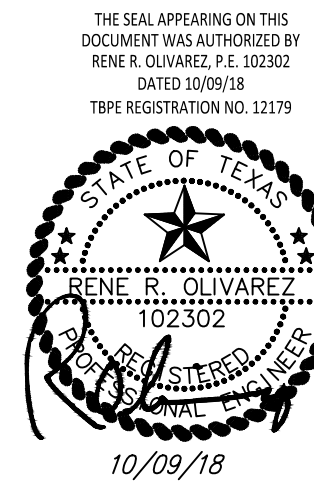
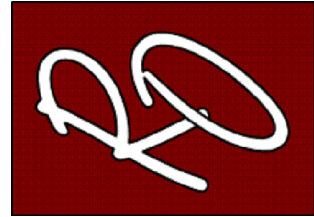
METASYS NETWORK LAYOUT



KEYED NOTES:

- DISCONNECT EXISTING CONTROL SYSTEM FROM DEMO ROOFTOP UNITS AND RECONNECT AND PROGRAM TO NEW ROOFTOP UNITS.
- IF EXISTING MECHANICAL SYSTEMS SUCH AS VAV BOXES, DAMPERS, EXHAUST FANS HAVE CONTROLS, THEY SHALL BE REPLACED WITH NEW CONTROLLERS AND CONNECTED TO MAIN SUPERVISORY CONTROLLER. SYSTEMS SHALL CONTINUE TO OPERATE DURING WORKING HOURS WITHOUT DISTURBANCE.

ENGINEERING, PLLC
MEP ENGINEERS & CONSTRUCTION MANAGERS
2705 E. Davis Rd., Suite A
Edinburg, Texas 78540
TBE Firm Registration No. 12179
www.ro-engineering.com



PROJECT NAME
PHARR POLICE STATION
HVAC REPLACEMENT

PROJECT LOCATION
1900 S CAGE BLVD
PHARR, TX 78577

PROJECT NAME

PROJECT LOCATION

DESCRIPTION

DATE

NO.

PROJECT NO.: 18008

DRAWN BY: G.M.

CHECKED BY: R.O.

SHEET TITLE:

B.A.S. SYSTEM
DETAILS

S H E E T

M3.0



PHARR INTERNATIONAL BRIDGE
9900 S CAGE BLVD, PHARR, TX 78577

PROJECT CONTACTS:

RO ENGINEERING	956-292-3336
CITY OF PHARR	956-402-4000
CITY OF PHARR ENGINEERING	956-402-4221

CITY COMMISSION

DR. AMBROSIO "AMOS" HERNANDEZ.....	MAYOR
ELEAZAR GUAJARDO.....	COMMISSIONER PLACE 1
ROBERTO "BOBBY" CARRILLO.....	COMMISSIONER PLACE 2
RAMIRO CABALLERO.....	COMMISSIONER PLACE 3
DANIEL CHAVEZ.....	COMMISSIONER PLACE 4
RICARDO MEDINA.....	COMMISSIONER PLACE 5
MARIO A. BRACAMONTES.....	COMMISSIONER PLACE 6

CONSTRUCTION NOTES:

1. CONTRACTOR SHALL OBTAIN ELECTRICAL PERMITS PRIOR TO CONSTRUCTION.
2. THE CONTRACTOR SHALL CALL 1-800-DIGTESS PRIOR TO ANY EXCAVATION OR DIGGING.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND IDENTIFYING ALL UNDERGROUND UTILITIES PRIOR TO STARTING ANY WORK.
4. ALL ELECTRICAL WIRING AND CONDUIT SHALL BE CONCEALED AS TO PREVENT VANDALISM.
5. THE CONTRACTOR SHALL BRING TO THE ATTENTION OF THE ENGINEER ANY CONFLICT AT THE JOB SITE PRIOR TO CONSTRUCTION.



LOCATION MAP:
N.T.S.





INDEX TO SHEETS:

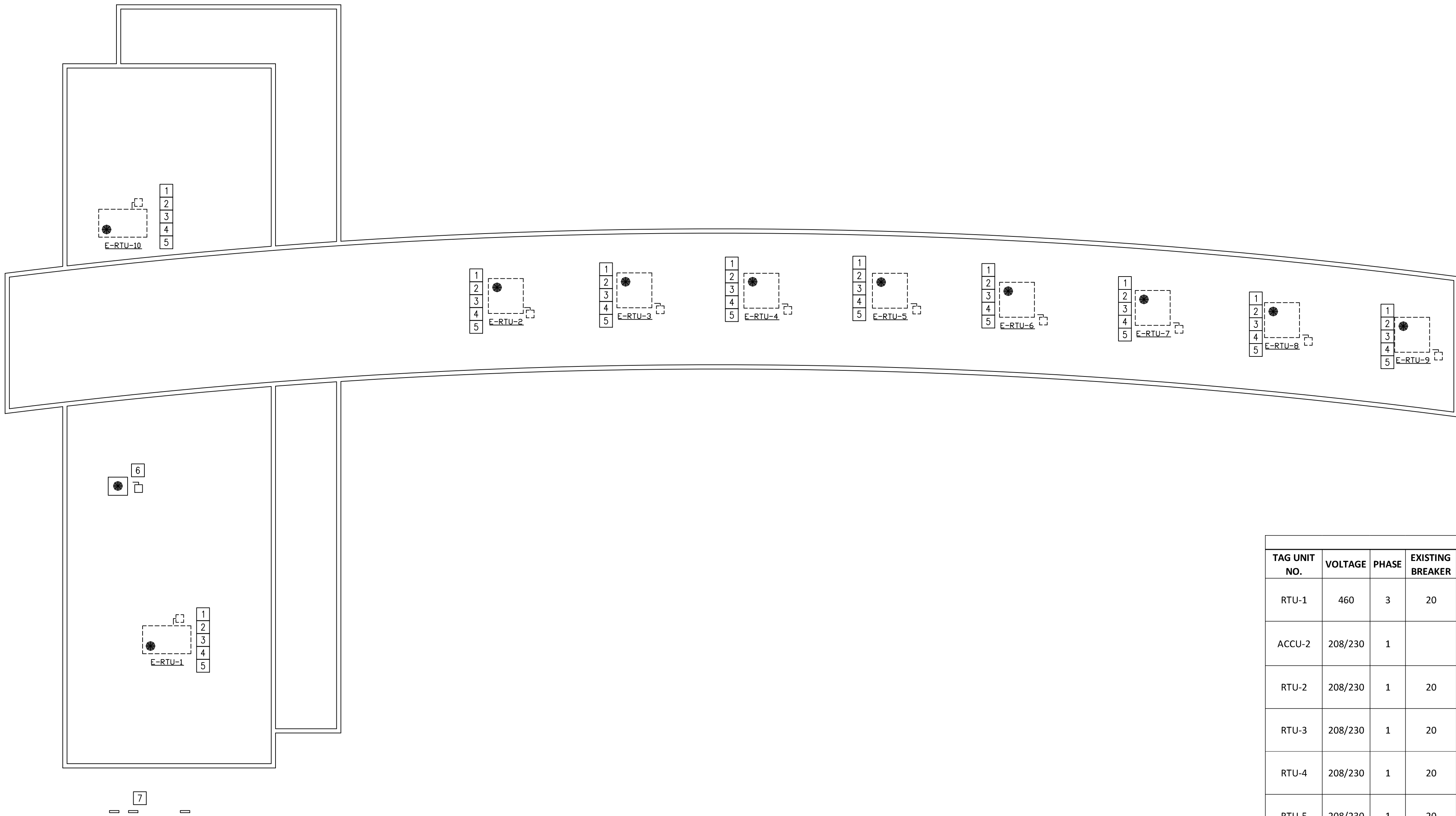
CONSTRUCTION PLANS:

M0.0	MECHANICAL SYMBOLS & ABBREVIATIONS
MD1.0	ROOFTOP UNIT MECHANICAL DEMOLITION PLAN
M1.0	ROOFTOP UNIT MECHANICAL PLAN
M2.0	MECHANICAL SCHEDULE & DETAILS
M3.0	B.A.S. SYSTEM DETAILS

GENERAL NOTES:

1. CAUTION: GAS, FIBER OPTIC, TELEPHONE, ELECTRIC, AND CITY OF PHARR UTILITIES EXIST WITHIN THE LIMITS OF CONSTRUCTION OF THIS PROJECT. NOTIFY RESPECTIVE UTILITY COMPANIES. ANY DRAINAGE TO PUBLIC OR PRIVATE LINES SHALL BE REPAIRED IN ACCORDANCE WITH THE RESPECTIVE UTILITY COMPANY REQUIREMENTS. COST FOR SUCH REPAIRS SHALL BE SUBSIDIARY TO OTHER BID ITEMS OF THE PROJECT PROPOSAL.
2. THERE SHALL BE MINIMUM INTERRUPTION OF TRAFFIC AND ACCESS TO ADJACENT RESIDENTS ALONG THE PROJECT SITE. IF ROADS ARE TO BE CLOSED, THE CITY OF EDINBURG FIRE AND POLICE DEPARTMENTS SHALL BE NOTIFIED AT LEAST 48 HOURS BEFORE SUCH CLOSING.
3. CONTRACTOR TO FIELD VERIFY ALL SITE DIMENSIONS PRIOR TO COMMENCING IMPROVEMENTS.
4. CONTRACTOR TO INSTALL AS PER MANUFACTURER RECOMMENDATIONS.
5. CONTRACTOR SHALL COORDINATE POWER OUTAGES WITH CITY OFFICIALS AND POWER COMPANY.

 <p>MEP ENGINEERING & CONSTRUCTION MANAGEMENT 2705 E DAVIS RD. Suite A Edinburg, Texas 78504 956.292.3336 p www.ro-engineering.com TBPE Firm Registration No. 12179</p>	<p>THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY RENE R. OLIVAREZ, P.E. 102302 DATED 10/09/18 TBPE REGISTRATION NO. 12179</p>  <p>10/09/18</p>		
RO Project Number 18008			
R.O.	G.M.	--	--



1 ROOF MECHANICAL DEMO PLAN
3/32" = 1'-0"

GENERAL DEMOLITION NOTES

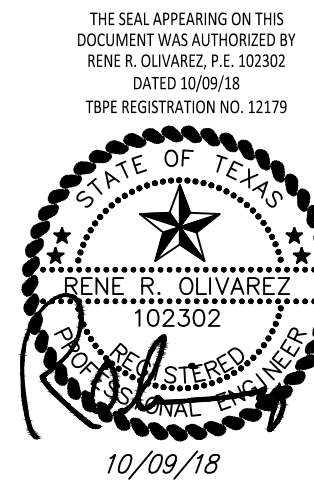
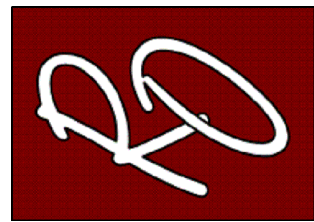
- A. COORDINATE DEMOLITION WORK WITH ELECTRICAL AND OTHER DISCIPLINES AS REQUIRED.
- B. EQUIPMENT LOCATIONS ARE SHOWN APPROXIMATELY. VERIFY ALL DIMENSIONS AND LOCATIONS AT JOB SITE PRIOR TO BID.
- C. IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAVE VERIFIED EXISTING JOBSITE CONDITIONS DURING THE BIDDING PERIOD, SO THEY WILL HAVE DISCOVERED THE FULL SCOPE OF WORK INVOLVED WITH THE REPLACEMENT OF EQUIPMENT. THE SCOPE OF THE WORK SHALL INCLUDE ALL MATERIALS FOR A COMPLETE INSTALLATION INCLUDING DEVICES, EQUIPMENT, OR APPARATUS WHICH MUST BE REROUTED, RELOCATED, OR REMOVED EITHER TEMPORARILY OR PERMANENTLY, OR WHICH MUST BE PROVIDED TO ACCOMMODATE THE INDICATED MECHANICAL SYSTEMS AND B.A.S.. NOT ALL EXISTING CONDITIONS ARE NECESSARILY INDICATED ON THE DRAWINGS.
- D. WHEN AN EQUIPMENT IS IDENTIFIED TO BE REMOVED, THE OWNER HAS FIRST RIGHT OF REFUSAL BEFORE DISPOSING OF THAT EQUIPMENT.
- E. PROVIDE ALL NECESSARY CLEAR PATH TO MOVE DEMOLISHED EQUIPMENT OUT OF THE FACILITY AS WELL TO BRING NEW EQUIPMENT INTO THE BUILDING. MODIFY EXISTING PIPING, DUCTWORK CONDUITS, AS REQUIRED TO COMPLETE THE DEMOLITION.
- F. THE "EXISTING" MECHANICAL SYSTEMS INDICATED ON THIS SHEET ARE BASED ON THE INFORMATION AVAILABLE AND MAY BE INCOMPLETE AND INACCURATE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ACTUAL CONDITIONS AND MAKE SUITABLE ADJUSTMENTS AS NECESSARY, TO ACCOMMODATE NEW WORK, AT NO EXTRA COST TO THE OWNER. CONDITIONS DIFFERENT TO THOSE INDICATED SHALL BE INCORPORATED INTO THE CONSTRUCTION DOCUMENTS. NOTE THAT ANY UNCOVERED SYSTEMS MUST BE CAREFULLY IDENTIFIED PRIOR TO MODIFICATIONS.
- G. CONTRACTOR SHALL COORDINATE HIS WORK WITH ALL TRADES AND INCLUDE ANY MODIFICATIONS NEEDED TO ACCOMMODATE THEIR WORK.
- H. EXISTING DUCTWORK TO REMAIN AND BE REUSED.

KEYED NOTES: DEMOLITION

- 1 EXISTING MECHANICAL EQUIPMENT TO BE REMOVED AND REPLACED WITH NEW UNITS. REFER TO SHEET M1.0 FOR NEW SCOPE OF WORK. VERIFY EXACT LOCATION ON SITE.
- 2 CONTRACTOR SHALL ENSURE THAT EXISTING CONDENSATE LINE IS FREE OF CLOGS AND DRAINS TO PROPER OUTLET.
- 3 EXISTING DISCONNECT TO BE REMOVED AND REPLACED. SEE SHEET M1.0.
- 4 EXISTING BREAKER AS SHOWN PER THE "EXISTING MECHANICAL EQUIPMENT SCHEDULE" BELOW. SURVEY OF EXISTING WIRE WAS NOT CONDUCTED. CONTRACTOR SHALL CONDUCT SURVEY OF EXISTING WIRE SERVING UNITS AND MAKE NO ASSUMPTIONS ABOUT EXISTING WIRE SIZE WHEN IT COMES TO DOWNGRADING OR UPGRADING THE BREAKER.
- 5 REMOVE EXISTING THERMOSTAT, PATCH WALL, AND PREPARE SURFACE FOR NEW BUILDING AUTOMATION SPACE TEMPERATURE AND HUMIDITY THERMOSTAT.
- 6 EXISTING CONDENSER AND DUCTLESS SPLIT TO REMAIN.
- 7 APPROXIMATE LOCATION OF PANELS ON EXTERIOR SOUTH SIDE OF BUILDING.

EXISTING MECHANICAL EQUIPMENT SCHEDULE									
TAG UNIT NO.	VOLTAGE	PHASE	EXISTING BREAKER	MANUFACTURER	MODEL	SERIAL NO.	TONS	REFRIGERANT	NOTES
RTU-1	460	3	20	RHEEM	RLNL-A060DM 000	7531F041004165	5	R410A	1
ACCU-2	208/230	1		GOODMAN	WIFPE-036SVW2/V5X140361AD	*/1706150142	3	R410A	1
RTU-2	208/230	1	20	RHEEM	RSNL-B024JK 000	F071402806	2	R410A	1
RTU-3	208/230	1	20	RHEEM	RSNL-B024JK 000	F091400173	2	R410A	1
RTU-4	208/230	1	20	RHEEM	RSNL-B024JK 000	F071402804	2	R410A	1
RTU-5	208/230	1	20	RHEEM	RSNL-B024JK 000	F071402803	2	R410A	1
RTU-6	208/230	1	20	RHEEM	RSNL-B024JK 000	F101401010	2	R410A	1
RTU-7	208/230	1	20	CARRIER	50SS-018-301	4194G40008	1.5	R22	1
RTU-8	208/230	1	20	CARRIER	50SS-018-301	4194G40011	1.5	R22	1
RTU-9	208/230	1	20	CARRIER	50SS-018-301	4094G40920	1.5	R22	1
RTU-10	460	3	25	RHEEM	RLNL-A048DL 000	7530F091002888	4	R410A	1

NOTES:
1. UNIT TAGS ARE ONLY FOR IDENTIFICATION WITHIN THESE PLANS AND MAY NOT MATCH EXISITING UNIT TAGS.



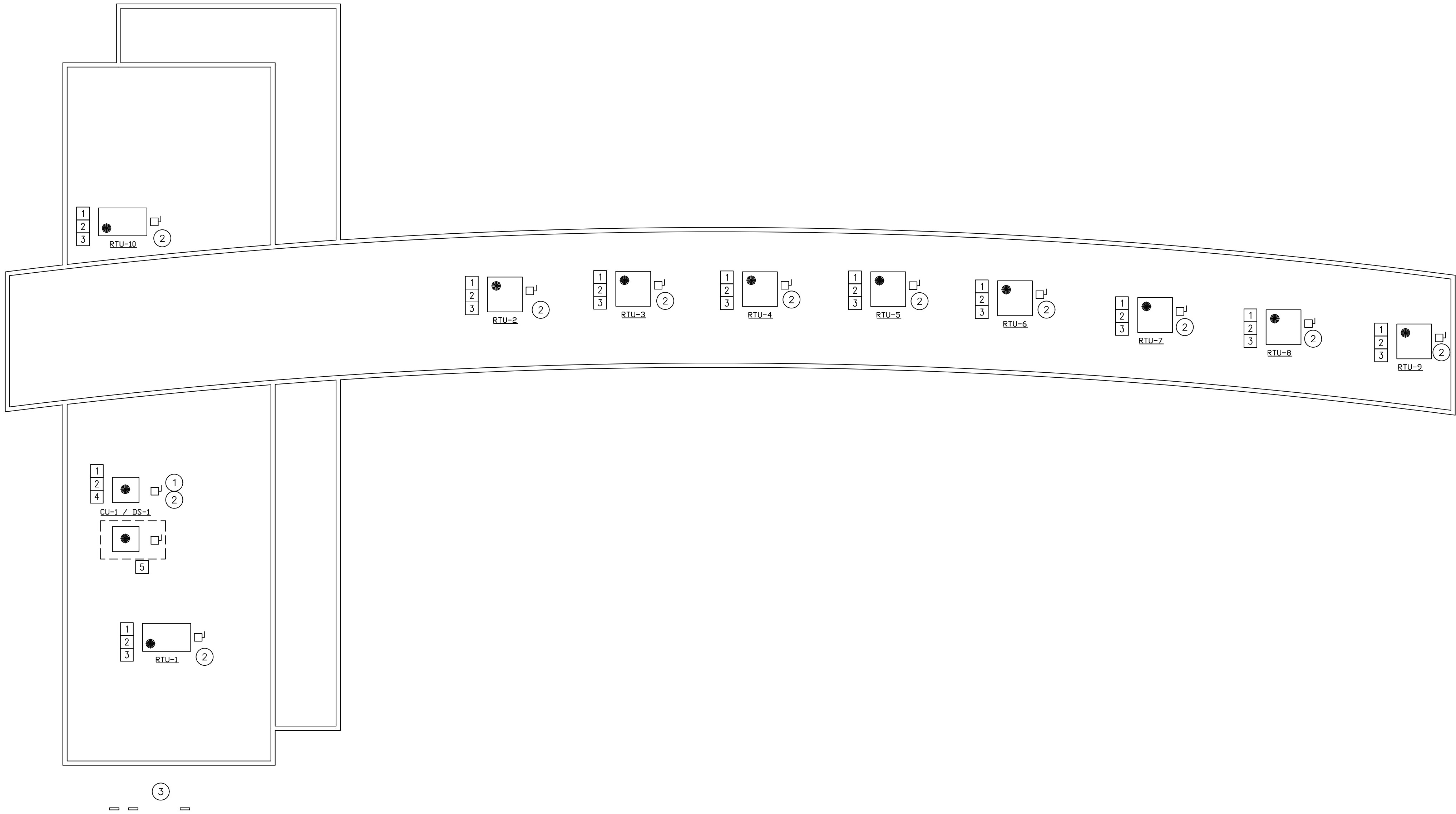
PROJECT NAME
PHARR INTERNATIONAL BRIDGE
HVAC REPLACEMENTS

PROJECT LOCATION
9900 S CAGE BLVD
PHARR, TX 78577

NO.	DATE	DESCRIPTION
1	10/09/2018	

PROJECT NO.: 18008
DRAWN BY: G.M.
CHECKED BY: R.O.

SHEET TITLE:
ROOF MECHANICAL
DEMOLITION PLAN



1 ROOF MECHANICAL PLAN
3/32" = 1'-0"

MECHANICAL GENERAL NOTES

- A. THE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL LOCATION OF EQUIPMENT. IT IS THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS THAT EQUIPMENT BE REPLACED, TESTED AND READY FOR OPERATION WHETHER OR NOT EVERY ITEM OF EQUIPMENT, ACCESSORY, DEVICE, ETC. IS SHOWN. REFERENCE SHALL BE MADE TO THE FULL DRAWING PACKAGE. THE MECHANICAL SUBCONTRACTOR SHALL, WITHOUT EXTRA CHARGE, MAKE REASONABLE MODIFICATIONS IN THE LAYOUT AS NEEDED TO PREVENT CONFLICTS WITH OTHER TRADES, OR FOR PROPER EXECUTION OF THE WORK. FIELD VERIFY ALL DIMENSIONS BEFORE FABRICATING DUCTWORK.
- B. ALL NEW A/C EQUIPMENT SHALL BE CLEANED AFTER THE FINISHING OF DRYWALL AND PRIOR TO THE RELEASE OF BUILDING TO OWNER. MECHANICAL CONTRACTOR TO PROVIDE DOCUMENTATION WITH DATE AND TIME OF UNIT CLEANING.
- C. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO SUBMITTALS.
- D. CONTRACTOR SHALL COORDINATE EQUIPMENT WEIGHTS AND SUPPORTS BASED ON ACTUAL EQUIPMENT SELECTED.
- E. FIELD VERIFY SIZES OF ROOF CURB ADAPTERS AND PROVIDE SHOP DRAWINGS PRIOR TO SUBMITTALS. REFER TO SHEET M2.0 DETAIL NO.2.
- F. FIELD COORDINATE ALL NEW DUCTWORK TRANSITION AND INCLUDE IN SHOP DRAWINGS. REFER TO SHEET M2.0 DETAIL NO.2.
- G. EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE VERIFIED WITH THE ACTUAL EQUIPMENT SELECTED VENDOR DRAWINGS.
- H. MECHANICAL EQUIPMENT SCHEDULE ON SHEET M2.0.
- I. 2015 IECC - ECONOMIZER REQUIRED ON INDIVIDUAL DX COOLING UNITS GREATER THAN 54,000 BTU/H.

KEYED NOTES: MECHANICAL

- 1 COORDINATE FINAL LOCATION OF EQUIPMENT WITH OWNER AND ENGINEER OF RECORD.
- 2 ALL CONDENSATE DRAINS SHALL MATCH EXISTING MATERIALS AND DRAIN TO EXISTING DRAIN SYSTEM. CONTRACTOR SHALL ENSURE THAT EXISTING CONDENSATE LINE IS FREE OF CLOGS AND DRAINS TO PROPER OUTLET.
- 3 PROVIDE ADAPTER CURBS TO FIT INTO EXISTING CURBS PROVIDED BY APPROVED MANUFACTURER. CONTRACTOR TO EXTEND AND ADAPT DUCTWORK FROM EXISTING DUCT TO NEW MECHANICAL UNIT. FIELD VERIFY AND PROVIDE SHOP DRAWINGS.
- 4 INSTALL NEW MINI SPLIT CONDENSER AND DUCTLESS UNIT IN SERVER ROOM. SEE M2.0 MECH SCHEDULE. PROVIDE NEW DISCONNECT.
- 5 EXISTING MINIS PLIT UNIT TO REMAIN.

KEYED NOTES: ELECTRICAL

- 1 ROUTE CIRCUIT TO EXISTING PANEL FOR NEW DUCTLESS SPLIT USING (3) #12 CONDUCTORS AND (1) #12 GROUND IN (1) 3/4" EMT CONDUIT.
- 2 PROVIDE NEW 30A/3P/NF/N1 DISCONNECT.
- 3 APPROXIMATE LOCATION OF PANELS ON EXTERIOR SOUTH SIDE OF BUILDING.

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THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY
RENE R. OLIVAREZ, P.E. 102302
DATED 10/09/18
TBPE REGISTRATION NO. 12179

PROJECT NAME
PHARR INTERNATIONAL BRIDGE
HVAC REPLACEMENTS

PROJECT LOCATION
9900 S CAGE BLVD
PHARR, TX 78577

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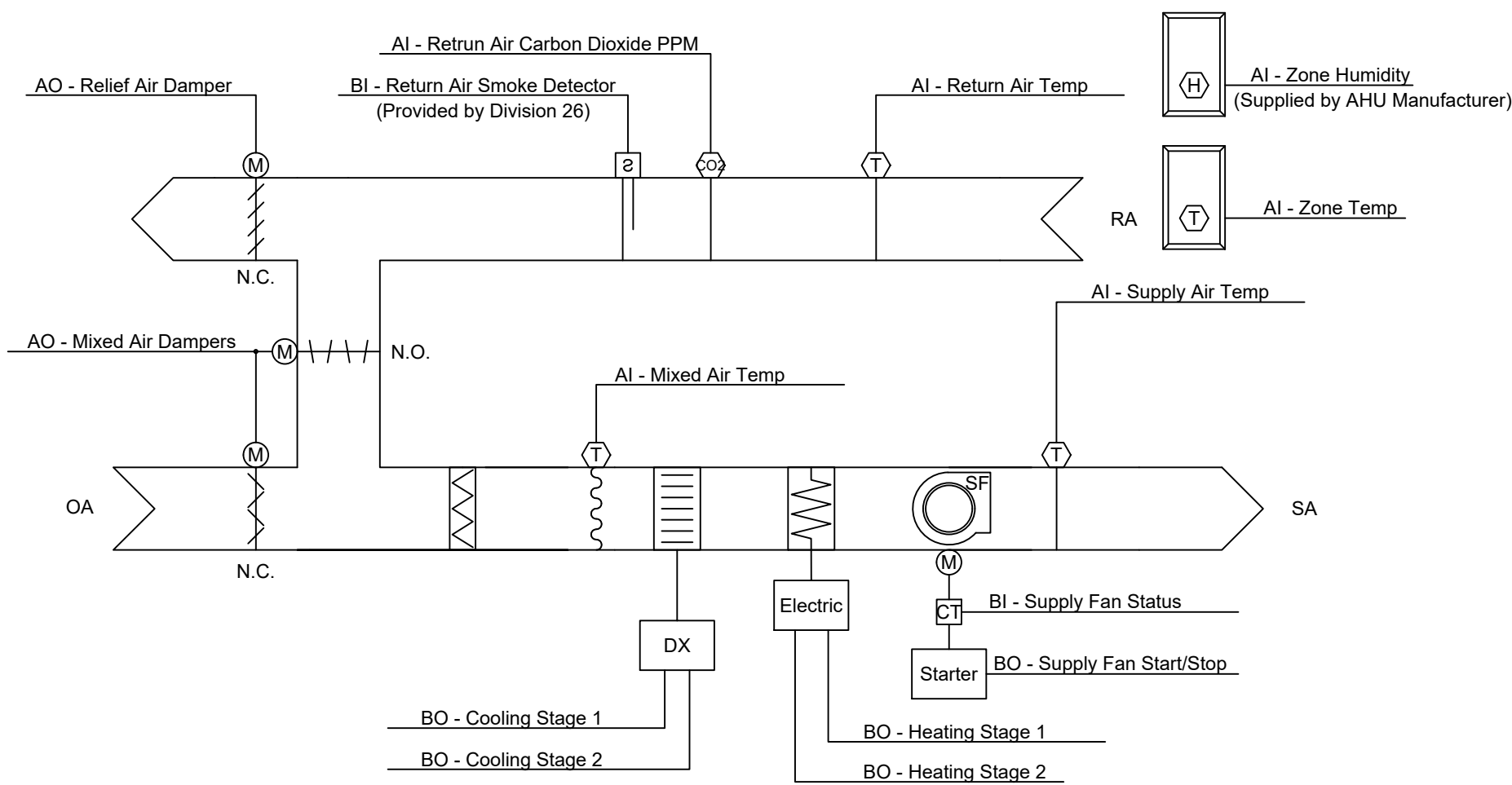
SHEET TITLE:

MECHANICAL
PLAN

S H E E T

M1.0

ROOF TOP UNIT SCHEDULE																									Notes
Unit Tags	Quantity	Fan Performance			Cooling Coil Performance								Heating Coil Performance				Cooling Energy Efficiency		Electrical Data			Weight Manufacturer Model Number			
		CFM	Outside Air	ESP	Gross Cooling Capacity	Gross Sensibel Capacity	EAT DB	EAT WB	LAT DB	LAT WB	MBH	Stages	EAT	LAT	EER	IEER	Voltage	MCA	MOCP						
		cfm	cfm	in H2O	MBh	MBh	F	F	F	F	MBh		F	F	EER		V/ø	A	A						
RTU-1	1	2000	400	0.5	58.78	46.95	80	67	58.26	57.54	20.5	1	70	79.43	12.5	18.4	460/3	11.3	15	1063	TRANE	TZC060	1-15		
RTU-2 TRHU 9	8	800	160	0.5	24.7	17.2	80	67	60	57	17.1	1	70	89.8	12	14	230/1	28	30	358	TRANE	4TTC4024	1-15		
RTU-10	1	1600	320	0.5	46.27	37.21	80	67	58.47	57.71	41	2	70	93.59	13.3	18.5	460/3	19.8	20	1009	TRANE	TZC048	1-15		
NOTES:																									
1. SINGLE POINT POWER WITH INTEGRAL NON-FUSED DISCONNECT SWITCH.																									
2. DOUBLE WALL CONSTRUCTION WITH MINIMUM 1" FOAM INSULATION.																									
3. PROVIDE HINGED ACCESS DOORS.																									
4. RECIRCULATION DAMPER FOR UN-OCCUPIED MODE.																									
5. DIRTY FILTER SENSOR ON OUTDOOR AND EXAHUST AIR.																									
6. 120V GFCI SERVICE OUTLET, FACTORY MOUNTED, FACTORY WIRED.																									
7. APPROVED MANUFACTURES SHALL THEIR HIGHEST EFFICIENCY ALTERNATIVE WITH SCHEDULED IEER VALUES OR GREATER.																									
8. RTU MANUFACTURER IS RESPONSIBLE FOR MEETING ALL REQUIREMENTS DETAILED IN THE CONTROLS DIAGRAMS AND SEQUENCES OF OPERATION PUBLISHED IN THESE CONSTRUCTION DOCUMENTS.																									
9. PROGRAMMABLE ROOM TEMPERATURE SENSOR AND DUCT MOUNTED HUMIDITY SENSOR FOR ENHANCED DEHUMIDIFICATION SEQUENCE.																									
10. PROVIDE WITH INVERTER SPEED COMPRESSORS TO MODULATE TO A MINIMUM CAPACITY OF 25% OR LESS AND MAINTAIN HIGH PART LOAD EFFICIENCY.																									
11. PROVIDE UNITS WITH VARIABLE SPEED FANS TO MODULATE TO ROOM TEMP FOR SINGLE ZONE VAV.																									
12. 2015 IECC - ECONOMIZER REQUIRED ON INDIVIDUAL DX COOLING UNITS GREATER THAN 54,000 BTU/H.																									
13. PROVIDE CURB ADAPTERS TO FIT INTO EXISTING CURBS PROVIDED BY APPROVED MANUFACTURER.																									
14. PROVIDE UNITS WITH FROSTAT, AND FACTORY HAIL GUARDS.																									
15. PROVIDE BACNET COMMUNICATION CARD FOR CONTROLS INTERFACE.																									
16. PROVIDE MINIMUM 5 YEAR PARTS WARRANTY.																									



RUN CONDITIONS - SCHEDULED:
THE UNIT SHALL RUN ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN THE FOLLOWING MODES:

OCCUPIED MODE: THE UNIT SHALL MAINTAIN

- A 75°F (ADJ.) COOLING SETPOINT
- A 68°F (ADJ.) HEATING SETPOINT.

UNOCCUPIED MODE (NIGHT SETBACK): THE UNIT SHALL MAINTAIN

- A 85°F (ADJ.) COOLING SETPOINT.
- A 55°F (ADJ.) HEATING SETPOINT.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH ZONE TEMP: IF THE ZONE TEMPERATURE IS GREATER THAN THE COOLING SETPOINT BY 4°F (ADJ.)
- LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY 4°F (ADJ.)

ZONE OPTIMAL START:
THE UNIT SHALL USE AN OPTIMAL START ALGORITHM FOR MORNING START-UP. THIS ALGORITHM SHALL MINIMIZE THE UNOCCUPIED WARM-UP OR COOL-DOWN PERIOD WHILE STILL ACHIEVING COMFORT CONDITIONS BY THE START OF SCHEDULED OCCUPIED PERIOD.

RETURN AIR SMOKE DETECTION:
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A RETURN AIR SMOKE DETECTOR STATUS.

SUPPLY FAN:
THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

COOLING STAGES:
THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND STAGE THE COOLING TO MAINTAIN ITS COOLING SETPOINT. TO PREVENT SHORT CYCLING, THERE SHALL BE A USER DEFINABLE (ADJ.) DELAY BETWEEN STAGES, AND EACH STAGE SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.

THE COOLING SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS GREATER THAN 60°F (ADJ.).
- AND THE ECONOMIZER IS DISABLED OR FULLY OPEN.
- AND THE ZONE TEMPERATURE IS ABOVE COOLING SETPOINT.
- AND THE SUPPLY FAN STATUS IS ON.
- AND THE HEATING IS NOT ACTIVE.

ECONOMIZER:
THE CONTROLLER SHALL MEASURE THE MIXED AIR TEMPERATURE AND MODULATE THE ECONOMIZER DAMPERS IN SEQUENCE TO MAINTAIN A SETPOINT 2°F (ADJ.) LESS THAN THE SUPPLY AIR TEMPERATURE SETPOINT. THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A MINIMUM ADJUSTABLE POSITION OF 20% (ADJ.) OPEN WHENEVER OCCUPIED.

THE ECONOMIZER SHALL BE ENABLED WHENEVER:

- OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.)
- AND THE OUTSIDE AIR ENTHALPY IS LESS THAN 22 BTU/LB (ADJ.)
- AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE THE RETURN AIR TEMPERATURE.
- AND THE OUTSIDE AIR ENTHALPY IS LESS THAN THE RETURN AIR ENTHALPY.
- AND THE SUPPLY FAN IS ON.

THE ECONOMIZER SHALL CLOSE WHENEVER:

- MIXED AIR TEMPERATURE DROPS FROM 40°F TO 35°F (ADJ.)
- OR ON LOSS OF SUPPLY FAN STATUS.

THE OUTSIDE AND EXHAUST AIR DAMPERS SHALL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN WHEN THE UNIT IS OFF. IN OPTIMAL START UP THE RETURN AIR DAMPER SHALL OPERATE AS DESCRIBED IN THE OCCUPIED MODE EXCEPT THAT THE OUTSIDE AIR DAMPER SHALL MODULATE TO FULLY CLOSED.

THE RELIEF DAMPER SHALL OPEN LINEARLY IN RELATION TO THE ECONOMIZER DAMPER POSITION. THE RELIEF DAMPER SHALL OPEN 20%(ADJ.) WHEN THE ECONOMIZER DAMPER IS OPEN 40%. THE RELIEF DAMPER SHALL OPEN 80%(ADJ.) WHEN THE ECONOMIZER DAMPER IS OPEN 100%.

MINIMUM OUTSIDE AIR VENTILATION - CARBON DIOXIDE (CO2) CONTROL:
WHEN IN THE OCCUPIED MODE, THE CONTROLLER SHALL MEASURE THE RETURN AIR CO2 LEVELS AND MODULATE THE OUTSIDE AIR DAMPERS CLOSED AND RETURN AIR DAMPERS OPEN AT A RATE OF 2% EVERY 10 MINUTES, TO MAINTAIN CO2 CONCENTRATIONS BELOW A CO2 SETPOINT OF 750 PPM (ADJ.). IN THE EVENT THE CO2 LEVEL IN THE ZONE(S) EXCEEDS THE CO2 SETPOINT, THE OUTSIDE AIR DAMPER SHALL MODULATE IN CONJUNCTION WITH THE RETURN AIR DAMPER AT AN IDENTICAL RATE, TO INCREASE THE OUTSIDE AIR PERCENTAGE THROUGH THE ROOF TOP UNIT UP TO THE SCHEDULED MINIMUM O.A.

MIXED AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE MIXED AIR TEMPERATURE.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH MIXED AIR TEMP: IF THE MIXED AIR TEMPERATURE IS GREATER THAN 90°F (ADJ.).
- LOW MIXED AIR TEMP: IF THE MIXED AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

RETURN AIR CARBON DIOXIDE (CO2) CONCENTRATION MONITORING:
THE CONTROLLER SHALL MEASURE THE RETURN AIR CO2 LEVELS.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH RETURN AIR CARBON DIOXIDE CONCENTRATION: IF THE RETURN AIR CO2 CONCENTRATION IS GREATER THAN 1000PPM (ADJ.) WHEN IN THE OCCUPIED MODE.

SPACE HUMIDITY:
THE CONTROLLER SHALL MONITOR THE SPACE HUMIDITY AND USE AS REQUIRED FOR ECONOMIZER CONTROL OR HUMIDITY CONTROL.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH SPACE HUMIDITY: IF THE SPACE HUMIDITY IS GREATER THAN 70% (ADJ.).
- LOW SPACE HUMIDITY: IF THE SPACE HUMIDITY IS LESS THAN 35% (ADJ.).

RETURN AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE RETURN AIR TEMPERATURE.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH RETURN AIR TEMP: IF THE RETURN AIR TEMPERATURE IS GREATER THAN 90°F (ADJ.).
- LOW RETURN AIR TEMP: IF THE RETURN AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

SUPPLY AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS GREATER THAN 120°F (ADJ.).
- LOW SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

ECONOMIZER FAULT DETECTION AND DIAGNOSTICS:

- OA, SA AND RA TEMPERATURE SENSORS MUST BE PERMANENTLY INSTALLED.
- TEMP. SENSORS MUST HAVE AN ACCURACY OF +2°F OVER THE RANGE OF 40° TO 80°F.
- REFRIGERANT PRESSURE SENSORS, WHERE USED, MUST HAVE AN ACCURACY OF +3° OF FULL SCALE.
- UNIT CONTROLLER MUST BE CAPABLE OF PROVIDING SYSTEM STATUS, MANUALLY INITIATING EACH OPERATING MODE AND REPORTING FAULTS TO A FAULT MANAGEMENT APPLICATION.
- FDD SYSTEM MUST BE CAPABLE OF DETECTING AIR TEMPERATURE SENSOR FAULT, ECONOMIZER FAULTS, DAMPER NOT MODULATING AND EXCESS OUTDOOR AIR.

1

RTU ECONOMIZER ELECTRIC HEAT

NTS

2

ROOF TOP UNIT MOUNTING DETAIL

NTS

3

COOLING COIL CONDENSATE DRAIN

NTS

4

PIPING ROOF PENETRATION

NTS

5

PIPING ROOF PENETRATION

NTS

6

ROOF DISCONNECT RACK DETAIL

NTS

7

ROOF DISCONNECT RACK DETAIL

NTS

DUCTLESS SPLIT SYSTEM SCHEDULE	
MARK	DS-1
SERVES	OFFICE
TYPE	HIGH WALL
AIRFLOW (CFM)	324-500
TOTAL COOLING (MBH)	18.0
VOLTS/PHASE/HERTZ	230 / 1 / 60
MCA	1
MOCP	20
MANUFACTURER	MITSUBISHI
MODEL NUMBER	FFHP182WQ2
MARK	DSCU-1
VOLTS/PHASE/HERTZ	230 / 1 / 60
MCA	9.98
MOCP	20
MANUFACTURER	FRIGIDAIRE
MODEL NUMBER	FFHP182CQ2
NOTES:	ALL
NOTES: 1. PROVIDE REFRIGERANT PIPING IN ACCORDANCE WITH MFR'S RECOMMENDATIONS. 2. PROVIDE WITH HEAT PUMP 3. PROVIDE WALL MOUNTED THERMOSTAT. 4. INDOOR UNIT RECEIVES POWER FROM OUTDOOR UNIT THROUGH FIELD SUPPLIED INTERCONNECTED WIRING.	

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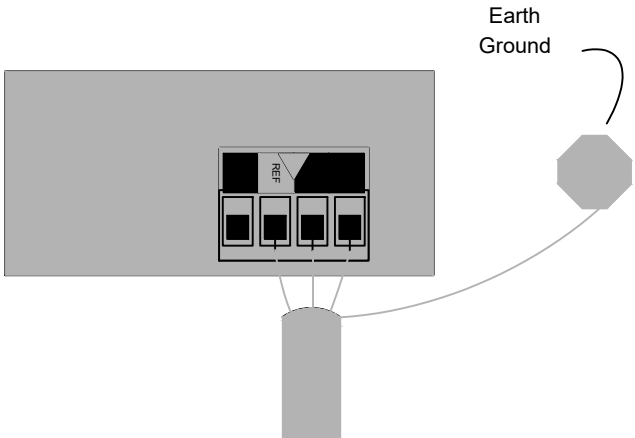
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TBPE Firm Registration No. 12179
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PHARR INTERNATIONAL BRIDGE
HVAC REPLACEMENTS

9900 S CAGE BLVD
PHARR, TX 78577

PROJECT NAME	PHARR INTERNATIONAL BRIDGE HVAC REPLACEMENTS
PROJECT LOCATION	9900 S CAGE BLVD PHARR, TX 78577
DESCRIPTION	
DATE	10/09/2018
NO.	1
PROJECT NO.: 18008	
DRAWN BY: G.M.	
CHECKED BY: R.O.	
SHEET TITLE:	
MECHANICAL SCHEDULE & DETAILS	
S H E E T M2.0	

BUILDING AUTOMATION SYSTEM

Category	Rules / Maximums Allowed
General	Typically daisy-chained; branch or star configuration acceptable when repeaters are used. See End of Line Switching and Repeater Guideline graphic.
Number of Devices	<p>When all of the devices connected on the FC Bus are Metasys FECs, VMAs, and/or IOMs, the device and bus segment limits are:</p> <p>100 devices total per FC Bus (maximum) 3 bus segments per FC Bus (maximum) 50 devices per bus segment (maximum, not to exceed 100 devices per FC Bus)</p> <p>When one or more TEC26xx Series thermostat or third-party MS/TP device is connected on the FC Bus, the device and bus segment limits are:</p> <p>64 devices total per FC Bus (maximum) 3 bus segments per FC Bus (maximum) 32 devices per bus segment (maximum, not to exceed 64 devices per FC Bus)</p> <p>Note: Metasys MS/TP devices generate less data traffic than third-party MS/TP devices and TEC26xx thermostats. Connecting third-party devices or TEC26xx thermostats to the FC Bus increases data traffic, reduces bus performance, and reduces the number of devices that can be connected to the bus. Bus segments on an FC Bus are connected with repeaters (only). Up to two cascaded repeaters may be applied to an FC Bus (to connect three bus segments).</p>
Line Length and Type	<p>When all of the devices connected on the FC Bus are Metasys FECs, VMAs, and/or IOMs, the cable length limits are:</p> <p>Each bus segment can be up to 1520 m (5000 ft) in length (using 22 AWG 3-wire twisted, shielded cable). Each FC Bus can be up to 4750 m (15,000 ft) in length (using 22 AWG 3-wire twisted, shielded cable).</p> <p>When one or more TEC26xx Series thermostat or third-party MS/TP device is connected on the FC Bus, the device and bus segment limits are:</p> <p>Each bus segment can be up to 1220 m (4000 ft) in length (using 22 AWG 3-wire twisted, shielded cable). Each FC Bus can be up to 3660 m (12,000 ft) in length (using 22 AWG 3-wire twisted, shielded cable). When using fiber-optic connections: 2,010 m (6,600 ft.) between two fiber modems 22 AWG Stranded, 3-Wire Twisted, Shielded Cable</p>
Cable	22 AWG stranded, 3-wire, twisted shielded cable
EOL Termination	<p>End-of-Line (EOL) termination is required on the FC Bus to reduce signal reflection when data transmissions reach the end of a bus segment and bounce back. EOL termination is built into some Metasys FC devices and is enabled with a switch or jumper on the device.</p> <p>EOL Termination on NAEs An EOL switch on an NAE enables EOL termination. For those NAEs with two FC Bus connections, two EOL double-pole switches are provided. Set the EOL switch to the ON (up) position to set the controller as an EOL termination device.</p> <p>EOL Termination on Switch-Terminating Devices Some field controllers have an EOL switch or jumper. Such devices include FECs, IOMs, VMAs, ZFR1810s, and repeaters. Set the EOL termination to On for any of these devices when it is the last device on a bus segment.</p> <p>EOL Termination on Devices Without EOL Provision For the devices such as TECs and third-party controllers in which no EOL provision is provided, install the MS-BACEOL-0 RS485 End-of-Line Terminator at the device if at the end of the bus segment.</p> <p>EOL Termination Across the FC Bus The FC Bus may consist of up to three bus segments. Each bus segment on an FC Bus requires two EOL termination devices, one at each end of the bus segment. All other devices on the FC Bus should have their EOL termination disabled (EOL switches Off) . If only one device on an FC segment has an EOL termination, it must be set to On.</p> <p>EOL on FC Bus Repeater When using repeaters in the FC Bus, set the EOL jumpers based on the position of the repeater in the run.</p>
<div><div></div><div><p>SHIELD GROUNDING</p><p>The shield should be earth grounded at one and only one point for the entire bus segment. (Preferably in the NAE Panel.) The shield screws on the controllers are simply a convenient way to continue the daisy chain of the bus. They are not attached to earth ground. You can use the shield terminal or twist together the shield and tape back at each controller.</p></div></div>	

RECOMMENDED MSTP FIELD CONTROLLER BUS CABLE					
Type	Typical Usage	Anixter #	Belden #	pF/ft	Area
22/3c Shielded Plenum	Open Plenum Installations. 38400+ Baud RS-485 Communication.	CBL-22/3-FC-PLN	6501FE	25	0.014
22/3c Shielded PVC	EMT (Raceway) Installations. 38400+ Baud RS-485 Communication.	CBL-22/3-FC-PVC	5501FE	31	0.015

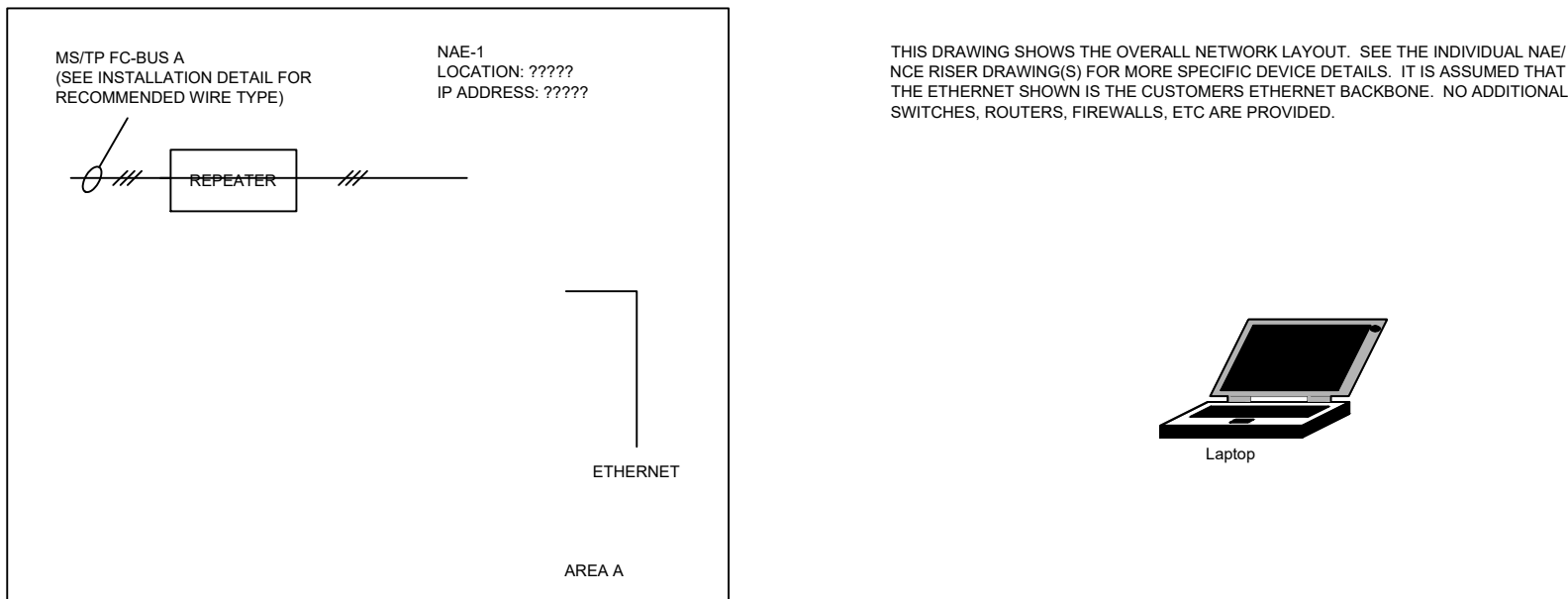
RECOMMENDED MSTP SENSOR ACTUATOR BUS CABLE					
Type	Typical Usage	Anixter #	Belden #	pF/ft	Area
22/2pr Shielded Plenum	Open Plenum Installations. 38400+ Baud RS-485 Communication.	CBL-22/2P-SA-PLN	6541FE	33	0.033
22/2pr Shielded PVC	EMT (Raceway) Installations. 38400+ Baud RS-485 Communication.	CBL-22/2P-SA-PVC	5541FE	31	0.034

METASYS MSTP NETWORK INSTALLATION DETAILS

The information in this document is not intended to replace the published Technical Product Literature for the Johnson Controls systems and products presented. The installation instructions that are packed with products, and the Technical Bulletins and Product Bulletins released with Johnson Controls systems and products supersede the information on this page. It is the responsibility of the product installer and product user to obtain and follow the product installation, operation, and safety procedures provided with the products or project specific information required by specification or local codes.

END OF THE LINE SWITCHING AND REPEATER GUIDELINES

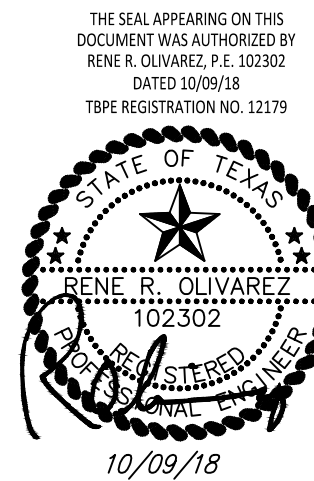
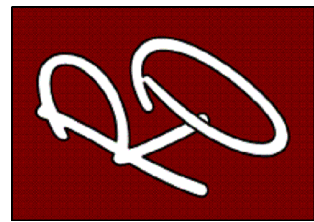
METASYS NETWORK LAYOUT



KEYED NOTES:

- DISCONNECT EXISTING CONTROL SYSTEM FROM DEMO ROOFTOP UNITS AND RECONNECT AND PROGRAM TO NEW ROOFTOP UNITS.
- IF EXISTING MECHANICAL SYSTEMS SUCH AS VAV BOXES, DAMPERS, EXHAUST FANS HAVE CONTROLS, THEY SHALL BE REPLACED WITH NEW CONTROLLERS AND CONNECTED TO MAIN SUPERVISORY CONTROLLER. SYSTEMS SHALL CONTINUE TO OPERATE DURING WORKING HOURS WITHOUT DISTURBANCE.

ENGINEERING, PLLC
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PROJECT NAME
PHARR INTERNATIONAL BRIDGE
HVAC REPLACEMENTS

PROJECT LOCATION
9900 S CAGE BLVD
PHARR, TX 78577

DESCRIPTION	DATE	NO.							
	10/09/2018	1							

PROJECT NO.: 18008
DRAWN BY: G.M.
CHECKED BY: R.O.
SHEET TITLE:

B.A.S. SYSTEM
DETAILS

S H E E T
M3.0



PHARR MEMORIAL LIBRARY HVAC REPLACEMENTS
121 E CHEROKEE AVE, PHARR, TX 78577

PROJECT CONTACTS:

RO ENGINEERING	956-292-3336
CITY OF PHARR	956-402-4000
CITY OF PHARR ENGINEERING	956-402-4221

CITY COMMISSION

DR. AMBROSIO "AMOS" HERNANDEZ.....	MAYOR
ELEAZAR GUAJARDO.....	COMMISSIONER PLACE 1
ROBERTO "BOBBY" CARRILLO.....	COMMISSIONER PLACE 2
RAMIRO CABALLERO.....	COMMISSIONER PLACE 3
DANIEL CHAVEZ.....	COMMISSIONER PLACE 4
RICARDO MEDINA.....	COMMISSIONER PLACE 5
MARIO A. BRACAMONTES.....	COMMISSIONER PLACE 6

CONSTRUCTION NOTES:

1. CONTRACTOR SHALL OBTAIN ELECTRICAL PERMITS PRIOR TO CONSTRUCTION.
2. THE CONTRACTOR SHALL CALL 1-800-DIGTESS PRIOR TO ANY EXCAVATION OR DIGGING.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND IDENTIFYING ALL UNDERGROUND UTILITIES PRIOR TO STARTING ANY WORK.
4. ALL ELECTRICAL WIRING AND CONDUIT SHALL BE CONCEALED AS TO PREVENT VANDALISM.
5. THE CONTRACTOR SHALL BRING TO THE ATTENTION OF THE ENGINEER ANY CONFLICT AT THE JOB SITE PRIOR TO CONSTRUCTION.



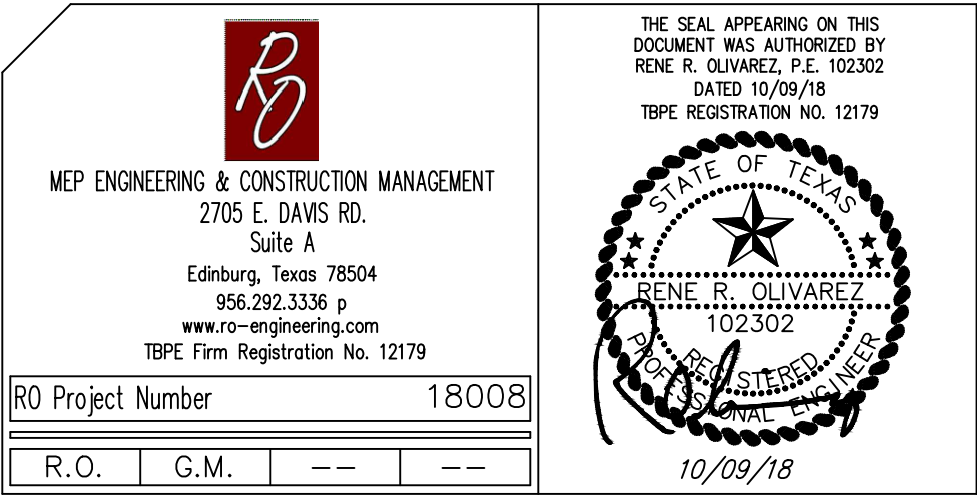
INDEX TO SHEETS:

CONSTRUCTION PLANS:

M0.0	MECHANICAL SYMBOLS & ABBREVIATIONS
MD1.0	1ST FLOOR MECHANICAL DEMOLITION PLAN
MD1.1	ROOFTOP UNIT MECHANICAL DEMOLITION PLAN
M1.0	1ST FLOOR MECHANICAL PLAN
M1.1	ROOFTOP UNIT MECHANICAL PLAN
M2.0	MECHANICAL SCHEDULES & RTU ECONOMIZER DETAIL
M2.1	MECHANICAL DETAILS
M3.0	B.A.S. SYSTEM DETAILS

GENERAL NOTES:

1. CAUTION: GAS, FIBER OPTIC, TELEPHONE, ELECTRIC, AND CITY OF PHARR UTILITIES EXIST WITHIN THE LIMITS OF CONSTRUCTION OF THIS PROJECT. NOTIFY RESPECTIVE UTILITY COMPANIES. ANY DRAINAGE TO PUBLIC OR PRIVATE LINES SHALL BE REPAIRED IN ACCORDANCE WITH THE RESPECTIVE UTILITY COMPANY REQUIREMENTS. COST FOR SUCH REPAIRS SHALL BE SUBSIDIARY TO OTHER BID ITEMS OF THE PROJECT PROPOSAL.
2. THERE SHALL BE MINIMUM INTERRUPTION OF TRAFFIC AND ACCESS TO ADJACENT RESIDENTS ALONG THE PROJECT SITE. IF ROADS ARE TO BE CLOSED, THE CITY OF EDINBURG FIRE AND POLICE DEPARTMENTS SHALL BE NOTIFIED AT LEAST 48 HOURS BEFORE SUCH CLOSING.
3. CONTRACTOR TO FIELD VERIFY ALL SITE DIMENSIONS PRIOR TO COMMENCING IMPROVEMENTS.
4. CONTRACTOR TO INSTALL AS PER MANUFACTURER RECOMMENDATIONS.
5. CONTRACTOR SHALL COORDINATE POWER OUTAGES WITH CITY OFFICIALS AND POWER COMPANY.



DUCT SYMBOLS

DOUBLE LINE SYMBOL	DESCRIPTION	SINGLE LINE SYMBOL
	DUCT- FIRST NUMBER IS VISIBLE DIMENSION.	
	MITERED ELBOW W/TURNING VANES	
	RADIUS ELBOW W/VANE(S) (1.5=R/D STANDARD)	
	DUCT SECTION, POSITIVE PRESSURE	
	DUCT SECTION, NEGATIVE PRESSURE	
	DUCT & AIRFLOW UP(LEFT) POSITIVE PRESSURE	
	DUCT & AIRFLOW DN(RIGHT) POSITIVE PRESSURE	
	DUCT & AIRFLOW UP(LEFT) NEGATIVE PRESSURE	
	DUCT & AIRFLOW DN(RIGHT) NEGATIVE PRESSURE	
	DUCT & AIRFLOW UP(LEFT) NEG./POS. PRESSURE	
	DUCT & AIRFLOW DN(RIGHT) NEG./POS. PRESSURE	
	CHANGE OF ELEVATION=RISE (R), DROP (D)	
	DUCT W/INTERNAL LINING	
	CLEAR INTERNAL DIMENSIONS SHOWN	
	ACCESS DOOR=SIDE (L), BOTTOM (M), TOP (R)	
	FLEXIBLE CONNECTOR	
	FLEXIBLE DUCT	
	FD- FIRE DAMPER, SD- SMOKE DAMPER, FSD- FIRE/SMOKE DAMPER.	
	MANUAL VOLUME DAMPER-SPECIFIC TYPE, NO LABEL-BUTTERFLY, OBO-OPPOSED BLADED DAMPER, PBD-PARALLEL BLADE DAMPER	
	MOTORIZED DAMPER OR ZONE CONTROL DAMPER	
	BRANCH TAP-W/45 DEG. ENTRY	
	BRANCH TAP-CONICAL SPIN-IN	
	BRANCH TAP-STRAIGHT SPIN-IN	
	TRANSITION	
	EXISTING DUCTWORK TO BE DEMOLISHED	
	EXISTING DUCTWORK TO REMAIN	
	HVAC - EQUIP AS NOTED	
	AIR DEVICE, SUPPLY- CEILING. CLEAR	
	AIR DEVICE TAG SPIN-IN DIMENSION AIRFLOW (CFM)	
	AIR DEVICE, RETURN- CEILING.	
	AIR DEVICE, EXHAUST- CEILING.	
	AIR DEVICE, SUPPLY- SIDEWALL.	
	AIR DEVICE, RETURN/EXHAUST- SIDEWALL.	

ABBREVIATIONS

A	ABV	ABOVE
	AC	ALTERNATING CURRENT / ABOVE CEILING
	ACMPR	AIR COMPRESSOR
	ACU	AIR CONDITIONING UNIT
	AF	ABOVE FINISHED FLOOR
	AFMS	AIR FLOW MEASURING STATION
	AHU	AIR HANDLING UNIT
	AMB	AMBIENT
	AMP	AMPERE
	ANSI	"AMERICAN NATIONAL STANDARDS INSTITUTE"
	APPROX.	APPROXIMATE
	ARI	AMERICAN REFRIGERATION INSTITUTE
	ASHRAE	"AMERICAN SOCIETY OF HEATING, REFRIGERATION, and AIR CONDITIONING ENGINEERS"
	ASME	"AMERICAN SOCIETY OF MECHANICAL ENGINEERS"
	ASPE	"AMERICAN SOCIETY OF PLUMBING ENGINEERS"
	ASTM	"AMERICAN SOCIETY FOR TESTING AND MATERIALS"
	AVG	AVERAGE
	AWWA	"AMERICAN WATER WORKS ASSOCIATION"
B	B	BOILER
	BARO	BAROMETRIC
	BAROPR	BAROMETRIC PRESSURE
	BF	BELOW FLOOR
	BFC	BELOW FINISHED CEILING
	BG	BELOW GRADE
	BHP	BRAKE HORSEPOWER
	BOD	BOTTOM OF DUCT
	BOM	BILL OF MATERIAL
	BOP	BOTTOM OF PIPE
	BTU	BRITISH THERMAL UNIT
C	CCL	COOLING COIL
	CCW	COUNTERCLOCKWISE
	CD	CONDENSATE DRAIN
	CFH	CUBIC FEET PER HOUR
	CFM	CUBIC FEET PER MINUTE
	CH	CHILLER
	CHP	CHILLER WATER PUMP
	CHR	CHILLED WATER RETURN
	CHS	CHILLED WATER SUPPLY
	CLR	CLOSED CIRCUIT COOLER
	CMPR	COMPRESSOR
	CR	CONDENSATE RETURN
	CRU	COMPUTER ROOM UNIT
	CT	COOLING TOWER
	CU	CONDENSING UNIT
	CU.FT.	CUBIC FEET
	CU.IN.	CUBIC INCH
	CV	CONSTANT VOLUME
	CX	CARBON DIOXIDE SENSOR
	CWP	CONDENSER WATER PUMP
	CWR	CONDENSER WATER RETURN
	CWS	CONDENSER WATER SUPPLY
D	dB	DECIBEL
	D	DIAMETER
	DBT	DRY BULB TEMPERATURE
	DC	DIRECT CURRENT
	DDC	DIRECT DIGITAL CONTROL
	DEG	DEGREE
	DENS	DENSITY
	DIA.	DIAMETER
	DIFF	DIFFERENCE or DELTA
	DN	DOWN
	DP	DEEP
	DPT	DEW POINT TEMPERATURE
E	E/A	EXHAUST AIR
	EA	EACH
	EAT	ENTERING AIR TEMPERATURE
	EDH	ELECTRIC DUCT HEATER
	EF	EXHAUST FAN
	EFF	EFFICIENCY
	ENTH.	ENTHALPY
	EOD	EMERGENCY OVERFLOW DRAIN
	ET	EXPANSION TANK
	EVP	EVAPORATIVE COOLER
	EWT	ENTERING WATER TEMPERATURE
	EXP	EXPANSION
F	F	FAHRENHEIT
	FCU	FAN COIL UNIT
	FLR.	FLOOR
	FOB	FLAT ON BOTTOM
	FOT	FLAT ON TOP
	FBM	FEET PER MINUTE
	FPS	FEET PER SECOND
	FTU	FAN POWERED TERMINAL UNIT
	FRN	FURNACE
	FT	FEET
	FT.W.G.	FEET OF WATER GAGE
	FVEL	FACE VELOCITY
G	GAL.	GALLONS
	GPH	GALLONS PER HOUR
	GPM	GALLONS PER MINUTE
	GR	GRAINS
H	HCL	HEATING COIL
	HD	HOOD
	HGT	HEIGHT
	HP	HORSEPOWER
	HPS	HIGH PRESSURE STEAM
	HR	HOUR
	HUM	HUMIDIFIER
	HWP	HOT WATER PUMP
	HWR	HOT WATER RETURN
	HWS	HOT WATER SUPPLY
	HZ	HERTZ
I	ID	INSIDE DIAMETER
	IH	INTAKE HOOD
	IN.	INCH
	IN.W.G.	INCHES OF WATER GAGE
	IRH	INFRARED HEATER
J		

ABBREVIATIONS

K	KHE	KITCHEN HOOD EXHAUST
	kW	KILOWATTS
	kwh	KILOWATT HOUR
L	L-#	LOUVER DESIGNATION
	LAT	LEAVING AIR TEMPERATURE
	LBS.	POUNDS
	LIQ	LIQUID
	LPS	LOW PRESSURE STEAM
	LWT	LEAVING WATER TEMPERATURE
M	MA	MAKEUP AIR
	MAX.	MAXIMUM
	MBH	THOUSAND BTU/HR.
	MCA	MINIMUM CIRCUIT AMPACITY
	MCF	THOUSAND CUBIC FEET
	MIN.	MINIMUM or MINUTES
	MOC	MAXIMUM OVERCURRENT PROTECTION
	MPS	MEDIUM PRESSURE STEAM
	MSS	"MANUFACTURERS' STANDARDIZATION SOCIETY of the Valves and Fittings Industry, Inc."
N	N/A	NOT APPLICABLE
	NC	NOISE CRITERIA
	N.C.	NORMALLY CLOSED
	NEBB	NATIONAL ENVIRONMENTAL BALANCING BUREAU
	N.I.C.	NOT IN CONTRACT
	N.O.	NORMALLY OPEN
	N.T.S.	NOT TO SCALE
O	O/A	OUTSIDE AIR
	OD	OUTSIDE DIAMETER
	OSHA	OCCUPATIONAL SAFETY and HEALTH ADMINISTRATION
	OZ	OUNCE
P	PD	PRESSURE DIFFERENCE
	PH	PHASE
	PPM	PART PER MILLION
	PRV	PRIMARY PRESSURE
	PSI	POUNDS PER SQUARE INCH
	PSIA	"PSI, ABSOLUTE"
	PSIG	"PSI, GAGE"
Q		
R	R	THERMAL RESISTANCE
	R-22	REFRIGERANT-22
	R/A	RETURN AIR
	RVR	RECEIVER
	RD	ROOF DRAIN
	RE	"REFER TO DETAIL NO.1, SHEET M--xx"
	RECIRC.	RECIRCULATE
	RF	RETURN FAN
	RH	RELIEF HOOD
	RLN	REFRIGERANT LIQUID
	RPM	REVOLUTIONS PER MINUTE
	RPS	REVOLUTIONS PER SECOND
	RS	REFRIGERANT SUCTION
	RTU	ROOFTOP UNIT
	RV	RELIEF VENT
S		
	s	SECOND
	S	SOUND ATTENUATOR
	S/A	SUPPLY AIR
	SAT	SATURATION
	SD	SMOKE DETECTOR
	SF	SUPPLY FAN
	SG	SPECIFIC GRAVITY
	SMACNA	"SHEET METAL and AIR CONDITIONING" "CONTRACTORS' NATIONAL ASSOCIATION"
	SP	STATIC PRESSURE
	SPEC.	SPECIFICATION
	SQ.FT.	SQUARE FEET
	SUCT.	SUCTION
T	TD	TEMPERATURE DIFFERENCE
	TEMP	TEMPERATURE
	TONS	TONS OF REFRIGERATION
	TSTAT	THERMOSTAT
	TU	TERMINAL UNIT
U		
	U	HEAT TRANSFER COEFFICIENT
	U/C	UNDER COUNTER
	UG	UNDERGROUND
	UH	UNIT HEATER
	U.N.O.	UNLESS NOTED OTHERWISE
	UV	UNIT VENTILATOR
V		
	V	VOLTS
	VA	VOLT AMPERE
	VAC	VACUUM
	VAR	VARIABLE
	VAV	VARIABLE AIR VOLUME
	VEL.	VELOCITY
	VENT.	VENTILATION
	VERT.	VERTICAL
	VFD	VARIABLE FREQUENCY DRIVE
	VOL.	VOLUME
	VP	VELOCITY PRESSURE
	VTR	VENT THRU ROOF
W		
	W	WITH
	W/O	WITHOUT
	W	WATTS
	WB	WET BULB
	WBT	WET BULB TEMPERATURE
	WT	WEIGHT
X		
Y	YCO	YARD CLEANOUT
	YD	YARD
	YR	YEAR
Z		
	ZN	ZONE

GENERAL MECHANICAL NOTES AND SPECIFICATIONS:

GENERAL

- COORDINATE WORK AMONG ALL DISCIPLINES. IT IS NOT THE INTENT OF THESE DOCUMENTS TO DICTATE WHO MUST DO THE WORK. ALL WORK SHOWN IS THE RESPONSIBILITY OF THE (PRIME) CONTRACTOR.
- FIELD VERIFY ALL CONDITIONS AND MEASURE DIMENSIONS WITHIN THE BUILDING PRIOR TO ORDERING EQUIPMENT AND/OR PROCEEDING WITH INSTALLATION.
- ALL EQUIPMENT SHALL BE FACTORY TESTED, AND CONTRACTOR SHALL VERIFY THEIR CONDITION PRIOR TO INSTALLATION. CONTRACTOR IS RESPONSIBLE FOR EQUIPMENT DAMAGED DURING MOVING AND INSTALLATION.
- EQUIPMENT FOUND DEFECTIVE PRIOR TO FINAL ACCEPTANCE SHALL BE REPLACED AT NO COST TO OWNER.
- SUBMISSION OF BID PROPOSAL IS CONSIDERED AN ACKNOWLEDGEMENT THAT CONTRACTOR VISITED SITE, AND VERIFIED ALL EXISTING CONDITIONS, AND INCLUDED ANY MODIFICATIONS TO EXISTING AND NEW WORK REQUIRED FOR INSTALLATION OF A COMPLETE AND OPERATIONAL MECHANICAL SYSTEM.
- COORDINATE WITH OWNER AND ENGINEER FOR ANY DISRUPTION IN UTILITY SERVICES, PARTICULARLY THOSE THAT MIGHT AFFECT OTHER BUILDINGS IN THE CAMPUS.
- CONTRACTOR SHALL NOT PROCEED WITH ANY WORK INVOLVING A CHANGE IN PROJECT SCOPE OR COST WITHOUT FIRST HAVING OBTAINED ENGINEER'S APPROVAL IN WRITING. UNLESS ENGINEER HAS AGREED TO SUCH CHANGE PRIOR TO IT BEING DONE, AND HAS AGREED THAT AN INCREASE IN COST ASSOCIATED WITH SUCH CHANGE IS WARRANTED; CONTRACTOR WILL NOT BE REIMBURSED FOR SUCH CHANGE.
- TESTING, ADJUSTING AND BALANCING (TAB) CONTRACTOR SHALL BE RETAINED BY THE PRIME CONTRACTOR. TAB SHALL NOT BE A PART OF THE MECHANICAL CONTRACT.

CODES AND ORDINANCES

- PERFORM ALL WORK PER LATEST VERSION OF INTERNATIONAL MECHANICAL CODE, AND APPLICABLE LOCAL CODES AND ORDINANCES, UNLESS DRAWINGS OR SPECIFICATIONS HAVE MORE STRINGENT REQUIREMENTS.
- CONTRACTOR IS RESPONSIBLE FOR ALL PERMITS AND FEES ASSOCIATED WITH PROJECT, INCLUDING FEES FOR INSPECTIONS, APPLICATIONS, AND PROVISION OF NEW SERVICES.
- NOTIFY ENGINEER OF ANY ASPECTS OF DESIGN WHICH ARE THOUGHT TO BE IN NONCOMPLIANCE WITH APPLICABLE CODES.

COORDINATION

- REFER TO ARCHITECTURAL AND STRUCTURAL PLANS FOR DETAILS OF CONSTRUCTION, INCLUDING BEAMS, FLOOR AND WALL PENETRATIONS, CHASES, AND REFLECTED CEILING PLANS. VERIFY OPENING SIZES WITH EQUIPMENT FURNISHED.
- COORDINATE ALL WORK WITH OTHER TRADES; COORDINATE SCHEDULE OF WORK WITH ALL SUB-CONTRACTORS TO ACHIEVE SMOOTH FLOW OF CONSTRUCTION.
- CONTRACTOR SHALL REVIEW COMPLETE DOCUMENTS PRIOR TO SUBMITTAL OF PROPOSAL TO GAIN COMPLETE UNDERSTANDING OF PROJECT SCOPE, WORK BY OTHERS, AND MECHANICAL WORK ASSOCIATED WITH OTHER DISCIPLINES.
- ENGINEER/ ARCHITECT MUST BE GIVEN AT LEAST A TEN (10) WORKING DAY NOTICE TO PERFORM ALL TYPES OF INSPECTIONS. COORDINATE WORK SCHEDULE WITH ARCHITECT AND ENGINEER TO PLAN ACCORDINGLY FOR APPROPRIATE INSPECTIONS.

ECONOMIZER.

- FOR SYSTEMS THAT REQUIRE ECONOMIZER, MECHANICAL CONTRACTOR SHALL PROVIDE A CONTROLLER EQUAL TO HONEYWELL JADE ECONOMIZER MODULE W7220. REFER TO ECONOMIZER DETAIL FOR ADDITIONAL INFORMATION.

METAL AND FLEXIBLE DUCTS

- DRAWINGS ARE DIAGRAMMATIC IN NATURE. FOR CLARITY SAKE, MOST DUCT OFFSETS/RISES/DROPS ARE NOT SHOWN. RECTANGULAR AND ROUND DUCTWORK SHALL BE GALVANIZED STEEL. SIZES SHOWN ARE INSIDE CLEAR DIMENSION.
- VERIFY BOTTOM OF DUCT ELEVATION AND COORDINATE WITH OTHER TRADES.
- CONSTRUCT AND LEAKAGE TEST ALL DUCTWORK BASED ON SMACNA REQUIREMENTS. COORDINATE PRESSURE CLASSES WITH EQUIPMENT SCHEDULES.
- ALL GALVANIZED SHEET METAL DUCT WORK SHALL COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS--METAL AND FLEXIBLE".
- USE 2" GLASS FIBER-REINFORCED FABRIC JOINT AND SEAM TAPE. USE WATER BASED JOINT AND SEAM SEALER. USE FIRE RESISTANT SEALER FOR FILLING OPENINGS AROUND DUCT PENETRATIONS THROUGH WALLS. ACCEPTABLE PRODUCTS ARE DOW CORNING, FIRE STOP FOAM AND FIRE STOP SEALER OR EQUAL.
- USE SHEET METAL SCREWS OR BLIND RIVETS COMPATIBLE WITH DUCT MATERIALS WHEN SECURING ALL DUCTWORK TO STRUCTURE.
- FLEXIBLE DUCT MAY BE USED TO CONNECT TO SUPPLY DIFFUSERS. MAXIMUM LENGTH OF FLEXIBLE DUCT LIMITED TO 6 FEET. PROVIDE FLEXMASTER TYPE BM UL 181 CLASS I AIR DUCT OR EQUAL. FLEXIBLE DUCT SHALL HAVE MIN. R-8 INSULATING VALUE.
- FLEXIBLE DUCT CLAMP SHALL BE OF STAINLESS STEEL BANDS WITH CADMIUM PLATED HEX SCREW TO TIGHTEN BAND WITH WORM GEAR ACTION.
- PROVIDE TURNING VANES IN ALL SPLITS, TEES AND SWEPT 90 DEGREE ANGLE DUCT FITTINGS. MANUFACTURED TURNING VANES TO BE 1-1/2" WIDE; DOUBLE VANE, CURVED BLADES OF GALVANIZED SHEET STEEL SET 1/4" O.C. ACCEPTABLE MANUFACTURER'S ARE DUCTMATE INDUSTRIES, METALWARE, WARD INDUSTRIES OR EQUAL.
- WHERE RECTANGULAR TEE FITTINGS ARE SHOWN, PROVIDE FITTING WITH ADJUSTABLE DIVIDER SHEET AND TURNING VANES.
- WHERE RECTANGULAR MAIN AND BRANCH CONNECTIONS ARE SHOWN, PROVIDE EXTRACTOR VANES.
- PROVIDE MANUAL VOLUME CONTROL DAMPERS WHERE SHOWN ON DRAWINGS. DAMPERS TO HAVE NEOPRENE BLADE SEALS AND GALVANIZED STEEL FRAMES, TIE BARS, DAMPER AND BRACKETS. ACCEPTABLE MANUFACTURER'S ARE RUSKIN CO., NAILOR INDUSTRIES, FLEXMASTER OR EQUAL.
- ABOVE INACCESSIBLE CEILINGS AND WHERE DUCT CONFIGURATION DOES NOT ALLOW FOR INSTALLATION OF DAMPER IN DUCTWORK OR DIFFUSER, PROVIDE REMOTE MANUAL DAMPER BY YOUNG REGULATOR, (BOWDEN CABLE CONTROL SYSTEM). CONTRACTOR MAY PROVIDE OPPOSED BLADE DAMPER THAT IS INTEGRAL TO GRID WITH ENGINEER'S APPROVAL.

INSULATION

- DUCT WRAP INSULATION SHALL BE MINERAL FIBER INSULATION. ALL SERVICE JACKETING MANUFACTURED FROM KRAFT PAPER, REINFORCING SCIRM, ALUMINUM FOIL AND VINYL FILM. ACCEPTABLE MANUFACTURER'S ARE CERTAINTED, KNAUF OR OWENS-CORNING. INSTALL DUCT WRAP INSULATION PER MANUFACTURER'S INSTRUCTIONS.

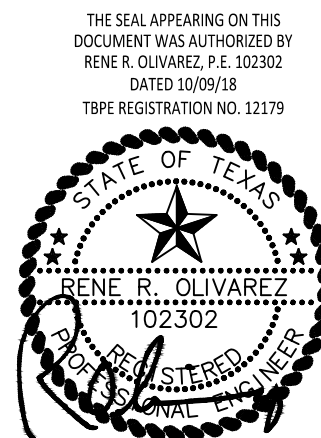
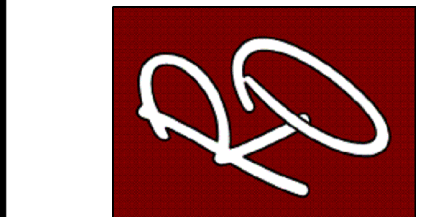
INTERIOR DUCTWORK TO BE INSULATED WITH DUCT WRAP INSULATION. ALL SUPPLY DUCTS TO HAVE 3" MIN. THICKNESS (R-8) INSULATION AND ALL RETURN AND OUTSIDE AIR DUCTS TO HAVE 2" MIN. INSULATION.

GENERAL ELECTRICAL NOTES AND SPECIFICATIONS:

- CONDUCTOR SIZES INDICATED ASSUME NO MORE THAN (3) SINGLE POLE BRANCH CIRCUITS IN EACH CONDUIT. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DE-RATE CONDUCTORS PER NEC TABLE 310.15(B)(2)(a) FOR CONDUITS WITH MORE THAN (3) CURRENT "CARRYING CONDUCTORS". THE NEUTRAL CONDUCTOR SHALL BE CONSIDERED "CURRENT CARRYING" FOR ALL BRANCH CIRCUITS SERVING MORE THAN (4) COMPUTERS.
- ALL EQUIPMENT SHALL HAVE A LOCAL DISCONNECTING MEANS, EITHER CORDED PLUG AND RECEPTACLE OR SWITCHED DISCONNECT. VERIFY FROM EQUIPMENT SUBMITTED OR RELOCATED IF DIRECT CONNECT OR RECEPTACLE. IF DIRECT CONNECT, PROVIDE SWITCH AS PER NEC OTHERWISE, PROVIDE RECEPTACLE, CORD PLUG AS REQUIRED BY EQUIPMENT SUBMITTAL.
- FIRESTOP ALL CONDUIT PENETRATIONS IN RATED WALLS. SEE ARCHITECTURAL FOR WALL RATINGS. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO SHEET ROCK AND REPAIR.
- PROVIDE FIRE RATED SLEEVES IN ALL FLOOR PENETRATIONS.
- PROVIDE A DUCT-MOUNTED SMOKE DETECTOR ON THE RETURN SIDE OF ALL RTU'S, AHU'S, AND FCU'S RATED AT 2000 CFM SUPPLY AND OVER. PROVIDE A DUCT-MOUNTED SMOKE DETECTOR ON THE RETURN AND SUPPLY SIDE OF ALL MECHANICAL EQUIPMENT RATED AT 10,000 CFM AND OVER. CONNECT FOR AUTOMATIC SHUTDOWN OF UNIT AND ALARM TO FACP (WHERE APPLICABLE). REFER TO MECHANICAL EQUIPMENT SCHEDULES FOR CFM RATINGS.
- REFER TO MECHANICAL EQUIPMENT ELECTRICAL CONNECTION SCHEDULE FOR CIRCUITING, SIZE OF CONDUCTORS, DISCONNECTS AND ALL CONNECTION REQUIREMENTS.
- COORDINATE EQUIPMENT LOCATION WITH MECHANICAL PLAN.
- PROVIDE DISCONNECTS (FUSED AND NON-FUSED) FULL RATING OF EQUIPMENT PROTECTED. COORDINATE SIZES WITH EQUIPMENT SUBMITTED. PROVIDE FUSED DISCONNECTS FOR ALL MULTIPLE PIECES OF EQUIPMENT ON THE SAME CIRCUIT. DISCONNECTS AND FUSES SHALL BE EQUAL TO OR GREATER THAN THE FEEDER/BREAKER SIZE. SIZE LOAD SIDE OF DISCONNECTS FOR EQUIPMENT AS LISTED.
- MOUNT DISCONNECTS ON UNISTRUT SUPPORTS. PROVIDE UNISTRUT RACKS FOR DISCONNECTS ON ROOF AS DETAILED. DISCONNECTS LOCATED ABOVE CEILING SHALL BE SUPPORTED FROM STRUCTURE.
- PROVIDE A WEATHERPROOF, 6FCI RECEPTACLE ON UNISTRUT RACKS FOR ROOF MOUNTED EQUIPMENT SO THAT EACH UNIT IS NO MORE THAN 25' FROM MECHANICAL EQUIPMENT. CIRCUIT ROOF MOUNTED RECEPTACLES FROM A 20A/1P SPARE CIRCUIT BREAKER IN THE NEAREST 120/208V PANEL BELOW. CIRCUIT NO MORE THAN (5) RECEPTACLES PER 20A CIRCUIT.
- ON CIRCUITS GREATER THAN 20A, FEEDING MULTIPLE PIECES OF EQUIPMENT, PROVIDE FUSED DISCONNECTS (SIZED FOR EQUIPMENT PROTECTING). PROVIDE FULL SIZED FEEDERS FROM BRANCH CIRCUIT BREAKER TO EQUIPMENT DISCONNECT WITH CONDUCTORS QUANTITIES AS INDICATED ON MECHANICAL EQUIPMENT ELECTRICAL SCHEDULE.
- PENETRATE ROOFS AS PER ROOFING GUIDELINES AND GANG CONDUIT TOGETHER. SUPPORT ROOFTOP CONDUIT WITH NEOPRENE BLOCKS WITH INTEGRAL UNISTRUT. SECURE CONDUIT TO BLOCKS ON ROOF.
- PROVIDE SEALTITE WITH WP FITTINGS TO MECHANICAL EQUIPMENT, MAX DISTANCE 48". DO NOT USE CONDUITS.
- PROVIDE NEMA 3R DISCONNECTS FOR ALL EXTERIOR LOCATIONS AND NEMA 1 DISCONNECTS FOR ALL INTERIOR, DRY LOCATIONS.
- POWER AND DATA REQUIREMENTS FOR HVAC CONTROLLERS ARE SHOWN ON B.A.S. SHEETS.
- ALL EQUIPMENT CONNECTION POINTS ARE DIAGRAMMATIC IN NATURE. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH EQUIPMENT INSTALLER FOR EXACT POINT OF CONNECTION. EXTEND FEEDERS IN CONDUIT AS REQUIRED.

ELECTRICAL DEMOLITION NOTES: (APPLIES TO ALL DEMOLITION SHEETS)

- GENERAL: EXCEPT FOR ITEMS OR MATERIALS INDICATED TO BE REUSED, SALVAGED, REINSTALLED, OR OTHERWISE INDICATED TO REMAIN OWNER'S PROPERTY, REMOVE DEMOLISHED MATERIALS FROM PROJECT SITE AND LEGALLY DISPOSE OF THEM IN AN EPA-APPROVED LANDFILL. DO NOT ALLOW DEMOLISHED MATERIALS TO ACCUMULATE ON-SITE REMOVE FROM OWNER OCCUPIED AREAS DAILY. REMOVE AND TRANSPORT DEBRIS IN A MANNER THAT WILL PREVENT SPILLAGE ON ADJACENT SURFACES AND AREAS.
- REMOVED AND REINSTALLED ITEMS: CLEAN AND REPAIR ITEMS TO FUNCTIONAL CONDITION ADEQUATE FOR INTENDED REUSE. PAINT EQUIPMENT TO MATCH NEW EQUIPMENT. PACK OR CRATE ITEMS AFTER CLEANING AND REPAIRING. IDENTIFY CONTENTS OF CONTAINERS. PROTECT ITEMS FROM DAMAGE DURING TRANSPORT AND STORAGE. REINSTALL ITEMS IN LOCATIONS INDICATED. COMPLY WITH INSTALLATION REQUIREMENTS FOR NEW MATERIALS AND EQUIPMENT. PROVIDE CONNECTIONS, SUPPORTS, AND MISCELLANEOUS MATERIALS NECESSARY TO MAKE ITEM FUNCTIONAL FOR USE INDICATED.
- EXISTING ITEMS TO REMAIN: PROTECT CONSTRUCTION INDICATED TO REMAIN AGAINST DAMAGE AND SOILING DURING SELECTIVE DEMOLITION. WHEN PERMITTED BY ARCHITECT, ITEMS MAY BE REMOVED TO A SUITABLE, PROTECTED STORAGE LOCATION DURING SELECTIVE DEMOLITION AND REINSTALLED IN THEIR ORIGINAL LOCATIONS AFTER SELECTIVE DEMOLITION OPERATIONS ARE COMPLETE.
- COORDINATE ALL DEMO ACTIVITIES WITH OWNER AND ARCHITECT AND PROVIDE 10 DAYS NOTICE FOR ANY POWER OUTAGES.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAVE VERIFIED EXISTING JOB-SITE CONDITIONS DURING THE BIDDING PERIOD TO OBTAIN THE SCOPE OF ELECTRICAL WORK INVOLVED AS A RESULT OF ARCHITECTURAL MODIFICATIONS TO THE EXISTING STRUCTURE. THE SCOPE OF THE WORK SHALL INCLUDE MATERIALS AND OUTLETS, CONSISTING OF FIXTURES, DEVICES, EQUIPMENT OR APPARATUS, WHICH MUST BE REROUTED, RELOCATED OR REMOVED EITHER TEMPORARILY OR PERMANENTLY, OR WHICH MUST BE PROVIDED, SO THAT THE INDICATED REMODELING MAY BE ACCOMPLISHED. NOT ALL EXISTING OUTLETS ARE NECESSARILY INDICATED ON THE DRAWINGS.
- PROVIDE ALL APPURTENANCES REQUIRED TO REROUTE, RELOCATED, REMOVE OR REINSTALL ALL ITEMS DESCRIBED IN THESE NOTES.
- AT THE COMPLETION OF THE PROJECT, THERE SHALL BE NO ABANDONED, CONTROLS, WIRING CONDUIT, ELECTRICAL EQUIPMENT, OR CONTRACTOR SHALL REMOVE ABANDONED MATERIALS DESCRIBED HEREINABOVE.
- CONTRACTOR SHALL MAKE SAFE ALL AREAS OF THE EXISTING STRUCTURE WHICH ARE TO BE DEMOLISHED BY DISCONNECTING FEEDERS AND SERVICES TO DEMO'D AREAS.



PROJECT NAME
**PHARR MEMORIAL LIBRARY
HVAC REPLACEMENTS**

PROJECT LOCATION
**121 E CHEROKEE AVE
PHARR, TEXAS 78577**

NO.	DESCRIPTION	DATE	10/09/2018						
1									

PROJECT NO.: 18008
DRAWN BY: G.M.
CHECKED BY: R.O.
SHEET TITLE:

MECHANICAL SYMBOLS
& ABBREVIATIONS

S H E E T
M0.0

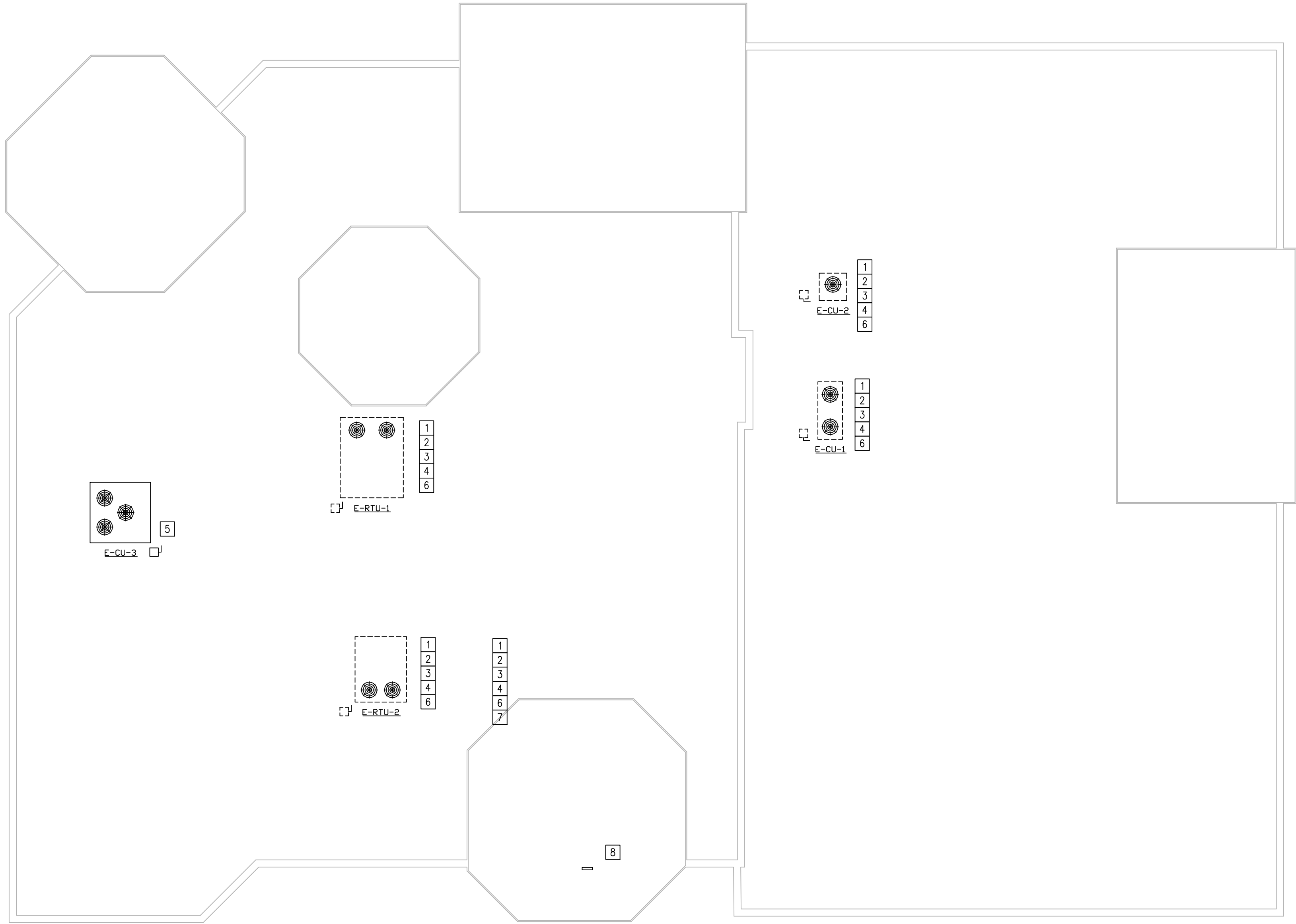


NOTES:

1. UNIT TAGS ARE ONLY FOR IDENTIFICATION WITHIN THESE PLANS AND MAY NOT MATCH EXISTING UNIT TAGS
2. EXISTING UNIT TO REMAIN.

- A. COORDINATE DEMOLITION WORK WITH ELECTRICAL AND OTHER DISCIPLINES AS REQUIRED.
- B. EQUIPMENT LOCATIONS ARE SHOWN APPROXIMATELY. VERIFY ALL DIMENSIONS AND LOCATIONS AT JOB SITE PRIOR TO BID.
- C. IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAVE VERIFIED EXISTING JOBSITE CONDITIONS DURING THE BIDDING PERIOD, SO THEY WILL HAVE DISCOVERED THE FULL SCOPE OF WORK INVOLVED WITH THE REPLACEMENT OF EQUIPMENT. THE SCOPE OF THE WORK SHALL INCLUDE ALL MATERIALS FOR A COMPLETE INSTALLATION INCLUDING DEVICES, EQUIPMENT, OR APPARATUS WHICH MUST BE REROUTED, RELOCATED, OR REMOVED EITHER TEMPORARILY OR PERMANENTLY, OR WHICH MUST BE PROVIDED TO ACCOMMODATE THE INDICATED MECHANICAL SYSTEMS AND B.A.S.. NOT ALL EXISTING CONDITIONS ARE NECESSARILY INDICATED ON THE DRAWINGS.
- D. WHEN AN EQUIPMENT IS IDENTIFIED TO BE REMOVED, THE OWNER HAS FIRST RIGHT OF REFUSAL BEFORE DISPOSING OF THAT EQUIPMENT.
- E. PROVIDE ALL NECESSARY CLEAR PATH TO MOVE DEMOLISHED EQUIPMENT OUT OF THE FACILITY AS WELL TO BRING NEW EQUIPMENT INTO THE BUILDING. MODIFY EXISTING PIPING, DUCTWORK CONDUTS, AS REQUIRED TO COMPLETE THE DEMOLITION.
- F. THE "EXISTING" MECHANICAL SYSTEMS INDICATED ON THIS SHEET ARE BASED ON THE INFORMATION AVAILABLE AND MAY BE INCOMPLETE AND INACCURATE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ACTUAL CONDITIONS AND MAKE SUITABLE ADJUSTMENTS AS NECESSARY, TO ACCOMMODATE NEW WORK, AT NO EXTRA COST TO THE OWNER. CONDITIONS DIFFERENT TO THOSE INDICATED SHALL BE INCORPORATED INTO THE CONSTRUCTION DOCUMENTS. NOTE THAT ANY UNCOVERED SYSTEMS MUST BE CAREFULLY IDENTIFIED PRIOR TO MODIFICATIONS.
- G. CONTRACTOR SHALL COORDINATE HIS WORK WITH ALL TRADES AND INCLUDE ANY MODIFICATIONS NEEDED TO ACCOMMODATE THEIR WORK.
- H. EXISTING DUCTWORK TO REMAIN AND BE REUSED.

- 1 EXISTING MECHANICAL EQUIPMENT TO BE REMOVED AND REPLACED WITH NEW UNITS. REFER TO SHEET M1.0 FOR NEW SCOPE OF WORK. VERIFY EXACT LOCATION ON SITE.
- 2 CONTRACTOR SHALL ENSURE THAT EXISTING CONDENSATE LINE IS FREE OF CLOGS AND DRAINS TO PROPER OUTLET.
- 3 REMOVE AND REPLACE REFRIGERANT LINES.
- 4 REMOVE EXISTING THERMOSTAT, PATCH WALL, AND PREPARE SURFACE FOR NEW BUILDING AUTOMATION SPACE TEMPERATURE AND HUMIDITY THERMOSTAT.
- 5 EXISTING AHU TO REMAIN.
- 6 EXISTING DISCONNECT TO BE REMOVED AND REPLACED. SEE SHEET M1.0.
- 7 EXISTING BREAKER AS SHOWN PER THE "EXISTING MECHANICAL EQUIPMENT SCHEDULE" BELOW. SURVEY OF EXISTING WIRE WAS NOT CONDUCTED. CONTRACTOR SHALL CONDUCT SURVEY OF EXISTING WIRE SERVING UNITS AND MAKE NO ASSUMPTIONS ABOUT EXISTING WIRE SIZE WHEN IT COMES TO DOWNGRADING OR UPGRADING THE BREAKER.
- 8 APPROXIMATE LOCATION OF PANELS IN 1ST FLOOR ELECTRICAL ROOM 150.



1 ROOF MECHANICAL DEMO PLAN
3/32" = 1'-0"

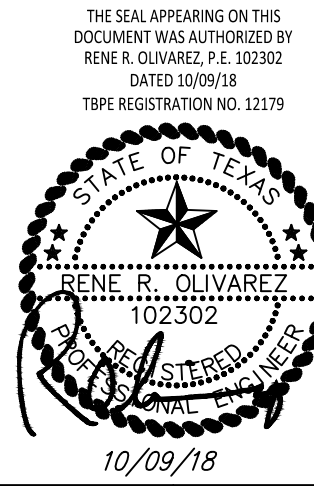
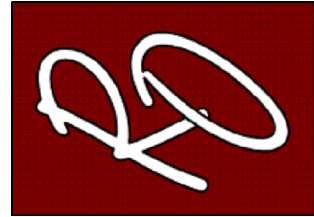
GENERAL DEMOLITION NOTES

- A. COORDINATE DEMOLITION WORK WITH ELECTRICAL AND OTHER DISCIPLINES AS REQUIRED.
- B. EQUIPMENT LOCATIONS ARE SHOWN APPROXIMATELY. VERIFY ALL DIMENSIONS AND LOCATIONS AT JOB SITE PRIOR TO BID.
- C. IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAVE VERIFIED EXISTING JOBSITE CONDITIONS DURING THE BIDDING PERIOD, SO THEY WILL HAVE DISCOVERED THE FULL SCOPE OF WORK INVOLVED WITH THE MODIFICATION OF THIS EXISTING SPACE. THE SCOPE OF THE WORK SHALL INCLUDE ALL MATERIALS FOR A COMPLETE INSTALLATION INCLUDING DEVICES, EQUIPMENT, OR APPARATUS WHICH MUST BE REROUTED, RELOCATED, OR REMOVED EITHER TEMPORARILY OR PERMANENTLY, OR WHICH MUST BE PROVIDED TO ACCOMMODATE THE INDICATED REMODELING. NOT ALL EXISTING CONDITIONS ARE NECESSARILY INDICATED ON THE DRAWINGS.
- D. WHEN AN EQUIPMENT IS IDENTIFIED TO BE REMOVED, THE OWNER HAS FIRST RIGHT OF REFUSAL BEFORE DISPOSING OF THAT EQUIPMENT.
- E. PROVIDE ALL NECESSARY CLEAR PATH TO MOVE DEMOLISHED EQUIPMENT OUT OF THE FACILITY AS WELL TO BRING NEW EQUIPMENT INTO THE BUILDING. MODIFY EXISTING PIPING, DUCTWORK CONDUITS, AS REQUIRED TO COMPLETE THE DEMOLITION.
- F. THE "EXISTING" MECHANICAL SYSTEMS INDICATED ON THIS SHEET ARE BASED ON THE INFORMATION AVAILABLE AND MAY BE INCOMPLETE AND INACCURATE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ACTUAL CONDITIONS AND MAKE SUITABLE ADJUSTMENTS AS NECESSARY, TO ACCOMMODATE NEW WORK, AT NO EXTRA COST TO THE OWNER. CONDITIONS DIFFERENT TO THOSE INDICATED SHALL BE INCORPORATED INTO THE CONSTRUCTION DOCUMENTS. NOTE THAT ANY UNCOVERED SYSTEMS MUST BE CAREFULLY IDENTIFIED PRIOR TO MODIFICATIONS.
- G. CONTRACTOR SHALL COORDINATE HIS WORK WITH ALL TRADES AND INCLUDE ANY MODIFICATIONS NEEDED TO ACCOMMODATE THEIR WORK.
- H. EXISTING DUCTWORK TO REMAIN AND BE REUSED.

KEYED NOTES: DEMOLITION

- 1 EXISTING MECHANICAL EQUIPMENT TO BE REMOVED AND REPLACED WITH NEW UNITS. REFER TO SHEET M1.1 FOR NEW SCOPE OF WORK. VERIFY EXACT LOCATION ON SITE.
- 2 CONTRACTOR SHALL ENSURE THAT EXISTING CONDENSATE LINE IS FREE OF CLOGS AND DRAINS TO PROPER OUTLET.
- 3 REMOVE AND REPLACE REFRIGERANT LINES.
- 4 REMOVE EXISTING THERMOSTAT, PATCH WALL, AND PREPARE SURFACE FOR NEW BUILDING AUTOMATION SPACE TEMPERATURE AND HUMIDITY THERMOSTAT.
- 5 EXISTING CONDENSER TO REMAIN.
- 6 EXISTING DISCONNECT TO BE REMOVED AND REPLACED. SEE SHEET M1.1.
- 7 EXISTING BREAKER AS SHOWN PER THE "EXISTING MECHANICAL EQUIPMENT SCHEDULE" BELOW. SURVEY OF EXISTING WIRE WAS NOT CONDUCTED. CONTRACTOR SHALL CONDUCT SURVEY OF EXISTING WIRE SERVING UNITS AND MAKE NO ASSUMPTIONS ABOUT EXISTING WIRE SIZE WHEN IT COMES TO DOWNGRADING OR UPGRADING THE BREAKER.
- 8 APPROXIMATE LOCATION OF PANELS IN 1ST FLOOR ELECTRICAL ROOM 150.

EXISTING ROOFTOP UNIT SCHEDULE CITY OF PHARR - MEMORIAL LIBRARY									
TAG UNIT	VOLTAGE	PHASE	EXISTING BREAKER	MANUFACTURER	MODEL	SERIAL NO.	TONS	REFRIGERANT	NOTES
E-CU-1	460	3	110/40	TRANE	TWE180B400CA/TTA180B400EA	3225YT06H/22143HHAD	15	R22	1
E-CU-2	460	3	60/50	TRANE	LPCAA12F1C0LU002050AG3GBGA01/TTA150B400EA	T03F37877/3232LTSAD	12.5	R22	1
E-RTU-1	460	3	70	TRANE	TCD151C40BBA	325100524D	12.5	R22	1
E-CU-3	460	3	30(FAN)/100(HEATER)/100(CU)	TRANE	LPCAF21F1C 7002067AE3KBJA01/RAUJC304BC0300D00002	T03F37878/C17K06941	30	R410A	1,2
E-RTU-2	460	3	70	TRANE	TCD181C40BCA	325100529D	15	R22	1
NOTES: 1. UNIT TAGS ARE ONLY FOR IDENTIFICATION WITHIN THESE PLANS AND MAY NOT MATCH EXISITING UNIT TAGS. 2. UNIT TO REMAIN.									



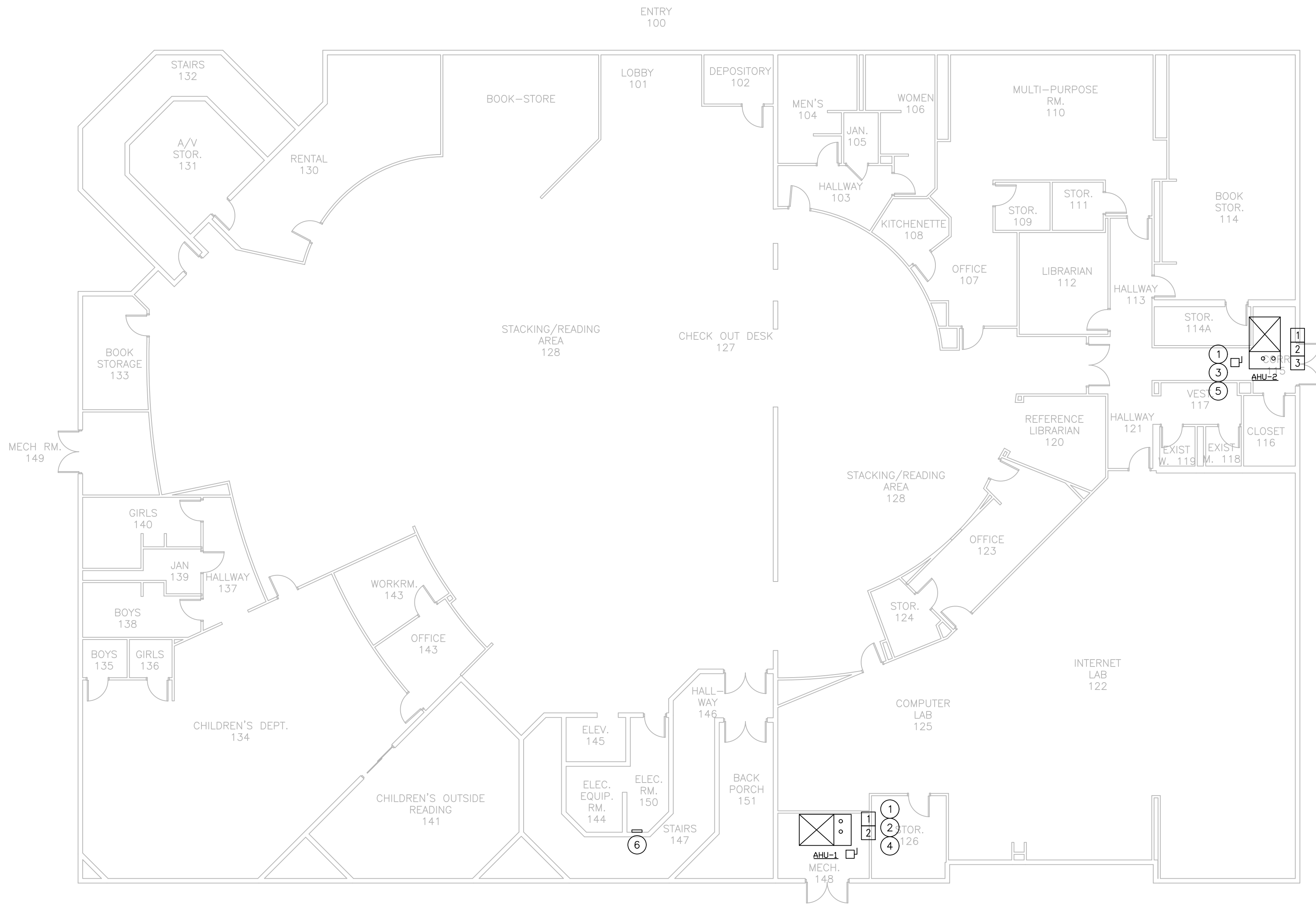
PROJECT NAME
PHARR MEMORIAL LIBRARY
HVAC REPLACEMENTS

PROJECT LOCATION
121 E CHEROKEE AVE
PHARR, TEXAS 78577

NO.	DATE	DESCRIPTION
1	10/09/2018	

PROJECT NO.: 18008
DRAWN BY: G.M.
CHECKED BY: R.O.

SHEET TITLE:
ROOFTOP UNIT
MECHANICAL
DEMOLITION PLAN



1 1ST FLOOR MECHANICAL PLAN
3/32" = 1'-0"

MECHANICAL GENERAL NOTES

- A. THE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL LOCATION OF EQUIPMENT. IT IS THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS THAT EQUIPMENT BE REPLACED, TESTED AND READY FOR OPERATION WHETHER OR NOT EVERY ITEM OF EQUIPMENT, ACCESSORY, DEVICE, ETC. IS SHOWN. REFERENCE SHALL BE MADE TO THE FULL DRAWING PACKAGE. THE MECHANICAL SUBCONTRACTOR SHALL, WITHOUT EXTRA CHARGE, MAKE REASONABLE MODIFICATIONS IN THE LAYOUT AS NEEDED TO PREVENT CONFLICTS WITH OTHER TRADES, OR FOR PROPER EXECUTION OF THE WORK. FIELD VERIFY ALL DIMENSIONS BEFORE FABRICATING DUCTWORK.
- B. ALL NEW A/C EQUIPMENT SHALL BE CLEANED AFTER THE FINISHING OF DRYWALL AND PRIOR TO THE RELEASE OF BUILDING TO OWNER. MECHANICAL CONTRACTOR TO PROVIDE DOCUMENTATION WITH DATE AND TIME OF UNIT CLEANING.
- C. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO SUBMITTALS.
- D. CONTRACTOR SHALL COORDINATE EQUIPMENT WEIGHTS AND SUPPORTS BASED ON ACTUAL EQUIPMENT SELECTED.
- E. FIELD VERIFY SIZES OF ROOF CURB ADAPTERS AND PROVIDE SHOP DRAWINGS PRIOR TO SUBMITTALS. REFER TO SHEET M2.1 DETAIL NO.3.
- F. FIELD COORDINATE ALL NEW DUCTWORK TRANSITION AND INCLUDE IN SHOP DRAWINGS. REFER TO SHEET M2.1 DETAIL NO.3.
- G. EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE VERIFIED WITH THE ACTUAL EQUIPMENT SELECTED VENDOR DRAWINGS.
- H. MECHANICAL EQUIPMENT SCHEDULE ON SHEET M2.0.

KEYED NOTES: MECHANICAL

- 1 COORDINATE FINAL LOCATION OF EQUIPMENT WITH OWNER AND ENGINEER OF RECORD.
- 2 ALL CONDENSATE DRAINS SHALL MATCH EXISTING MATERIALS AND DRAIN TO EXISTING DRAIN SYSTEM. CONTRACTOR SHALL ENSURE THAT EXISTING CONDENSATE LINE IS FREE OF CLOGS AND DRAINS TO PROPER OUTLET.
- 3 AHU LOCATED IN ATTIC.

KEYED NOTES: ELECTRICAL

- 1 REPLACE EXISTING 3 POLE CIRCUIT BREAKER SERVING EXISTING UNIT WITH NEW 3 POLE CIRCUIT BREAKER MATCHING THE MOCF OF NEW UNIT. NEW BREAKER MUST MATCH EXISTING PANEL MANUFACTURER AND AIC RATING.
- 2 ROUTE CIRCUIT TO EXISTING PANEL SERVING EXISTING HVAC UNIT USING (3) #6 CONDUCTORS AND (1) #8 GROUND IN (1) 1" EMT CONDUIT.
- 3 ROUTE CIRCUIT TO EXISTING PANEL SERVING EXISTING HVAC UNIT USING (3) #4 CONDUCTORS AND (1) #8 GROUND IN (1) 1-1/4" EMT CONDUIT.
- 4 PROVIDE NEW 60A/3P/NF/N1 DISCONNECT.
- 5 PROVIDE NEW 100A/3P/NF/N1 DISCONNECT.
- 6 APPROXIMATE LOCATION OF PANELS IN 1ST FLOOR ELECTRICAL ROOM 150.

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RENE R. OLIVAREZ, P.E. 102302
DATED 10/09/18
TBPB REGISTRATION NO. 12179

PROJECT NAME
**PHARR MEMORIAL LIBRARY
HVAC REPLACEMENTS**

PROJECT LOCATION
**121 E CHEROKEE AVE
PHARR, TEXAS 78577**

NO.	DATE	DESCRIPTION
1	10/09/2018	

PROJECT NO.: 18008

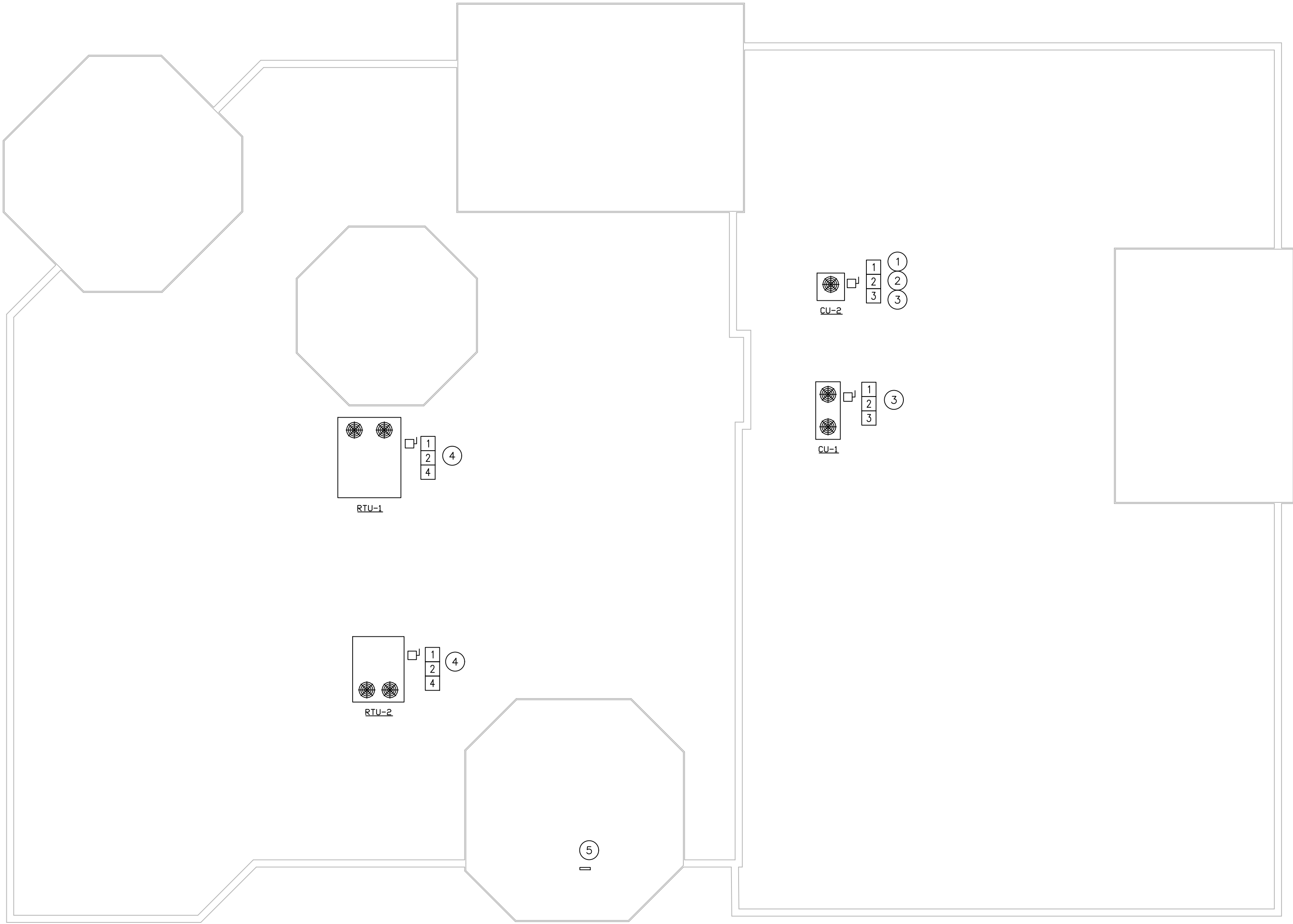
DRAWN BY: G.M.

CHECKED BY: R.O.

SHEET TITLE:
**1ST FLOOR
MECHANICAL
PLAN**

S H E E T

M1.0



1 ROOF MECHANICAL PLAN
3/32" = 1'-0"

MECHANICAL GENERAL NOTES

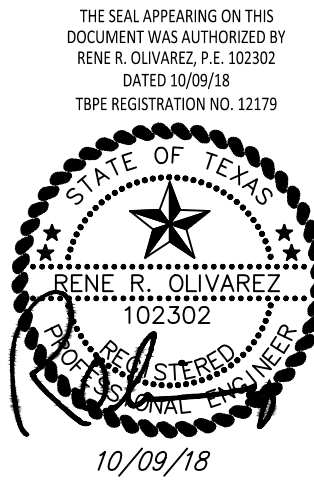
- A. THE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL LOCATION OF EQUIPMENT. IT IS THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS THAT EQUIPMENT BE REPLACED, TESTED AND READY FOR OPERATION WHETHER OR NOT EVERY ITEM OF EQUIPMENT, ACCESSORY, DEVICE, ETC., IS SHOWN. REFERENCE SHALL BE MADE TO THE FULL DRAWING PACKAGE. THE MECHANICAL SUBCONTRACTOR SHALL, WITHOUT EXTRA CHARGE, MAKE REASONABLE MODIFICATIONS IN THE LAYOUT AS NEEDED TO PREVENT CONFLICTS WITH OTHER TRADES, OR FOR PROPER EXECUTION OF THE WORK. FIELD VERIFY ALL DIMENSIONS BEFORE FABRICATING DUCTWORK.
- B. ALL NEW A/C EQUIPMENT SHALL BE CLEANED AFTER THE FINISHING OF DRYWALL AND PRIOR TO THE RELEASE OF BUILDING TO OWNER. MECHANICAL CONTRACTOR TO PROVIDE DOCUMENTATION WITH DATE AND TIME OF UNIT CLEANING.
- C. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO SUBMITTALS.
- D. CONTRACTOR SHALL COORDINATE EQUIPMENT WEIGHTS AND SUPPORTS BASED ON ACTUAL EQUIPMENT SELECTED.
- E. FIELD VERIFY SIZES OF ROOF CURB ADAPTERS AND PROVIDE SHOP DRAWINGS PRIOR TO SUBMITTALS. REFER TO SHEET M2.1 DETAIL NO.3.
- F. FIELD COORDINATE ALL NEW DUCTWORK TRANSITION AND INCLUDE IN SHOP DRAWINGS. REFER TO SHEET M2.1 DETAIL NO.3.
- G. EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE VERIFIED WITH THE ACTUAL EQUIPMENT SELECTED VENDOR DRAWINGS.
- H. MECHANICAL EQUIPMENT SCHEDULE ON SHEET M2.0.

KEYED NOTES: MECHANICAL

- 1 COORDINATE FINAL LOCATION OF EQUIPMENT WITH OWNER AND ENGINEER OF RECORD.
- 2 ALL CONDENSATE DRAINS SHALL MATCH EXISTING MATERIALS AND DRAIN TO EXISTING DRAIN SYSTEM. CONTRACTOR SHALL ENSURE THAT EXISTING CONDENSATE LINE IS FREE OF CLOGS AND DRAINS TO PROPER OUTLET.
- 3 PROVIDE NEW REFRIGERANT LINES.
- 4 PROVIDE ADAPTER CURBS TO FIT INTO EXISTING CURBS PROVIDED BY APPROVED MANUFACTURER.

KEYED NOTES: ELECTRICAL

- 1 REPLACE EXISTING 3 POLE CIRCUIT BREAKER SERVING EXISTING UNIT WITH NEW 3 POLE CIRCUIT BREAKER MATCHING THE MCOF OF NEW UNIT. NEW BREAKER MUST MATCH EXISTING PANEL MANUFACTURER AND AIC RATING.
- 2 ROUTE CIRCUIT TO EXISTING PANEL SERVING EXISTING HVAC UNIT USING (3) #8 CONDUCTORS AND (1) #8 GROUND IN (1) 3/4" EMT CONDUIT.
- 3 PROVIDE NEW 60A/3P/NF/N1 DISCONNECT.
- 4 PROVIDE NEW 100A/3P/NF/N1 DISCONNECT.
- 5 APPROXIMATE LOCATION OF PANELS IN 1ST FLOOR ELECTRICAL ROOM 150.



PROJECT NAME
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NO.	DATE	DESCRIPTION
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PROJECT NO.: 18008
DRAWN BY: G.M.
CHECKED BY: R.O.
SHEET TITLE:

ROOFTOP UNIT
MECHANICAL
PLAN

RTU SCHEDULE																			
UNIT TAGS	FAN PERFORMANCE			COOLING COIL PERFORMANCE								HEATING COIL			COOLING		ELECTRICAL DATA		
	OUTSIDE AIR		ESP	GROSS COOLING CAPACITY		GROSS SENSIBLE	EAT DB	EAT WB	LAT DB	LAT WB	MBH	EAT	LAT	EER	IEER	VOLTAGE		MCA	MOCP
	CFM	CFM	IN H2O	MBH	MBH	F	F	F	F	MBH	F	F	EER			V/Ø	A	A	LB
RTU-1	6000	550	0.5	179.79	145.46	80	67	57.55	57.34	122.9	70	88.9	12.5	19.7		460/3	62	70	2546
RTU-2	5000	500	0.5	154.07	121.95	80	67	57.42	57.04	122.9	70	92.6	12.4	19.6		460/3	62	70	2540

- NOTES:
- SINGLE POINT POWER WITH INTEGRAL NON-FUSED DISCONNECT SWITCH.
 - DOUBLE WALL CONSTRUCTION WITH MINIMUM 1" FOAM INSULATION.
 - PROVIDE HINGED ACCESS DOORS.
 - RECIRCULATION DAMPER FOR UN-OCCUPIED MODE.
 - DIRTY FILTER SENSOR ON OUTDOOR AND EXAHUST AIR.
 - 120V GFCI SERVICE OUTLET, FACTORY MOUNTED, FACTORY WIRED.
 - APPROVED MANUFACTURES SHALL THEIR HIGHEST EFFICIENCY ALTERNATIVE WITH SCHEDULED IEER VALUES OR GREATER.
 - RTU MANUFACTURER IS RESPONSIBLE FOR MEETING ALL REQUIREMENTS DETAILED IN THE CONTROLS DIAGRAMS AND SEQUENCES OF OPERATION PUBLISHED IN THESE CONSTRUCTION DOCUMENTS.
 - PROGRAMMABLE ROOM TEMPERATURE SENSOR AND DUCT MOUNTED HUMIDITY SENSOR FOR ENHANCED DEHUMIDIFICATION SEQUENCE.
 - PROVIDE WITH INVERTER SPEED COMPRESSORS TO MODULATE TO A MINIMUM CAPACITY OF 25% OR LESS AND MAINTAIN HIGH PART LOAD EFFICIENCY.
 - PROVIDE UNITS WITH VARIABLE SPEED FANS TO MODULATE TO ROOM TEMP FOR SINGLE ZONE VAV.
 - 2015 IECC - ECONOMIZER REQUIRED ON INDIVIDUAL DX COOLING UNITS GREATER THAN 54,000 BTU/H.
 - PROVIDE CURB ADAPTERS TO FIT INTO EXISTING CURBS PROVIDED BY APPROVED MANUFACTURER.
 - PROVIDE UNITS WITH FROSTAT, AND FACTORY HAIL GUARDS.
 - PROVIDE BACNET COMMUNICATION CARD FOR CONTROLS INTERFACE.
 - PROVIDE MINIMUM 5 YEAR PARTS WARRANTY.

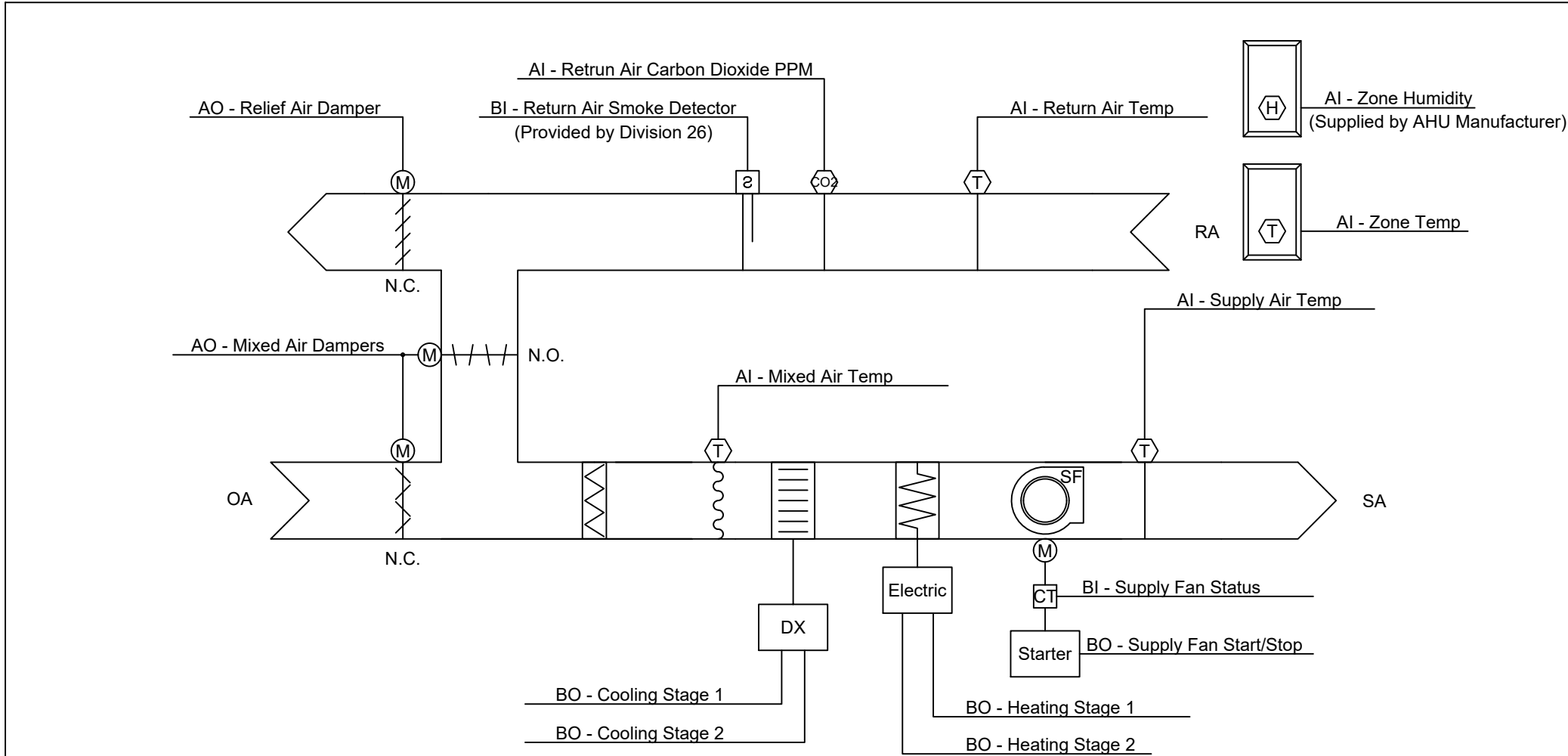
AIR HANDLER UNITS		
TAG	AHU-1	AHU-2
CONFIGURATION	VERTICAL /TOP FRONT	VERTICAL/TOP BACK
UNIT TYPE	INDOOR UNIT	INDOOR UNIT
SUPPLY MOTOR HP - PER FAN	3 HP	5 HP
DESIGN AIRFLOW	6000	5000
OUTSIDE AIR	935	540
SUPPLY FAN ESP	0.5	1.5
NUMBER OF DISTRIBUTORS	2	2
COOLING EDB	80	74
COOLING EWB	67	62
COOLING LDB	58.57	52.4
COOLING LWB	57.01	51.83
TOTAL COOLING CAPACITY	193.48	144.67
SENSIBLE CAPACITY	146.89	118.37
COIL ROW/FPI	4/14	4/12
REHEAT EAT	45	45
REHEAT LAT	60.79	71.35
ELECTRIC HEATER KW	30 KW	50 KW
UNIT VOLTAGE	460/60/3	460/60/3
UNIT MAX FUSE SIZE	60	70
UNIT MIN CIRCUIT AMPACITY	51	69.86
UNIT SIZE	15	12
UNIT LENGTH	29.125	40.068
UNIT WIDTH	79.685	71
UNIT HEIGHT	69.125	101.685
INSTALLED WEIGHT	752	829.4
UNIT MODEL	TWE180	TWE150
NOTES	2,3,4,5,6,7	1,2,3,4,5,6,7

- NOTES:
- PROVIDE WITH 2" DOUBLE WALL FOAM INJECTED CONSTRUCTION.
 - PROVIDE WITH INTERTWINED DX CIRCUITS.
 - PROVIDE ELECTRIC REHEAT AS SCHEDULED WITH 2 STAGES OF CONTROL.
 - 2015 IECC - ECONOMIZER REQUIRED ON INDIVIDUAL DX COOLING UNITS GREATER THAN 54,000 BTU/H.
 - PROVIDE UNIT WITH 2" MERV8 FILTERS.
 - PROVIDE WITH SINGLE POINT POWER.
 - MANUFACTURER TO PROVIDE TXVS SIZED ACCORDING TO MANUFACTURER INSTALLTION GUIDES.
 - UNIT TO HAVE FLAT FILTER SECTION, COIL SECTION, FAN SECTION, WITH MAINTENANCE ACCESS.
 - PROVIDE BACNET COMMUNICATION CARD FOR CONTROLS INTERFACE.
 - PROVIDE MINIMUM 5 YEAR PARTS WARRANTY.

CONDENSOR UNIT SCHEDULE		
TAG	CU-1	CU-2
UNIT SERVED	AHU-1	AHU-2
MODEL NUMBER	TTA180	TTA150
UNIT FUNCTION	COOLING	COOLING
UNIT TONNAGE	15 TONS	12.5 TONS
REFRIGERANT	R-410A REFRIGERANT	R-410A REFRIGERANT
VOLTAGE	460/60/3	460/60/3
REFIGERATION CIRCUIT / STAGE	MANIFOLD COMPRESSOR / 2	DUAL COMPRESSOR / 2
MCA/MOCP	32/40	26/35
DESIGN DRY BULB	95	95
WEIGHT	807	506
NOTES	ALL	ALL

NOTES:

- PROVIDE UNIT WITH FACTORY HAIL GUARDS.
- CONTRACTOR TO INSTALL REFRIGERANT SPECIALTIES AS PER MANUFACTURER INSTALLATION INSTRUCTIONS.
- PROVIDE MINIMUM 5 YEAR PARTS WARRANTY.



- RUN CONDITIONS - SCHEDULED:
THE UNIT SHALL RUN ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN THE FOLLOWING MODES:
- OCCUPIED MODE: THE UNIT SHALL MAINTAIN
- A 75°F (ADJ.) COOLING SETPOINT.
 - A 68°F (ADJ.) HEATING SETPOINT.
- UNOCCUPIED MODE (NIGHT SETBACK): THE UNIT SHALL MAINTAIN
- A 85°F (ADJ.) COOLING SETPOINT.
 - A 55°F (ADJ.) HEATING SETPOINT.
- ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH ZONE TEMP: IF THE ZONE TEMPERATURE IS GREATER THAN THE COOLING SETPOINT BY 4°F (ADJ.).
 - LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN THE HEATING SETPOINT BY 4°F (ADJ.).
- ZONE OPTIMAL START:
THE UNIT SHALL USE AN OPTIMAL START ALGORITHM FOR MORNING START-UP. THIS ALGORITHM SHALL MINIMIZE THE UNOCCUPIED WARM-UP OR COOL-DOWN PERIOD WHILE STILL ACHIEVING COMFORT CONDITIONS BY THE START OF SCHEDULED OCCUPIED PERIOD.
- RETURN AIR SMOKE DETECTION:
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A RETURN AIR SMOKE DETECTOR STATUS.
- SUPPLY FAN:
THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES.
- ALARMS SHALL BE PROVIDED AS FOLLOWS:
- SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
 - SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

- COOLING STAGES:
THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND STAGE THE COOLING TO MAINTAIN ITS COOLING SETPOINT. TO PREVENT SHORT CYCLING, THERE SHALL BE A USER DEFINABLE (ADJ.) DELAY BETWEEN STAGES, AND EACH STAGE SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.
- THE COOLING SHALL BE ENABLED WHENEVER:
- OUTSIDE AIR TEMPERATURE IS GREATER THAN 60°F (ADJ.).
 - AND THE ECONOMIZER IS DISABLED OR FULLY OPEN.
 - AND THE ZONE TEMPERATURE IS ABOVE COOLING SETPOINT.
 - AND THE SUPPLY FAN STATUS IS ON.
 - AND THE HEATING IS NOT ACTIVE.

- ECONOMIZER:
THE CONTROLLER SHALL MEASURE THE MIXED AIR TEMPERATURE AND MODULATE THE ECONOMIZER DAMPERS IN SEQUENCE TO MAINTAIN A SETPOINT 2°F (ADJ.) LESS THAN THE SUPPLY AIR TEMPERATURE SETPOINT. THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A MINIMUM ADJUSTABLE POSITION OF 20% (ADJ.) OPEN WHENEVER OCCUPIED.
- THE ECONOMIZER SHALL BE ENABLED WHENEVER:
- OUTSIDE AIR TEMPERATURE IS LESS THAN 65°F (ADJ.)
 - AND THE OUTSIDE AIR ENTHALPY IS LESS THAN 22 BTU/LB (ADJ.)
 - AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE.
 - AND THE OUTSIDE AIR ENTHALPY IS LESS THAN THE RETURN AIR ENTHALPY.
 - AND THE SUPPLY FAN IS ON.
- THE ECONOMIZER SHALL CLOSE WHENEVER:
- MIXED AIR TEMPERATURE DROPS FROM 40°F TO 35°F (ADJ.)
 - OR ON LOSS OF SUPPLY FAN STATUS.
- THE OUTSIDE AND EXHAUST AIR DAMPERS SHALL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN WHEN THE UNIT IS OFF. IN OPTIMAL START UP THE RETURN AIR DAMPER SHALL OPERATE AS DESCRIBED IN THE OCCUPIED MODE EXCEPT THAT THE OUTSIDE AIR DAMPER SHALL MODULATE TO FULLY CLOSED.

- THE RELIEF DAMPER SHALL OPEN LINEARLY IN RELATION TO THE ECONOMIZER DAMPER POSITION. THE RELIEF DAMPER SHALL OPEN 20%(ADJ.) WHEN THE ECONOMIZER DAMPER IS OPEN 40%. THE RELIEF DAMPER SHALL OPEN 80%(ADJ.) WHEN THE ECONOMIZER DAMPER IS OPEN 100%.
- MINIMUM OUTSIDE AIR VENTILATION - CARBON DIOXIDE (CO2) CONTROL:
WHEN IN THE OCCUPIED MODE, THE CONTROLLER SHALL MEASURE THE RETURN AIR CO2 LEVELS AND MODULATE THE OUTSIDE AIR DAMPERS CLOSED AND RETURN AIR DAMPERS OPEN AT A RATE OF 2% EVERY 10 MINUTES, TO MAINTAIN CO2 CONCENTRATIONS BELOW A CO2 SETPOINT OF 750 PPM (ADJ.). IN THE EVENT THE CO2 LEVEL IN THE ZONE(S) EXCEEDS THE CO2 SETPOINT, THE OUTSIDE AIR DAMPER SHALL MODULATE IN CONJUNCTION WITH THE RETURN AIR DAMPER AT AN IDENTICAL RATE, TO INCREASE THE OUTSIDE AIR PERCENTAGE THROUGH THE ROOF TOP UNIT UP TO THE SCHEDULED MINIMUM O.A.

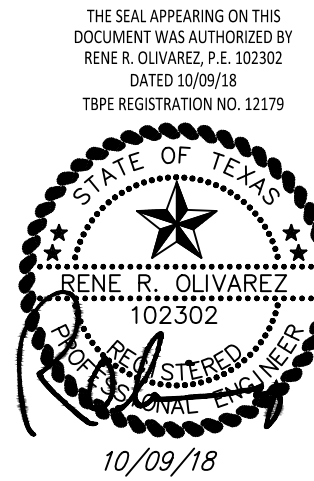
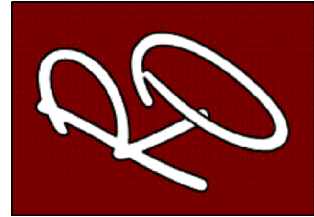
- MIXED AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE MIXED AIR TEMPERATURE.
- ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH MIXED AIR TEMP: IF THE MIXED AIR TEMPERATURE IS GREATER THAN 90°F (ADJ.).
 - LOW MIXED AIR TEMP: IF THE MIXED AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

- RETURN AIR CARBON DIOXIDE (CO2) CONCENTRATION MONITORING:
THE CONTROLLER SHALL MEASURE THE RETURN AIR CO2 LEVELS.
- ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH RETURN AIR CARBON DIOXIDE CONCENTRATION: IF THE RETURN AIR CO2 CONCENTRATION IS GREATER THAN 1000PPM (ADJ.) WHEN IN THE OCCUPIED MODE.
- SPACE HUMIDITY:
THE CONTROLLER SHALL MONITOR THE SPACE HUMIDITY AND USE AS REQUIRED FOR ECONOMIZER CONTROL OR HUMIDITY CONTROL.
- ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH SPACE HUMIDITY: IF THE SPACE HUMIDITY IS GREATER THAN 70% (ADJ.).
 - LOW SPACE HUMIDITY: IF THE SPACE HUMIDITY IS LESS THAN 35% (ADJ.).
- RETURN AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE RETURN AIR TEMPERATURE.
- ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH RETURN AIR TEMP: IF THE RETURN AIR TEMPERATURE IS GREATER THAN 90°F (ADJ.).
 - LOW RETURN AIR TEMP: IF THE RETURN AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

- SUPPLY AIR TEMPERATURE:
THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE.
- ALARMS SHALL BE PROVIDED AS FOLLOWS:
- HIGH SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS GREATER THAN 120°F (ADJ.).
 - LOW SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS LESS THAN 45°F (ADJ.).

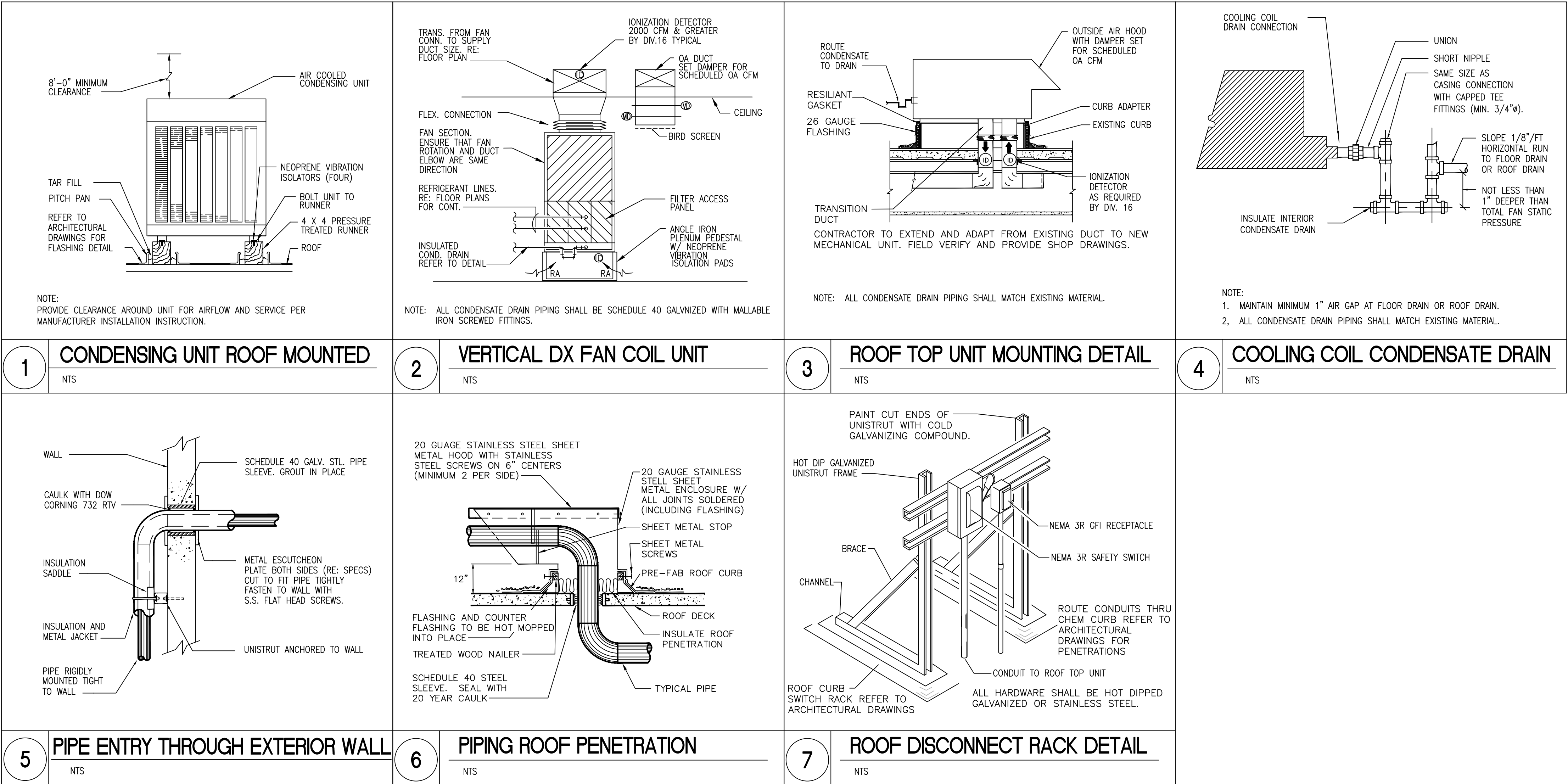
- ECONOMIZER FAULT DETECTION AND DIAGNOSTICS:
- OA, SA AND RA TEMPERATURE SENSORS MUST BE PERMANENTLY INSTALLED.
 - TEMP. SENSORS MUST HAVE AN ACCURACY OF +2°F OVER THE RANGE OF 40° TO 80°F.
 - REFRIGERANT PRESSURE SENSORS, WHERE USED, MUST HAVE AN ACCURACY OF +3° OF FULL SCALE.
 - UNIT CONTROLLER MUST BE CAPABLE OF PROVIDING SYSTEM STATUS, MANUALLY INITIATING EACH OPERATING MODE AND REPORTING FAULTS TO A FAULT MANAGEMENT APPLICATION.
 - FDD SYSTEM MUST BE CAPABLE OF DETECTING AIR TEMPERATURE SENSOR FAULT, ECONOMIZER FAULTS, DAMPER NOT MODULATING AND EXCESS OUTDOOR AIR.

1 M2.0	RTU ECONOMIZER ELECTRIC HEAT
	NTS

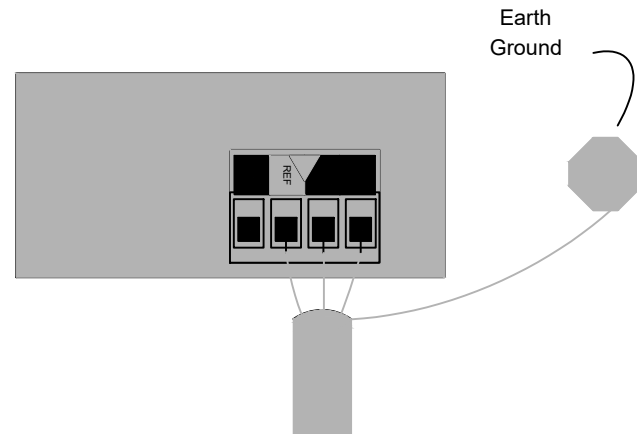


PROJECT NAME	DESCRIPTION	DATE	NO.
PHARR MEMORIAL LIBRARY HVAC REPLACEMENTS		10/09/2018	1

PROJECT NO.: 18008
DRAWN BY: G.M.
CHECKED BY: R.O.
SHEET TITLE:



BUILDING AUTOMATION SYSTEM

Category	Rules / Maximums Allowed
General	Typically daisy-chained; branch or star configuration acceptable when repeaters are used. See End of Line Switching and Repeater Guideline graphic.
Number of Devices	<p>When all of the devices connected on the FC Bus are Metasys FECs, VMAs, and/or IOMs, the device and bus segment limits are: 100 devices total per FC Bus (maximum) 3 bus segments per FC Bus (maximum) 50 devices per bus segment (maximum, not to exceed 100 devices per FC Bus)</p> <p>When one or more TEC26xx Series thermostat or third-party MSTP device is connected on the FC Bus, the device and bus segment limits are: 64 devices total per FC Bus (maximum) 3 bus segments per FC Bus (maximum) 32 devices per bus segment (maximum, not to exceed 64 devices per FC Bus)</p> <p>Note: Metasys MSTP devices generate less data traffic than third-party MSTP devices and TEC26xx thermostats. Connecting third-party devices or TEC26xx thermostats to the FC Bus increases data traffic, reduces bus performance, and reduces the number of devices that can be connected to the bus. Bus segments on an FC Bus are connected with repeaters (only). Up to two cascaded repeaters may be applied to an FC Bus (to connect three bus segments).</p>
Line Length and Type	<p>When all of the devices connected on the FC Bus are Metasys FECs, VMAs, and/or IOMs, the cable length limits are: Each bus segment can be up to 1520 m (5000 ft) in length (using 22 AWG 3-wire twisted, shielded cable). Each FC Bus can be up to 4750 m (15,000 ft) in length (using 22 AWG 3-wire twisted, shielded cable).</p> <p>When one or more TEC26xx Series thermostat or third-party MSTP device is connected on the FC Bus, the device and bus segment limits are: Each bus segment can be up to 1220 m (4000 ft) in length (using 22 AWG 3-wire twisted, shielded cable) Each FC Bus can be up to 3650 m (12,000 ft) in length (using 22 AWG 3-wire twisted, shielded cable). When using fiber-optic connections: 2,010 m (6,600 ft) between two fiber modems 22 AWG Stranded, 3-Wire Twisted, Shielded Cable</p>
Cable	22 AWG stranded, 3-wire, twisted shielded cable
EOL Termination	<p>End-of-Line (EOL) termination is required on the FC Bus to reduce signal reflection when data transmissions reach the end of a bus segment and bounce back. EOL termination is built into some Metasys FC devices and is enabled with a switch or jumper on the device.</p> <p>EOL Termination on NAEs An EOL switch on an NAE enables EOL termination. For those NAEs with two FC Bus connections, two EOL double-pole switches are provided. Set the EOL switch to the ON (up) position to set the controller as an EOL termination device.</p> <p>EOL Termination on Switch-Terminating Devices Some field controllers have an EOL switch or jumper. Such devices include FECs, IOMs, VMAs, ZFR1810s, and repeaters. Set the EOL termination to On for any of these devices when it is the last device on a bus segment.</p> <p>EOL Termination on Devices Without EOL Provision For the devices such as TECs and third-party controllers in which no EOL provision is provided, install the MS-BACEOL-0 RS485 End-of-Line Terminator at the device if at the end of the bus segment.</p> <p>EOL Termination Across the FC Bus The FC Bus may consist of up to three bus segments. Each bus segment on an FC Bus requires two EOL termination devices, one at each end of the bus segment. All other devices on the FC Bus should have their EOL termination disabled (EOL switches Off). If only one device on an FC segment has an EOL termination, it must be set to On.</p> <p>EOL on FC Bus Repeater When using repeaters in the FC Bus, set the EOL jumpers based on the position of the repeater in the run.</p>
<div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>SHIELD GROUNDING</p> <p>The shield should be earth grounded at one and only one point for the entire bus segment. (Preferably in the NAE Panel.) The shield screws on the controllers are simply a convenient way to continue the daisy chain of the bus. They are not attached to earth ground. You can use the shield terminal or twist together the shield and tape back at each controller.</p> </div> </div>	

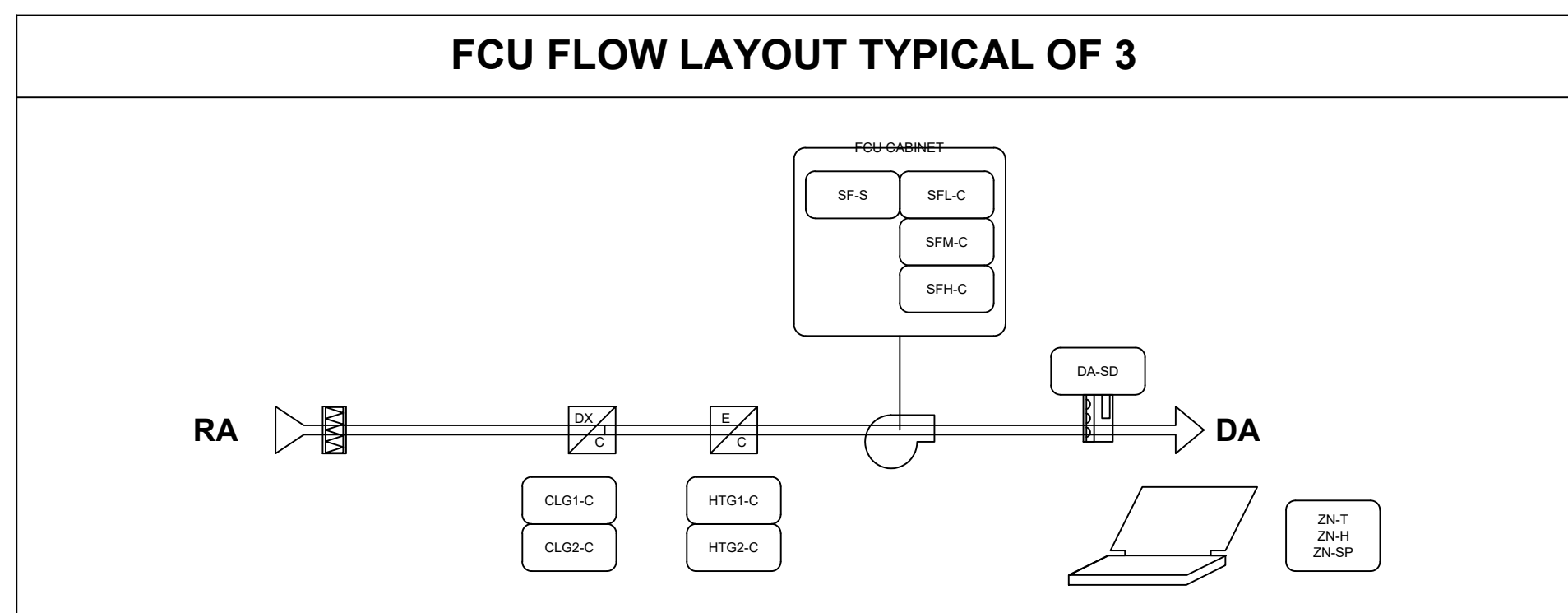
Type	Typical Usage	Anixster #	Belden #	pF/ft	Area
22/3c Shielded Plenum	Open Plenum Installations. 38400+ Baud RS-485 Communication.	CBL-22/3-FC-PLN	6501FE	25	0.014
22/3c Shielded PVC	EMT (Raceway) Installations. 38400+ Baud RS-485 Communication.	CBL-22/3-FC-PVC	5501FE	31	0.015

Type	Typical Usage	Anixter #	Belden #	pF/ft	Area
22/2pr Shielded Plenum	Open Plenum Installations, 38400+ Baud RS-485 Communication.	CBL-22/2P-SA-PLN	6541FE	33	0.033
22/2pr Shielded PVC	EMT (Raceway) Installations, 38400+ Baud RS-485 Communication.	CBL-22/2P-SA-PVC	5541FE	31	0.034

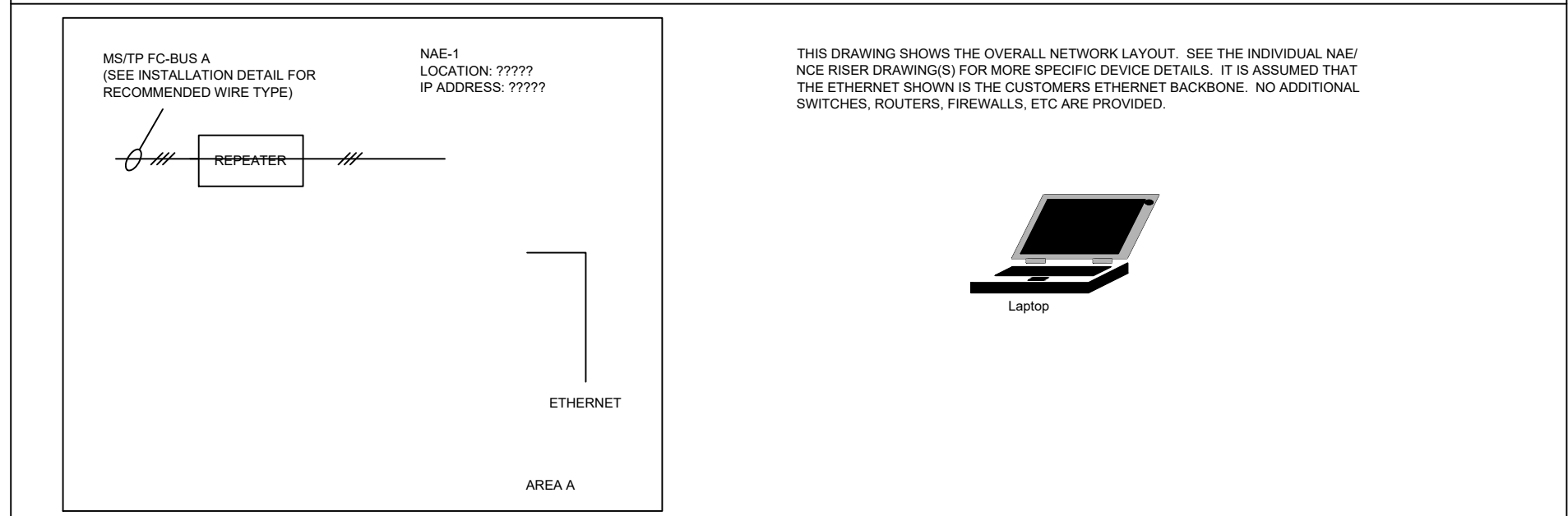
METASYS MSTP NETWORK INSTALLATION DETAILS

The information in this document is not intended to replace the published Technical Product Literature for the Johnson Controls systems and products presented. The Installation Instructions that are packed with products, and the Technical Bulletins and Product Bulletins released with Johnson Controls systems and products supersede the information on this page. It is the responsibility of the product installer and product user to obtain and follow the product installation, operation, and safety procedures provided with the products or project specific information required by specification or local codes.

END OF THE LINE SWITCHING AND REPEATER GUIDELINES


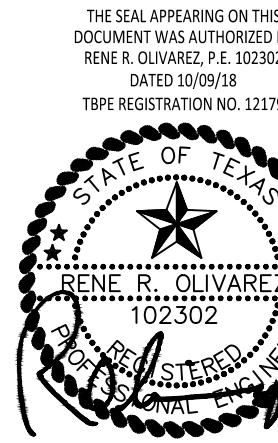


METASYS NETWORK LAYOUT

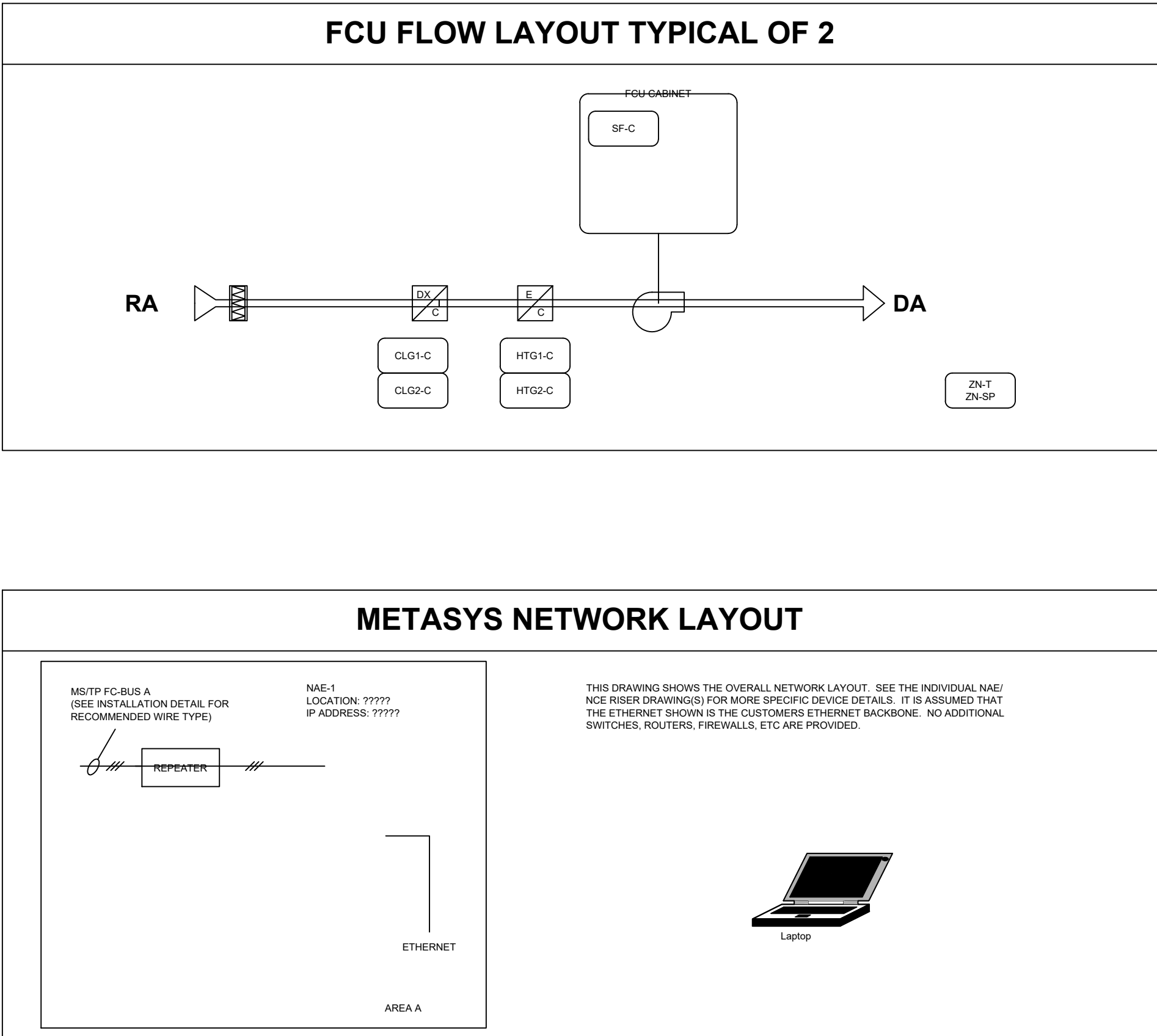
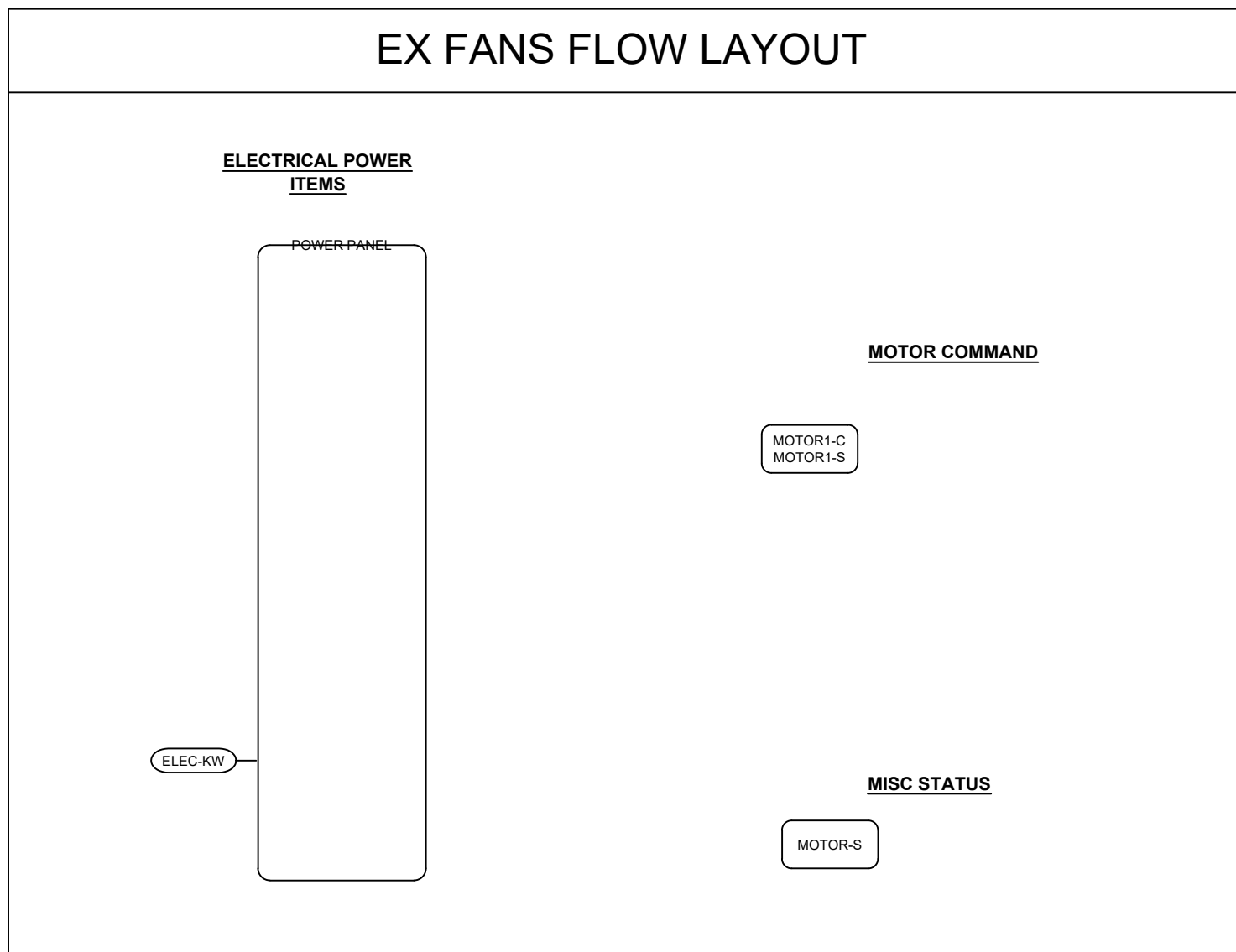
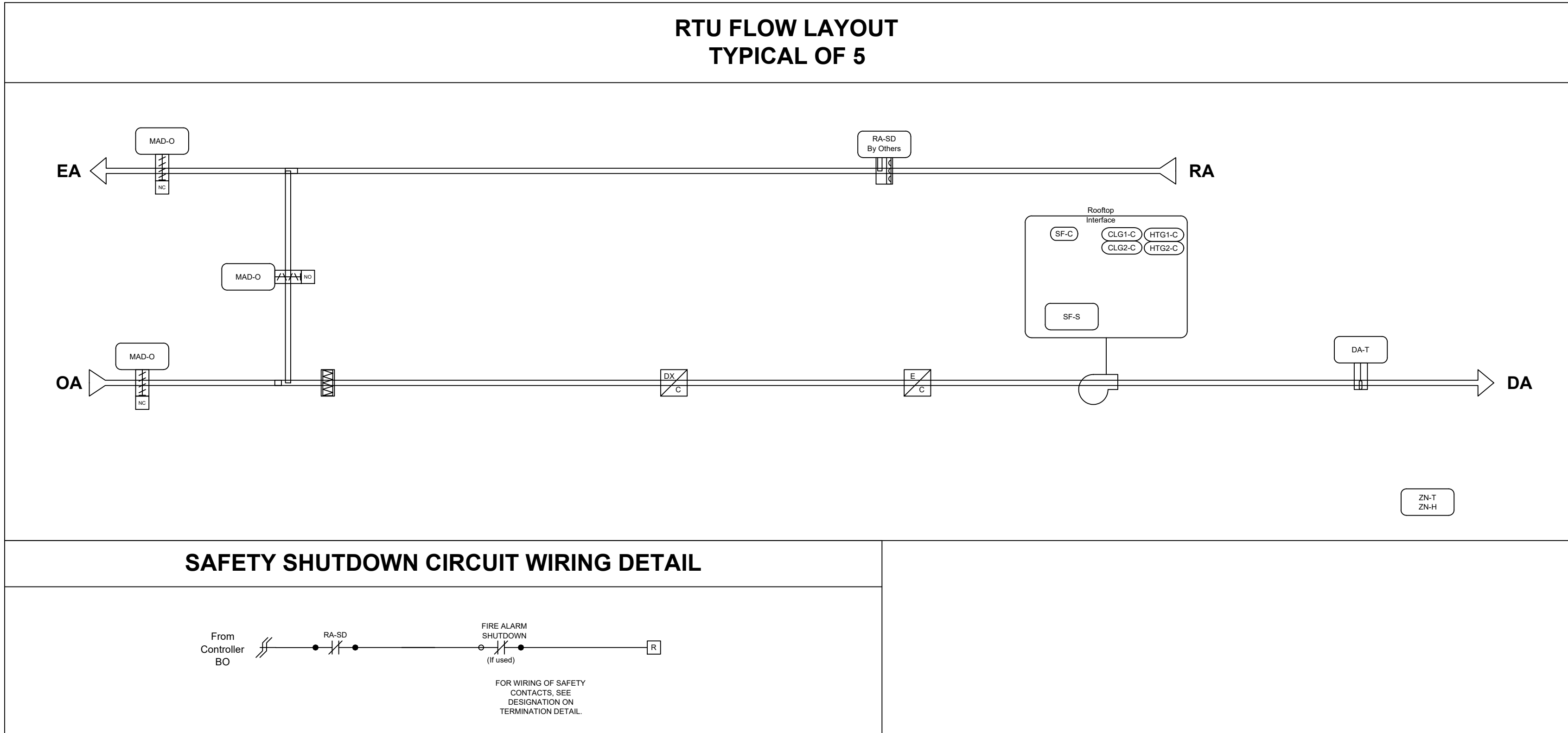


KEYED NOTES:

- A. DISCONNECT EXISTING CONTROL SYSTEM FROM DEMO ROOFTOP UNITS AND RECONNECT AND PROGRAM TO NEW ROOFTOP UNITS.
- B. IF EXISTING MECHANICAL SYSTEMS SUCH AS VAV BOXES, DAMPERS, EXHAUST FANS HAVE CONTROLS, THEY SHALL BE REPLACED WITH NEW CONTROLLERS AND CONNECTED TO MAIN SUPERVISORY CONTROLLER. SYSTEMS SHALL CONTINUE TO OPERATE DURING WORKING HOURS WITHOUT DISTURBANCE.

<div>ENGINEERING, PLLC</div> <div>MEP ENGINEERS & CONSTRUCTION MANAGERS</div> <div>2705 E. Davis Rd., Suite A</div> <div>Edinburg, Texas 78540</div> <div>TBPE Firm Registration No. 12179</div> <div>www.ro-engineering.com</div>			
		<div>THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY RENE R. OLIVAREZ, P.E. 102302 DATED 10/09/18 TBPE REGISTRATION NO. 12179</div> <div> 10/09/18</div>	
<div>PROJECT NAME</div> <div>PHARR MEMORIAL LIBRARY HVAC REPLACEMENTS</div>		<div>PROJECT LOCATION</div> <div>121 E CHEROKEE AVE PHARR, TEXAS 78577</div>	
NO.	DATE	DESCRIPTION	
1	10/09/2018		
PROJECT NO.: 18008			
DRAWN BY: G.M.			
CHECKED BY: R.O.			
SHEET TITLE:			
B.A.S. SYSTEM DETAILS			
S H E E T			
M3.0			

BUILDING AUTOMATION SYSTEM



KEYED NOTES:

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TBE REGISTRATION NO. 12179

STATE OF TEXAS
RENE R. OLIVAREZ
P.E. 102302
10/09/18

PROJECT NAME
TIERRA DEL SOL CLUB HOUSE
HVAC REPLACEMENTS

PROJECT LOCATION
700 E HALL ACRES RD
PHARR, TEXAS 78577

NO.	DATE	DESCRIPTION
1	10/09/2018	

PROJECT NO.: 18008
DRAWN BY: G.M.
CHECKED BY: R.O.
SHEET TITLE:
B.A.S. SYSTEM
DETAILS

S H E E T
DNP M3.0



TIERRA DEL SOL CLUB HOUSE, HVAC REPLACEMENTS

700 E HALL ACRES RD, PHARR, TX 78577

PROJECT CONTACTS:

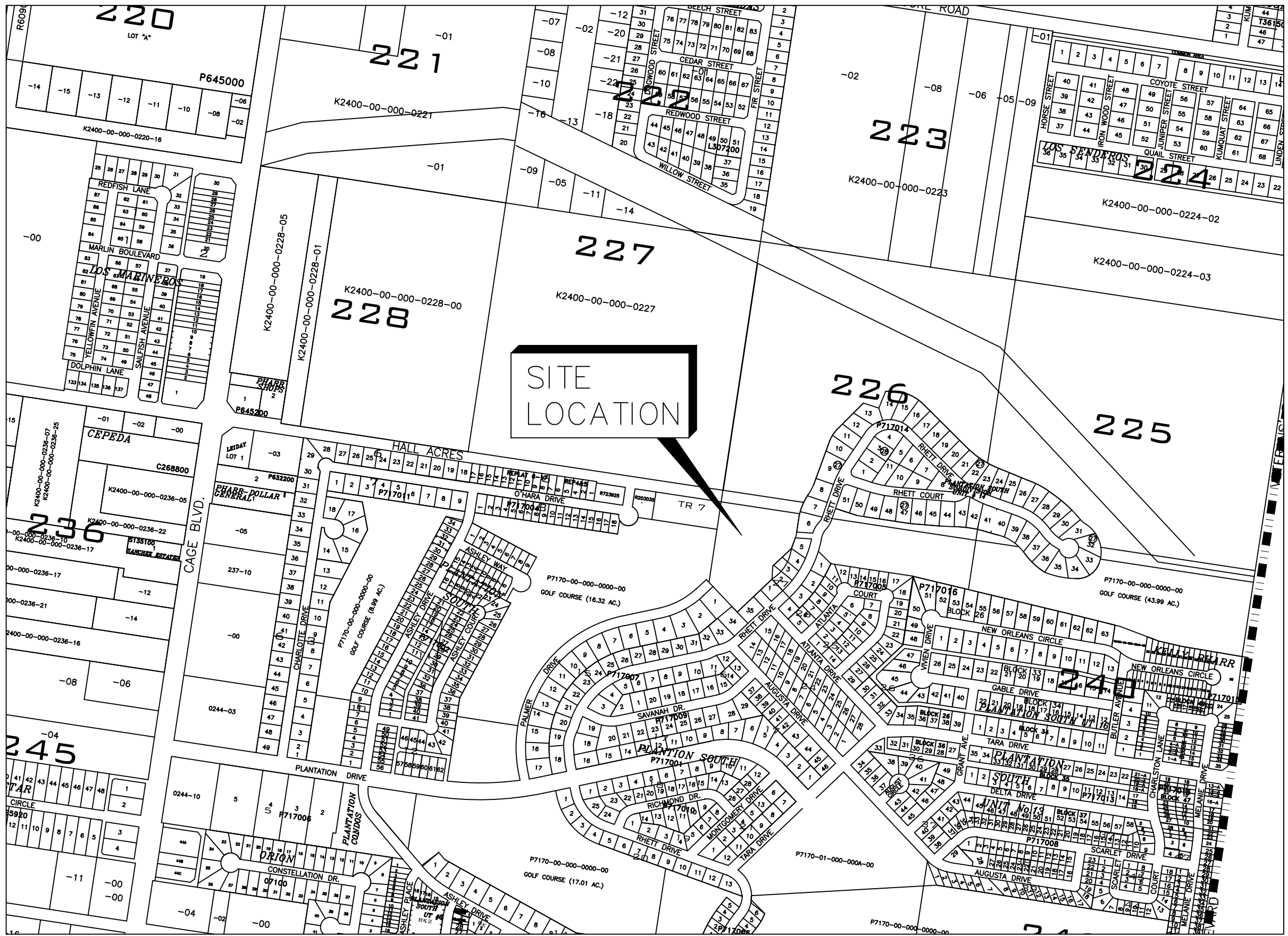
RO ENGINEERING 956-292-3336
CITY OF PHARR 956-402-4000
CITY OF PHARR ENGINEERING 956-402-4221

CITY COMMISSION

DR. AMBROSIO "AMOS" HERNANDEZ.....	MAYOR
ELEAZAR GUAJARDO.....	COMMISSIONER PLACE 1
ROBERTO "BOBBY" CARRILLO.....	COMMISSIONER PLACE 2
RAMIRO CABALLERO.....	COMMISSIONER PLACE 3
DANIEL CHAVEZ.....	COMMISSIONER PLACE 4
RICARDO MEDINA.....	COMMISSIONER PLACE 5
MARIO A. BRACAMONTES.....	COMMISSIONER PLACE 6

CONSTRUCTION NOTES:

- 1. CONTRACTOR SHALL OBTAIN ELECTRICAL PERMITS PRIOR TO CONSTRUCTION.
- 2. THE CONTRACTOR SHALL CALL 1-800-DIGTESS PRIOR TO ANY EXCAVATION OR DIGGING.
- 3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND IDENTIFYING ALL UNDERGROUND UTILITIES PRIOR TO STARTING ANY WORK.
- 4. ALL ELECTRICAL WIRING AND CONDUIT SHALL BE CONCEALED AS TO PREVENT VANDALISM.
- 5. THE CONTRACTOR SHALL BRING TO THE ATTENTION OF THE ENGINEER ANY CONFLICT AT THE JOB SITE PRIOR TO CONSTRUCTION.



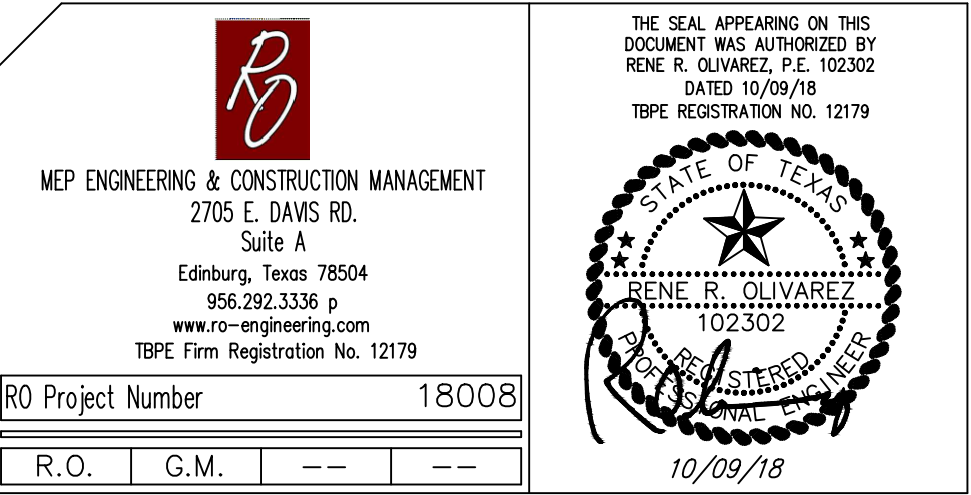
INDEX TO SHEETS:

CONSTRUCTION PLANS:

M0.0	MECHANICAL SYMBOLS & ABBREVIATIONS
MD1.0	1ST FLOOR MECHANICAL DEMOLITION PLAN
MD1.1	ROOFTOP UNIT MECHANICAL DEMOLITION PLAN
M1.0	1ST FLOOR MECHANICAL PLAN
M1.1	ROOFTOP UNIT MECHANICAL PLAN
M2.0	MECHANICAL SCHEDULES & RTU ECONOMIZER DETAIL
M2.1	MECHANICAL DETAILS
M3.0	B.A.S. SYSTEM DETAILS

GENERAL NOTES:

- 1. CAUTION: GAS, FIBER OPTIC, TELEPHONE, ELECTRIC, AND CITY OF PHARR UTILITIES EXIST WITHIN THE LIMITS OF CONSTRUCTION OF THIS PROJECT. NOTIFY RESPECTIVE UTILITY COMPANIES. ANY DRAINAGE TO PUBLIC OR PRIVATE LINES SHALL BE REPAIRED IN ACCORDANCE WITH THE RESPECTIVE UTILITY COMPANY REQUIREMENTS. COST FOR SUCH REPAIRS SHALL BE SUBSIDIARY TO OTHER BID ITEMS OF THE PROJECT PROPOSAL.
- 2. THERE SHALL BE MINIMUM INTERRUPTION OF TRAFFIC AND ACCESS TO ADJACENT RESIDENTS ALONG THE PROJECT SITE. IF ROADS ARE TO BE CLOSED, THE CITY OF EDINBURG FIRE AND POLICE DEPARTMENTS SHALL BE NOTIFIED AT LEAST 48 HOURS BEFORE SUCH CLOSING.
- 3. CONTRACTOR TO FIELD VERIFY ALL SITE DIMENSIONS PRIOR TO COMMENCING IMPROVEMENTS.
- 4. CONTRACTOR TO INSTALL AS PER MANUFACTURER RECOMMENDATIONS.
- 5. CONTRACTOR SHALL COORDINATE POWER OUTAGES WITH CITY OFFICIALS AND POWER COMPANY.



DUCT SYMBOLS

DOUBLE LINE SYMBOL	DESCRIPTION	SINGLE LINE SYMBOL
	DUCT- FIRST NUMBER IS VISIBLE DIMENSION.	
	MITERED ELBOW W/TURNING VANES	
	RADIUS ELBOW W/VANE(S) (1.5=R/D STANDARD)	
	DUCT SECTION, POSITIVE PRESSURE	
	DUCT SECTION, NEGATIVE PRESSURE	
	DUCT & AIRFLOW UP(LEFT) POSITIVE PRESSURE	
	DUCT & AIRFLOW DN(RIGHT) POSITIVE PRESSURE	
	DUCT & AIRFLOW UP(LEFT) NEGATIVE PRESSURE	
	DUCT & AIRFLOW DN(RIGHT) NEGATIVE PRESSURE	
	DUCT & AIRFLOW UP(LEFT) NEG./POS. PRESSURE	
	DUCT & AIRFLOW DN(RIGHT) NEG./POS. PRESSURE	
	CHANGE OF ELEVATION=RISE (R), DROP (D)	
	DUCT W/INTERNAL LINING CLEAR INTERNAL DIMENSIONS SHOWN	
	ACCESS DOOR=SIDE (L), BOTTOM (M), TOP (R)	
	FLEXIBLE CONNECTOR	
	FLEXIBLE DUCT	
	FD- FIRE DAMPER, SD- SMOKE DAMPER, FSD- FIRE/SMOKE DAMPER.	
	MANUAL VOLUME DAMPER-SPECIFIC TYPE, NO LABEL-BUTTERFLY, OBO-OPPOSED BLADED DAMPER, PBD-PARALLEL BLADE DAMPER	
	MOTORIZED DAMPER OR ZONE CONTROL DAMPER	
	BRANCH TAP-W/45 DEG. ENTRY	
	BRANCH TAP-CONICAL SPIN-IN	
	BRANCH TAP-STRAIGHT SPIN-IN	
	TRANSITION	
	EXISTING DUCTWORK TO BE DEMOLISHED	
	EXISTING DUCTWORK TO REMAIN	
	HVAC - EQUIP AS NOTED	
	AIR DEVICE, SUPPLY- CEILING. CLEAR	
	AIR DEVICE TAG SPIN-IN DIMENSION AIRFLOW (CFM)	
	AIR DEVICE, RETURN- CEILING.	
	AIR DEVICE, EXHAUST- CEILING.	
	AIR DEVICE, SUPPLY- SIDEWALL.	
	AIR DEVICE, RETURN/EXHAUST- SIDEWALL.	

ABBREVIATIONS

A	ABV	ABOVE
	AC	ALTERNATING CURRENT / ABOVE CEILING
	ACMPR	AIR COMPRESSOR
	ACU	AIR CONDITIONING UNIT
	AF	ABOVE FINISHED FLOOR
	AFMS	AIR FLOW MEASURING STATION
	AHU	AIR HANDLING UNIT
	AMB	AMBIENT
	AMP	AMPERE
	ANSI	"AMERICAN NATIONAL STANDARDS INSTITUTE"
	APPROX.	APPROXIMATE
	ARI	AMERICAN REFRIGERATION INSTITUTE
	ASHRAE	"AMERICAN SOCIETY OF HEATING, REFRIGERATION, and AIR CONDITIONING ENGINEERS"
	ASME	"AMERICAN SOCIETY OF MECHANICAL ENGINEERS"
	ASPE	"AMERICAN SOCIETY OF PLUMBING ENGINEERS"
	ASTM	"AMERICAN SOCIETY FOR TESTING AND MATERIALS"
	AVG	AVERAGE
	AWWA	"AMERICAN WATER WORKS ASSOCIATION"
B	B	BOILER
	BARO	BAROMETRIC
	BAROPR	BAROMETRIC PRESSURE
	BF	BELOW FLOOR
	BFC	BELOW FINISHED CEILING
	BG	BELOW GRADE
	BHP	BRAKE HORSEPOWER
	BOD	BOTTOM OF DUCT
	BOM	BILL OF MATERIAL
	BOP	BOTTOM OF PIPE
	BTU	BRITISH THERMAL UNIT
C	CCL	COOLING COIL
	CCW	COUNTERCLOCKWISE
	CD	CONDENSATE DRAIN
	CFH	CUBIC FEET PER HOUR
	CFM	CUBIC FEET PER MINUTE
	CH	CHILLER
	CHP	CHILLER WATER PUMP
	CHR	CHILLED WATER RETURN
	CHS	CHILLED WATER SUPPLY
	CLR	CLOSED CIRCUIT COOLER
	CMPR	COMPRESSOR
	CR	CONDENSATE RETURN
	CRU	COMPUTER ROOM UNIT
	CT	COOLING TOWER
	CU	CONDENSING UNIT
	CU.FT.	CUBIC FEET
	CU.IN.	CUBIC INCH
	CV	CONSTANT VOLUME
	CX	CARBON DIOXIDE SENSOR
	CWP	CONDENSER WATER PUMP
	CWR	CONDENSER WATER RETURN
	CWS	CONDENSER WATER SUPPLY
D	dB	DECIBEL
	D	DIAMETER
	DBT	DRY BULB TEMPERATURE
	DC	DIRECT CURRENT
	DDC	DIRECT DIGITAL CONTROL
	DEG	DEGREE
	DENS	DENSITY
	DIA.	DIFFERENCE or DELTA
	DIFF	DIFFERENCE
	DN	DOWN
	DP	DEEP
	DPT	DEW POINT TEMPERATURE
E	E/A	EXHAUST AIR
	EA	EACH
	EAT	ENTERING AIR TEMPERATURE
	EDH	ELECTRIC DUCT HEATER
	EF	EXHAUST FAN
	EFF	EFFICIENCY
	ENTH.	ENTHALPY
	EOD	EMERGENCY OVERFLOW DRAIN
	ET	EXPANSION TANK
	EVP	EVAPORATIVE COOLER
	EWT	ENTERING WATER TEMPERATURE
	EXP	EXPANSION
F	F	FAHRENHEIT
	FCU	FAN COIL UNIT
	FLR.	FLOOR
	FOB	FLAT ON BOTTOM
	FOT	FLAT ON TOP
	FBM	FEET PER MINUTE
	FPS	FEET PER SECOND
	FTU	FAN POWERED TERMINAL UNIT
	FRN	FURNACE
	FT	FEET
	FT.W.G.	FEET OF WATER GAGE
	FVEL	FACE VELOCITY
G	GAL.	GALLONS
	GPH	GALLONS PER HOUR
	GPM	GALLONS PER MINUTE
	GR	GRAINS
H	HCL	HEATING COIL
	HD	HOOD
	HGT	HEIGHT
	HP	HORSEPOWER
	HPS	HIGH PRESSURE STEAM
	HR	HOUR
	HUM	HUMIDIFIER
	HWP	HOT WATER PUMP
	HWR	HOT WATER RETURN
	HWS	HOT WATER SUPPLY
	HZ	HERTZ
I	ID	INSIDE DIAMETER
	IH	INTAKE HOOD
	IN.	INCH
	IN.W.G.	INCHES OF WATER GAGE
	IRH	INFRARED HEATER
J		

ABBREVIATIONS

K	KHE	KITCHEN HOOD EXHAUST
	kW	KILOWATTS
	kwh	KILOWATT HOUR
L	L-#	LOUVER DESIGNATION
	LAT	LEAVING AIR TEMPERATURE
	LBS.	POUNDS
	LIQ	LIQUID
	LPS	LOW PRESSURE STEAM
	LWT	LEAVING WATER TEMPERATURE
M	MA	MAKEUP AIR
	MAX.	MAXIMUM
	MBH	THOUSAND BTU/HR.
	MCA	MINIMUM CIRCUIT AMPACITY
	MCF	THOUSAND CUBIC FEET
	MIN.	MINIMUM or MINUTES
	MOC	MAXIMUM OVERCURRENT PROTECTION
	MPS	MEDIUM PRESSURE STEAM
	MSS	"MANUFACTURERS' STANDARDIZATION SOCIETY of the Valves and Fittings Industry, Inc."
N	N/A	NOT APPLICABLE
	NC	NOISE CRITERIA
	N.C.	NORMALLY CLOSED
	NEBB	NATIONAL ENVIRONMENTAL BALANCING BUREAU
	N.I.C.	NOT IN CONTRACT
	N.O.	NORMALLY OPEN
	N.T.S.	NOT TO SCALE
O	O/A	OUTSIDE AIR
	OD	OUTSIDE DIAMETER
	OSHA	OCCUPATIONAL SAFETY and HEALTH ADMINISTRATION
	OZ	OUNCE
P	PD	PRESSURE DIFFERENCE
	PH	PHASE
	PPM	PART PER MILLION
	PRV	PRIMARY PRESSURE
	PSI	POUNDS PER SQUARE INCH
	PSIA	"PSI, ABSOLUTE"
	PSIG	"PSI, GAGE"
Q		
R	R	THERMAL RESISTANCE
	R-22	REFRIGERANT-22
	R/A	RETURN AIR
	RCVR	RECEIVER
	RD	ROOF DRAIN
	RE	"REFER TO DETAIL NO.1, SHEET M--xx"
	RE-1/M--xx	RE-1/M--xx
	RECIRC.	RECIRCULATE
	RF	RETURN FAN
	RH	RELIEF HOOD
	RLN	REFRIGERANT LIQUID
	RPM	REVOLUTIONS PER MINUTE
	RPS	REVOLUTIONS PER SECOND
	RS	REFRIGERANT SUCTION
	RTU	ROOFTOP UNIT
	RV	RELIEF VENT
S	S	SECOND
	s	SOUND ATTENUATOR
	S/A	SUPPLY AIR
	SAT	SATURATION
	SD	SMOKE DETECTOR
	SF	SUPPLY FAN
	SG	SPECIFIC GRAVITY
	SMACNA	"SHEET METAL and AIR CONDITIONING" "CONTRACTORS' NATIONAL ASSOCIATION"
	SP	STATIC PRESSURE
	SPEC.	SPECIFICATION
	SQ.FT.	SQUARE FEET
	SUCT.	SUCTION
T	TD	TEMPERATURE DIFFERENCE
	TEMP	TEMPERATURE
	TONS	TONS OF REFRIGERATION
	TSTAT	THERMOSTAT
	TU	TERMINAL UNIT
U	U	HEAT TRANSFER COEFFICIENT
	U/C	UNDER COUNTER
	UG	UNDERGROUND
	UH	UNIT HEATER
	U.N.O.	UNLESS NOTED OTHERWISE
	UV	UNIT VENTILATOR
V	V	VOLTS
	VA	VOLT AMPERE
	VAC	VACUUM
	VAR	VARIABLE
	VAV	VARIABLE AIR VOLUME
	VEL	VELOCITY
	VENT.	VENTILATION
	VERT.	VERTICAL
	VFD	VARIABLE FREQUENCY DRIVE
	VOL.	VOLUME
	VP	VELOCITY PRESSURE
	VTR	VENT THRU ROOF
W	W	WITH
	W/O	WITHOUT
	W	WATTS
	WB	WET BULB
	WBT	WET BULB TEMPERATURE
	WT	WEIGHT
X		
Y	YCO	YARD CLEANOUT
	YD	YARD
	YR	YEAR
Z	ZN	ZONE

GENERAL MECHANICAL NOTES AND SPECIFICATIONS:

GENERAL

- COORDINATE WORK AMONG ALL DISCIPLINES. IT IS NOT THE INTENT OF THESE DOCUMENTS TO DICTATE WHO MUST DO THE WORK. ALL WORK SHOWN IS THE RESPONSIBILITY OF THE (PRIME) CONTRACTOR.
- FIELD VERIFY ALL CONDITIONS AND MEASURE DIMENSIONS WITHIN THE BUILDING PRIOR TO ORDERING EQUIPMENT AND/OR PROCEEDING WITH INSTALLATION.
- ALL EQUIPMENT SHALL BE FACTORY TESTED, AND CONTRACTOR SHALL VERIFY THEIR CONDITION PRIOR TO INSTALLATION. CONTRACTOR IS RESPONSIBLE FOR EQUIPMENT DAMAGED DURING MOVING AND INSTALLATION.
- EQUIPMENT FOUND DEFECTIVE PRIOR TO FINAL ACCEPTANCE SHALL BE REPLACED AT NO COST TO OWNER.
- SUBMISSION OF BID PROPOSAL IS CONSIDERED AN ACKNOWLEDGEMENT THAT CONTRACTOR VISITED SITE, AND VERIFIED ALL EXISTING CONDITIONS, AND INCLUDED ANY MODIFICATIONS TO EXISTING AND NEW WORK REQUIRED FOR INSTALLATION OF A COMPLETE AND OPERATIONAL MECHANICAL SYSTEM.
- COORDINATE WITH OWNER AND ENGINEER FOR ANY DISRUPTION IN UTILITY SERVICES, PARTICULARLY THOSE THAT MIGHT AFFECT OTHER BUILDINGS IN THE CAMPUS.
- CONTRACTOR SHALL NOT PROCEED WITH ANY WORK INVOLVING A CHANGE IN PROJECT SCOPE OR COST WITHOUT FIRST HAVING OBTAINED ENGINEER'S APPROVAL IN WRITING. UNLESS ENGINEER HAS AGREED TO SUCH CHANGE PRIOR TO IT BEING DONE, AND HAS AGREED THAT AN INCREASE IN COST ASSOCIATED WITH SUCH CHANGE IS WARRANTED; CONTRACTOR WILL NOT BE REIMBURSED FOR SUCH CHANGE.
- TESTING, ADJUSTING AND BALANCING (TAB) CONTRACTOR SHALL BE RETAINED BY THE PRIME CONTRACTOR. TAB SHALL NOT BE A PART OF THE MECHANICAL CONTRACT.

CODES AND ORDINANCES

- PERFORM ALL WORK PER LATEST VERSION OF INTERNATIONAL MECHANICAL CODE, AND APPLICABLE LOCAL CODES AND ORDINANCES, UNLESS DRAWINGS OR SPECIFICATIONS HAVE MORE STRINGENT REQUIREMENTS.
- CONTRACTOR IS RESPONSIBLE FOR ALL PERMITS AND FEES ASSOCIATED WITH PROJECT, INCLUDING FEES FOR INSPECTIONS, APPLICATIONS, AND PROVISION OF NEW SERVICES.
- NOTIFY ENGINEER OF ANY ASPECTS OF DESIGN WHICH ARE THOUGHT TO BE IN NONCOMPLIANCE WITH APPLICABLE CODES.

COORDINATION

- REFER TO ARCHITECTURAL AND STRUCTURAL PLANS FOR DETAILS OF CONSTRUCTION, INCLUDING BEAMS, FLOOR AND WALL PENETRATIONS, CHASES, AND REFLECTED CEILING PLANS. VERIFY OPENING SIZES WITH EQUIPMENT FURNISHED.
- COORDINATE ALL WORK WITH OTHER TRADES; COORDINATE SCHEDULE OF WORK WITH ALL SUB-CONTRACTORS TO ACHIEVE SMOOTH FLOW OF CONSTRUCTION.
- CONTRACTOR SHALL REVIEW COMPLETE DOCUMENTS PRIOR TO SUBMITTAL OF PROPOSAL TO GAIN COMPLETE UNDERSTANDING OF PROJECT SCOPE, WORK BY OTHERS, AND MECHANICAL WORK ASSOCIATED WITH OTHER DISCIPLINES.
- ENGINEER/ ARCHITECT MUST BE GIVEN AT LEAST A TEN (10) WORKING DAY NOTICE TO PERFORM ALL TYPES OF INSPECTIONS. COORDINATE WORK SCHEDULE WITH ARCHITECT AND ENGINEER TO PLAN ACCORDINGLY FOR APPROPRIATE INSPECTIONS.

ECONOMIZER.

- FOR SYSTEMS THAT REQUIRE ECONOMIZER, MECHANICAL CONTRACTOR SHALL PROVIDE A CONTROLLER EQUAL TO HONEYWELL JADE ECONOMIZER MODULE W7220. REFER TO ECONOMIZER DETAIL FOR ADDITIONAL INFORMATION.

METAL AND FLEXIBLE DUCTS

- DRAWINGS ARE DIAGRAMMATIC IN NATURE. FOR CLARITY SAKE, MOST DUCT OFFSETS/RISES/DROPS ARE NOT SHOWN. RECTANGULAR AND ROUND DUCTWORK SHALL BE GALVANIZED STEEL. SIZES SHOWN ARE INSIDE CLEAR DIMENSION.
- VERIFY BOTTOM OF DUCT ELEVATION AND COORDINATE WITH OTHER TRADES.
- CONSTRUCT AND LEAKAGE TEST ALL DUCTWORK BASED ON SMACNA REQUIREMENTS. COORDINATE PRESSURE CLASSES WITH EQUIPMENT SCHEDULES.
- ALL GALVANIZED SHEET METAL DUCT WORK SHALL COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS--METAL AND FLEXIBLE".
- USE 2" GLASS FIBER-REINFORCED FABRIC JOINT AND SEAM TAPE. USE WATER BASED JOINT AND SEAM SEALER. USE FIRE RESISTANT SEALER FOR FILLING OPENINGS AROUND DUCT PENETRATIONS THROUGH WALLS. ACCEPTABLE PRODUCTS ARE DOW CORNING, FIRE STOP FOAM AND FIRE STOP SEALER OR EQUAL.
- USE SHEET METAL SCREWS OR BLIND RIVETS COMPATIBLE WITH DUCT MATERIALS WHEN SECURING ALL DUCTWORK TO STRUCTURE.
- FLEXIBLE DUCT MAY BE USED TO CONNECT TO SUPPLY DIFFUSERS. MAXIMUM LENGTH OF FLEXIBLE DUCT LIMITED TO 6 FEET. PROVIDE FLEXMASTER TYPE BM UL 181 CLASS I AIR DUCT OR EQUAL. FLEXIBLE DUCT SHALL HAVE MIN. R-8 INSULATING VALUE.
- FLEXIBLE DUCT CLAMP SHALL BE OF STAINLESS STEEL BANDS WITH CADMIUM PLATED HEX SCREW TO TIGHTEN BAND WITH WORM GEAR ACTION.
- PROVIDE TURNING VANES IN ALL SPLITS, TEES AND SWEPT 90 DEGREE ANGLE DUCT FITTINGS. MANUFACTURED TURNING VANES TO BE 1-1/2" WIDE; DOUBLE VANE, CURVED BLADES OF GALVANIZED SHEET STEEL SET 1/4" O.C. ACCEPTABLE MANUFACTURER'S ARE DUCTMATE INDUSTRIES, METALWARE, WARD INDUSTRIES OR EQUAL.
- WHERE RECTANGULAR TEE FITTINGS ARE SHOWN, PROVIDE FITTING WITH ADJUSTABLE DIVIDER SHEET AND TURNING VANES.
- WHERE RECTANGULAR MAIN AND BRANCH CONNECTIONS ARE SHOWN, PROVIDE EXTRACTOR VANES.
- PROVIDE MANUAL VOLUME CONTROL DAMPERS WHERE SHOWN ON DRAWINGS. DAMPERS TO HAVE NEOPRENE BLADE SEALS AND GALVANIZED STEEL FRAMES, TIE BARS, DAMPER AND BRACKETS. ACCEPTABLE MANUFACTURER'S ARE RUSKIN CO., NAILOR INDUSTRIES, FLEXMASTER OR EQUAL.
- ABOVE INACCESSIBLE CEILINGS AND WHERE DUCT CONFIGURATION DOES NOT ALLOW FOR INSTALLATION OF DAMPER IN DUCTWORK OR DIFFUSER, PROVIDE REMOTE MANUAL DAMPER BY YOUNG REGULATOR, (BOWDEN CABLE CONTROL SYSTEM). CONTRACTOR MAY PROVIDE OPPOSED BLADE DAMPER THAT IS INTEGRAL TO GRID WITH ENGINEER'S APPROVAL.

INSULATION

- DUCT WRAP INSULATION SHALL BE MINERAL FIBER INSULATION. ALL SERVICE JACKETING MANUFACTURED FROM KRAFT PAPER, REINFORCING SCIRM, ALUMINUM FOIL AND VINYL FILM. ACCEPTABLE MANUFACTURER'S ARE CERTAINTED, KNAUF OR OWENS-CORNING. INSTALL DUCT WRAP INSULATION PER MANUFACTURER'S INSTRUCTIONS.

INTERIOR DUCTWORK TO BE INSULATED WITH DUCT WRAP INSULATION. ALL SUPPLY DUCTS TO HAVE 3" MIN. THICKNESS (R-8) INSULATION AND ALL RETURN AND OUTSIDE AIR DUCTS TO HAVE 2" MIN. INSULATION.

GENERAL ELECTRICAL NOTES AND SPECIFICATIONS:

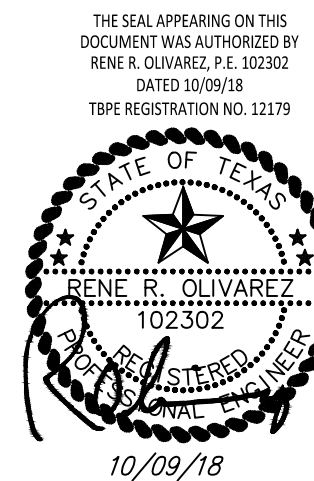
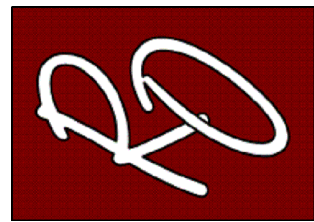
- CONDUCTOR SIZES INDICATED ASSUME NO MORE THAN (3) SINGLE POLE BRANCH CIRCUITS IN EACH CONDUIT. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DE-RATE CONDUCTORS PER NEC TABLE 310.15(B)(2)(a) FOR CONDUITS WITH MORE THAN (3) CURRENT "CARRYING CONDUCTORS". THE NEUTRAL CONDUCTOR SHALL BE CONSIDERED "CURRENT CARRYING" FOR ALL BRANCH CIRCUITS SERVING MORE THAN (4) COMPUTERS.
- ALL EQUIPMENT SHALL HAVE A LOCAL DISCONNECTING MEANS, EITHER CORDED PLUG AND RECEPTACLE OR SWITCHED DISCONNECT. VERIFY FROM EQUIPMENT SUBMITTED OR RELOCATED IF DIRECT CONNECT OR RECEPTACLE. IF DIRECT CONNECT, PROVIDE SWITCH AS PER NEC OTHERWISE, PROVIDE RECEPTACLE, CORD PLUG AS REQUIRED BY EQUIPMENT SUBMITTAL.
- FIRESTOP ALL CONDUIT PENETRATIONS IN RATED WALLS. SEE ARCHITECTURAL FOR WALL RATINGS. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO SHEET ROCK AND REPAIR.
- PROVIDE FIRE RATED SLEEVES IN ALL FLOOR PENETRATIONS.
- PROVIDE A DUCT-MOUNTED SMOKE DETECTOR ON THE RETURN SIDE OF ALL RTU'S, AHU'S, AND FCU'S RATED AT 2000 CFM SUPPLY AND OVER. PROVIDE A DUCT-MOUNTED SMOKE DETECTOR ON THE RETURN AND SUPPLY SIDE OF ALL MECHANICAL EQUIPMENT RATED AT 10,000 CFM AND OVER. CONNECT FOR AUTOMATIC SHUTDOWN OF UNIT AND ALARM TO FACP (WHERE APPLICABLE). REFER TO MECHANICAL EQUIPMENT SCHEDULES FOR CFM RATINGS.
- REFER TO MECHANICAL EQUIPMENT ELECTRICAL CONNECTION SCHEDULE FOR CIRCUITING, SIZE OF CONDUCTORS, DISCONNECTS AND ALL CONNECTION REQUIREMENTS.
- COORDINATE EQUIPMENT LOCATION WITH MECHANICAL PLAN.
- PROVIDE DISCONNECTS (FUSED AND NON-FUSED) FULL RATING OF EQUIPMENT PROTECTED. COORDINATE SIZES WITH EQUIPMENT SUBMITTED. PROVIDE FUSED DISCONNECTS FOR ALL MULTIPLE PIECES OF EQUIPMENT ON THE SAME CIRCUIT. DISCONNECTS AND FUSES SHALL BE EQUAL TO OR GREATER THAN THE FEEDER/BREAKER SIZE. SIZE LOAD SIDE OF DISCONNECTS FOR EQUIPMENT AS LISTED.
- MOUNT DISCONNECTS ON UNISTRUT SUPPORTS. PROVIDE UNISTRUT RACKS FOR DISCONNECTS ON ROOF AS DETAILED. DISCONNECTS LOCATED ABOVE CEILING SHALL BE SUPPORTED FROM STRUCTURE.
- PROVIDE A WEATHERPROOF, GFCI RECEPTACLE ON UNISTRUT RACKS FOR ROOF MOUNTED EQUIPMENT SO THAT EACH UNIT IS NO MORE THAN 25' FROM MECHANICAL EQUIPMENT. CIRCUIT ROOF MOUNTED RECEPTACLES FROM A 20A/1P SPARE CIRCUIT BREAKER IN THE NEAREST 120/208V PANEL BELOW. CIRCUIT NO MORE THAN (5) RECEPTACLES PER 20A CIRCUIT.
- ON CIRCUITS GREATER THAN 20A, FEEDING MULTIPLE PIECES OF EQUIPMENT, PROVIDE FUSED DISCONNECTS (SIZED FOR EQUIPMENT PROTECTING). PROVIDE FULL SIZED FEEDERS FROM BRANCH CIRCUIT BREAKER TO EQUIPMENT DISCONNECT WITH CONDUCTORS QUANTITIES AS INDICATED ON MECHANICAL EQUIPMENT ELECTRICAL SCHEDULE.
- PENETRATE ROOFS AS PER ROOFING GUIDELINES AND GANG CONDUIT TOGETHER. SUPPORT ROOFTOP CONDUIT WITH NEOPRENE BLOCKS WITH INTEGRAL UNISTRUT. SECURE CONDUIT TO BLOCKS ON ROOF.
- PROVIDE SEALTITE WITH WP FITTINGS TO MECHANICAL EQUIPMENT, MAX DISTANCE 48". DO NOT USE CONDUITS.
- PROVIDE NEMA 3R DISCONNECTS FOR ALL EXTERIOR LOCATIONS AND NEMA 1 DISCONNECTS FOR ALL INTERIOR, DRY LOCATIONS.
- POWER AND DATA REQUIREMENTS FOR HVAC CONTROLLERS ARE SHOWN ON B.A.S. SHEETS.
- ALL EQUIPMENT CONNECTION POINTS ARE DIAGRAMMATIC IN NATURE. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH EQUIPMENT INSTALLER FOR EXACT POINT OF CONNECTION. EXTEND FEEDERS IN CONDUIT AS REQUIRED.

ELECTRICAL DEMOLITION NOTES: (APPLIES TO ALL DEMOLITION SHEETS)

- GENERAL: EXCEPT FOR ITEMS OR MATERIALS INDICATED TO BE REUSED, SALVAGED, REINSTALLED, OR OTHERWISE INDICATED TO REMAIN OWNER'S PROPERTY, REMOVE DEMOLISHED MATERIALS FROM PROJECT SITE AND LEGALLY DISPOSE OF THEM IN AN EPA-APPROVED LANDFILL. DO NOT ALLOW DEMOLISHED MATERIALS TO ACCUMULATE ON-SITE REMOVE FROM OWNER OCCUPIED AREAS DAILY. REMOVE AND TRANSPORT DEBRIS IN A MANNER THAT WILL PREVENT SPILLAGE ON ADJACENT SURFACES AND AREAS.
- REMOVED AND REINSTALLED ITEMS: CLEAN AND REPAIR ITEMS TO FUNCTIONAL CONDITION ADEQUATE FOR INTENDED REUSE. PAINT EQUIPMENT TO MATCH NEW EQUIPMENT. PACK OR CRATE ITEMS AFTER CLEANING AND REPAIRING. IDENTIFY CONTENTS OF CONTAINERS. PROTECT ITEMS FROM DAMAGE DURING TRANSPORT AND STORAGE. REINSTALL ITEMS IN LOCATIONS INDICATED. COMPLY WITH INSTALLATION REQUIREMENTS FOR NEW MATERIALS AND EQUIPMENT. PROVIDE CONNECTIONS, SUPPORTS, AND MISCELLANEOUS MATERIALS NECESSARY TO MAKE ITEM FUNCTIONAL FOR USE INDICATED.
- EXISTING ITEMS TO REMAIN: PROTECT CONSTRUCTION INDICATED TO REMAIN AGAINST DAMAGE AND SOILING DURING SELECTIVE DEMOLITION. WHEN PERMITTED BY ARCHITECT, ITEMS MAY BE REMOVED TO A SUITABLE, PROTECTED STORAGE LOCATION DURING SELECTIVE DEMOLITION AND REINSTALLED IN THEIR ORIGINAL LOCATIONS AFTER SELECTIVE DEMOLITION OPERATIONS ARE COMPLETE.
- COORDINATE ALL DEMO ACTIVITIES WITH OWNER AND ARCHITECT AND PROVIDE 10 DAYS NOTICE FOR ANY POWER OUTAGES.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAVE VERIFIED EXISTING JOB-SITE CONDITIONS DURING THE BIDDING PERIOD TO OBTAIN THE SCOPE OF ELECTRICAL WORK INVOLVED AS A RESULT OF ARCHITECTURAL MODIFICATIONS TO THE EXISTING STRUCTURE. THE SCOPE OF THE WORK SHALL INCLUDE MATERIALS AND OUTLETS, CONSISTING OF FIXTURES, DEVICES, EQUIPMENT OR APPARATUS, WHICH MUST BE REROUTED, RELOCATED OR REMOVED EITHER TEMPORARILY OR PERMANENTLY, OR WHICH MUST BE PROVIDED, SO THAT THE INDICATED REMODELING MAY BE ACCOMPLISHED. NOT ALL EXISTING OUTLETS ARE NECESSARILY INDICATED ON THE DRAWINGS.
- PROVIDE ALL APPURTENANCES REQUIRED TO REROUTE, RELOCATED, REMOVE OR REINSTALL ALL ITEMS DESCRIBED IN THESE NOTES.
- AT THE COMPLETION OF THE PROJECT, THERE SHALL BE NO ABANDONED, CONTROLS, WIRING CONDUIT, ELECTRICAL EQUIPMENT, OR CONTRACTOR SHALL REMOVE ABANDONED MATERIALS DESCRIBED HEREINABOVE.
- CONTRACTOR SHALL MAKE SAFE ALL AREAS OF THE EXISTING STRUCTURE WHICH ARE TO BE DEMOLISHED BY DISCONNECTING FEEDERS AND SERVICES TO DEMO'D AREAS.

ENGINEERING, PLLC

MEP ENGINEERS & CONSTRUCTION MANAGERS
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Edinburg, Texas 78540
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www.ro-engineering.com



PROJECT NAME
TIERRA DEL SOL CLUB HOUSE
HVAC REPLACEMENTS

PROJECT LOCATION
700 E HALL ACRES RD
PHARR, TEXAS 78577

DESCRIPTION	DATE	NO.	1						
	10/09/2018								

PROJECT NO.: 18008

DRAWN BY: G.M.

CHECKED BY: R.O.

SHEET TITLE:

MECHANICAL SYMBOLS
& ABBREVIATIONS

S H E E T
M0.0



1 1ST FLOOR MECHANICAL DEMO PLAN
1/8" = 1'-0"

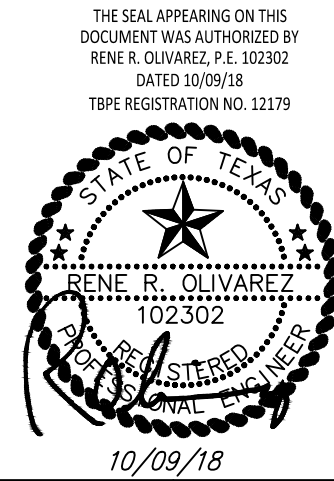
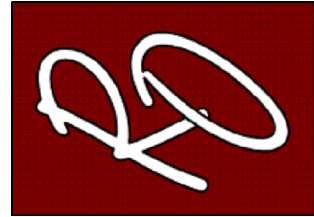
GENERAL DEMOLITION NOTES

- A. COORDINATE DEMOLITION WORK WITH ELECTRICAL AND OTHER DISCIPLINES AS REQUIRED.
- B. EQUIPMENT LOCATIONS ARE SHOWN APPROXIMATELY. VERIFY ALL DIMENSIONS AND LOCATIONS AT JOB SITE PRIOR TO BID.
- C. IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAVE VERIFIED EXISTING JOBSITE CONDITIONS DURING THE BIDDING PERIOD, SO THEY WILL HAVE DISCOVERED THE FULL SCOPE OF WORK INVOLVED WITH THE MODIFICATION OF THIS EXISTING SPACE. THE SCOPE OF THE WORK SHALL INCLUDE ALL MATERIALS FOR A COMPLETE INSTALLATION INCLUDING DEVICES, EQUIPMENT, OR APPARATUS WHICH MUST BE REROUTED, RELOCATED, OR REMOVED EITHER TEMPORARILY OR PERMANENTLY, OR WHICH MUST BE PROVIDED TO ACCOMMODATE THE INDICATED REMODELING. NOT ALL EXISTING CONDITIONS ARE NECESSARILY INDICATED ON THE DRAWINGS.
- D. WHEN AN EQUIPMENT IS IDENTIFIED TO BE REMOVED, THE OWNER HAS FIRST RIGHT OF REFUSAL BEFORE DISPOSING OF THAT EQUIPMENT.
- E. PROVIDE ALL NECESSARY CLEAR PATH TO MOVE DEMOLISHED EQUIPMENT OUT OF THE FACILITY AS WELL TO BRING NEW EQUIPMENT INTO THE BUILDING. MODIFY EXISTING PIPING, DUCTWORK CONDUITS, AS REQUIRED TO COMPLETE THE DEMOLITION.
- F. THE "EXISTING" MECHANICAL SYSTEMS INDICATED ON THIS SHEET ARE BASED ON THE INFORMATION AVAILABLE AND MAY BE INCOMPLETE AND INACURATE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ACTUAL CONDITIONS AND MAKE SUITABLE ADJUSTMENTS AS NECESSARY, TO ACCOMMODATE NEW WORK. AT NO EXTRA COST TO THE OWNER. CONDITIONS DIFFERENT TO THOSE INDICATED SHALL BE INCORPORATED INTO THE CONSTRUCTION DOCUMENTS. NOTE THAT ANY UNCOVERED SYSTEMS MUST BE CAREFULLY IDENTIFIED PRIOR TO MODIFICATIONS.
- G. CONTRACTOR SHALL COORDINATE HIS WORK WITH ALL TRADES AND INCLUDE ANY MODIFICATIONS NEEDED TO ACCOMMODATE THEIR WORK.
- H. EXISTING DUCTWORK TO REMAIN AND BE REUSED.

KEYED NOTES: DEMOLITION

- 1 EXISTING MECHANICAL EQUIPMENT TO BE REMOVED AND REPLACED WITH NEW UNITS. REFER TO SHEET M1.0 FOR NEW SCOPE OF WORK. VERIFY EXACT LOCATION ON SITE.
- 2 CONTRACTOR SHALL ENSURE THAT EXISTING CONDENSATE LINE IS FREE OF CLOGS AND DRAINS TO PROPER OUTLET.
- 3 EXISTING DUCTED HEATERS TO REMAIN.
- 4 REMOVE EXISTING THERMOSTAT, PATCH WALL, AND PREPARE SURFACE FOR NEW BUILDING AUTOMATION SPACE TEMPERATURE AND HUMIDITY THERMOSTAT.
- 5 EXISTING DISCONNECT SERVING UNIT TO BE REMOVED AND REPLACED, SEE SHEET M1.0.
- 6 EXISTING BREAKER AS SHOWN PER THE "EXISTING MECHANICAL EQUIPMENT SCHEDULE" BELOW. SURVEY OF EXISTING WIRE WAS NOT CONDUCTED. CONTRACTOR SHALL CONDUCT SURVEY OF EXISTING WIRE SERVING UNITS AND MAKE NO ASSUMPTIONS ABOUT EXISTING WIRE SIZE WHEN IT COMES TO DOWNGRADING OR UPGRADING THE BREAKER.
- 7 APPROXIMATE LOCATION OF PANELS IN 2ND FLOOR ELECTRICAL/STORAGE ROOM.

EXISTING MECHANICAL EQUIPMENT SCHEDULE CITY OF PHARR - TIERRA DEL SOL CLUB HOUSE									
UNIT TAG	VOLTAGE	PHASE	EXISTING BREAKER	MANUFACTURER	MODEL	SERIAL NO.	TONS	REFRIGERANT	NOTES
E-AHU-1/E-CU-1	208/230	3	50	RHEEM	RHGE 100ZL/RAWE-122CAZ	1536069900188/F051401094	10	R22	1,2
E-AHU-2/E-CU-2	208/230	3	50	RHEEM	RHGE 075ZL/RAW0076CAZ	140G519800318/6416 M0199 13624	7.5	R22	1,2
NOTES: 1. UNIT TAGS ARE ONLY FOR IDENTIFICATION WITHIN THESE PLANS AND MAY NOT MATCH EXISTING UNIT TAGS. 2. AIR HANDLER UNIT AND CONDENSER UNIT USE SAME BREAKER IN EXISTING CONDITION.									



PROJECT NAME
TIERRA DEL SOL CLUB HOUSE
HVAC REPLACEMENTS

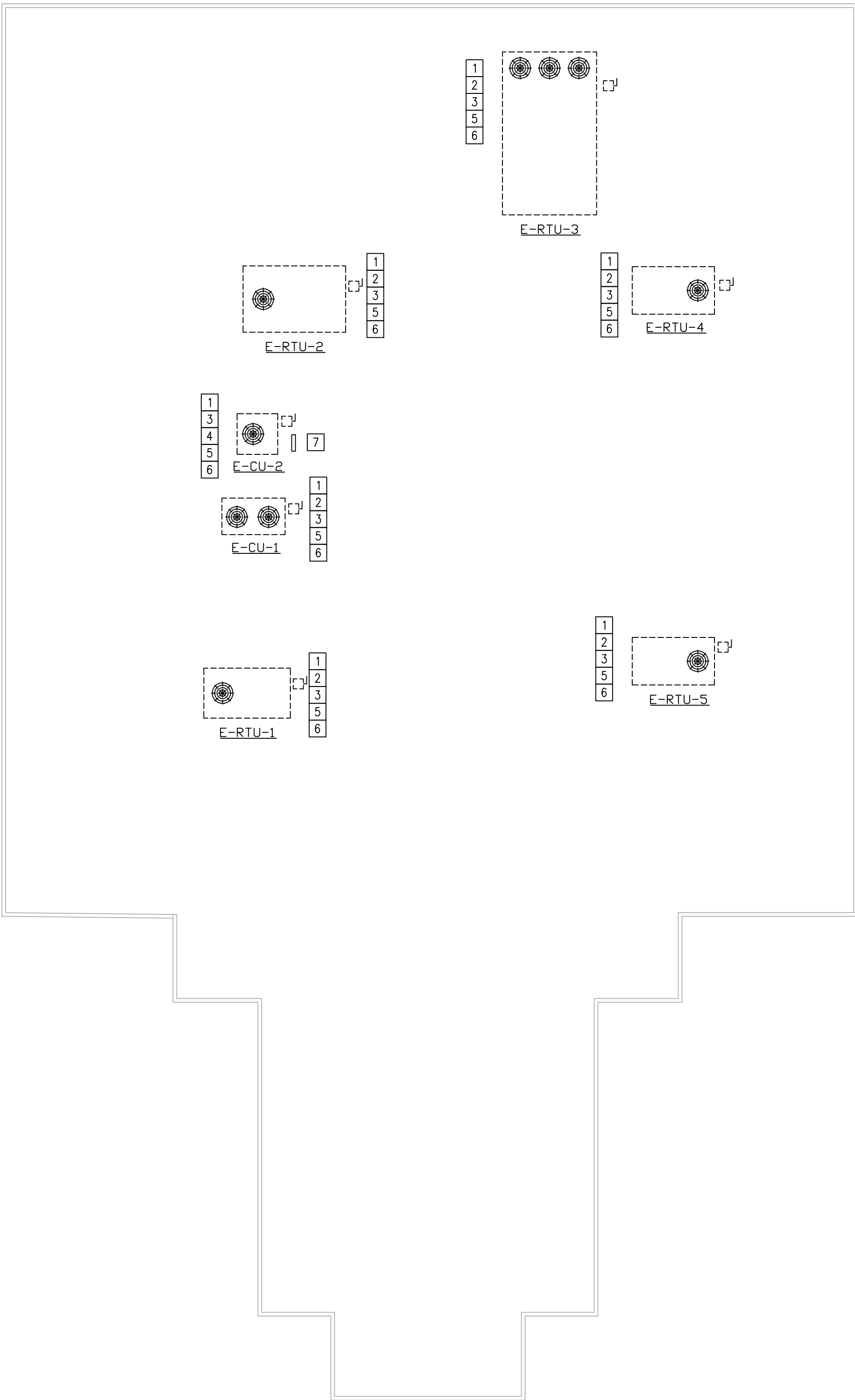
PROJECT LOCATION
700 E HALL ACRES RD
PHARR, TEXAS 78577

DESCRIPTION	DATE	NO.							
	10/09/2018	1							

PROJECT NO.: 18008
DRAWN BY: G.M.
CHECKED BY: R.O.

SHEET TITLE:

1ST FLOOR
MECHANICAL
DEMOLITION PLAN



1 ROOFTOP UNIT MECHANICAL DEMO PLAN
1/8" = 1'-0"

GENERAL DEMOLITION NOTES

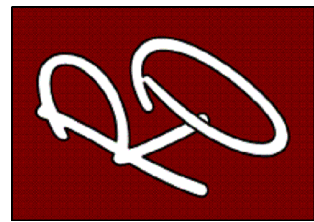
- A. COORDINATE DEMOLITION WORK WITH ELECTRICAL AND OTHER DISCIPLINES AS REQUIRED.
- B. EQUIPMENT LOCATIONS ARE SHOWN APPROXIMATELY. VERIFY ALL DIMENSIONS AND LOCATIONS AT JOB SITE PRIOR TO BID.
- C. IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAVE VERIFIED EXISTING JOBSITE CONDITIONS DURING THE BIDDING PERIOD, SO THEY WILL HAVE DISCOVERED THE FULL SCOPE OF WORK INVOLVED WITH THE MODIFICATION OF THIS EXISTING SPACE. THE SCOPE OF THE WORK SHALL INCLUDE ALL MATERIALS FOR A COMPLETE INSTALLATION INCLUDING DEVICES, EQUIPMENT, OR APPARATUS WHICH MUST BE REROUTED, RELOCATED, OR REMOVED EITHER TEMPORARILY OR PERMANENTLY, OR WHICH MUST BE PROVIDED TO ACCOMMODATE THE INDICATED REMODELING. NOT ALL EXISTING CONDITIONS ARE NECESSARILY INDICATED ON THE DRAWINGS.
- D. WHEN AN EQUIPMENT IS IDENTIFIED TO BE REMOVED, THE OWNER HAS FIRST RIGHT OF REFUSAL BEFORE DISPOSING OF THAT EQUIPMENT.
- E. PROVIDE ALL NECESSARY CLEAR PATH TO MOVE DEMOLISHED EQUIPMENT OUT OF THE FACILITY AS WELL TO BRING NEW EQUIPMENT INTO THE BUILDING. MODIFY EXISTING PIPING, DUCTWORK CONDUITS, AS REQUIRED TO COMPLETE THE DEMOLITION.
- F. THE "EXISTING" MECHANICAL SYSTEMS INDICATED ON THIS SHEET ARE BASED ON THE INFORMATION AVAILABLE AND MAY BE INCOMPLETE AND INACCURATE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ACTUAL CONDITIONS AND MAKE SUITABLE ADJUSTMENTS AS NECESSARY, TO ACCOMMODATE NEW WORK, AT NO EXTRA COST TO THE OWNER. CONDITIONS DIFFERENT TO THOSE INDICATED SHALL BE INCORPORATED INTO THE CONSTRUCTION DOCUMENTS. NOTE THAT ANY UNCOVERED SYSTEMS MUST BE CAREFULLY IDENTIFIED PRIOR TO MODIFICATIONS.
- G. CONTRACTOR SHALL COORDINATE HIS WORK WITH ALL TRADES AND INCLUDE ANY MODIFICATIONS NEEDED TO ACCOMMODATE THEIR WORK.
- H. EXISTING DUCTWORK TO REMAIN AND BE REUSED.

KEYED NOTES: DEMOLITION

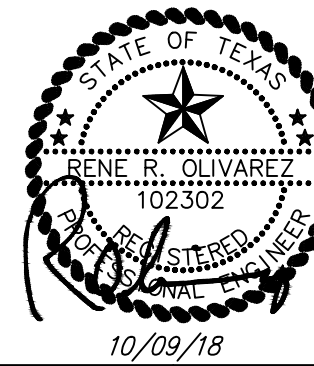
- 1 EXISTING MECHANICAL EQUIPMENT TO BE REMOVED AND REPLACED WITH NEW UNITS. REFER TO SHEET M1.0 FOR NEW SCOPE OF WORK. VERIFY EXACT LOCATION ON SITE.
- 2 CONTRACTOR SHALL ENSURE THAT EXISTING CONDENSATE LINE IS FREE OF CLOGS AND DRAINS TO PROPER OUTLET.
- 3 EXISTING MECHANICAL EQUIPMENT TO BE REMOVED AND REPLACED.
- 4 REMOVE AND REPLACE REFRIGERANT LINES.
- 5 EXISTING DISCONNECT SERVING UNIT TO BE REMOVED AND REPLACED, SEE SHEET M1.1.
- 6 EXISTING BREAKER AS SHOWN PER THE "EXISTING MECHANICAL EQUIPMENT SCHEDULE" BELOW. SURVEY OF EXISTING WIRE WAS NOT CONDUCTED. CONTRACTOR SHALL CONDUCT SURVEY OF EXISTING WIRE SERVING UNITS AND MAKE NO ASSUMPTIONS ABOUT EXISTING WIRE SIZE WHEN IT COMES TO DOWNGRADING OR UPGRADING THE BREAKER.
- 7 APPROXIMATE LOCATION OF PANELS IN 2ND FLOOR ELECTRICAL/STORAGE ROOM.

EXISTING MECHANICAL EQUIPMENT SCHEDULE CITY OF PHARR - TIERRA DEL SOL CLUB HOUSE									
UNIT TAG	VOLTAGE	PHASE	EXISTING BREAKER	MANUFACTURER	MODEL	SERIAL NO.	TONS	REFRIGERANT	NOTES
E-RTU-1	208/230	3	50	YORK	ZF060C00A2AAA2A	N1G3922715	5	R-410A	2
E-AHU-1/E-CU-1	208/230	3	50	RHEEM	RHGE 100ZL/RAWE-122CAZ	1536069900188/F051401094	10	R22	2,3
E-AHU-2/E-CU-2	208/230	3	50	RHEEM	RHGE 075ZL/RAWD076CAZ	140G519800318/6416 M0199 13624	7.5	R22	2,3
E-RTU-2	208/230	3	60	RHEEM	RLKL-B090CL 000	8294F191206836	7.5	R-410A	2
E-RTU-3	208/240	3	200	RHEEM	URCF	-	20	-	1,2
E-RTU-4	208/230	3	50	RHEEM	RLKA-A060CK 000	-	5	-	1,2
E-RTU-5	208/230	3	50	RHEEM	RLKA-A060CK 000	5673F139910606	5	R22	2

NOTES:
1. INFORMATION ILLEGIBLE OR INACCESSIBLE.
2. UNIT TAGS ARE ONLY FOR IDENTIFICATION WITHIN THESE PLANS AND MAY NOT MATCH EXISITING UNIT TAGS.
3. AIR HANDLER UNIT AND CONDENSER UNIT USE SAME BREAKER IN EXISTING CONDITION.



THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY
RENE R. OLIVAREZ, P.E. 102302
DATED 10/09/18
TBPB REGISTRATION NO. 12179



PROJECT NAME
TIERRA DEL SOL CLUB HOUSE
HVAC REPLACEMENTS

PROJECT LOCATION
700 E HALL ACRES RD
PHARR, TEXAS 78577

PROJECT NAME	DESCRIPTION	DATE	NO.	PROJECT NO.:	DRAWN BY:	CHECKED BY:	SHEET TITLE:
TIERRA DEL SOL CLUB HOUSE HVAC REPLACEMENTS		10/09/2018	1	18008	G.M.	R.O.	ROOFTOP UNIT MECHANICAL DEMOLITION PLAN



1 1ST FLOOR MECHANICAL PLAN
1/8" = 1'-0"

MECHANICAL GENERAL NOTES

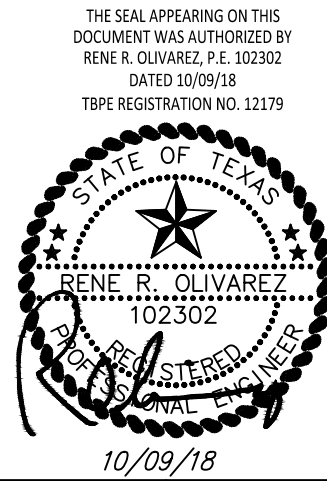
- A. THE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL LOCATION OF EQUIPMENT. IT IS THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS THAT EQUIPMENT BE REPLACED, TESTED AND READY FOR OPERATION WHETHER OR NOT EVERY ITEM OF EQUIPMENT, ACCESSORY, DEVICE, ETC. IS SHOWN. REFERENCE SHALL BE MADE TO THE FULL DRAWING PACKAGE. THE MECHANICAL SUBCONTRACTOR SHALL, WITHOUT EXTRA CHARGE, MAKE REASONABLE MODIFICATIONS IN THE LAYOUT AS NEEDED TO PREVENT CONFLICTS WITH OTHER TRADES, OR FOR PROPER EXECUTION OF THE WORK. FIELD VERIFY ALL DIMENSIONS BEFORE FABRICATING DUCTWORK.
- B. ALL NEW A/C EQUIPMENT SHALL BE CLEANED AFTER THE FINISHING OF DRYWALL AND PRIOR TO THE RELEASE OF BUILDING TO OWNER. MECHANICAL CONTRACTOR TO PROVIDE DOCUMENTATION WITH DATE AND TIME OF UNIT CLEANING.
- C. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO SUBMITTALS.
- D. CONTRACTOR SHALL COORDINATE EQUIPMENT WEIGHTS AND SUPPORTS BASED ON ACTUAL EQUIPMENT SELECTED.
- E. FIELD VERIFY SIZES OF ROOF CURB ADAPTERS AND PROVIDE SHOP DRAWINGS PRIOR TO SUBMITTALS. REFER TO SHEET M2.1 DETAIL NO.3.
- F. FIELD COORDINATE ALL NEW DUCTWORK TRANSITION AND INCLUDE IN SHOP DRAWINGS. REFER TO SHEET M2.1 DETAIL NO.3.
- G. EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE VERIFIED WITH THE ACTUAL EQUIPMENT SELECTED VENDOR DRAWINGS.
- H. MECHANICAL EQUIPMENT SCHEDULE ON SHEET M2.0.

KEYED NOTES: MECHANICAL

- 1 ALL CONDENSATE DRAINS SHALL MATCH EXISTING MATERIALS AND DRAIN TO EXISTING DRAIN SYSTEM. CONTRACTOR SHALL ENSURE THAT EXISTING CONDENSATE LINE IS FREE OF CLOGS AND DRAINS TO PROPER OUTLET.
- 2 COORDINATE FINAL LOCATION OF FCU'S WITH OWNER AND ENGINEER OF RECORD.

KEYED NOTES: ELECTRICAL

- 1 PROVIDE SEPARATE CIRCUITS FOR INDOOR AND OUTDOOR UNITS.
- 2 CONNECT NEW AHU AND EXISTING DUCTED HEATER TO EXISTING PANEL SERVING EXISTING HVAC UNITS WITH NEW 80A/3P CIRCUIT BREAKER. ROUTE TO PANEL USING (3) #4 CONDUCTORS AND (1) #8 GROUND IN (1) 1" EMT CONDUIT.
- 3 PROVIDE NEW 100A/3P/NF/N1 DISCONNECT.
- 4 APPROXIMATE LOCATION OF PANELS IN 2ND FLOOR ELECTRICAL/STORAGE ROOM.



PROJECT NAME
TIERRA DEL SOL CLUB HOUSE
HVAC REPLACEMENTS

PROJECT LOCATION
700 E HALL ACRES RD
PHARR, TEXAS 78577

NO.	DATE	DESCRIPTION
1	10/09/2018	

PROJECT NO.: 18008
DRAWN BY: G.M.
CHECKED BY: R.O.

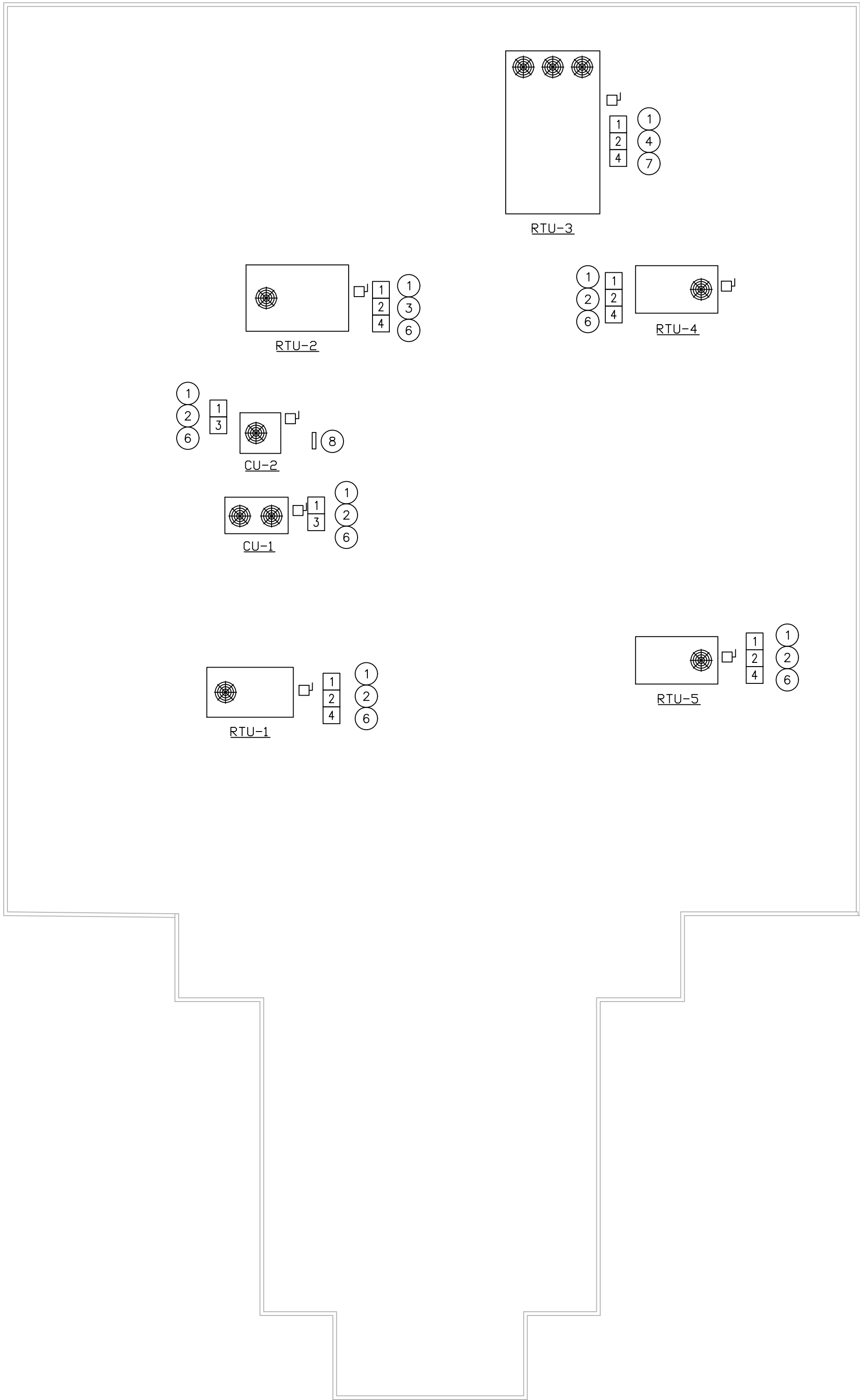
SHEET TITLE:

1ST FLOOR
MECHANICAL
PLAN

S H E E T

M1.0

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1 ROOFTOP UNIT MECHANICAL PLAN
1/8" = 1'-0"

MECHANICAL GENERAL NOTES

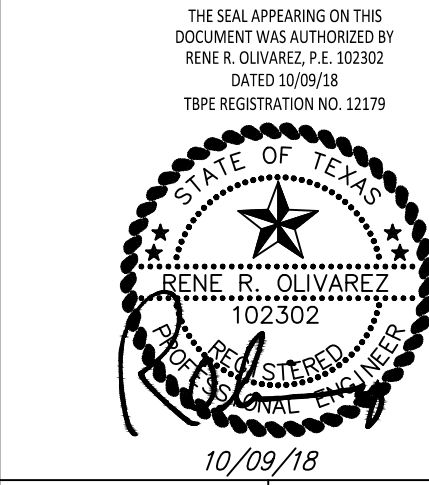
- A. THE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL LOCATION OF EQUIPMENT. IT IS THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS THAT EQUIPMENT BE REPLACED, TESTED AND READY FOR OPERATION WHETHER OR NOT EVERY ITEM OF EQUIPMENT, ACCESSORY, DEVICE, ETC., IS SHOWN. REFERENCE SHALL BE MADE TO THE FULL DRAWING PACKAGE. THE MECHANICAL SUBCONTRACTOR SHALL, WITHOUT EXTRA CHARGE, MAKE REASONABLE MODIFICATIONS IN THE LAYOUT AS NEEDED TO PREVENT CONFLICTS WITH OTHER TRADES, OR FOR PROPER EXECUTION OF THE WORK. FIELD VERIFY ALL DIMENSIONS BEFORE FABRICATING DUCTWORK.
- B. ALL NEW A/C EQUIPMENT SHALL BE CLEANED AFTER THE FINISHING OF DRYWALL AND PRIOR TO THE RELEASE OF BUILDING TO OWNER. MECHANICAL CONTRACTOR TO PROVIDE DOCUMENTATION WITH DATE AND TIME OF UNIT CLEANING.
- C. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO SUBMITTALS.
- D. CONTRACTOR SHALL COORDINATE EQUIPMENT WEIGHTS AND SUPPORTS BASED ON ACTUAL EQUIPMENT SELECTED.
- E. FIELD VERIFY SIZES OF ROOF CURB ADAPTERS AND PROVIDE SHOP DRAWINGS PRIOR TO SUBMITTALS. REFER TO SHEET M2.1 DETAIL NO.3.
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- G. EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE VERIFIED WITH THE ACTUAL EQUIPMENT SELECTED VENDOR DRAWINGS.
- H. MECHANICAL EQUIPMENT SCHEDULE ON SHEET M2.0.

KEYED NOTES: MECHANICAL

- 1 COORDINATE FINAL LOCATION OF EQUIPMENT WITH OWNER AND ENGINEER OF RECORD.
- 2 ALL CONDENSATE DRAINS SHALL MATCH EXISTING MATERIALS AND DRAIN TO EXISTING DRAIN SYSTEM. CONTRACTOR SHALL ENSURE THAT EXISTING CONDENSATE LINE IS FREE OF CLOGS AND DRAINS TO PROPER OUTLET.
- 3 PROVIDE NEW REFRIGERANT LINES.
- 4 PROVIDE ADAPTER CURBS TO FIT INTO EXISTING CURBS PROVIDED BY APPROVED MANUFACTURER. CONTRACTOR TO EXTEND AND ADAPT DUCTWORK FROM EXISTING DUCT TO NEW MECHANICAL UNIT. FIELD VERIFY AND PROVIDE SHOP DRAWINGS.

KEYED NOTES: ELECTRICAL

- 1 REPLACE EXISTING 3 POLE CIRCUIT BREAKER SERVING EXISTING UNIT WITH NEW 3 POLE CIRCUIT BREAKER MATCHING THE MOCF OF NEW UNIT. NEW BREAKER MUST MATCH EXISTING PANEL MANUFACTURER AND AIC RATING.
- 2 ROUTE TO PANEL USING (3) #8 CONDUCTORS AND (1) #8 GROUND IN (1) 3/4" EMT CONDUIT.
- 3 ROUTE TO PANEL USING (3) #6 CONDUCTORS AND (1) #8 GROUND IN (1) 1" EMT CONDUIT.
- 4 ROUTE TO PANEL USING (3) #1/0 CONDUCTORS AND (1) #6 GROUND IN (1) 2" EMT CONDUIT.
- 6 PROVIDE NEW 60A/3P/NF/N3R DISCONNECT.
- 7 PROVIDE NEW 200A/3P/NF/N3R DISCONNECT.
- 8 APPROXIMATE LOCATION OF PANELS IN 2ND FLOOR ELECTRICAL/STORAGE ROOM.



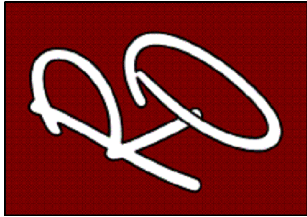
PROJECT NAME
TIERRA DEL SOL CLUB HOUSE
HVAC REPLACEMENTS

PROJECT LOCATION
700 E HALL ACRES RD
PHARR, TEXAS 78577

NO.	DATE	DESCRIPTION
1	10/09/2018	

PROJECT NO.: 18008
DRAWN BY: G.M.
CHECKED BY: R.O.

SHEET TITLE:
ROOFTOP UNIT
MECHANICAL
PLAN



NOTES:

1. SINGLE POINT POWER WITH INTEGRAL NON-FUSED DISCONNECT SWITCH.
2. DOUBLE WALL CONSTRUCTION WITH MINIMUM 1" FOAM INSULATION.
3. PROVIDE HINGED ACCESS DOORS.
4. RECIRCULATION DAMPER FOR UN-OCCUPIED MODE.
5. DIRTY FILTER SENSOR ON OUTDOOR AND EXHAUST AIR.
6. 120V GFCI SERVICE OUTLET, FACTORY MOUNTED, FACTORY WIRED.
7. APPROVED MANUFACTURES SHALL THEIR HIGHEST EFFICIENCY/ ALTERNATIVE WITH SCHEDULED IEER VALUES OR GREATER.
8. RTU MANUFACTURER IS RESPONSIBLE FOR MEETING ALL REQUIREMENTS DETAILED IN THE CONTROLS DIAGRAMS AND SEQUENCES OF OPERATION PUBLISHED IN THESE CONSTRUCTION DOCUMENTS.
9. PROGRAMMABLE ROOM TEMPERATURE SENSOR AND DUCT MOUNTED HUMIDITY SENSOR FOR ENHANCED DEHUMIDIFICATION SEQUENCE.
10. PROVIDE WITH INVERTER SPEED COMPRESSORS TO MODULATE TO A MINIMUM CAPACITY OF 25% OR LESS AND MAINTAIN HIGH PART LOAD EFFICIENCY.
11. PROVIDE UNITS WITH VARIABLE SPEED FANS TO MODULATE TO ROOM TEMP FOR SINGLE ZONE VAV.
12. 2015 IECC - ECONOMIZER REQUIRED ON INDIVIDUAL DX COOLING UNITS GREATER THAN 54,000 BTU/H.
13. PROVIDE CURB ADAPTERS TO FIT INTO EXISTING CURBS PROVIDED BY APPROVED MANUFACTURER.
14. PROVIDE UNITS WITH FROSTAT, AND FACTORY HAIL GUARDS.
15. PROVIDE BACNET COMMUNICATION CARD FOR CONTROLS INTERFACE.
16. PROVIDE MINIMUM 5 YEAR PARTS WARRANTY.

NOTES:

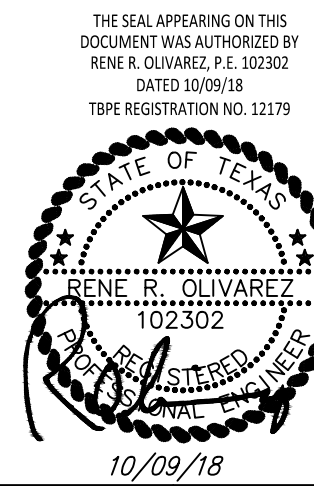
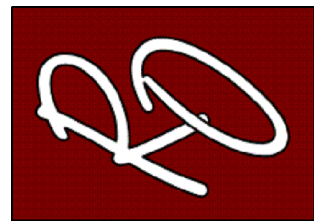
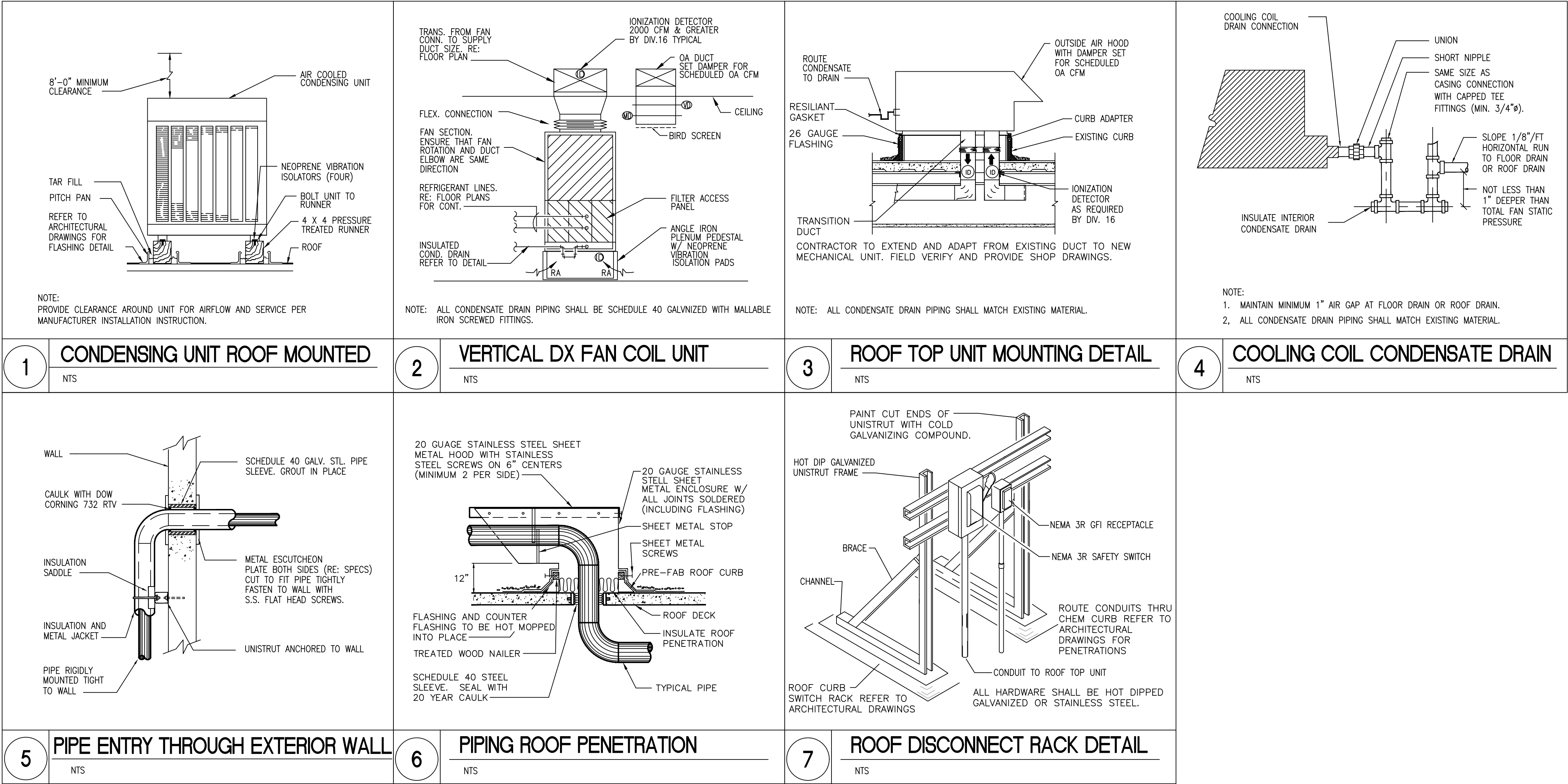
1. PROVIDE WITH 2" DOUBLE WALL FOAM INJECTED CONSTRUCTION.
2. PROVIDE WITH INTERTWINED DX CIRCUITS.
3. PROVIDE ELECTRIC REHEAT AS SCHEDULED WITH 2 STAGES OF CONTROL.
4. PROVIDE UNIT WITH 2" MEVOR FLEX DUCTS.
5. PROVIDE WITH SINGLE POINT POWER.
6. PROVIDE UNITS AS CONSTANT VOLUME WITH BELT DRIVEN FANS.
7. EXISTING 20 KW ELECTRIC DUCTED HEATER TO REMAIN AND BE CIRCUITED WITH AHU.
8. PROVIDE BACNET COMMUNICATION CARD FOR CONTROLS INTERFACE.
9. PROVIDE MINIMUM 5 YEAR PARTS WARRANTY.

RETURN AIR SMOKE DETECTION:
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A RETURN AIR SMOKE DETECTOR STATUS.

SUPPLY FAN:
THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.



PROJECT NAME

TERRA DEL SOL CLUB HOUSE

HVAC REPLACEMENTS

PROJECT LOCATION

700 E HALL ACRES RD

PHARR, TEXAS 78577

NO.	DATE	DESCRIPTION
1	10/09/2018	

PROJECT NO.: 18008

DRAWN BY: G.M.

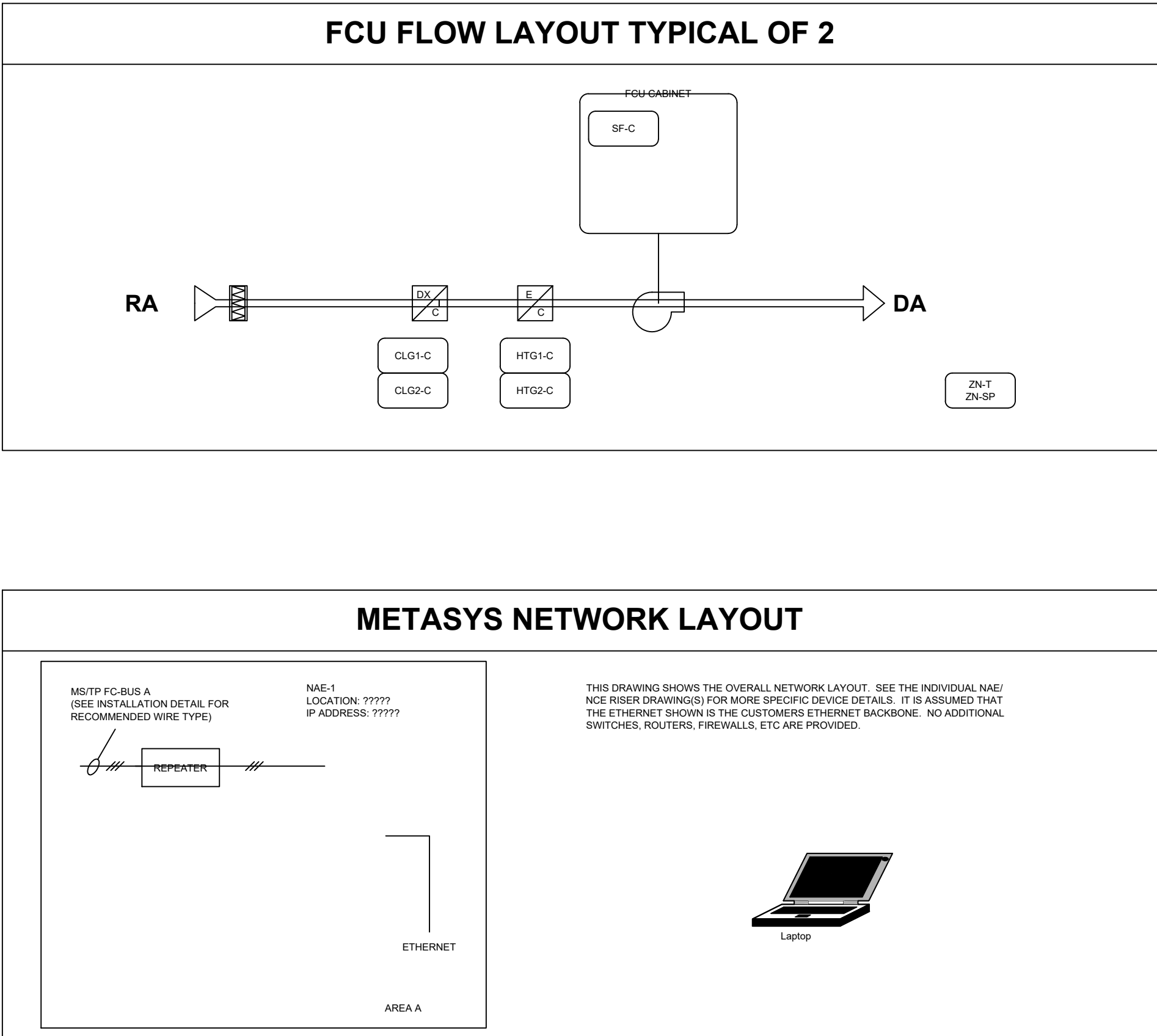
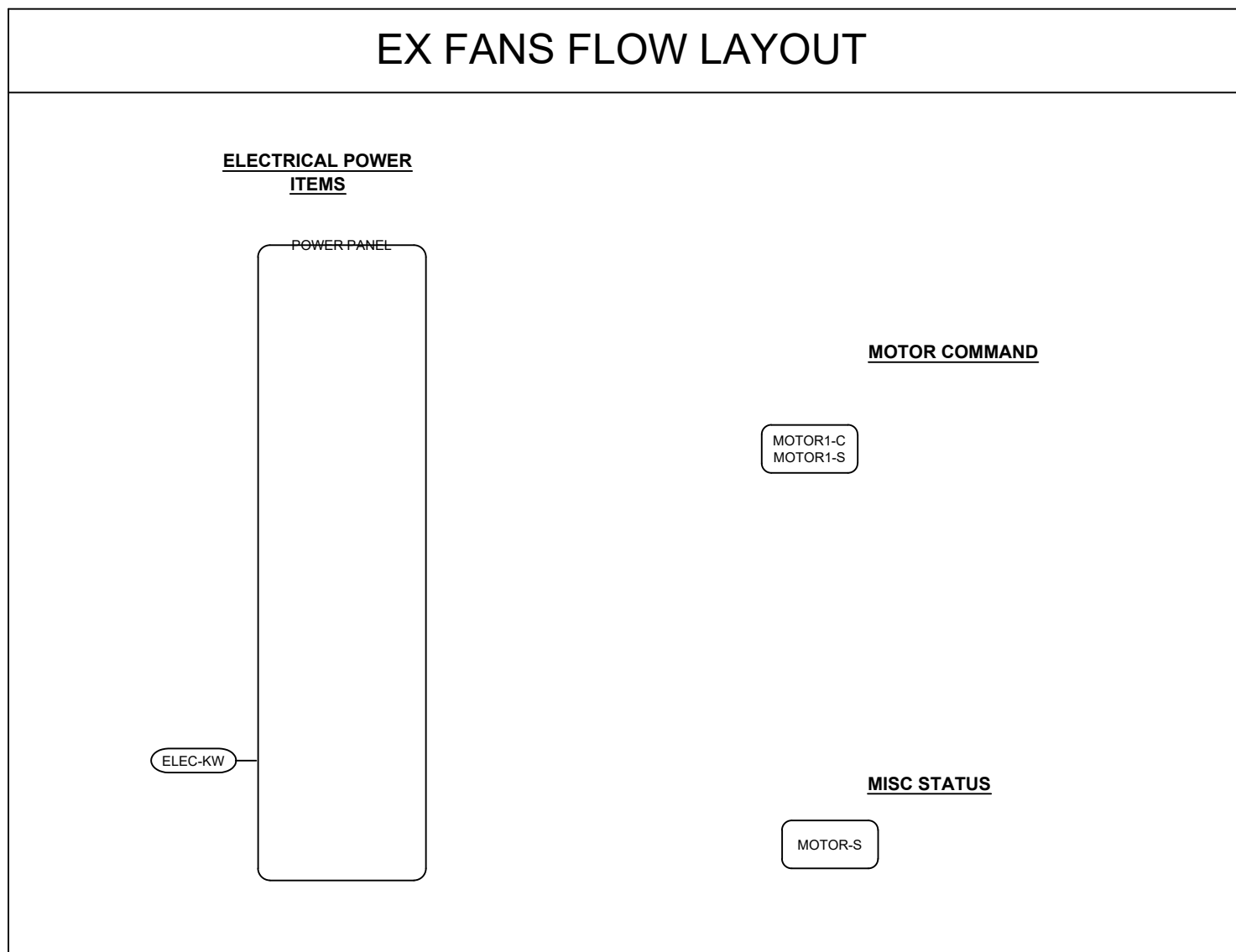
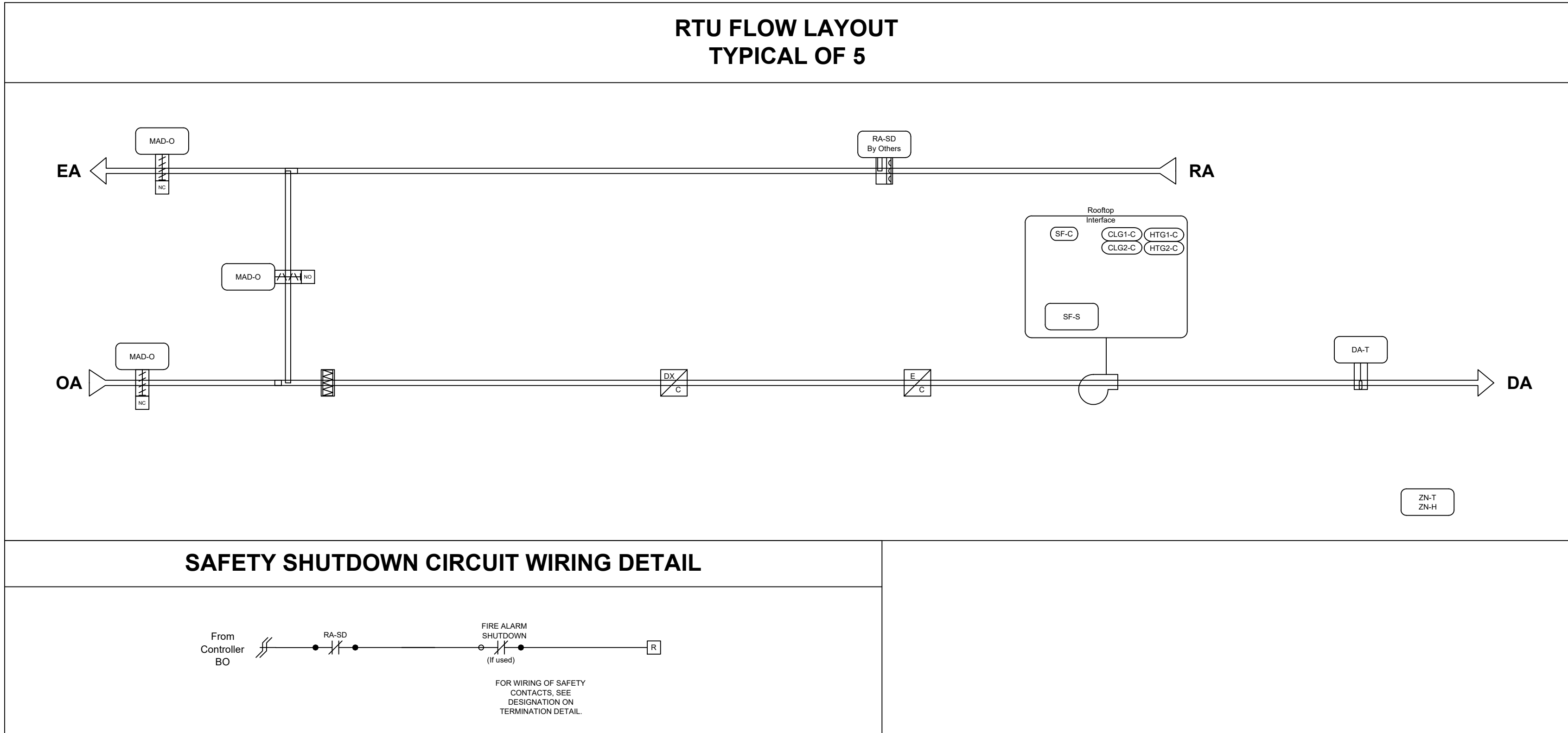
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SHEET TITLE:

MECHANICAL

DETAILS

BUILDING AUTOMATION SYSTEM



KEYED NOTES:

- DISCONNECT EXISTING CONTROL SYSTEM FROM DEMO ROOFTOP UNITS AND RECONNECT AND PROGRAM TO NEW ROOFTOP UNITS.
- IF EXISTING MECHANICAL SYSTEMS SUCH AS VAV BOXES, DAMPERS, EXHAUST FANS HAVE CONTROLS, THEY SHALL BE REPLACED WITH NEW CONTROLLERS AND CONNECTED TO MAIN SUPERVISORY CONTROLLER. SYSTEMS SHALL CONTINUE TO OPERATE DURING WORKING HOURS WITHOUT DISTURBANCE.

ENGINEERING, PLLC

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TBE Firm Registration No. 12179
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THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY
RENE R. OLIVAREZ, P.E. 102302
DATED 10/09/18
TBE REGISTRATION NO. 12179

10/09/18

PROJECT NAME
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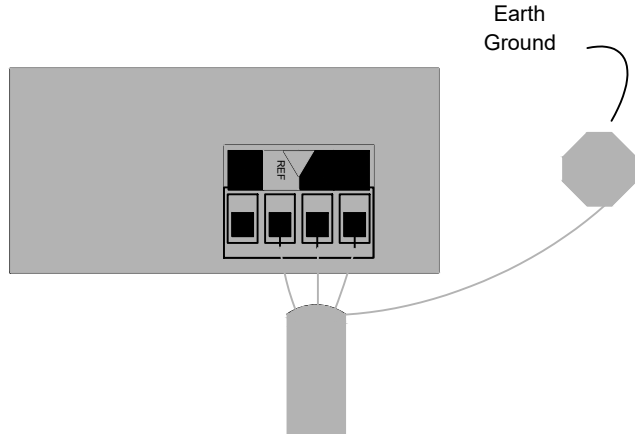
SHEET TITLE:

B.A.S. SYSTEM
DETAILS

S H E E T

DNP M3.0

BUILDING AUTOMATION SYSTEM

Category	Rules / Maximums Allowed
General	Typically daisy-chained; branch or star configuration acceptable when repeaters are used. See End of Line Switching and Repeater Guideline graphic.
Number of Devices	<p>When all of the devices connected on the FC Bus are Metasys FECs, VMAs, and/or IOMs, the device and bus segment limits are:</p> <p>100 devices total per FC Bus (maximum) 3 bus segments per FC Bus (maximum) 50 devices per bus segment (maximum, not to exceed 100 devices per FC Bus)</p> <p>When one or more TEC26xx Series thermostat or third-party MS/TP device is connected on the FC Bus, the device and bus segment limits are:</p> <p>64 devices total per FC Bus (maximum) 3 bus segments per FC Bus (maximum) 32 devices per bus segment (maximum, not to exceed 64 devices per FC Bus)</p> <p>Note: Metasys MS/TP devices generate less data traffic than third-party MS/TP devices and TEC26xx thermostats. Connecting third-party devices or TEC26xx thermostats to the FC Bus increases data traffic, reduces bus performance, and reduces the number of devices that can be connected to the bus. Bus segments on an FC Bus are connected with repeaters (only). Up to two cascaded repeaters may be applied to an FC Bus (to connect three bus segments).</p>
Line Length and Type	<p>When all of the devices connected on the FC Bus are Metasys FECs, VMAs, and/or IOMs, the cable length limits are:</p> <p>Each bus segment can be up to 1520 m (5000 ft) in length (using 22 AWG 3-wire twisted, shielded cable). Each FC Bus can be up to 4750 m (15,000 ft) in length (using 22 AWG 3-wire twisted, shielded cable).</p> <p>When one or more TEC26xx Series thermostat or third-party MS/TP device is connected on the FC Bus, the device and bus segment limits are:</p> <p>Each bus segment can be up to 1220 m (4000 ft) in length (using 22 AWG 3-wire twisted, shielded cable). Each FC Bus can be up to 3660 m (12,000 ft) in length (using 22 AWG 3-wire twisted, shielded cable). When using fiber-optic connections: 2,010 m (6,600 ft.) between two fiber modems 22 AWG Stranded, 3-Wire Twisted, Shielded Cable</p>
Cable	22 AWG stranded, 3-wire, twisted shielded cable
EOL Termination	<p>End-of-Line (EOL) termination is required on the FC Bus to reduce signal reflection when data transmissions reach the end of a bus segment and bounce back. EOL termination is built into some Metasys FC devices and is enabled with a switch or jumper on the device.</p> <p>EOL Termination on NAEs An EOL switch on an NAE enables EOL termination. For those NAEs with two FC Bus connections, two EOL double-pole switches are provided. Set the EOL switch to the ON (up) position to set the controller as an EOL termination device.</p> <p>EOL Termination on Switch-Terminating Devices Some field controllers have an EOL switch or jumper. Such devices include FECs, IOMs, VMAs, ZFR1810s, and repeaters. Set the EOL termination to On for any of these devices when it is the last device on a bus segment.</p> <p>EOL Termination on Devices Without EOL Provision For the devices such as TECs and third-party controllers in which no EOL provision is provided, install the MS-BACEOL-0 RS485 End-of-Line Terminator at the device if at the end of the bus segment.</p> <p>EOL Termination Across the FC Bus The FC Bus may consist of up to three bus segments. Each bus segment on an FC Bus requires two EOL termination devices, one at each end of the bus segment. All other devices on the FC Bus should have their EOL termination disabled (EOL switches Off). If only one device on an FC segment has an EOL termination, it must be set to On.</p> <p>EOL on FC Bus Repeater When using repeaters in the FC Bus, set the EOL jumpers based on the position of the repeater in the run.</p>
<div><div></div><div><p>SHIELD GROUNDING</p><p>The shield should be earth grounded at one and only one point for the entire bus segment. (Preferably in the NAE Panel.) The shield screws on the controllers are simply a convenient way to continue the daisy chain of the bus. They are not attached to earth ground. You can use the shield terminal or twist together the shield and tape back at each controller.</p></div></div>	

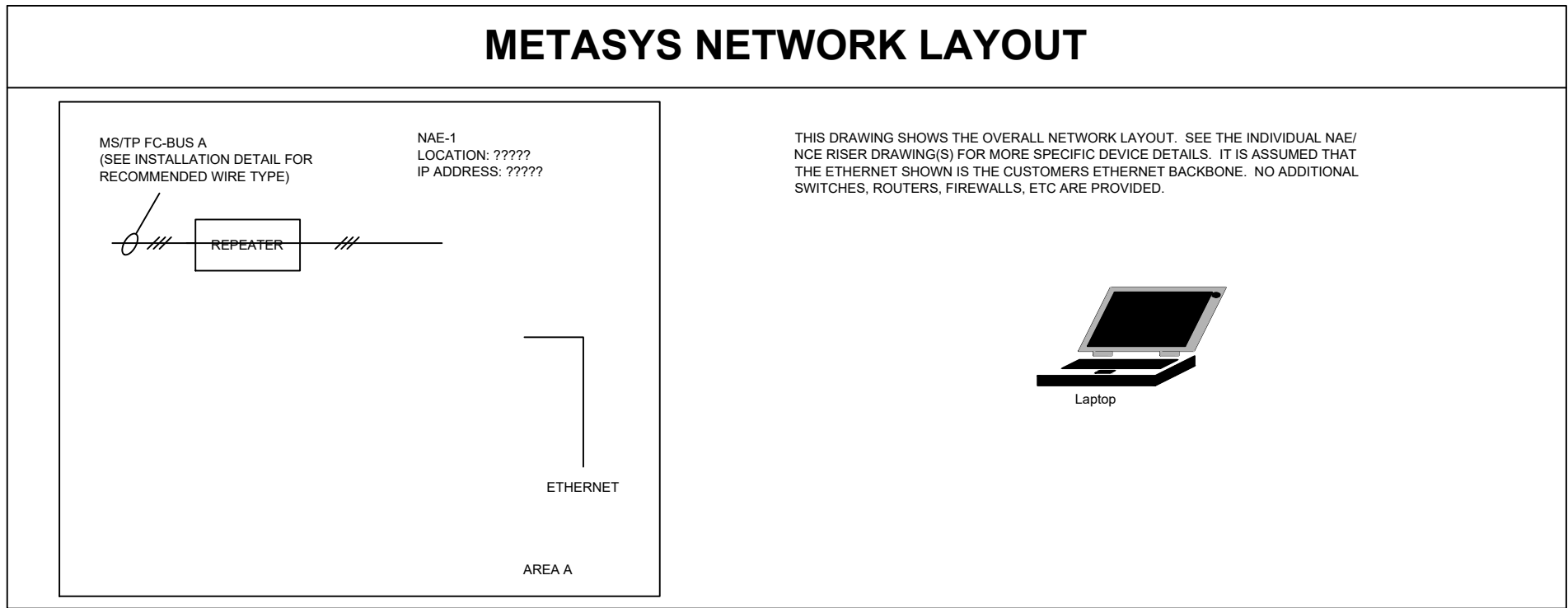
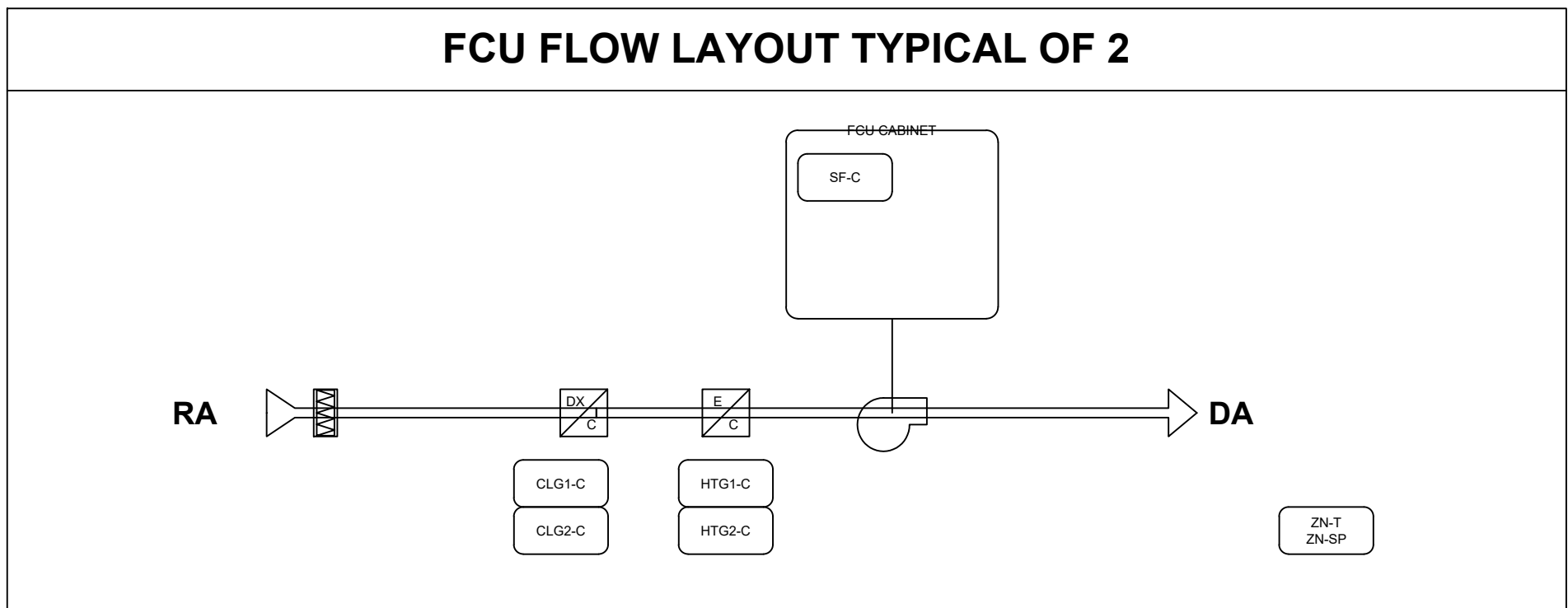
RECOMMENDED MSTP FIELD CONTROLLER BUS CABLE					
Type	Typical Usage	Anixter #	Belden #	pF/ft	Area
22/3c Shielded Plenum	Open Plenum Installations. 38400+ Baud RS-485 Communication.	CBL-22/3-FC-PLN	6501FE	25	0.014
22/3c Shielded PVC	EMT (Raceway) Installations. 38400+ Baud RS-485 Communication.	CBL-22/3-FC-PVC	5501FE	31	0.015

RECOMMENDED MSTP SENSOR ACTUATOR BUS CABLE					
Type	Typical Usage	Anixter #	Belden #	pF/ft	Area
22/2pr Shielded Plenum	Open Plenum Installations. 38400+ Baud RS-485 Communication.	CBL-22/2P-SA-PLN	6541FE	33	0.033
22/2pr Shielded PVC	EMT (Raceway) Installations. 38400+ Baud RS-485 Communication.	CBL-22/2P-SA-PVC	5541FE	31	0.034

METASYS MSTP NETWORK INSTALLATION DETAILS

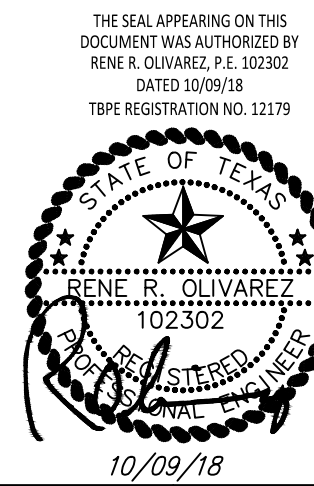
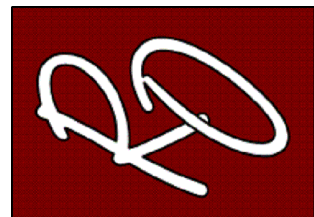
The information in this document is not intended to replace the published Technical Product Literature for the Johnson Controls systems and products presented. The installation instructions that are packed with products, and the Technical Bulletins and Product Bulletins released with Johnson Controls systems and products supersede the information on this page. It is the responsibility of the product installer and product user to obtain and follow the product installation, operation, and safety procedures provided with the products or project specific information required by specification or local codes.

END OF THE LINE SWITCHING AND REPEATER GUIDELINES



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