# HOUSTON COMMUNITY COLLEGE COLEMAN COLLEGE OF HEALTH SCIENCES



THE PROJECT INCLUDES THE FOLLOWING MAJOR ELEMENTS FOR HOUSTON COMMUNITY COLLEGE, COLEMAN COLLEGE OF HEALTH SCIENCES: 1.REPLACEMENT OF 35000 CFM OUTSIDE AIR UNIT

- 2.REMOVAL OF LOW PRESSURE STEAM HEATING ELEMENT SERVING OAHU-R.01 AND REPLACING WITH 388 KW ELECTRICAL HEATER.
- 3.REPLACEMENT OF TWO FAN COIL UNITS SERVING THE ELEVATOR MACHINE ROOM AND TELECOM ROOMS.
- 4. REPLACEMENT OF ELECTRIC UNIT HEATER SERVING MECHANICAL ROOM HOUSING OAHU-R.01 VFD AND OTHER MECHANICAL EQUIPMENT.
- 5.UPGRADE OF EXISTING BUILDING AUTOMATION SYSTEM TO MODERNIZE CONTROLS.

1900 PRESSLER ST, HOUSTON, TX 77030





LOCATION MAP





AFFILIATED ENGINEERS, INC ONE GREENWAY PLAZA, SUITE 150 HOUSTON, TX 77046 OFFICE: (713) 548-8900 FAX: (713) 548-8901 **TEXAS RESISTED ENGINEERING FIRM F-8301** WWW.AEIENG.COM





- HOUSTON COMMUNITY COLLEGE COLEMAN

	DRAWING LIST
<u>GENERAL:</u>	
	COVER SHEET
MECHANIC	<u>AL:</u>
M-001 M-101 M-201 M-202 M-501 M-502 M-701 M-702 M-703 M-901	MECHANICAL ABBREVIATIONS AND SYMBOLS MECHANICAL ROOF PLAN A - DEMOLITION MECHANICAL ROOF PLAN B - DEMOLITION MECHANICAL ROOF PLAN A -NEW WORK MECHANICAL ROOF PLAN B -NEW WORK MECHANICAL DETAILS MECHANICAL DETAILS BAS SYSTEM ARCHITECTURE MECHANICAL CONTROL SCHEMATICS SEQUENCE OF OPERATIONS AND POINTS LIST MECHANICAL EQUIPMENT SCHEDULES
ELECTRICA	<u>NL:</u>
E-001 E-101 E-102 E-201 E-202 E-501 E-601 E-701	ELECTRICAL SYMBOLS AND ABBREVIATIONS ELECTRICAL ROOF PLAN A - DEMOLITION ELECTRICAL ROOF PLAN B - DEMOLITION ELECTRICAL ROOF PLAN A - NEW WORK ELECTRICAL ROOF PLAN B - NEW WORK ENLARGED ELECTRICAL PLANS ELECTRICAL SINGLE LINE PANEL SCHEDULES

## 100% CONSTRUCTION DOCUMENT 04/10/2020





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## 100% CONSTRUCTION DOCUMENT 04/10/2020







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- 8. ALL UTI DAMAG 9. REMOV SHALL I 10. THIS CO THEIR V SHALL O
- ALL PEI STOPPI
   NO CUT STRUC
   PAINT A WHERE DUCTW
   CHS AN OTHERI
   SLOPE
   ALL CO
   FLOOR DIAGRA
   INSTALI CONTR
   BUILDIN OPERA

ABBREVIATIONS	MECHANICAL SYMBOLS AND ABBREVIATIONS	SYSTEM LABELS	DUCTWORK
ACU - AIR CONDITIONING UNIT MCC - MOTOR CONTROL CENTER ADJ - ADJUSTABLE MBH - THOUSANDS OF BTU PER HOUR	NOTE: SYMBOLS INDICATED HERE AND NOT USED IN THE CONTRACT DOCUMENTS DO NOT APPLY TO THIS PROJECT. ADDITIONAL SYMBOLS MAY BE INDICATED IN THE	<u>NEW</u> <u>EXISTING</u>	
AFF - ABOVE FINISHED FLOOR MC - MECHANICAL CONTRACTOR AHU - AIR HANDLING UNIT MEP - MECHANICAL, ELECTRICAL AND PIPING AMS - AIRFLOW MEASURING STATION MER - MECHANICAL EQUIPMENT ROOM		— CHR — CHILLED WATER RETURN — X-CHR — CHILLED WATER RETURN     — CHS — CHILLED WATER SUPPLY — X-CHS — CHILLED WATER SUPPLY     — D — DRAIN — X-D — DRAIN	S S S S S S S S S S S S S S S S S S S
AP - ACCESS PANEL NA - NOT APPLICABLE AT - AIR TERMINAL DEVICE NC - NORMALLY CLOSED BAS - BUILDING AUTOMATION SYSTEM NIC - NOT IN CONTRACT		HOT WATER RETURNX-HWRHOT WATER RETURNHOT WATER SUPPLYX-HWSHOT WATER SUPPLY	S ROUND/ROUND BRANCH TAKE
BHP -       BRAKE HORSEPOWER       NO -       NORMALLY OPEN         BOD -       BOTTOM OF DUCT       NPS -       NOMINAL PIPE SIZE         BOP -       BOTTOM OF PIPE       NPT -       NATIONAL PIPE THREAD	REFER GENERAL REFERENCE EQUIPMENT NAME AND NUMBER	(XX) = SYSTEM PRESSURE IN PSIG	
BTU - BRITISH THERMAL UNIT NTS - NOT TO SCALE BTUH - BRITISH THERMAL UNITS PER HOUR OA - OUTSIDE AIR CAV - CONSTANT AIR VOLUME OC - ON CENTER	NUMBER LAB EQUIPMENT NUMBER	PIPING	S A S A S A S A S A S A S A S A S A S A
CFCI - CONTRACTOR FURNISHED, CONTRACTOR INSTALLED CFM - CUBIC FEET PER MINUTE		SINGLE DOUBLE (SMALLER THAN 4") (4" AND LARGER)	D NOT NOT LESS 6"
CL - CENTERLINE CLG - CEILING COND - CONDENSATE/CONDENSER OFOI - OWNER FURNISHED, OWNER INSTALLED OV - OUTLET VELOCITY	x0.0 DESIGNATES DETAIL NUMBER BOTTOM DESIGNATES SHEET NUMBER	S ELBOW DOWN	45° LATERAL BRANCH
COP - CENTER OF PIPE P - PUMP CP - CONDENSATE PUMP/ PCF - POUNDS PER CUBIC FOOT CONTROL PANEL PD - PRESSURE DROP		s ELBOW UP	S
D - DAMPER DB - DRY BULB DDC - DIRECT DIGITAL CONTROL PH - PHASE PP - POLYPROPYLENE PSF - POUNDS PER SQUARE FOOT PSI - POUNDS PER SQUARE INCH	#     SECTION REFERENCE TOP       DESIGNATES SECTION       X0.0         WIMBER         NUMBER         OUTPON         CONSTRUCTION BULLETIN NUMBER	Sector BOTTOM CONNECTION (45° OR 90°)	-15° MAX. FOR DIVERGING, 25° MAX FOR
EA - EXHAUST AIR EAT - ENTERING AIR TEMPERATURE EF - EXHAUST FAN EV - EXHAUST VOOD EF - EXHAUST VOOD EV - POLYVINYL CHLORIDE	NUMBER <u>A VIBRATION ISOLATOR</u>	TOP CONNECTION (45° OR 90°)	
ER - EXHAUST HOOD EL - ELEVATION ESP - EXTERNAL STATIC PRESSURE EWT - ENTERING WATER TEMPERATURE REF - ROOF EXHAUST FAN	ELEVATION SYMBOL 2 SPECIALTY EQUIPMENT	→D S→D S→D S→D S→D S→D S→D S→D S	S SECTION EXISTING DUCT TO REMAIN
EXH - EXHAUST F - FILTER FA - FRESH AIR INTAKE/ RF - RETURN FAN RPM - REVOLUTIONS PER MINUTE SA - SUPPLY AIR SA - SUPPLY AIR	NEW CONNECTION TO EXISTING	S TEE (REFER TO N/A SPECIFICATION FOR SIDE,	
FIELD ADJUSTABLE SAD - SOUND ATTENUATING DEVICE FAT - FINAL AIR TEMPERATURE SD - SUCTION DIFFUSER FC - FAIL CLOSED SE SUDDIX FAN	DEMO TO THIS POINT	s S S S S S S S S S S S S S S S S S S S	
FCU - FAN COIL UNIT FD - FLOOR DRAIN FE - FUME HOOD EXHAUST FE - FUME HOOD EXHAUST FE - FUME HOOD EXHAUST FBR - TO BE REMOVED	VALVES	← ー → EXISTING PIPING TO BE REMOVED	
FLA       -       FULL LOAD AMPS       TC       -       TEMPERATURE CONTROL         FLR       -       FLOOR       TOB       -       TOP OF BEAM         FO       -       FAIL OPEN       TOD       -       TOP OF DUCT/TOP OF DECK	→ → → BUTTERFLY VALVE → → → → → → → → → → → BUTTERFLY VALVE → → → → → → → → → → → → → → → → → → →	FLOW DIRECTION DESIGNATION	SUPPLY AIR (SA) OR OUTDOOR AIR (OA) DUCT (SOLID LINE WITH FILL OR HATCH TYPICAL FOR SUPPLY AND OUTDOOR AIR UP, BROKEN LINE DOWN)
FPMFEET PER MINUTETOJTOP OF JOISTFPSFEET PER SECONDTOPTOP OF PIPEGAGAUGETOSTOP OF SLAB			S-2 S-2 RETURN AIR (RA), RELIEF AIR, OR TRANSFER AIR (TA) DUCT (SOLID LINE WITH FILL OR HATCH TYPICAL FOR
GC - GENERAL CONTRACTOR ISP - TOTAL STATIC PRESSURE GE - GENERAL EXHAUST V - VALVE/VOLTS GPM - GALLONS PER MINUTE VAV - VARIABLE AIR VOLUME	→ → → → PRESSURE REDUCING VALVE- PRV (DOWNSTREAM SETPOINT) VALVE FOR 2 1/2" AND LARGER.	ACTUATORS	RETURN, RELIEF AND TRANSFER AIR UP, BROKEN LINE DOWN)
GS - GALVANIZED STEEL VFD - VARIABLE FREQUENCE DRIVE WB - WET BULB H - HUMIDIFIER WC - WATER COLUMN HC - HEATING COIL WF - WATER FILTER	BALL VALVE FOR 2" AND SMALLER) PRESSURE REDUCING VALVE- PRV (UPSTREAM SETPOINT) GAUGE VALVE	T MANUAL M ELECTRIC MOTOR DRIVEN	S
KO - KNOCK-OUT WG - WATER GAUGE LAT - LEAVING AIR TEMPERATURE WPD - WATER PRESSURE DROP LWT - LEAVING WATER TEMPERATURE X - EXISTING	→ PLUG VALVE → GAS REGULATOR → BALANCING VALVE → REDUCED PRESSURE BACKFLOW PREVENTER (RPBP)	GENERAL TWO POSITION SPRING RETURN	
CENEDAL NOTES		Solenoid Two Position	→D DUCT RISE (R)/DROP(D) W/45° ELBOWS
1 ALL WORK SHOWN ON THESE DRAWINGS ARE NEW UNLESS OTHERWISE NOTED	SWING CHECK VALVE	N	S I I I I I (RECTANGULAR DUCTS)
<ol> <li>ALL MECHANICAL EQUIPMENT, MATERIALS, AND INSTALLATION SHALL BE PROVIDED BY THE CONTRACTOR FOR THIS CONSTRUCTION. ALL EQUIPMENT SHALL BE COMPLETE, INSTALLED AND FULLY FUNCTIONAL PRIOR TO FINAL ACCEPTANCE OF THE WORK. MATERIALS OR FOULIPMENT SPECIFIED TO BE "FURNISHED BY OTHERS" SHALL BE</li> </ol>	2-WAY SOLENOID VALVE		SODDDUCT RISE/DROP W/90° ELBOWS (ROUND DUCTS)
FURNISHED BY THE GENERAL CONTRACTOR AND PROCURED FROM SOURCES SPECIFIED BY THE CONTRACT DOCUMENTS. 3 EXISTING CONDITIONS AND DIMENSIONS SHOWN ON THESE DRAWINGS ARE APPROXIMATE. BIDDERS SHALL VISIT	ARROW INDICATING FAIL POSITION 2-WAY CONTROL VALVE (VALVE BODY AS SPECIFIED)	FIELD MOUNTED CONTROLS	S S OLS DUCT RISE/DROP W/90° ELBOWS (OVAL DUCTS)
THE PREMISES AND THOROUGHLY FAMILIARIZE THEMSELVES WITH ALL DETAILS OF WORK AND WORKING CONDITIONS BEFORE SUBMITTING THEIR BID. REASONABLE MODIFICATIONS TO INDICATED LOCATIONS AND ARRANGEMENTS TO SUIT IOB CONDITIONS SHALL NOT CONSTITUTE BASIS FOR REQUESTING OF ADDITIONAL FUNDS	(XX)=DEFINES FAIL POSITION OR NORMAL POSITION	Image: Space Thermostat   Image: Temperature Sensor     Image: Optimized Space Humidistat   Image: Hermostat     Image: Optimized Space Humidistat   Image: Hermostat	
<ul> <li>FROM THE OWNER.</li> <li>PRIOR TO ORDERING MATERIALS AND PROCURING EQUIPMENT, SUCCESSFUL BIDDER (CONTRACTOR) SHALL BE BEOURDED TO VERIES AND EXISTING CONDITIONS FOURIMENTS, MATERIALS, SIZES, AND DIMENSIONS THAT AFEECT.</li> </ul>	FC=FAIL CLOSED (CONTROL VALVE OR DAMPER) FO=FAIL OPEN (CONTROL VALVE OR DAMPER) NC=NORMALLY CLOSED (CONTROL VALVE OR DAMPER)	<ul> <li>CARBON DIOXIDE SENSOR</li> <li>P PRESSURE SENSOR</li> <li>EMERGENCY PUSHBUTTON</li> <li>E<sub>SD</sub> DUCT SMOKE DETECTOR</li> </ul>	(ROUND OR OVAL DUCTS)
HIS WORK. ALL EQUIPMENT AND FIXTURES SHALL BE CAPABLE OF FITTING INTO THE SPACES ALLOTTED WHILE MEETING THE MANUFACTURER'S RECOMMENDED ACCESS REQUIREMENTS. SHOW ALL DISCREPANCIES ON SHOP	NO-NORWALLY OF LN (CONTROL VALVE OR DAWF LR)	Image: Set in the set in	NSOR , R=1.5W - +
<ol> <li>5. REFER TO PROJECT MANUAL (SPECIFICATIONS) FOR ADDITIONAL REQUIREMENTS. PLANS AND SPECIFICATIONS SHALL BE TAKEN TOGETHER. PROVIDE ALL WORK CALLED FOR IN EITHER. WHERE ONE DOCUMENT CONFLICTS</li> </ol>	COMMON INSTRUMENTATION DEVICE		SINGLE LINE SYMBOL INDICATES EITHER RADIUS OR R=1.5W R=1.5W RADIUS ELBOW FI BOW (REFER TO SPEC. SECTION 15850 PART 3 FOR
<ol> <li>WORK SHALL CONFORM TO ALL APPLICABLE CODES AND STANDARDS UNLESS CONTRACT DOCUMENTS ARE MORE STRINGENT.</li> <li>EURNICH ALL FOURDMENT, MATERIAL &amp; LABOR, TOOLS, ETC., DECUMPER FOR THE INSTALL ATION OF THE COMPLETE</li> </ol>		DAWPER5	SQUARE ELBOW VANES)
<ol> <li>FURNISH ALL EQUIPMENT, MATERIALS, LABOR, TOOLS, ETC., REQUIRED FOR THE INSTALLATION OF THE COMPLETE AND OPERATING SYSTEM. ALL EQUIPMENT AND MATERIALS SHALL BE NEW UNLESS OTHERWISE NOTED.</li> <li>ALL UTILITIES AND APPURTENANCES SHALL BE PROTECTED AT ALL TIMES DURING CONSTRUCTION, AND IF</li> </ol>	OR U (THERMOMETER) WITH OR THERMOWELL OR CAUGE WITH GAUGE VALVE	RE A MANUAL BALANCING DAMPER -ES	SQUARE/RECTANGULAR BRANCH TAKE-OFF (SA, RA, OR EA)
<ol> <li>9. REMOVE ALL UNUSED PIPING UNLESS SPECIFICALLY INDICATED AS "ABANDON IN PLACE." ALL ABANDONED PIPING SHALL BE CAPPED AT BOTH ENDS.</li> <li>10. THE CONTRACTOR AT NO COST TO THE OWNER.</li> </ol>	GAUGE CONNECTION WITH TEMPERATURE INDICATOR GAUGE CONNECTION WITH GAUGE VALVE		45 - 1/4 W BUT NOT LESS THAN 6"
10. THIS CONTRACT REQUIRES THE PLUMBING, BAS, AND MECHANICAL SUBCONTRACTORS TO CAREFULLY COORDINATE THEIR WORK WITH EACH OTHER, THE GENERAL CONTRACTOR, AND OTHER TRADES. THE GENERAL CONTRACTOR SHALL OVERSEE THAT PRIORITY IS GIVEN IN THE FOLLOWING ORDER:	WELL (DIRECT INSERTION)	Image: Provide the sector of the	
GRAVITY FLOW: SEWER, STORM DRAIN, DOWNSPOUT, AND CONDENSATE DRAIN PIPING. EQUIPMENT AND DUCTWORK. FORCED AND PRESSURE PIPING SUCH AS WATER, FIRE SPRINKLER, AND GAS PIPING.		ARCHITECT FOR WALL RATING)	
<ol> <li>ALL PENETRATIONS OF REQUIRED FIRE-RATED WALLS, PARTITIONS, AND FLOORS SHALL BE PROVIDED WITH FIRE STOPPING MATERIAL AS REQUIRED AND IN ACCORDANCE WITH ASTM E 814, FM P7825, AND UL 1479.</li> <li>NO CUTTING OR DRILLING OF ANY STRUCTURAL MEMBERS WILL BE PERMITTED WITHOUT THE APPROVAL OF THE</li> </ol>	TE TEMPERATURE	(XX) DEFINES FAIL POSITION OR NORMAL POSITION.	
STRUCTURAL ENGINEER. 13. PAINT ALL EXPOSED PIPING AND/OR DUCTWORK TO MATCH SURROUNDING COLOR. PROVIDE ESCUTCHEONS WHERE EXPOSED PIPING PENETRATES FINISHED WALLS AND CEILINGS. PROVIDE PAINTED TRIM WHERE EXPOSED	(DIRECT INSERTION)	FC = FAIL CLOSED (CONTROL VALVE OR DAMPER) FO = FAIL OPEN (CONTROL VALVE OR DAMPER) NC = NORMALLY CLOSED (CONTROL VALVE OR DAMPER)	
DUCTWORK PENETRATES FINISHED WALLS AND CEILINGS. 14. CHS AND CHR RUNOUTS, INCLUDING VALVED/CAPPED CONNECTIONS, SHALL BE MINIMUM 3/4" UNLESS NOTED OTHERWISE.	STRAP ON PIPE TEMPERATURE INSTRUMENT (AQUASTAT)	NU = NURMALLY OPEN (CONTROL VALVE OR DAMPER) PIPING SPECIALTIES	
<ol> <li>SLOPE CONDENSATE DRAIN PIPING NOT LESS THAN 2% (1/8" PER FT.).</li> <li>ALL CONTROL ZONES TO BE PROVIDED WITH THERMOSTAT.</li> <li>FLOOR PLANS INCLUDE PIPE ROUTING, MAJOR VALVING AND MAJOR PIPING SPECIALTIES, REFER TO FLOW</li> </ol>			
DIAGRAMS, DETAILS, AND SPECIFICATIONS FOR ADDITIONAL VALVING, PIPING, AND SPECIALTIES. 18. INSTALL BRANCH WATER PIPING TO EACH UNIT WITH A MINIMUM OF THREE ELBOWS TO ALLOW FOR EXPANSION AND CONTRACTION OF THE PIPING SYSTEM.	TEMPERATURE ELEMENT WITH TRANSMITTER AND	GENERAL PIPELINE	
<ol> <li>BUILDING TO REMAIN OPERATIONAL DURING CONSTRUCTION. CONTRACTOR TO PROVIDE MINIMUM DISRUPTION TO OPERATION AND SHALL COORDINATE ALL SHUTDOWNS IF REQUIRED WITH OWNER.</li> </ol>	THERMOWELL (FS) FLOW SWITCH	WATER SYSTEM PIPELINE STRAINER	
DUCTWORK SPECIALTIES		SUCTION DIFFUSER	
	- VFD DIFFERENTIAL STATIC PRESSURE SENSOR	Basket strainer     Automatic air vent	
	DUCTWORK AT DIFFUSERS AND GRILLES	HERMOSTATIC AIR VENT	
ACCESS DOOR ORY ACCESS DOOR ORY POINT OF CHANGE IN DUCT CONSTRUCTION BY PRESSURE CLASS	SINGLE LINE-HARD OR DOUBLE LINE-HARD OR FLEXIBLE CONNECTION FLEXIBLE CONNECTION	AND LARGER, BLIND FLANGE TEST PLUG (PRESSURE/TEMP.)	REDUCER
	SQUARE/RECTANGULAR SUPPLY DIFFUSER, GRILLE OR REGISTER		
	► ► ► ► ► ► ► ► ► ► ► ► ► ► ► ► ► ► ►		
DUCT SIZE IN INCHES (NET INSIDE DIMENSIONS) (ROUND SHOWN) Ø INDICATES BOUIND			
CD-1 - CEILING DIFFUSER FIRST FIGURE: SIDE SHOWN SECOND FIGURE: SIDE NOT SHOWN	► ► ► ► ► ► ► ► ► ► ► ► ► ► ► ► ► ► ►	PIPE SLEEVE     ANCHOR	
SUPPLY AIR DUCT AIR QUANTITY (CFM)	SUPPLY REGISTER OR GRILLE (VERTICAL MOUNT)	PUMP     DIFFERENTIAL PRESSURE TRAN	NSMITTER
1 ARROW: 1 WAY 2 ARROWS: 2 WAY 3 ARROWS: 3 WAY			
4 AKKOWS: 4 WAY NO ARROWS: 4 WAY			



## **GRILLE, REGISTER NOTATION**

EXHAUST AIR DUCT. RETURN AIR DUCT (RA)	DEA	G-1 250
DUCT SIZE IN INCHES (NET INSIDE DIMENSIONS) FIRST FIGURE: SIDE SHOWN SECOND FIGURE: SIDE NOT SHOWN	7	



# JS OR 3 FOR ING



	1 MECHANICAL ROC SCALE: 1/4"=1'-0"	<b>DF PLAN A - DEMOLITION</b>
	-	



## **GENERAL NOTES**

A. CONTRACTOR TO FIELD VERIFY LOCATIONS OF ALL EXISTING EQUIPMENT, CONTROLS, PIPING, AND ASSOCIATED APPURTENANCES.

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<u> </u>	<u> </u>	<u></u>	

- 1. REMOVE EXISTING OAHU-R.01, VFD, ALL ASSOCIATED CONTROLS, ALL CONDENSATE PIPING. ROOF CURB, APPRX. 24'-0" X 10'-4", TO REMAIN, REFER TO DETAIL 8/M-501 FOR FLASHING DETAILS.
- 2. CHS&R PIPING SHALL BE REMOVED TO EXISTING ISOLATION VALVES. REFER TO DETAIL 7/M-501 FOR CHS&R PIPING REMOVAL.
- 3. STEAM PIPING SHALL BE REMOVED AND CAPPED IN 4TH FLOOR MECHANICAL ROOM. REFER TO DETAIL 6/M-501 FOR STEAM PIPING REMOVAL.
- 4. TRANSITION DUCTING FROM OAHU-R.01 TO 50X42 DUCT IN OA RISER SHAFT TO BE REMOVED. CONTRACTOR TO VERIFY INTEGRITY OF EXISTING RISER. CONTRACTOR TO DEMO SHAFT WALL ON 5TH FLOOR AS REQUIRED FOR DUCT REMOVAL.
- 5. REMOVE (E)OAHU-R.01 VFD AND DDC PANEL CONTROLS. DDC PANEL ENCLOSURE TO REMAIN.
- 6. REMOVE EXISTING FCU-P.01, ASSOCIATED CONTROLS, AND APPURTENANCES. CHS & R PIPING SHALL BE REMOVED TO ISOLATION VALVES IN PENTHOUSE.
- 7. EXISTING SUPPLY DUCTWORK SHALL REMAIN.
- 8. REMOVE EXISTING FCU-P.02, ASSOCIATED CONTROLS, AND APPURTENANCES. CHS & R PIPING SHALL BE REMOVED TO ISOLATION VALVES IN PENTHOUSE.
- 9. REMOVE EXISTING EUH-P.01 AND ASSOCIATED CONTROLS.









F	
	1 MECHANICAL ROOF PLAN A - NEW WORK SCALE: 1/4"=1'-0"



## **GENERAL NOTES**

- A. CONTRACTOR TO FIELD VERIFY LOCATIONS OF ALL EXISTING EQUIPMENT, CONTROLS, PIPING, AND ASSOCIATED APPURTENANCES.
- B. INSULATE NEW CHILLED WATER PIPING, PIPING APPURTENANCES, AND CONDENSATE DRAIN PIPING PER SECTION 23 0700.
- C. PROVIDE FIRE STOPPING FOR MECHANICAL SYSTEM PENETRATIONS PER 20 0573.

- 1. PROVIDE NEW OAHU-R.01, CONNECT CHS&R WITH EXISTING ISOLATION VALVES. MOUNT UNIT ON EXISTING ROOF CURB, APPRX. 24'-0" X 10'-4". FLASH ROOF CURB AS REQUIRED SEE DETAIL 8/M-501.
- 2. PROVIDE ALL TRANSITIONS REQUIRED TO TIE INTO THE EXISTING 50X42 SUPPLY AIR RISER. CONTRACTOR TO PATCH ANY WALL DEMOLITION REQUIRED FOR ACCESS TO OA RISER ON 5TH FLOOR.
- 3. ROUTE NEW CONDENSATE DRAIN PIPING TO NEAREST EXISTING ROOF DRAIN.
- 4. TIE NEW CHILLED WATER PIPING INTO EXISTING 6" CHS & R PIPING IN 5TH FLOOR MECHANICAL ROOM. REFER TO DETAIL 1/M-501 FOR CONNECTION REQUIREMENTS. INSULATE PIPING PER SECTION 23 0700.
- 5. OAHU-R.01 VFD AND HEATER CONTROLS/POWER CONNECTIONS TO BE MOUNTED IN VESTIBULE. INSULATE AS REQUIRED PER SECTION 23 0700.
- 6. MANUFACTURER OF CUSTOM AHU TO PROVIDE CONDUIT/DUCT FROM FAN SECTION TO BLEED 100 CFM INTO VESTIBULE.
- 7. PROVIDE NEW FCU-P.01, SUPPORTS, ASSOCIATED CONTROLS, AND APPURTENANCES.
- 8. CHS & R PIPING SHALL BE TIED INTO EXISTING 1-1/4" ISOLATION VALVES IN PENTHOUSE.
- 9. PROVIDE TRANSITIONS, DUCT CONNECTOR REQUIRED TO TIE INTO EXISTING SUPPLY DUCTING.
- 10. ROUTE NEW 1-1/4" CONDENSATE PIPE TO (E)FLOOR DRAIN.
- 11. PROVIDE NEW FCU-P.02, SUPPORTS, ASSOCIATED CONTROLS, AND APPURTENANCES.
- 12. CHS & R PIPING SHALL BE TIED INTO EXISTING 3/4" ISOLATION VALVES IN PENTHOUSE.
- 13. ROUTE NEW 1-1/4" CONDENSATE PIPE TO (E)FLOOR DRAIN.
- 14. PROVIDE NEW EUH-P.01 AND ASSOCIATED CONTROLS.
- 15. PROVIDE NEW DDC CONTROLS IN EXISTING PANEL. CONTRACTOR TO FIELD VERIFY ADEQUACY OF EXISTING ENCLOSURE TO HOUSE DDC CONTROLS AND PROVIDE ADDITIONAL PANEL ENCLOSURES AS REQUIRED.















**FAN COIL UNIT SUPPORT DETAIL** 

SCALE: NONE

## (MSS TYPE-1 CLEVIS HANGER)







- 2. FILTER BANK
- 3. ELECTRIC HEATING COIL
- 4. COOLING COIL
- 5. FAN ARRAY
- 6. SUPPLY AIR OUTLET
- 7. PIPING AND CONTROLS VESTIBULE
- 8. VFD ENCLOSURE
- 9. HEATING CONTROLLER (SCR)
- 10. U.V. LIGHTS

<u>MEP</u> Affiliated Engineers Affiliated Engineers, Inc. One Greenway Plaza, Suite 150 Houston, Texas 77046 Tel 713.548.8900 Fax 713.548.8901 Texas Registered Engineering Firm F-8301 HCC Issue 100% CD 2020.05.07 Revisions Project HCC COLEMAN DOAS REPLACEMENT AND BAS UPGRADE Sheet Title MECHANICAL DETAILS Scale AS NOTED Date **04/10/2020** Drawn By AEI Project No. 20683-00 Sheet No. M-502





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ROOF/PENTHOUSE

### TO ADDITIONAL UNITS AND DEVICES

LEVEL 5

## TO ADDITIONAL UNITS AND DEVICES

\_\_\_\_\_LEVEL 4\_\_\_\_

## TO ADDITIONAL UNITS AND DEVICES

\_\_\_\_\_ LEVEL 3

### TO ADDITIONAL UNITS AND DEVICES

LEVEL 2

## TO ADDITIONAL UNITS AND DEVICES

LEVEL 1

## TO ADDITIONAL UNITS AND DEVICES

BASEMENT

## **GENERAL NOTES**

- A. THE BUILDING AUTOMATION SYSTEM (BAS) SHALL BE UPGRADED WITH NEW PLATFORM. THIS WORK WILL BE PERFORMED BY THE CONTROL MANUFACTURE IN CONJUNCTION WITH HVAC UPGRADE IN THIS SCOPE OF WORK.
- C. THE INTENT OF THIS DIAGRAM IS TO PROVIDE A MSTP/IP BASIS FOR THE BAS, NOT THE ACTUAL LAYOUT OF THE FINAL DESIGN. BAS CONTRACTOR SHALL PROVIDE ADDITIONAL CONTROLLERS AS NECESSARY TO FULFILL REQUIREMENTS AND SEQUENCES WITHIN THE PROJECT DOCUMENTS.
- D. IF USING IP CONTROLLERS FOR TERMINAL UNITS, CONTROLS CONTRACTOR IS TO COORDINATE ADDITIONAL DATA DROPS. IN CONTRACTOR'S DESIGN, PROVIDE 20% SPACE FOR FUTURE ADDITIONAL TERMINAL UNIT CONTROLLERS IN EACH DATA CONNECTION. CONNECTING CONTROLLERS VIA IP, USE CIRCLE OR STAR WIRING METHOD, OR WIRING METHOD APPROVED BY EOR.
- E. COORDINATE WITH THE CONTROLS REP FOR THE BAS SYSTEM PLATFORM NOTED BELOW FOR THE EXACT SCOPE OF WORK AND REPLACEMENT COSTS.
- F. ALL COLEMAN SCIENCE AND TECH CONTINUUM CONTROLS (BAS) SHALL BE INTEGRATED TO THE HCC "ECO-STRUXURE BAS" BY SCHNEIDER ELECTRIC.
- G. EXISTING CONTINUUM MASTER NODES SHAL BE REPLACED WITH NEW ECO-STRUXURE MASTER NODES.
- H. EXISTING NON-COMPATIBLE HVAC SYSTEM CONTROLS SHALL BE UPGRADED TO COMMUNICATE WITH THE NEW ECOSTRUXURE BY REPLACING THE EXISTING CONTROLLER, PER EACH PIECE OF EQUIPMENT, WITH NEW CONTROLLER.
- I. EXISTING COMPATIBLE HVAC SYSTEM CONTROLS SHALL REMAIN AND COMMUNICATE WITH THE NEW ECOSTRUXURE BY REPLACING EXISTING CONTROLLER MASTER NODES, CONVERTING EXISTING DATABASE AND CREATING NEW GRAPHICS, TRENDS AND ALARMS.
- J. THE CURRENT BAS SYSTEM SHALL BE ANALYZED FROM WORKSTATION FOR ISSUES WITH COMMUNICATION, CONTROLLERS, AND FIELD SENSORS.
- K. A DEFICIENCY REPORT SHALL BE PROVIDED TO THE OWNER AND ENGINEER FOR AUTHORIZATION TO REPAIR.

## SHEET KEYNOTES

1. ADD ITEM 1: PROVIDE CONTROLS PANEL/MODULES AS REQUIRED TO INCLUDE MONITORING AND CONTROLS OF FCU-P.03.





## **SEQUENCE OF OPERATIONS**

1.1. OUTSIDE AIR HANDLING UNIT – OAHU-R.01 b. CHILLED WATER COIL = CLOSED A. SCOPE c. SUPPLY FANS = OFF 1. REFER TO MECHANICAL EQUIPMENT SCHEDULES FOR OAHUS ASSOCIATED WITH THIS SEQUENCE. C. UNIT OPERATION 2. THE 100% DEDICATED OUTSIDE AIR HANDLING UNIT IS DESIGNED TO PROVIDE VENTILATION AIR TO EACH MECHANICAL 1. SYSTEM SHALL OPERATE CONTINUOSLY 24/7. ROOM OUTSIDE AIR TERMINAL UNITS. DOWNSTREAM AHUS MAY RESET DISCHARGE AIR TEMPERATURE BASED ON 2. SYSTEM SHALL BE CAPAPBLE OF MANUALLY START/STOP BY COMMAND FROM OPERATOR VIA BAS COMMAND POINT. TERMINAL UNIT CRITICAL ZONES PER PREVIOUS PROJECT PROGRAMMING. 3. WHEN SYSTEM IS COMMANDED TO STOP; FCU SUPPLY FAN SHALL STOP, CHILLED WATER VALVE SHALL BE COMMANDED 3. ALL SETPOINTS SHOULD BE OPERATOR ADJUSTABLE CLOSED, AND PRE-HEATING COIL SHALL BE COMMANDED OFF. B. INTERLOCKING D. FAN FAILURE DETECTION 1. WHEN AN AIR HANDLING UNIT IS NOT OPERATING (FAILED OR OFF), EXCEPT DURING LOW TEMPERATURE SWITCH 1. SUPPLY FAN SHALL EACH BE PROGRAMMED FOR THE FOLLOWING FAN FAILURE OPERATION. FAN FAILURES ARE SENSED SHUTDOWN, CONTROL DEVICES SHALL BE IN THE FOLLOWING POSITIONS: BY A LOW CURRENT INDICATION AT THE CURRENT SWITCH. a. OUTSIDE AIR DAMPER = CLOSED a. VFD FAILURE: FCU SHALL FAIL. WHEN THE FCU FAILS, ALL DEVICES SHALL OPERATE AS DESCRIBED ABOVE IN b. PRE-HEATING COIL ELECTRIC SCR HEATER = OFF INTERLOCKING. FCU SHALL BE LOCKED OUT UNTIL RESET MANUALLY. c. CHILLED WATER COIL = CLOSED E. SYSTEM SUPPLY AIR AND TEMPERATURE CONTROL d. SUPPLY FANS = OFF 1. SUPPLY FANS ARE CONSTANT SPEED AND SHALL ENERGIZE TO MAINTAIN ROOM (RETURN DUCT TEMPERATURE FOR e. INTERLOCKED GENERAL EXHAUST FANS = OFF FCU-P.01) T-STAT COOLING SETPOINT OF 80F AND HEATING SETPOINT OF 60F (SCR PRE-HEAT FOR FCU-P.02) 2. INTERLOCK ALL BUILDING GENERAL EXHASUT FANS TO OPERATION OF OAHU. a. PRE-HEATING COIL DISCHARGE AIR TEMPERATURE CONTROL (FCU-P.02 ONLY) - NORMAL OPERATION: C. UNIT OPERATION THE PRE-HEATING COIL SCR CONTROLLER SHALL MODULATE TO MAINTAIN TEMPERATURE SETPOINT VIA ROOM i. T-STAT OF 60F. 1. SYSTEM SHALL OPERATE BASED ON BUILDING OCCUPANCY SCHEDULE (FA). b. COOLING COIL DISCHARGE AIR TEMPERATURE CONTROL (REFER TO MECHANICAL SCHEDULES) - NORMAL a. DURING UNOCCUPIED HOURS OAHU SHALL REMAIN DISABLED. OPERATION: b. DURING UNOCCUPIED HOURS BAS SHALL CALCULATE WARM-UP TIME NEEDED TO BRING SPACE TEMPERATURES TO i. THE COOLING COIL 2-WAY CONTROL VALVE SHALL MODULATE TO MAINTAIN FCU ROOM (RETURN DUCT OCCUPIED SETPOINTS. TEMPERATURE FOR FCU-P.01) AIR TEMPERATURE. 1) BAS SHALL OPERATE DOWNSTREAM AHUS IN RECIRCULATOIN MODE ONLY FOR TIME DURATION REQUIRED 1) AS ROOM (RETURN) AIR TEMPERATURE INCREASES, COOLING COIL CONTROL VALVE SHALL MODULATE FOR EXTERIOR TERMINAL UNITS REHEAT COILS TO MEET ALL SPACE TEMERATURE SETPOINTS. OPEN TO MAINTAIN AIR TEMPERATURE AT SETPOINT. THE REVERSE SHALL OCCUR AS COOLING COLL c. DURING UNOCCUPIED HOURS BAS SHALL CALCULATE COOL-DOWN TIME NEEDED TO BRING SPACE TEMPERATURES DISCHARGE AIR TEMPERATURE DECREASES. TO OCCUPIED SETPOINTS. 2) COOLING COIL CONTROL VALVE SHALL BE LOCKED IN CLOSED POSITION WHENEVER ASSOCIATED SUPPLY 1) BAS SHALL OPERATE DOWNSTREAM AHUS IN RECIRCULATOIN MODE ONLY FOR TIME DURATION REQUIRED FAN IS NOT OPERATING. FOR TERMINAL UNITS TO MEET ALL SPACE TEMERATURE SETPOINTS. THE COOLING COIL CONTROL VALVE AND PRE-HEATING CONTROL SHALL NOT BE ALLOWED TO OPERATE d. DURING OCCUPIED HOURS OAHU SHALL BE ENABLED AND ALL GENERAL EXHAUST FANS SHALL BE ENABLED. SIMULTANEOUSLY. 2. SYSTEM SHALL BE CAPAPBLE OF MANUALLY START/STOP BY COMMAND FROM OPERATOR VIA BAS COMMAND POINT. F. SAFETIES 3. WHEN AN OAHU IS COMMANDED TO START BY THE BAS OR AFTER FAILURE, THE FOLLOWING SEQUENCE SHALL OCCUR: 1. SCR HEATING COIL AIRFLOW PROVING SWITCH SHALL PREVENT SCR HEATING FROM ENABLING WHEN FLOW HAS NOT a. OUTSIDE AIR DAMPER SHALL OPEN, OAHU SUPPLY FAN SHALL START AND HOLD AT MINIMUM SPEED FOR 120 PROVEN SECONDS (FA) WHILE THE, PREHEATING COIL AND CHILLED WATER COIL, ARE RELEASED TO CONTROL PER J. MONITOR AND ALARM TEMPERATURE CONTROL BELOW. 1. MONITOR, THROUGH THE BAS, THE FOLLOWING POINTS AND GENERATE THE ALARMS INDICATED (REFER POINTS LIST FOR b. AFTER THE OUTSIDE AIR DAMPERS HAVE OPENED, OAHU SUPPLY FAN SHALL START SLOWLY RAMPING UP TO ADDITIONAL MONITORING POINTS): MAINTAIN DUCT STATIC PRESSURE SETPOINT. a. SUPPLY FAN MOTOR STATUS - FCU PANEL (DI) 4. WHEN SYSTEM IS COMMANDED TO STOP; OAHU SUPPLY FAN SHALL STOP, AND OUTSIDE AIR DAMPER SHALL BE 1) GENERATE NON-CRITICAL ALARM IF A FAN FAILURE IS INDICATED. COMMANDED CLOSED. b. FILTER PRESSURE DROP (TYPICAL OF ALL FILTERS) - (AI) 5. WHEN THE SUPPLY FAN VFD IS COMMANDED TO START VIA H-O-A SWITCH ON VFD, THE FOLLOWING SEQUENCE SHALL 1) GENERATE NON-CRITICAL ALARM WHEN PRESSURE DROP EXCEEDS 1.1" WC (FA). OCCUR. a. IF THE OAHU IS OFF, AND A SUPPLY FAN VFD IS PLACED INTO HAND MODE, THE FAN SERVED BY THE VFD SHALL c. MAINTENANCE MODE ALARM (SOFTWARE) START AND OPERATE AT SPEED SELECTED ON VFD. BAS SHALL COMMAND OUTSIDE AIR DAMPER OPEN. 1) GENERATE A NON-CRITICIAL ALARM WHEN OPERATATOR OVERRIDES UNIT TO MANUALLY OFF 6. WHEN A VFD H-O-A SWITCH IS IN ANY POSITION OTHER THAN AUTO MODE, AN ALARM SHALL BE ANNUNCIATED AT THE BAS. d. TEMPERATURE OUT OF RANGE (SOFTWARE) D. FAN FAILURE DETECTION 1) GENERATE A CRITICIAL ALARM WHEN TEMPERATURE IS +/- 5F FROM SETPOINT FOR 15 MIN OR MORE. 1. SUPPLY FAN VFD SHALL EACH BE PROGRAMMED FOR THE FOLLOWING FAN FAILURE OPERATION. FAN FAILURES ARE SENSED BY A LOW CURRENT INDICATION AT THE CURRENT SWITCH. VFD FAILURES ARE INDICATED BY FAULT INDICATION 1.3 ELECTRIC UNIT HEATER – EUH-P.01, EUH-P.02 AT VFD. A. SCOPE a. VFD FAILURE: OAHU SHALL FAIL. WHEN THE OAHU FAILS, ALL DEVICES SHALL OPERATE AS DESCRIBED ABOVE IN INTERLOCKING. OAHU SHALL BE LOCKED OUT UNTIL RESET MANUALLY. 1. REFER TO MECHANICAL EQUIPMENT SCHEDULES FOR EUHs ASSOCIATED WITH THIS SEQUENCE. E. SYSTEM SUPPLY AIR VOLUME AND DISCHARGE TEMPERATURE CONTROL 2. THE UNIT HEATER MAINTAINS HEATING SETPOINT OF 60F WITHIN MECHANICAL ROOM 605 (EUH-P.01), MECHANICAL ROOM 1. SUPPLY FANS ARE VARIABLE SPEED AND ARE CONTROLLED THROUGH VARIABLE FREQUENCY DRIVES (VFD). FAN SPEED 603 (EUH-P.02). SHALL BE CONTROLLED THROUGH BAS, TO MAINTAIN DUCT STATIC PRESSURE SETPOINT. 3. ALL SETPOINTS SHOULD BE OPERATOR ADJUSTABLE a. VARIABLE FREQUENCY DRIVES B. UNIT OPERATION 1) VFDS SHALL BE SWITCHED BETWEEN HAND, OFF, AND AUTO MODES VIA MANUAL LOCAL CONTROL 1. SPACE MOUNTED T-STAT SHALL THROUGH THE DDC CONTROLLER, CONTROL THE OPERATION OF THE UNIT HEATER. ADJUSTMENT AT EACH VFD. 2. UPON THE EVENT THE TEMPERATURE FALLS BELOW HEATING SETPOINT OF 60F, UNIT HEATER FANS SHALL ENERGIZE AND 2) CONTROL LOOPS OTHER THAN VOLUME/PRESSURE CONTROL LOOPS USING VFD SPEED OUTPUTS, SHALL THE ELECTRIC HEATING COIL SHALL MAINTAIN THE SETPOINT. CONTINUE TO FUNCTION IN THE HAND MODE. C. MONITOR AND ALARM 3) MOTORS SHALL OPERATE AT CONSTANT SPEED IN THE HAND MODE. REMOTE START/STOP CONTROL 1. MONITOR, THROUGH THE BAS, THE FOLLOWING POINTS AND GENERATE THE ALARMS INDICATED (REFER POINTS LIST FOR SHALL BE VIA LOCAL CONTROL AT EACH VFD. ADDITIONAL MONITORING POINTS): 4) ALL SAFETY DEVICES SHALL BE WIRED AS TO BE STILL ACTIVE IN THE HAND MODE. a. MAINTENANCE MODE ALARM (SOFTWARE) 5) COORDINATE COMMUNICATION REQUIREMENTS WITH VFD MANUFACTURER. ALL MONITORING AND 1) GENERATE A NON-CRITICIAL ALARM WHEN OPERATATOR OVERRIDES UNIT TO MANUALLY OFF CONTROL POINT DATA FROM VFD INTERFACE CARD SHALL BE MAPPED TO THE BAS. VFD START/STOP b. TEMPERATURE OUT OF RANGE (SOFTWARE) CONTROL AND SPEED CONTROL POINTS SHALL BE HARD WIRED FROM THE BAS CONTROLLER TO THE DRIVE 1) GENERATE A CRITICIAL ALARM WHEN TEMPERATURE IS - 5F FROM SETPOINT FOR 15 MIN OR MORE 6) THE CONTROL CONTRACTOR SHALL COORDINATE WITH THE TESTING AND BALANCING CONTRACTOR TO ESTABLISH DUCT STATIC PRESSURE SETPOINT. 2. PRE-HEATING COIL DISCHARGE AIR TEMPERATURE CONTROL (REFER TO MECHANICAL SCHEDULES) - NORMAL OPERATION: a. THE PRE-HEATING COIL SCR CONTROLLER SHALL MODULATE TO MAINTAIN PRE-HEATING COIL DISCHARGE AIR TEMPERATURE SETPOINT VIA TEMPERATURE SENSOR LOCATED UPSTREAM OF COOLING COIL. b. THE BAS SHALL SIGNAL SCR PRE-HEATING COIL BASED ON SCR HEATING CONTROLLER INPUT. SCR HEATING CONTROLLER SHALL STAGE AND MODULATE HEATING ELEMENTS AS REQUIRED TO MAINTAIN HEATING COIL DISCHARGE AIR TEMPERATURE SETPOINT. 3. COOLING COIL DISCHARGE AIR TEMPERATURE CONTROL (REFER TO MECHANICAL SCHEDULES) - NORMAL OPERATION: a. THE COOLING COIL CONTROL VALVE SHALL MODULATE TO MAINTAIN OAHU DISCHARGE AIR TEMPERATURE SETPOINT VIA TEMPERATURE SENSOR LOCATED IMMEDIATELY DOWNSTREAM OF OAHU. 1) AS DISCHARGE AIR TEMPERATURE INCREASES, COOLING COIL CONTROL VALVE SHALL MODULATE OPEN TO MAINTAIN DISCHARGE AIR TEMPERATURE AT SETPOINT. THE REVERSE SHALL OCCUR AS COOLING COIL DISCHARGE AIR TEMPERATURE DECREASES. 2) COOLING COIL CONTROL VALVE SHALL BE LOCKED IN CLOSED POSITION WHENEVER OUTSIDE AIR TEMPERATURE IS BELOW 56°F (FA) FOR 10 CONSECUTIVE MINUTES (FA) OR WHENEVER ASSOCIATED SUPPLY FAN IS NOT OPERATING, WHEN SAFETY LOW TEMPERATURE LIMIT CONTROL (FREEZE-STAT) IS NOT IN ALARM. 4. THE COOLING COIL CONTROL VALVE AND PRE-HEATING CONTROL SHALL NOT BE ALLOWED TO OPERATE SIMULTANEOUSLY. DAMPER CONTROL: 1. THE OUTSIDE AIR DAMPER SHALL OPEN WHEN UNIT IS ENABLED. DAMPER SHALL CLOSE WHEN UNIT IS DISABLED. G. UV LIGHT CONTROL: 1. BAS SHALL ENABLE UV LIGHT WHEN THE UIN IT OPERATING AND COOLIN COIL CONTROL AVLAVE IS GREAT THAT 5% OPEN (FA). BAS SHALL PROVIDE UV LIGHT RUN TIME LOG BASED ON DURATION OF COOLING COIL BEING OPEN. 2. UV LIGHT SHALL BE DISABLED WHEN RESPECTIVE COOLING COIL VALE IS LESS THAN 5% OPEN FOR 30 MINUTES (FA) OR UNIT IS NOT OPERATING. 3. UV LIGHT SHALL BE HARDWIRED INTERLOCKED WITH RESPECTIVE OAHU ACCESS DOOR SO THAT UV LIGHT IS DISABLED WHEN ACCESS DOOR IS "NOT CLOSED" AS INDICATED BY CLOSED-INDICATING DOOR POSISTION SWITCH. SMOKE DETECTORS IN DUCTWORK: 1. SMOKE DETECTORS WILL BE FURNISHED, INSTALLED, AND WIRED TO FIRE ALARM CONTROL PANEL BY ELECTRICAL CONTRACTOR. 2. WIRE CONTACT ON FIRE ALARM SYSTEM PROVIDED BY EC TO AIR HANDLING UNIT SUPPLY FAN STARTER TO SHUT DOWN UNIT FAN WHEN FIRE ALARM SYSTEM IS IN ALARM CONDITION. 3. WIRE AUXILIARY CONTACT ON SMOKE DETECTOR TO AIR HANDLING UNIT SUPPLY FAN STARTER. EACH AIR HANDLING UNIT'S SMOKE DETECTOR(S) UPON DETECTION OF SMOKE SHALL STOP ITS RESPECTIVE AIR HANDLING UNIT. SAFETIES Ι. 1. LOW TEMPERATURE PROTECTION a. PROVIDE SAFETY LOW LIMIT TEMPERATURE CONTROL (FREEZE-STAT), WITH 3 MINUTE (FA) TIME DELAY, AT ENTERING SIDE OF COOLING COIL. THE LOW TEMPERATURE THERMOSTAT 35°F (FA) SHALL BE HARDWIRED TO SHUT DOWN THE SUPPLY FANS AND CLOSE THE OUTDOOR AIR DAMPERS, AND OPEN THE CHILLED WATER VALVE. 2. PROVIDE HIGH STATIC PRESSURE SAFETY SWITCH BETWEEN SUPPLY FANS AND END OF UNIT BEFORE THE SUPPLY DUCT AND WIRE IN SERIES WITH VFD SAFETY CIRCUIT TO STOP SUPPLY FAN. THE PRESSURE SWITCH SHALL BE ADJUSTED TO 4.0" WC (FA). THE STATUS OF THE PRESSURE SWITCH SHALL BE WIRED TO THE BAS SYSTEM FOR ALARMING. THE PRESSURE SWITCH MUST BE MANUALLY RESET LOCALLY BEFORE THE AIR HANDLING UNIT CAN BE RESTARTED. HIGH STATIC PRESSURE SAFETY SWITCH SHALL BE FUNCTIONAL IN VFD HAND MODE OF OPERATION. 3. PROVIDE LOW STATIC SUCTION PRESSURE SAFETY SWITCH BETWEEN INLET OF SUPPLY FAN AND OUTSIDE AIR DAMPER AND WIRE IN SERIES WITH VFD SAFETY CIRCUIT TO STOP SUPPLY FAN. THE PRESSURE SWITCH SHALL BE ADJUSTED TO -3.0" WC (FA). THE STATUS OF THE PRESSURE SWITCH SHALL BE WIRED TO THE BAS SYSTEM FOR ALARMING. THE PRESSURE SWITCH MUST BE MANUALLY RESET LOCALLY BEFORE THE AIR HANDLING UNIT CAN BE RESTARTED. LOW STATIC PRESSURE SAFETY SWITCH SHALL BE FUNCTIONAL IN VFD HAND MODE OF OPERATION. J. MONITOR AND ALARM 1. MONITOR, THROUGH THE BAS, THE FOLLOWING POINTS AND GENERATE THE ALARMS INDICATED (REFER POINTS LIST FOR ADDITIONAL MONITORING POINTS): a. UNIT DISCHARGE AIR TEMPERATURE - EACH OAHU (AI) 1) GENERATE NON-CRITICAL ALARM IF TEMPERATURE DEVIATES FROM SETPOINT BY ±2°F (FA) FOR 10 CONSECUTIVE MINUTES (FA). b. LOW LIMIT THERMOSTAT (FREEZESTAT) - EACH OAHU (DI) 1) GENERATE EMERGENCY ALARM AND STOP OAHU. c. SUPPLY FAN VFD FAULT - EACH VFD (SOFTWARE) 1) GENERATE CRITICAL ALARM. d. SUPPLY FAN MOTOR STATUS - OAHU PANEL (DI) 1) GENERATE NON-CRITICAL ALARM IF A FAN FAILURE IS INDICATED. e. VFD H-O-A SWITCH - EACH VFD (SOFTWARE) 1) GENERATE CRITICAL ALARM IF SWITCH IS IN ANY POSITION OTHER THAN AUTO. f. SUPPLY FAN STATIC SUCTION SAFETY SWITCH - (DI) 1) GENERATE CRITICAL ALARM AND STOP OAHU IF PRESSURE FALLS BELOW -3.0" WC (FA). g. SUPPLY STATIC PRESSURE HIGH LIMIT - (DI) 1) GENERATE NON-CRITICAL ALARM WHEN STATIC PRESSURE EXCEEDS 3.5" WC (FA). h. FILTER PRESSURE DROP (TYPICAL OF ALL FILTERS) - (AI) 1) GENERATE NON-CRITICAL ALARM WHEN PRESSURE DROP EXCEEDS 1.1" WC (FA). i. UV LIGHT RUNTIME ALARM (TYPICAL OF ALL UV LIGHTS) - (SOFTWARE) 1) GENERATE A NON-CRITICAL ALARM WHEN RUN TIME EXCEEDS OPERATIONAL LIFE EXPECTANCY HOURS (FA). j. MAINTENANCE MODE ALARM (SOFTWARE) 1) GENERATE A NON-CRITICIAL ALARM WHEN OPERATATOR OVERRIDES UNIT TO MANUALLY OFF

1.2 FAN COIL UNIT – FCU-P.01, FCU-P.02

A. SCOPE

1. REFER TO MECHANICAL EQUIPMENT SCHEDULES FOR FCUS ASSOCIATED WITH THIS SEQUENCE. 2. THE FAN COIL UNIT IS DESIGNED TO COOL ROOM SETPOINT OF 80F TO ELEVATOR MECHANICAL ROOM (FCU-P.02), TELECOM ROOMS (FCU-P.01)

3. THE FAN COIL UNIT IS DESIGNED TO HEAT ROOM SETPOINT OF 60F TO ELEVATOR MECHANICAL ROOM (FCU-P.02)

4. ALL SETPOINTS SHOULD BE OPERATOR ADJUSTABLE

B. INTERLOCKING 1. WHEN AN FAN COIL UNIT IS NOT OPERATING (FAILED OR OFF), CONTROL DEVICES SHALL BE IN THE FOLLOWING POSITIONS: a. PRE-HEATING COIL ELECTRIC SCR HEATER = OFF

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MARK	SERVICE	FILTER			SUPPLY F	AN CH	IARACTE	RISTICS			
		TYPE	QTY	MERV	CFM	MIN.	ESP	NO. FANS	WHEEL	DRIVE	M
				RATING		OA	("WG)		DIA.		
						(%)	(1)		(IN)		
		4" PLEATED(12X24)	8								
OAHU-R.01	OUTSIDE AIR	4" PLEATED(24X24)	16	8	35000	100%	1"	2	-	DIRECT	
		4" PLEATED(12X12)	1								

(1) ESP TO EXCLUDE PD OF UNIT COMPONENTS FURNISHED BY UNIT MANUFACTURER SUCH AS COILS, "DIRTY" FILTERS, U.V. LAMP, AND PERFORATED DIFFUSER PLATES WHERE REQUIRED.

(2) PROVIDE C.C. WITH U.V.LIGHT, DOOR SHUTOFF SWITCH, AND DEDICATED POWER WITH TOGGLE SWITCH IN WEATHERPROOF HOUSING, 120V/1PH/60HZ, 1110W, 3 ROW

(3) BASIS OF DESIGN, CUSTOM TEMTROL UNIT, SEE DETAIL 1/M-502.

(4) PROVIDE WITH ALL ELECTRICAL CONNECTIONS AND CONTROLS AT UNIT, INCLUDING VFD, HEATER POWER AND CONTROLS, U.V. LIGHT, AND INTERIOR LIGHTING WITH TOGGLE SWITCH.

MARK	LOCATION	TYPE	FAN CH	ARCTER	RISTICS	COOLIN	IG COIL										ELECTRICA	L CHARAC	TERISTICS			HEATING	G COIL						FILTERS	6	OPERATIN	REMARKS
			NOM.	TYPE	ESP	HT	HS	EAT		LAT		EWT	LWT	GPM	PD	MAX	MOTOR	VOLT	PH	MCA	SCCR	CAP.	EAT	LAT	ELECTR	ICAL			TYPE	MERV	WEIGHT	
			CFM		(IN. WG	) (BTUH)	(BTUH)	DB	WB	DB	WB	(°F)	(°F)		(FT)	FACE VEL.	HP				(MIN)	(BTUH)	DB	DB	V	Р	KW	STAGE			(LB)	
								(°F)	(°F)	(°F)	(°F)					(FPM)						· ·	(°F)	(°F)								
FCU-P.0 <sup>2</sup>	MECH PENTHOUSE	HORIZONTAL	1500	EC	0.15	55310	41960	80	67	54.1	54	46	61	8	1.8	-	1/2	277	1	4.7	5k	-	-	-	-	-	-	-	2"	8	238	(1)(2)(3)(4)
FCU-P.02	2 MECH PENTHOUSE	HORIZONTAL	600	EC	0	22000	16660	80	67	54.3	54	46	61.9	3	3	-	1/3	460	3	13.66	5k	23900	60	96.9	460	3	7	1	2"	8	158	(1)(2)(3)(5)
FCU-P.03	3 MECH PENTHOUSE	HORIZONTAL	600	EC	0	22000	16660	80	67	54.3	54	46	61.9	3	3	-	1/3	460	3	13.66	5k	23900	60	96.9	460	3	7	1	2"	8	158	(1)(2)(3)(5)

(1) ESP TO EXCLUDE PD OF UNIT COMPONENTS FURNISHED BY UNIT MANUFACTURER SUCH AS COILS, "DIRTY" FILTERS, AND PERFORATED DIFFUSER PLATES WHERE REQUIRED.

(2) SUSPEND UNITS WITH APPROPIATE HANGERS AND VIBRATION ISOLATORS, 1" DEFLECTION.

(3) CONTRACTOR TO VERIFY EXISTING CIRCUIT ADEQUATE FOR NEW EQUIPMENT. SEE ELECTRICAL DRAWINGS FOR POWER CONNECTIONS.

(4) BASIS OF DESIGN, TRANE MODEL BCD054.

(5) BASIS OF DESIGN, TRANE MODEL BCD024.

MARK	LOCATION	TYPE	MOUNTING	CAPACITY (KW)	VOLT	PH	STAGES	THERMOSTAT	SCCR (MIN)	OPER. WEIGHT (LB)	REMARKS
EUH-P.01	PENTHOUSE	UNIT HEATER	WALL	5	480	3	1	Y	(1)	9	(1)(2)(3)
EUH-P.02	PENTHOUSE	UNIT HEATER	WALL	5	480	3	1	Y	(1)	9	(1)(2)(3)

NOTES:

(1) COORDINATE SCCR OF EQUIPMENT AND CONTROLS WITH DIV 26 CONTRACTOR.

(2) PROVIDE WITH LINE T-STAT.

(3) BASIS OF DESIGN TRANE MODEL UHEC053D.

						COOLIN	NG COIL	_											HEATING (	COIL										OPER.	REMARKS	
TOR		RICAL	•			EAT (°F	-)	LAT (°F	)	ROWS	FINS/	MAX.	MAX.	MAX.	CAPACITY	GPM	EWT	LWT	EAT	LAT	MAX.	CAPACITY	ELECTR	RICAL					١	<b>VEIGHT</b>		
ΗP	V	PH	HZ	FLA	MCA	DB	WB	DB	WB		INCH	FACE	AIR	WATER	(MBH)		(°F)	(°F)	(°F)	(°F)	AIR	(MBH)	V	PH	HZ	FLA	KW	CONTROL	STAGES	(LB)		
Ā												VEL.	PD	PD						. ,	PD									. ,		
												(FPM)	("WG)	(FT)							("WG)											
20	460	3	60	50	56	89	80	52.8	52.8	8	10	410	0.85	8.73	3312	475	46	59.9	20	55	_	1323	460	3	60	488	388	SCR	0-10V	19381	(1)(2)(3)(4)	

ELECTRIC UNIT HEATER
----------------------

## OUTSIDE AIR HANDLING UNITS

## FAN COIL UNITS

![](_page_12_Picture_20.jpeg)

![](_page_13_Picture_0.jpeg)

## ELECTRICAL SYMBOLS AND ABBREVIATIONS

NOTES: 1. SYMBOLS INDICATED HERE AND NOT USED IN THE CONTRACT DOCUMENTS DO NOT APPLY TO THIS PROJECT. ADDITIONAL SYMBOLS MAY BE INDICATED IN THE CONTRACT DOCUMENTS.

2. EXISTING TO REMAIN IS SHOWN WITH LIGHT LINES. 3. NEW WORK IS SHOWN WITH SOLID HEAVY LINES.

	EQUIPMENT AND	WIRIN	IG
$\bigcirc$	MOTOR		AUTOMATIC TRANSFER SWITCH
uuu mm	TRANSFORMER - ONE LINE DIAGRAM	 図	VOLTMETER & SELECTOR SWITCH
m	ISOLATION TRANSFORMER - ONE LINE DIAGRAM	 (A) (A)	AMMETER, SELECTOR SWITCH, & CT'S
<u> </u>	GROUND CONNECTION	EGS	ENGINE GENERATOR SET
Т	TRANSFORMER	GEN	REMOTE GENERATOR ANNUNCIATOR
$\leq$	PANELBOARD - NORMAL SURFACE MOUNTED	G	REMOTE GROUND INDICATOR
$\leq$	PANELBOARD - NORMAL FLUSH MOUNTED	G <sub>P</sub>	ROOM REFERENCE GROUND POINT
4	PANELBOARD - EMERGENCY/LIFE SAFETY SURFACE MOUNTED		GROUND CONNECTION - PLUG-IN
4	PANELBOARD - EMERGENCY/LIFE SAFETY FLUSH MOUNTED	Ū	LINE VOLTAGE THERMOSTAT
	PANELBOARD - CRITICAL SURFACE MOUNTED		REVENUE METER, kWh/D
	PANELBOARD - CRITICAL FLUSH MOUNTED	6-0	METER WITH CURRENT TRANSFORMER
6	LOW VOLTAGE LIGHTING CONTROL PANEL - SURFACE MOUNTED		MOLDED CASE CIRCUIT BREAKER
$\leq$	LOW VOLTAGE LIGHTING CONTROL PANEL - FLUSH MOUNTED	«···»	LOW VOLTAGE DRAW-OUT AIR CIRCUIT BREAKER
	DISTRIBUTION PANELBOARD	<b>~</b> •	SWITCH - ONE LINE DIAGRAM
MCC	MOTOR CONTROL CENTER	Υ <del></del>	GROUNDED "Y" SYSTEM
R	CABLE TAP BOX	Н	ELECTRIC HEATER
t)	BUSWAY PLUG-IN UNIT	®	RELAY - TYPE AS NOTED
3	CURRENT TRANSFORMER	TR	TIMING RELAY
⊱	POTENTIAL TRANSFORMER	8	AIR TERMINAL
$\bigcirc$	REVERSE POWER RELAY	••	PUSH BUTTON
다	NON FUSED DISCONNECT SWITCH	К	KIRK KEY INTERLOCK
Ē	FUSED DISCONNECT SWITCH	PM	PHYSIOLOGICAL MONITOR OUTLET
B	BREAKER DISCONNECT SWITCH	$\Diamond$	PANEL DIVISION ARROW
$\boxtimes$	MAGNETIC MOTOR STARTER		PANEL DIVISION LINE
× K	COMBINATION MOTOR STARTER	~ ~	WIRING CONCEALED IN FLOOR
<b>\$</b> <sub>M</sub>	MANUAL STARTER W/OVERLOAD PROTECTION	$\frown$	WIRING IN CEILING/WALLS
J	SURFACE JUNCTION BOX	Î.	
-0	SURFACE JUNCTION BOX - WALL	444	HOMERUN
J	FLUSH JUNCTION BOX - CEILING		PNL. A1 INDICATES PANEL AND CIRCUIT 
—J	FLUSH JUNCTION BOX - WALL		INDICATES NEUTRAL CONDUCTOR INDICATES GROUND CONDUCTOR
$\langle \mathbf{J} \rangle$	FLUSH JUNCTION BOX - FLOOR	//-1,3,3 - P/	THELAND GINCOITS, FAMELA, GIRGUITS 1,3,3

### RECEPTACLES

- DUPLEX RECEPTACLE MOUNTING LOCATION: WALL MOUNTING HEIGHT: 1'-6"
- = EMERGENCY DUPLEX RECEPTACLE MOUNTING LOCATION: WALL
- MOUNTING HEIGHT: 1'-6" - SINGLE RECEPTACLE MOUNTING LOCATION: WALL MOUNTING HEIGHT: 1'-6"
- DOUBLE DUPLEX RECEPTACLE MOUNTING LOCATION: WALL MOUNTING HEIGHT: 1'-6"
- EMERGENCY DOUBLE DUPLEX RECEPTACLE MOUNTING LOCATION: WALL MOUNTING HEIGHT: 1'-6"
- DUPLEX RECEPTACLE ABOVE CASEWORK OR 2" ABOVE COUNTERTOP BACKSPLASH MOUNTING LOCATION: WALL MOUNTING HEIGHT: FIELD VERIFY
- EMERGENCY DUPLEX RECEPTACLE ABOVE CASEWORK OR 2" ABOVE COUNTERTOP BACKSPLASH MOUNTING LOCATION: WALL MOUNTING HEIGHT: FIELD VERIFY
- POWER OUTLET MOUNTING LOCATION: WALL MOUNTING HEIGHT: 1'-6"
- POWER OUTLET, EMERGENCY CIRCUIT MOUNTING LOCATION: WALL MOUNTING HEIGHT: 1'-6"
- FIXED EQUIPMENT CONNECTION WALL MOUNTING LOCATION: WALL MOUNTING HEIGHT: 1'-6" - FIXED EQUIPMENT CONNECTION - WALL
- EMERGENCY CIRCUIT MOUNTING LOCATION: WALL MOUNTING HEIGHT: 1'-6" - LOCKING RECEPTACLE
- MOUNTING LOCATION: WALL MOUNTING HEIGHT: 1'-6"
- SWITCH/ RECEPTACLE
- MOUNTING LOCATION: WALL MOUNTING HEIGHT: 3'-6"

## **SWITCHES**

- SINGLE POLE SWITCH **\$**\_ MOUNTING LOCATION: WALL MOUNTING HEIGHT: 3'-6" a = SWITCH DESIGNATION THREE WAY SWITCH **\$**3 MOUNTING LOCATION: WALL MOUNTING HEIGHT: 3'-6" FOUR WAY SWITCH **\$**⊿ MOUNTING LOCATION: WALL MOUNTING HEIGHT: 3'-6" TWO POLE SWITCH **\$**2 MOUNTING LOCATION: WALL MOUNTING HEIGHT: 3'-6" \$ĸ KEY SWITCH MOUNTING LOCATION: WALL
- MOUNTING HEIGHT: 3'-6" \$<sub>MC</sub> MOMENTARY CONTACT SWITCH MOUNTING LOCATION: WALL MOUNTING HEIGHT: 3'-6"
- **\$**D DOOR SWITCH MOUNTING LOCATION: WALL MOUNTING HEIGHT: 3'-6"
- SWITCH WITH PILOT LIGHT MOUNTING LOCATION: WALL MOUNTING HEIGHT: 3'-6"
- **\$** LOW VOLTAGE "M"-MASTER SWITCH LV-M MOUNTING LOCATION: WALL MOUNTING HEIGHT: 3'-6"
- \$<sub>DM</sub> REMOTE CONTROL FOR MOTORIZED DAMPER MOUNTING LOCATION: WALL MOUNTING HEIGHT: 3'-6"

F	PULL STATION/FIRE ALARM BOX
$CO_2$	CARBON DIOXIDE
DC	DRY CHEMICAL
DH	DOOR HOLDER
HL	HALON
FO	FOAM
WC	WET CHEMICAL
CA	CLEAN AGENT
WM	WATER MIST
DL	DELUGE FIRE SPRINKLER
PRE	PREACTION
MB	FIRE ALARM MASTER BOX
DK	DRILL KEY
DS	DOOR HOLDER W/ SMOKE DETECTOR
Μ	MANUAL RELEASING SWITCH
TS	TAMPER SWITCH
WF	FLOW DETECTOR/SWITCH
PS	PRESSURE DETECTOR/SWITCH
LS	LEVEL DETECTOR/SWITCH
TSS	TEMPERATURE SUPERVISORY SWITCH
ΗT	HIGH TEMPERATURE SWITCH
LT	LOW TEMPERATURE SWITCH
VS	VALVE SUPERVISORY SWITCH
VS	VALVE WITH SUPERVISORY SWITCH
$\boxtimes$	
۲X	FIRE SERVICE OR EMERGENCY PHONE
	A = ACCESSIBLE J = JACK
	H = HANDSET

![](_page_13_Figure_28.jpeg)

![](_page_13_Picture_29.jpeg)

E-001

1			

![](_page_14_Figure_1.jpeg)

![](_page_14_Figure_2.jpeg)

![](_page_14_Figure_3.jpeg)

1 ELCTRICAL ROOF PLAN A - DEMOLITION WORK SCALE: 1/4"=1'-0"

## GENERAL NOTES

- (EX) OAHU-R.01. REMOVE ALL CIRCUITS DOWN TO ROOF CURB. REMOVE CONDUCTORS BACK TO VFD OR SERVING PANEL.
   EXISTING VFD FOR OAHU-R.01. REMOVE AND RETURN TO OWNER OR
- RECYCLE AT OWNER'S DIRECTION.
   DEMO EXISTING CIRCUIT BACK TO VFD. EXISTING CONDUIT INSIDE ROOF
- CURB WILL BE RE-USED FOR NEW OAHU-R.01 CONTROL CIRCUIT.4. RE-USE EXISTING CONDUITS FOR NEW CONTROL CIRCUITS.
- 5. DEMO EXISTING CONVENIENCE RECEPTACLE(S) AT OAHU INCLUDING CONDUCTORS BACK TO SERVING PANEL. LEAVE CONDUITS IN PLACE FOR FUTURE DEVICES INSTALLED APPROXIMATE THE SAME LOCATIONS.
- 6. DISCONNECT EXISTING UNIT HEATER. RE-USE EXISTING CIRCUIT FOR NEW UNIT.
- 7. DISCONNECT EXISTING FCU. RE-USE EXISTING CIRCUIT FOR NEW UNIT.

![](_page_14_Picture_13.jpeg)

![](_page_14_Picture_14.jpeg)

![](_page_15_Figure_0.jpeg)

![](_page_15_Picture_1.jpeg)

# KEYPLAN 0 1 2 3 4 6 8 12 1/4"=1'-0"

Affiliated Engineers Affiliated Engineers, Inc. One Greenway Plaza, Suite 150 Houston, Texas 77046 Tel 713.548.8900 Fax 713.548.8901 Texas Registered Engineering Firm F-8301 GENE M. MOSCINS HCC Issue 100% CD 2020.05.07 Revisions Project HCC COLEMAN DOAS REPLACEMENT AND BAS UPGRADE Sheet Title ELECTRICAL ROOF PLAN B - DEMOLITION WORK Scale AS NOTED Date 04/10/2020 Drawn By AEI Project No. 20683-00 Sheet No. E-102

![](_page_16_Figure_1.jpeg)

1 ELECTICAL ROOF PLAN A - NEW WORK SCALE: 1/4"=1'-0"

## GENERAL NOTES

- 1. REUSE EXISTING 120V CIRCUIT FOR NEW RECEPTACLE.
- 2. HEATER CONTROL PANEL WITH FUSED DISCONNECT (FUSE). STUB UP NEW CONDUIT INSIDE ROOF CURB.
- 3. UV LIGHT(S) CONTROL PANEL. PROVIDE DEDICATED 120V/20A CIRCUIT FROM SPARE 20A BREAKER IN L5.02 IN L5 ELECTRICAL ROOM.
- VFD FURNISHED WITH OAHU. EXTEND EXISTING CONDUIT FROM 5TH FLOOR ELECTRICAL ROOM INSIDE ROOF CURB. INSTALL NEW CONDUCTORS FROM PANEL 'HD5.01'.
- 5. NEW UNIT HEATER. PROVIDE 480V/3PH, 30A/3P FUSED DISCONNECT SWITCH.
- PROVIDE (2) 1"C FOR CONTROLS BACK TO DDC PANELS IN LEVEL 5 MECHANICAL ROOM. (1) CONDUIT FOR HEATER CONTROL AND (1) CONDUIT FOR MOTOR CONTROL.
- 7. REUSE EXISTING EMERGENCY CIRCUIT FOR NEW FCU -P.01
- 8. CONVENIENCE RECEPTACLE AND CIRCUIT FOR INTERIOR LIGHTING.
- 9. NEW CONDUITS TO EXISTING MAIN SWITCHGEAR IN BASEMENT. COORDINATE ROUTING WITH OWNER FOR MINIMUM DISRUPTION TO EXISTING FACILITY. REFER TO SINGLE-LINE FOR FEEDER SIZE.
- 10. PROVIDE AIR TERMINAL ON TOP OF OUTSIDE AIR HANDLING UNIT. CONNECT NEW AIR TERMINAL TO EXISTING LIGHTNING PROTECTION SYSTEM. MATERIAL OF NEW AIR TERMINAL AND CABLE SHALL MATCH THAT OF EXISTING LIGHTNING PROTECTION SYSTEM. LOCATION OF AIR TERMINAL SHOWN IS APPROXIMATE. FINAL LOCATION AND QUANTITY IF AIR TERMINALS FOR NEW COOLING TOWERS SHALL BE DETERMINED BY LIGHTNING PROTECTION CONTRACTOR. AFTER LIGHTNING PROTECTION WORK IS COMPLETE, LIGHTNING PROTECTION CONTRACTOR SHALL HAVE THE ENTIRE LIGHTNING PROTECTION SYSTEM RECERTIFIED TO PROVIDE A UL780 MASTER LABEL FOR THE ENTIRE SYSTEM.

![](_page_16_Picture_17.jpeg)

![](_page_16_Picture_18.jpeg)

![](_page_17_Figure_0.jpeg)

![](_page_17_Figure_2.jpeg)

![](_page_18_Picture_0.jpeg)

![](_page_18_Figure_1.jpeg)

2 ENLARGED ELECTRICAL PLAN - LEVEL FIVE ELECTRICAL ROOM SCALE: 1/4" = 1'-0"

![](_page_18_Picture_4.jpeg)

![](_page_19_Figure_0.jpeg)

## GENERAL NOTES

- 1. UTILIZE EXISTING FEEDER BREAKER FOR NEW OAHU-R.01 ELECTRIC HEATING COIL. ADJUST LONG TIME (LT) SETTING ON TRIP UNIT TO 650A.
- 2. 600A FUSED DISCONNECT SWITCH FOR HEATING COIL IN OAHU-R.01 (FWE). 3. RE-USE EXISTING 100A CIRCUIT BREAKER IN 'HD5.01' FOR NEW FAN ARRAY IN
- OAHU-R.01 4. FUSED DISCONNECT OR CIRCUIT BREAKER (INCLUDED WITH VFD).

![](_page_19_Picture_8.jpeg)

Location: PER PLANS Feeder Panel	
Feeder Panel Location	
Riser	
PANEL ACCESSORIES	
Description	
SPARE	$\wedge$
EF-P.01	
FCU-P.03	2>
	$\sim$
 EUH-P.02	
	$\checkmark$
SPARE	
SPARE	
SPARE SPARE	
SPARE SPARE	
SPARE SPARE	
SPARE SPARE	
5TH FLC	
Location: PER PLANS Feeder Panel	
Feeder Panel Location	
PANEL ACCESSORIE	
Description	
(EX) FILM ILLUMINATO	
(EX) FILM ILLUMINATO	
(EX) PROCESSOR	
(EX) RECEPTACLES	
(EX) RECEPTACLES	
(EX) RECEPT - PENTH (EX) AHU LITES & REC	
(EX) LIGHTING CONT	
(EX) PUMP	
(EX) PUMP	
(EX) AIK COMPRESSO	

JSE EL	EC	TRIC	AL R	OOM	1	Pane	el:		HPR.01				
						<b>Bus Size</b>	:	100A	Main Breaker: 100				
						Voltage:		480Y/27	77V 3 Phase, 4Wire				
						Fault Cu	rrent Ra	ting	10 kAIC (MIN)				
						Mfr							
STANDAR	D ASS	EMBLY											
	Brkr.			Righ	nt Side I	<b>⊲\/</b> Δ							
	Amp. Cct.				•/ (	i tigi			Cct.	Amp.	Description		
	Pole	No.	А	В	С	A	В	С	No.	Pole			
	20/1	1				1.00			2	20/1	(EX) LIGHTING		
		3		2.70					4		SPACE ONLY		
	15/3	5			2.70				6		SPACE ONLY		
		7	2.70						8		SPACE ONLY		
		9		2.40					10		SPACE ONLY		
	20/3	11			2.40				12		SPACE ONLY		
		13	2.40						14		SPACE ONLY		
		15		1.67					16		SPACE ONLY		
	20/3	17			1.67				18		SPACE ONLY		
		19	1.67						20		SPACE ONLY		
		21							22		SPACE ONLY		
	20/3	23							24		SPACE ONLY		
		25							26		SPACE ONLY		
	20/1	27							28		SPACE ONLY		
	20/1	29							30		SPACE ONLY		
	20/1	31							32		SPACE ONLY		
	20/1	33							34		SPACE ONLY		
	20/1	35							36		SPACE ONLY		
	20/1	37							38		SPACE ONLY		
	20/1	39							40		SPACE ONLY		
	20/1	41							42		SPACE ONLY		
			0.00	0.00	0.00					Lighting		1.00	
Load Subt	otal, Le	eft (kVA):	6.77	6.77	6.77	1.00	0.00	0.00	R	Receptacle		0.00	
oad Subtot	al, Rig	ht (kVA):	1.00	0.00	0.00					Kitchen		0.00	
Loa	ad, Tota	al, (kVA):	7.77	6.77	6.77					Motor		20.31	
										Elevator		0.00	
										Data		0.00	
										X-Ray		0.00	
										Power		0.00	
										Total		21.31	

## OR ELECTRICAL ROOM Panel: Bus Size: 225A Main Breaker: MLO Voltage: 208Y/120V 3 Phase, 4Wire Fault Current Pating 10 kAIC (MIN)

Fault Current Rating 10 kAIC (MIN)													
						Mfr							
STANDA	RD ASS	EMBLY											
	Brkr.		ما	ft Sida k	١٧٨	Righ	t Sida k	$\Delta/\Delta$		Brkr.			
	Amp.	Cct.	LU	it Olde, R	VA I	ixigi		V/	Cct.	Amp.	Description		
	Pole	No.	Α	В	С	A	В	С	No.	Pole			
2	20/1	43							44	20/1	(EX) MAMMOGRAM		
2	20/1	45							46	20/1	(EX) HAND DRYER		
2	20/1	47							48	20/1	(EX) HAND DRYER		
	20/1	49							50	20/1	(EX) HAND DRYER		
	20/1	51							52	20/1	(EX) HAND DRYER		
	20/1	53			0.70			1.80	54	20/1	(EX) EF-R.03 & EF-R.06		
	20/1	55	0.40			0.40			56	20/1	(EX) RECEPTACLES		
	20/1	57		0.40					58	20/1	SPARE		
DUSE	20/1	59			0.30				60	20/1	SPARE		
DUSE	20/1	61	0.30						62	20/1	SPARE		
PT	20/1	63		0.50					64	20/1	SPARE		^
CTOR	20/1	65			0.20			0.18	66	20/1	REC - OAHU		-
		67	0.30			1.10			68	20/1	UVLIGHTS		
	20/3	69		0.30					70		SPACE ONLY		
		71			0.30				72		SPACE ONLY		
		73	0.30						74		SPACE ONLY		
	20/3	75		0.30					76		SPACE ONLY		
		77			0.30				78		SPACE ONLY		
		79	0.50						80		SPACE ONLY		
2	20/3	81		0.50					82		SPACE ONLY		
		83			0.50				84		SPACE ONLY		
			0.00	0.00	0.00					Lighting		0.20	
Load Sub	ototal, Le	eft (kVA):	1.80	2.00	2.30	1.50	0.00	1.98		Receptacle		3.78	
oad Subto	otal, Rig	ht (kVA):	1.50	0.00	1.98					Kitchen		0.00	
Lo	ad, Tota	al, (kVA):	3.30	2.00	4.28					Motor		5.60	
										Elevator		0.00	
										Data		0.00	
										X-Ray		0.00	
										Power		0.00	
										Total		9.58	

4TH FLOOR E	LEC	TRIC	AL RO	DOM		Pane	el:		EH4.01					
_ocation: PER PLANS						Bus Size	e:	400A	Mai	n Breaker	: 400			
Feeder Panel						Voltage:		480Y/27	77V 3 Phase, 4Wire					
Feeder Panel Location						FaultCu	rrent Ra	iting	22 kAIC (MIN)					
Riser						Mfr								
PANEL ACCESSORIES: STANDA	RD ASS	SEMBLY												
	Brkr.	Brkr. Loff Side KVA				Rig	ht Side	k\/A		Brkr.				
Description	Amp.	Cct.	Lei	it olue, k	٧٨	Right Side, KVA		Cct.	Amp.	Description				
	Pole	No.	Α	В	С	Α	В	С	No.	Pole				
EX) 3RD FLOOR LTG	20/1	1							2	20/1	4TH FLOOR LTG.			
EX) 3RD FLOOR EXIT SIGNS	20/1	3							4	20/1	4TH FLOOR LTG.			
EX) 5TH FLOOR LTG	20/1	5	L L						6	20/1	LIGHTING-PENTHOUSE			
EX) 5TH FLOOR EXIT SIGN	20/1	7							8	20/1	SPARE			
PARE	20/1	9							10	20/1	SPARE			
PARE	20/1	11							12	20/1	SPARE			
PARE	20/1	13							14	20/1	SPARE			
PARE	20/1	15							16	20/1	SPARE			
		17	Ļ					0.30	18	20/1	FCU-P 01	-		
PACEONLY		19							20		SPACE ONLY			
		21							22		SPACE ONLY	-		
		23	Ļ						24		SPACE ONLY	-		
		25							26		SPACE ONLY			
EMR ET4 01	60/3	27							28					
		29	. L			L			30					
		31							32			_		
	300/3	33							34					
	000/0	35	, L						36					
		37							38			-		
	70/3	30							40	30/3		-		
	1013	11							42	50/5		_		
			0.00	0.00	0.00				72	Lighting	<u> </u>			
	htotal L	off $(k)/(A)$	0.00	0.00	0.00	0.00	0.00	0.30	D		0.0			
Load Subt	otal Dia	$\frac{\partial \mathbf{r}}{\partial \mathbf{h}} = \frac{\partial \mathbf{r}}{\partial \mathbf{h}} \frac{\partial \mathbf{r}}{\partial \mathbf{h}}$	0.00	0.00	0.00	0.00	0.00	0.30		Kitabaa	0.0			
	oral, Rig	$(k \vee A)$ .	0.00	0.00	0.30					Motor	0.0			
LC	Jau, 10ta	ai, (KVA):	0.00	0.00	0.30					Flouretor	0.3			
											0.0			
										Data	0.0			
										х-кау	0.0			
										Power	0.0			
										Total	0.3	0		

## 5TH FLOOR ELECTRICAL ROOM Panel:

L5.02

5TH FLOOR EL	DOM		Pane	el:			)						
Location: PER PLANS						Bus Size	e:	400A	Mai	n Breaker:	: 400		
Feeder Panel						Voltage:		480Y/27	7V		3 Phase, 4Wire		
Feeder Panel Location						Fault Current Rating					22 kAIC (MIN)		
Riser						Mfr							
PANEL ACCESSORIES: STANDA	RD ASS	EMBLY											
	Brkr.		Left Side kVA				ht Sida			Brkr.			
Description	Amp.	Cct.	Lei	l Siue, K	vA	rig	nt Slue, I		Cct.	Amp.	Description		
	Pole	No.	A	В	С	A	В	С	No.	Pole			
(EX) VAV	20/1	1							2	20/1	(EX) VAV		
(EX) VAV	20/1	3							4	20/1	(EX) VAV		
(EX) VAV	20/1	5							6	20/1	(EX) VAV		
		7						_	8	20/1	(EX) VAV		
(EX) VAV	20/3	9	L						10				
		11							12	20/3	(EX) VAV		
		13						_	14				
(EX) VAV	20/3	15	L						16	20/1	(EX) VAV		
		17							18				
		19						-	20	20/3	(EX) VAV		
(EX) VAV	20/3	21	L						22			_	
		23				2.00			24	20/1	SPARE	_	
		25				3.00	2.00	-	26				
(EX) VAV	20/3	27	L				3.00	2.00	28	20/3	FCU-P.02		
		29				1 70		3.00	30				
	20/3	31				1.70	1 70	-	3/	20/3			
	20/5	35	L			l l	1.70	1 70	36	2013			
		37						1.70	38	20/1		- ·	
	20/3	39						-	40	20/1			
		41	L			l l			42	20/1	SPARE	_	
			0.00	0.00	0.00					Lighting	0.0	0	
Load Sub	total. Le	eft (kVA):	0.00	0.00	0.00	4.70	4.70	4.70	R	eceptacle	0.0	0	
Load Subto	tal, Rig	ht (kVA):	4.70	4.70	4.70					Kitchen	0.0	0	
Lo	ad, Tota	al, (kVA):	4.70	4.70	4.70	Load &	Total no	t equal :		Motor	12.3	0	
										Elevator	0.0	0	
										Data	0.0	0	
										X-Ray	0.0	0	
										Power	0.0	00	
										Total	12.3	0	

	5TH FLOOR EI	EC	TRIC	AL RO	DOM		Panel:					HP5.01 (SEC. 2)
	Location: PER PLANS						Bus Size	e:	400A	Mai	n Breaker:	MLO
	Feeder Panel						Voltage:		480Y/27	7V		3 Phase, 4Wire
	Feeder Panel Location						Fault Cu	irrent Ra	iting			22 kAIC (MIN)
	Riser						Mfr					
	PANEL ACCESSORIES: STANDA	RD ASS	EMBLY									
		Brkr.		Lef	tSide k	/Δ	Rig	ht Side	k\/Δ	-	Brkr.	
	Description	Amp.	Cct.	LOI		•/ (	ittig			Cct.	Amp.	Description
		Pole	No.	A	В	С	А	В	С	No.	Pole	
$\wedge$			1	0.80			6.00			2		
<1)	EF-R.04 & EF-R.05	20/3	3		0.80			6.00		4	20/3	(EX) VAV
$\checkmark$			5			0.80			6.00	6		
			7	3.00			3.00			8		
	(EX) VAV	20/3	9		3.00			3.00		10	20/3	(EX) VAV
			11			3.00			3.00	12		
			13	3.00			4.00			14		-
	(EX) VAV	20/3	15		3.00			4.00		16	20/3	(EX) VAV
			17			3.00			4.00	18		
			19	3.00			3.00		_	20		
	(EX) VAV	20/3	21		3.00			3.00		22	20/3	(EX) VAV
			23			3.00			3.00	24		
			25	3.00			3.00			26		
	(EX) VAV	20/3	27		3.00			3.00		28	20/3	(EX) VAV
			29			3.00			3.00	30		
			31	3.00			3.00			32		
	(EX) VAV	20/3	33		3.00			3.00		34	20/3	(EX) VAV
			35			3.00			3.00	36		
			37	3.00			3.00			38		
	(EX) VAV	20/3	39		3.00			3.00		40	20/3	(EX) VAV
			41			3.00			3.00	42		-
				0.00	0.00	0.00					Lighting	0.00
	Load Sub	total, Le	ett (kVA):	18.80	18.80	18.80	25.00	25.00	25.00	R	eceptacle	0.00
	Load Subto	tal, Rig	nt (kVA):	25.00	25.00	25.00					Kitchen	0.00
	Lo	ad, Tota	al, (kVA):	43.80	43.80	43.80					Motor	0.00
											Elevator	0.00
											Data	0.00
											X-Ray	0.00
											Power	131.40
											Total	131.40

## GENERAL NOTES

- 1. RE-USE EXISTING CIRCUIT BREAKER FOR NEW EQUIPMENT
- 2. ADD ALTERNATE 1: RE-USE EXISTING CIRCUIT BREAKER FOR NEW EQUIPMENT

AEI Affiliated <sup>1</sup>Engineers Affiliated Engineers, Inc. One Greenway Plaza, Suite 150 Houston, Texas 77046 Tel 713.548.8900 Fax 713.548.8901 Texas Registered Engineering Firm F-8301 JGENE M. MOSCINS HCC Issue 100% CD 2020.05.07 Revisions \_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_ Project HCC COLEMAN DOAS REPLACEMENT AND BAS UPGRADE Sheet Title PANEL SCHEDULES Scale AS NOTED Date **04/10/2020** Drawn By **FJ** AEI Project No. 20683-00 Sheet No. E-701