ELECTRICAL GENERAL SPECIFICATION

I. GENERAL

- A. BASIC MATERIALS AND METHODS
 - 1. GENERAL: THE WORK INCLUDES ALL LABOR, MATERIALS, EQUIPMENT, DEVICES, PERMITS, PAYMENT OF ALL FEES AND ALL OTHER OPERATIONS NECESSARY FOR THE INSTALLATION OF THE COMPLETE ELECTRICAL SYSTEM INDICATED OR SPECIFIED. TAKE INTO ACCOUNT ALL FACTORS AND CONDITIONS AFFECTING ELECTRICAL WORK INDICATED ON THE ASSOCIATED MECHANICAL AND ELECTRICAL DRAWINGS AND SPECIFICATIONS.
- 2. CODES: COMPLY WITH THE 2020 NATIONAL ELECTRICAL CODE, 2020 NATIONAL ELECTRICAL SAFETY CODE, AND LOCAL CODES, ORDINANCES AND REGULATIONS, EXCEPT WHERE PLANS OR SPECIFICATIONS ARE STRICTER.
- 3. PERMITS: OBTAIN ALL REQUIRED PERMITS AND INSPECTIONS AND PAY ALL ASSOCIATED FEES UNDER THIS SECTION OF THE SPECIFICATION WITHOUT ADDITIONAL COST TO THE OWNER.
- 4. TEST: UPON COMPLETION OF WORK AND ADJUSTMENT OF EQUIPMENT, TEST ALL SYSTEMS UNDER DIRECTION OF THE OWNER. TEST FOR SHORT CIRCUITS, GROUNDS AND FUNCTIONAL PERFORMANCE.
- 5. MATERIALS: ALL MATERIALS AND EQUIPMENT SHALL BE NEW, OF FIRST CLASS QUALITY AND APPROVED UNDER APPLICABLE STANDARDS. ALL MATERIALS FOR WHICH 'U.L.' LABELING SERVICE IS ESTABLISHED SHALL BEAR THE 'U.L.' LABEL.
- 6. THE OWNER RESERVES THE RIGHT TO REJECT ANY MATERIAL OR WORK IF, IN HIS OPINION, IT IS NOT IN STRICT ACCORDANCE WITH THE CONTRACT DOCUMENTS.
- 7. GROUNDING: PROPERLY GROUND ALL ELECTRICAL EQUIPMENT IN ACCORDANCE WITH THE REQUIREMENTS SET FORTH IN THE NEC.
- 8. BIDDERS ARE CAUTIONED TO VISIT THE SITE PRIOR TO THE PREPARATION OF THEIR BID.
- 9. COORDINATE ALL EQUIPMENT LOCATIONS, MOUNTING HEIGHTS, ETC., I. SAFETY SWITCHES WITH MECHANICAL DRAWINGS. NOTIFY ENGINEER OF ANY CONFLICTS PRIOR TO INSTALLATIONS.
- 10. CERTIFICATES: PROVIDE THE OWNER WITH FINAL ELECTRICAL INSPECTION CERTIFICATE.
- 11. ALL DIMENSIONS ARE ABOVE FINISHED FLOOR UNLESS OTHERWISE
- 12. ALL PANELBOARDS AND ELECTRICAL EQUIPMENT ARE EXISTING UNLESS OTHERWISE NOTED.
- 13. THE CONTRACTOR SHALL PROVIDE NEW, TYPEWRITTEN CIRCUIT SCHEDULES ON PANEL DOOR. SCHEDULE SHALL CONTAIN CIRCUIT NUMBER RESPECTIVELY TO CIRCUIT BREAKER NUMBER,
- 14. THE CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE IN WRITING AS TO THE CONSTRUCTION SCHEDULE TO ALLOW SUFFICIENT TIME FOR COORDINATION OF EXISTING BUILDING ACTIVITIES WITH THE WORK.

EQUIPMENT DESIGNATION, AND ROOM NUMBER.

15. THE CONTRACTOR SHALL PROVIDE O&M DOCUMENTS AFTER PROJECT COMPLETION.

II. EQUIPMENT A. RACEWAYS

- 1. ELECTRICAL METALLIC TUBING: ANSI-80.3; NEPCO, WALKER, YOUNGSTOWN, REPUBLIC, OR PITTSBURGH. USE COMPRESSION TYPE CONNECTORS AND COUPLING OF ALL STEEL, RAIN-TIGHT, NYLON INSULATED, THROAT TYPE; T & B OR STEEL CITY FOR SIZES THROUGH 2 INCHES.
- 2. FLEXIBLE METALLIC CONDUIT: GALVANIZED, NATIONAL FLEXSTEEL.
- 3. LIQUID-TIGHT FLEXIBLE CONDUIT: ANACONDA "SEAL-TITE" WITH NYLON INSULATED, THROAT TYPE CONNECTORS; T & B SERIES

ARMOR CLAD CABLE: TWO, THREE, OR FOUR WIRE TYPE AC OR ACT. SIMPLEX OR GENERAL CABLE.

- 1. ALL WIRE AND CABLE SHALL BE COPPER THW OR THHN, COLOR CODED PER N.E.C., UNLESS OTHERWISE NOTED. MINIMUM WIRE SIZE SHALL BE #12 AWG. HOMERUNS GREATER THAN 100 FEET IN LENGTH SHALL BE #10 AWG MINIMUM.
- C. JUNCTION AND PULL BOXES
- 1. INSTALL JUNCTION OR PULL BOXES WHEREVER REQUIRED TO FACILITATE WIRE PULLING OR CONNECTION. FABRICATE BOXES FROM CODE GAUGE MINIMUM, GALVANIZED STEEL, AND EQUIP WITH SCREW COVER. LABEL CIRCUITS INSIDE EACH BOX AND ON COVER EXTERIOR WITH ONE—HALF INCH HIGH STENCILED LETTERS.
- D. PANELBOARDS
- 1. PANELBOARDS ARE EXISTING TO REMAIN.
- 2. BRANCH CIRCUIT OVERCURRENT PROTECTIVE DEVICES SHALL BE BOLT-ON MOLDED CASE CIRCUIT BREAKERS. BRANCH CIRCUIT OVERCURRENT PROTECTIVE DEVICES SHALL ALSO MEET NEMA, ANSI, IEEE, AND U.L. STANDARD PUBLICATIONS. WHERE "EQUIPPED SPACE" OR "SPACE" IS CALLED FOR ON PANEL SCHEDULE, PROVIDE NECESSARY BUS, DEVICE SUPPORTS, AND CONNECTIONS FOR FUTURE DEVICES. PROVIDE TYPE-WRITTEN SCHEDULE OF ALL BRANCH CIRCUIT AND FEEDER CONNECTIONS IN FRAME ON INSIDE DOOR OF EACH PANEL DOOR UNDER PLASTIC
- 3. SEE PANELBOARD SCHEDULE FOR MINIMUM KA RATINGS.

- 1. HEAVY DUTY, FRONT OPERATED TYPE, WITH NUMBER OF POLES, FUSES, AND CAPACITIES AS INDICATED. INTERLOCK FRONT COVER WITH SWITCH. VOLTAGE RATING: 250 OR 600 VOLTS TO SUIT CIRCUIT VOLTAGE APPLICATION. PROVIDE NEMA 3R ENCLOSURES FOR WEATHER-PROOF SWITCHES, AND NEMA 1 ENCLOSURE ELSEWHERE, EXCEPT AS OTHERWISE NOTED.
- 2. SWITCHES SHALL BE CAPABLE OF WITHSTANDING AVAILABLE FAULT CURRENT OR LET-THROUGH CURRENT BEFORE FUSE OPERATES WITHOUT DAMAGE OR CHANGE IN RATING. DESIGN AND COORDINATE FUSE CLIPS TO ACCOMMODATE CLASS AND TYPE OF FUSE SPECIFIED OR INDICATED TO BE USED WITH SWITCH.
- 3. ARRANGE SWITCHES FOR PADLOCKING IN "OPEN" POSITION.
- 4. ACCEPTABLE MANUFACTURERS: SQUARE D, GENERAL ELECTRIC, SIEMENS, OR CUTLER-HAMMER.

III. EXECUTION

- A. WIRING METHODS
- 1. INSTALL WIRING IN METAL RACEWAY EXCEPT WHERE ARMOR CLAD CABLE IS SPECIFIED. SIZE RACEWAYS AS REQUIRED BY NATIONAL ELECTRICAL CODE, EXCEPT WHERE LARGER SIZES ARE INDICATED OR SPECIFIED. MINIMUM RACEWAY SIZE UNLESS OTHERWISE NOTED: 3/4-INCH. CONCEAL WIRING AS NECESSARY TO MEET REQUIREMENTS FOR FLUSH OUTLETS. MAKE WALL OUTLETS
- 2. FOR WIRING EXPOSED OR CONCEALED IN DRY CONSTRUCTION, USE EMT EXCEPT WHERE ANOTHER WIRING METHOD IS INDICATED OR SPECIFIED. USE EMT FOR ALL FEEDER RUNS.

FI FCTRICAL ABBREVIATIONS

WEATHERPROOF

WITH

WITHOUT

WIRE SIZING AMPS

	CTRICAL AB	BREV	IATIONS
A.F.F.	ABOVE FINISHED FLOOR AIR CONDITIONING UNIT AIR HANDLING UNIT ALUMINUM	HW	HOT WATER HEATER
A/C	AIR CONDITIONING UNIT	INCAN.	INCANDESCENT
A/C AHU	AIR HANDLING UNIT	IG	ISOLATED GROUND
AL	ALUMINUM	KV	KILOVOLT
A.W.G.	AMERICAN WIRE GAUGE	KVA	KILOVOLT AMPERES
Α	AMPERE	KW	KILOWATTS
A.I.C.	AMPERE INTERRUPTING CAPACITY	LTG	LIGHTING
ARCH.	AMPERE INTERRUPTING CAPACITY ARCHITECT AUTOMATIC TRANSFER SWITCH BACKBOARD (PLYWOOD) BASEBOARD HEATER CONDUIT CIRCUIT BREAKER CIRCUIT CEILING CONTACTOR PANEL CURRENT TRANSFORMER COPPER	MCB MDP	MAIN CIRCUIT BREAKER
A.T.S. BKBD. BBH	AUTOMATIC TRANSFER SWITCH	MDP	MAIN DISTRIBUTION PANEL
BKBD.	BACKBOARD (PLYWOOD)	MLO	MAIN LUGS ONLY
BBH	BASEBOARD HEATER	MECH.	MECHANICAL
C	CONDUIT	MV	MERCURY VAPOR
CB	CIRCUIT BREAKER	MH	METAL HALIDE
CKT	CIRCUIT	MCA	MINIMUM CIRCUIT AMPS
CLG	CEILING	MCC	MOTOR CONTROL CENTER
CP	CONTACTOR PANEL	MCA MCC MTD.	MOUNTED
CT	CURRENT TRANSFORMER	N.E.C. OR NEC	NATIONAL ELECTRICAL CODE
CU	COPPER		NON FUSED
Δ	DELTA	NA OR N/A	NOT APPLICABLE
DEMO.	DEMOLITION	IN.I.C.	NOT IN CONTRACT
DISC.	DISCONNECT	PNL	PANELBOARD
DBL.	DOUBLE	PH	PENTHOUSE
DWG	DRAWING	φ	PHASE
DH	DRAWING DUCT HEATER ELECTRIC WATER COOLER	Ψ PLBG	PLUMBING
E.W.C.	ELECTRIC WATER COOLER	Р	POLE(S)
FLFC.	FLECTRICAL	RECEPT.	RECEPTACLE
EMER. OR E GEN. EW	EMERGENCY	RLA SCU	RUNNING LOAD AMPS
GEN.	EMERGENCY GENERATOR	SCU	SELF CONTAINED UNIT
EW	EMERGENCY WHITE (LIGHT) EMPTY CONDUIT EXISTING EXTERIOR	SH.	SHEET
E.C.	EMPTY CONDUIT ` ´	SW.	SWITCH
EXIST.	EXISTING	SW. SWBD. TELE.	SWITCHBOARD
EXT.	EXTERIOR	TELE.	TELEPHONE
F	I AN	XFMR	TRANSFORMER
FCU	FAN COIL UNIT	UH	UNIT HEATER
LA	FIRE ALARM	Ü.O.N.	UNLESS OTHERWISE NOTED
FAA	FIRE ALARM ANNUNCIATOR	VAV	VARIABLE AIR VOLUME
FACP	FIRE ALARM CONTROL PANEL FIRE ALARM TERMINAL CABINET FLUORESCENT	U.O.N. VAV VFD V WH	VARIABLE FREQUENCY DRIVE
FATC	FIRE ALARM TERMINAL CABINET	V	VOLTS
FLUOR.	FLUORESCENT	WH	WALL HEATER
F.S.S.	FUSED SAFETY SWITCH	W	WATTS
0.00.000	ODOLIND	WD	WEATHEDDDOOF

GROUND FAULT INTERRUPTING

HIGH INTENSITY DISCHARGE

HIGH PRESSURE SODIUM

GROUND

HORSEPOWER

G OR GND

H.I.D.

HPS

ELECTRICAL SYMBOLS LIST

•	DIRECT CONNECTION TO MECHANICAL EQUIPMENT
(m)	MOTOR CONNECTION
3/30/30 🔀	COMBINATION MOTOR CONTROLLER AND DISCONNECT - POLE/AMP/FUSE

EXISTING PANELBOARD 208/120V, 3 PHASE HOMERUN TO PANELBOARD. ARROWS INDICATE CIRCUITS IN RUN. DESIGNATED PANELBOARD DESIGNATED CIRCUIT NUMBERS

WASHIIN EMB, BOILER



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REVISIONS

<u>DATE</u> <u>DESCRIPTION</u> 03/31/22 ISSUED FOR REVIEW 09/13/22 BID SET

ELECTRICAL COVER

DRAWING INDEX

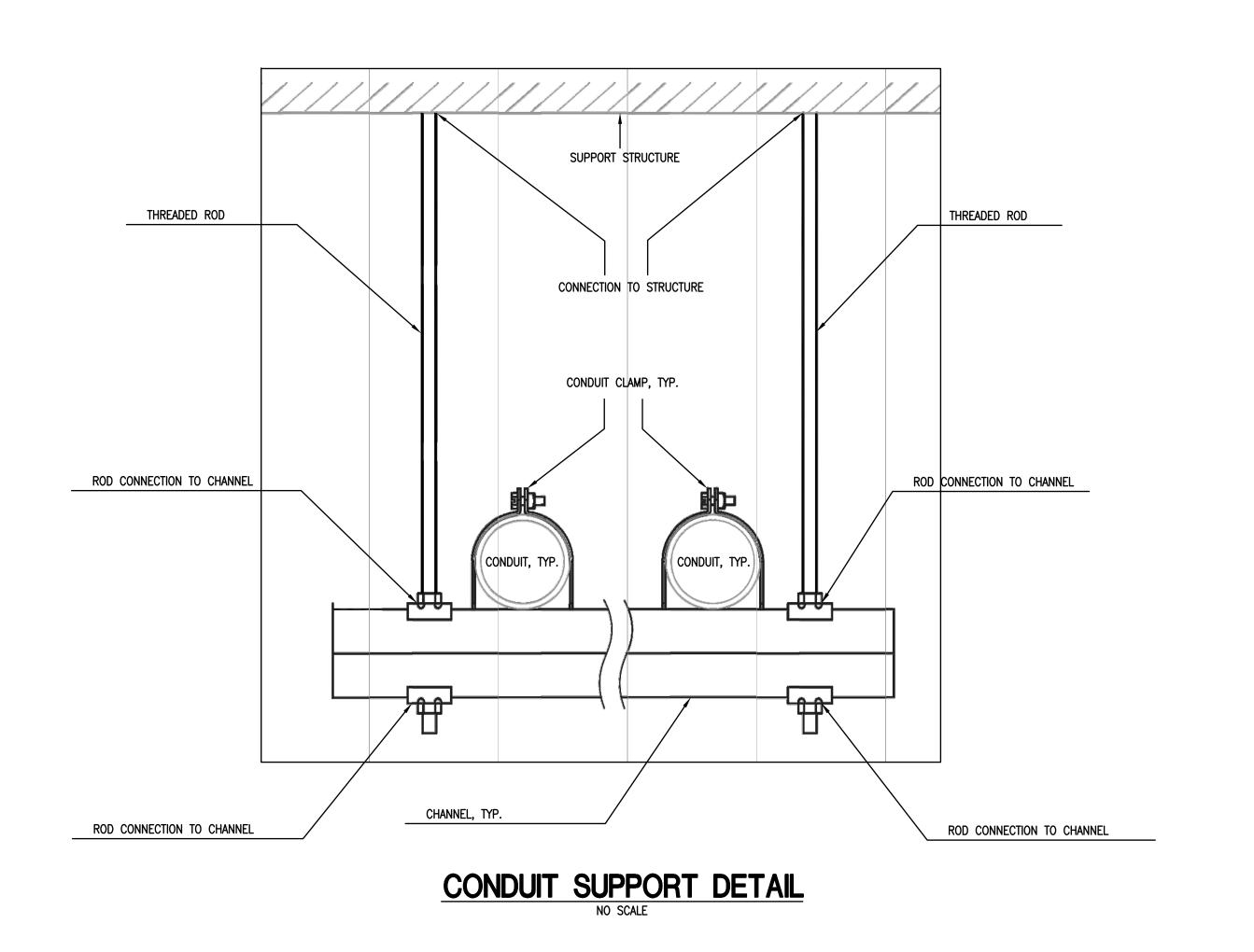
ELECTRICAL PANELBOARD SCHEDULES

E001 ELECTRICAL COVER SHEET E201 ELECTRICAL PENTHOUSE NEW WORK PLAN

Job: 2022-1256-00 Sheet No.

708 BP-2 2 HP, 208V, 3ø 208V, 1ø, 20 MOCP

PENTHOUSE ELECTRICAL NEW WORK PLAN SCALE: 1/4" = 1'-0"



DEMO NOTES

D1) REMOVE EXISTING WIRING AND CONDUIT BACK TO PANELBOARD FOR BOILERS AND PUMPS BEING REMOVED. SEE MECHANICAL DEMOLITION PLAN.

KEY NOTES

- 1) REUSE EXISTING CIRCUIT TO PANEL 7EL2.
- 2 PROVIDE COMBINATION HOA MOTOR STARTER SWITCH SECURED TO WALL. (3) EXISTING PANEL 7EL2 TO REMAIN.
- 4 EXISTING PANEL 7EL2A TO REMAIN. 5 NO LIGHTING OR FIRE ALARM WORK IS REQUIRED FOR THIS PROJECT.

Sheet Title:
ELECTRICAL PENTHOUSE
NEW WORK PLAN

Job: 2022-1256-00 Sheet No. E201

Oz

REVISIONS DATE DESCRIPTION 03/31/22 ISSUED FOR REVIEW 09/13/22 BID SET

EXISTING CONDITIONS PANEL SCHEDULE

NAME	LOCATION	MOUN	OUNTING		SUPPLIED FROM		VO	LTAGE		BUS AMP SIZE	MAIN O. C. DEVICE
Subpnl 7el2a	PENT.	SUR	FACE		PNL EL2		•	OV, 3ø GROUN		100A MLC	
EXISTING											
DESCRIF	FULL LOAD (KVA)	BRAN BRK SIZ	R.	1A	CUIT ND ASE	ID BRKR		FULL LOAD (KVA)	DESCRIPTION		
BOILER	PUMP		15 /	[′] 2	1A	2A	20) / 1			BOILER 1
P-2)				3B	4B		/			BOILER 2
BOILER		15 /	/ 2	5C	6C		/			BOILER 3	
P-3			/	7A	8A					CONTROLS	
BOILER		15 /	/ 2	9B	10B	<u> </u>				SPACE	
P-		\rightarrow	\sim	11C	12C	Н					
SPAC		- /	,	13A	14A 16B	H				CDACE	
SPAC	, <u>C</u>		- /	,	15B 17C	18C	Н	_/_			SPACE
$\overline{}$,	19A	20A		_/_			
			 	,	21B	22B					
			 	,	23C	24C		_/_			
				,	25A	26A		1			
					27B	28B		/			
				/	290	₩		/			
					31A	32A		4			
				<i>'</i>	33B	34B					
			/		35C	36C	_		\vdash		
	/		/	,	37A	38A		_/_			
_/			<u> </u>	,	39B 41C	40B 42C	_	_/_			$\overline{}$
			/		410	420	<u> </u>	_/		<u> </u>	

1 REMOVE EXISTING CIRCUIT BREAKER AND BRANCH CIRCUIT WIRING. SEE NEW WORK PANEL SCHEDULE.

2 RELOCATE EXISTING CIRCUIT IN PANEL. SEE NEW WORK PANEL SCHEDULE.

NEW WORK PANEL SCHEDLLE

NAME LOCATION MOUNTING SUBPNL 7EL2A PENT. SURFACE		NTING	IPPLIED FROM		VOLTAGE		BUS AMP SIZE	MAIN O. C. DEVICE		
		SURI	FACE	PNL 7EL2	l	•		100A MLO		
ING		•	•				•		10,000 Al	
DESCRIPTION LOAD BI		BRANCH BRKR. SIZE	l Al	ND	BRANCH BRKR. SIZE	FULL LOAD (KVA)	DI	ESCRIPTION		
BP-1		2.0	15 / 3	1A	2A	20 / 2	0.5		BOILER 1	
			\searrow	3B	4B	\nearrow				
				\		20 / 2	0.5		BOILER 2	
BP-2		2.0	15 / 3			45 / 3			DD 7	
			\			15 / 3	2.0		BP-3	
DOII ED	7	0.5	20 / 2	-						
DOILLIN	3	0.5	20 / 2			20 / 1	0.2	FXI	ST. CONTROLS	
			/	_		/	0.2	EXIC	<u> </u>	
			/	19A	20A	/				
			/	21B	22B	/				
			/	23C	24C	/				
						1				
				\rightarrow	-		<u> </u>			
				_	$\overline{}$					
			1							
		—	/			/ /				
			//	_		//				
			-/-	39B	40B	//				
			/	41C	42C	/				
	7EL2A ING DESCRIPT BP-1 BP-2	SUBPNL PENT. 7EL2A ING DESCRIPTION	PENT. SURI SURI	SUBPNL PENT. SURFACE	DESCRIPTION	DESCRIPTION	DESCRIPTION	SUBPNL PENT. SURFACE PNL 7EL2 WITH GROUND	SUBPNL PENT. SURFACE PNL 208/120V, 3ø, 4W 100A 100A	

NAME	LOCATION	NOUNTING		SUP FF	PLIED		VOLTAGE		BUS AMP SIZE	MAIN O. C DEVIC	
PNL 7EL2	PENT.	SURI	SURFACE 30 KVA 208/120V, 3ø, 4V					100A 100			
XISTING	•										
DESCRIP	PTION	FULL LOAD (KVA)	BRAN BRK SIZ	R.	CIR(A) PHA	۱D	BRANCH BRKR. SIZE	FULL LOAD (KVA)	DESCRIPTION		
EXISTII	NG		20 /	′ 1	1A	2A	15 / 1			EXISTING	
			15 /	′ 1	3B	4B	20 / 1				
			20 /	′ 1	5C	6C	15 / 1				
			15 /	′ 1	7A	88	15 / 1				
			15 /	′ 1	9B	10B	15 / 1				
			15 /	′ 1	11C	12C	15 / 1				
			20 /	′ 1	13A	14A	30 / 3				
<u> </u>			20 /	′ 1	15B	16B					
EXIST. PANE	L 7EL2A		60 /	′ 3	17C	18C	\nearrow				
			\searrow	′	19A	20A	15 / 1				
					21B	22B	15 / 1				
EXISTII	NG		20 /	′ 1	23C	24C	15 / 1				
			20 /	′ 1	25A	26A	15 / 1				
			15 /	′ 1	27B	28B	15 / 1				
<u> </u>			15 /	′ 1	29C	30C	15 / 1				
ROOF I	FAN		20 /	/ 3	31A	32A	20 / 1				
			\searrow		33B	34B	20 / 1				
				$\overline{}$	35C	36C	20 / 1				
EXISTII	NG		20 /	′ 1	37A	38A	100 / 3			MAIN	
			20 /	<u> 1</u>	39B	40B					
,			20 /	/ 1	41C	42C					

PANELBOARD NOTES

* PROVIDE NEW CIRCUIT BREAKER IN EXISTING SPACE. MATCH EXISTING BREAKER TYPE AND AIC RATING.

PANELBOARD SCHEDULES
NO SCALE

REVISIONS

DATE DESCRIPTION 03/31/22 ISSUED FOR REVIEW 09/13/22 BID SET

Sheet Title:
PANELBOARD
SCHEDULES

SPECIFICATIONS

A. GENERAL REQUIREMENTS

- THESE NOTES APPLY TO ALL MECHANICAL WORK FOR THIS PROJECT. CONTRACTOR SHALL COORDINATE ALL REQUIREMENTS HEREIN WITH ALL TRADES AFFECTED BY THIS WORK. REVIEW THE DRAWINGS FOR NOTES, DIMENSIONS, ETC., AND COORDINATE WITH OTHER TRADES INVOLVED. CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL SPACE CONDITIONS BEFORE INSTALLATION OF ANY TRADES. IF CONTRACTOR ALLOWS ONE TRADE TO INSTALL HIS WORK PRIOR
- TO COORDINATION WITH THE OTHER TRADES, THE CONTRACTOR SHALL MAKE ALL NECESSARY CHANGES REQUIRED TO CORRECT THE CONDITIONS AT NO ADDITIONAL COST TO THE OWNER. NOTIFY ENGINEER OF CONFLICTS BEFORE PROCEEDING WITH WORK. DRAWINGS SHALL BE CONSIDERED TO BE DIAGRAMMATIC ONLY. DRAWINGS ARE GENERALLY TO SCALE AND ARE DRAWN AS ACCURATELY AS SCALE WILL PERMIT; HOWEVER, CONTRACTOR SHALL

DETERMINE ALL CRITICAL DIMENSIONS IN THE FIELD. DRAWINGS ARE NOT ERECTION DRAWINGS

- AND DO NOT INDICATE EVERY FITTING, ELBOW, OFFSET, ETC. COORDINATION WITH EXISTING STRUCTURE AND OTHER TRADES IS REQUIRED TO COMPLETE THE JOB. REPORT ANY ALTERATION TO AND/OR DEVIATIONS FROM THE DRAWINGS TO THE OWNER AND SECURE THEIR APPROVAL BEFORE STARTING ANY ALTERATIONS.
- INSPECT EXISTING EQUIPMENT, OWNER-FURNISHED EQUIPMENT, AND MATERIALS PRIOR TO STARTING WORK TO VERIFY CONDITION. PERFORM THE WORK IN ACCORDANCE WITH ALL APPLICABLE LOCAL AND NATIONAL CODES.
- OBTAIN WRITTEN PERMISSION FROM OWNER TO INTERRUPT UTILITIES, EXISTING LIFE SAFETY SYSTEMS, AND OTHER SERVICES. ALL WORK THAT AFFECTS THE EXISTING ROOF SHALL BE PERFORMED IN STRICT ACCORDANCE
- WITH THE CURRENT ROOFING SYSTEM MANUFACTURER'S RECOMMENDATIONS, TO PRESERVE THE ROOF WARRANTY. FAILURE TO DO SO WILL RESULT IN THE CORRECTION OF ALL DEFICIENCIES BY THE OWNER, THE COSTS OF WHICH WILL BE DEDUCTED FROM THE AMOUNTS OWED TO THE

B. SUBMITTALS AND PROJECT CLOSE OUT

- SUBMIT 4 COPIES OF PRODUCT AND CAPACITY DATA FOR EQUIPMENT TO THE ENGINEER AS DIRECTED BEFORE ORDERING EQUIPMENT. PROVIDE INFORMATION ELECTRONICALLY IN PDF
- WARRANTY: ALL EQUIPMENT, LABOR AND MATERIALS PROVIDED SHALL HAVE A FULL ONE YEAR WARRANTY. CONTRACTOR SHALL PROVIDE LABOR AND MATERIALS REQUIRED TO CORRECT DEFICIENCIES DURING THE WARRANTY PERIOD. SUBMIT WARRANTY CERTIFICATES TO TENANT
- AND/OR BUILDING OWNER FOR RECORD PURPOSES. PRODUCT DATA TO BE SUBMITTED SHALL BE PUBLISHED BY THE MANUFACTURER AND SHALL CONTAIN COMPLETE AND DETAILED ENGINEERING AND DIMENSIONAL INFORMATION. PRODUCT DATA SUBMITTED SHALL CONTAIN ONLY INFORMATION RELEVANT TO THE PARTICULAR EQUIPMENT OR MATERIAL TO BE FURNISHED. THE CONTRACTOR SHALL NOT SUBMIT CATALOGS WHICH DESCRIBE SEVERAL DIFFERENT ITEMS IN ADDITION TO THOSE ITEMS TO BE USED, UNLESS ALL IRRELEVAN' INFORMATION IS MARKED OUT OR UNLESS RELEVANT INFORMATION IS CLEARLY MARKED. PRODUCT
- DATA FROM EACH MANUFACTURER SHALL BE IDENTIFIED AND SUBMITTED SEPARATELY. THE CONTRACTOR SHALL PROVIDE ONE COPY OF OPERATING INSTRUCTIONS AND MAINTENANCE DATA BOOKS FOR ALL NEW EQUIPMENT FURNISHED. MAINTENANCE INSTRUCTION MANUALS SHALI INCLUDE COMPLETE OILING, CLEANING, AND SERVICING DATA COMPILED IN A CLEAR AND EASILY UNDERSTANDABLE FORM. THE MANUALS SHALL ALSO INCLUDE LISTS OF REPLACEMENT PARTS, MOTOR RATINGS, AND ACTUAL LOADS. INCLUDE THE FOLLOWING WHERE APPLICABLE:
- IDENTIFYING NAME AND MARK NUMBER. LOCATIONS (WHERE SEVERAL SIMILAR ITEMS ARE USED, PROVIDE A LIST).
- COMPLETE NAMEPLATE DATA. PARTS LIST.
- PERFORMANCE CURVES AND DATA WIRING DIAGRAMS.
- LUBRICATION CHARTS. INSTALLATION INSTRUCTIONS.
- MANUFACTURER'S START UP DOCUMENTATION.
- MANUFACTURERS' RECOMMENDED OPERATING AND MAINTENANCE INSTRUCTIONS WITH ALL NON-APPLICABLE INFORMATION DELETED.
- CLEANING: THE CONTRACTOR SHALL, AFTER SATISFACTORY COMPLETION OF ALL PRESSURE TESTS, AND AFTER TEMPORARY OPERATION, PROPERLY CLEAN EVERY PIECE OF APPARATUS FURNISHED
- UNDER THIS CONTRACT UPON COMPLETION OF THE WORK. AT PROJECT COMPLETION, PROVIDE TWO (2) COMPILED ELECTRONIC COPIES OF THE APPROVED SUBMITTALS IN PDF FORMAT.

- PROVIDE 18 GAGE GALVANIZED SHEET METAL SLEEVES FOR ALL PIPE AND DUCT PENETRATIONS THROUGH EXISTING MASONRY WALLS. PACK VOID SPACE WITH U.L. LISTED 3M OR DOW
- CAULK-TYPE FIREPROOF AND WATERPROOF SEALANT. SEAL, CAULK, AND PROVIDE FIRE STOP AROUND ALL OPENINGS, PENETRATIONS, AND SLEEVES THROUGH FIRE RATED WALLS, FLOORS, PARTITIONS, CEILINGS, ETC. U.L. LABELED AND LISTED FIRE RATED MATERIALS, FIRE STOPS, ETC. SHALL BE USED IN ACCORDANCE WITH THIS
- REQUIREMENT AND OTHER SPECIFICATION SECTIONS. 3. ALL ROOF MODIFICATIONS SHALL BE PERFORMED IN ACCORDANCE WITH THE ROOFING MANUFACTURER'S RECOMMENDATIONS. SO THAT THE ROOFING SYSTEM WARRANTY WILL BE MAINTAINED. SUBMIT INSTALLATION AND FLASHING DETAILS TO ARCHITECT FOR APPROVAL.

D. DEMOLITION

- THE GENERAL EXTENT OF EXISTING MECHANICAL WORK TO BE DISMANTLED AND REMOVED IS INDICATED ON THE DRAWINGS. b. ALL COMPONENTS OF SYSTEMS AND EQUIPMENT ARE NOT INDICATED INDIVIDUALLY WHERE
- ITEMS ARE TO BE REMOVED. UNLESS OTHERWISE INDICATED, REMOVE ALL ASSOCIATED VALVES, ELECTRICAL COMPONENTS, PIPING, HANGERS, INSULATION, PLATFORMS, BASES, AND ALL OTHER ITEMS RELATED TO EQUIPMENT AND MATERIALS INDICATED TO BE REMOVED. WHERE NOT SURE WHETHER A PARTICULAR ITEM IS TO BE REMOVED. REQUEST CLARIFICATION FROM THE OWNER'S REPRESENTATIVE PRIOR TO STARTING WORK.
- DISPOSITION: UNLESS OTHERWISE INDICATED, ALL ITEMS AND MATERIAL INDICATED TO BE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF OFF-SITE. PROTECTION: PROTECT FROM DAMAGE ALL EXISTING WORK TO REMAIN AND NEW WORK. REPLACE
- WITH MATERIALS AND EQUIPMENT CONFORMING TO THESE SPECIFICATIONS, ANY EXISTING-TO-REMAIN MATERIALS AND EQUIPMENT DAMAGED DURING THE COURSE OF THE WORK. TERMINATIONS AND PATCHING: a. DISCONNECT EXISTING-TO-BE-REMOVED DUCTWORK AND PIPING FROM EXISTING-TO-REMAIN

AT THE POINTS INDICATED. IF NOT INDICATED, VERIFY POINT WITH THE OWNER'S

REPRESENTATIVE PRIOR TO DISCONNECTION. WHERE EXISTING FLOORS, WALLS AND ROOFS MUST BE CUT OR ARE DAMAGED DURING REMOVAL OF MECHANICAL WORK, PATCH AREAS TO MATCH ADJACENT CONSTRUCTION. WHERE ROOFS OR OTHER SURFACES EXPOSED TO WEATHER ARE ALTERED, CONTRACTOR SHALL REPAIR SURFACES PER RECOMMENDATIONS OF ORIGINAL ROOF INSTALLER TO

E. PIPING — HVAC

HEATING HOT WATER PIPING:

MAINTAIN WARRANTY.

- a. TYPE L COPPER TUBING WITH WROUGHT COPPER FITTINGS AND 95/5 SOLDER JOINTS OR SCH 40 BLACK STEEL WITH 150 LB MALLEABLE IRON SCREWED OR 150 LB BUTT WELDING FITTINGS. PROVIDE DIELECTRIC NIPPLES AT POINTS OF CONNECTION BETWEEN COPPER AND FERROUS PIPE. TEST WITH WATER AT 100 PSI FOR 4 HOURS.
- INSULATE WITH 1 INCH THICK INSULATION.. CONDENSING BOILER DRAIN PIPING AND ACID NEUTRALIZING TANK PIPING:
- SCHEDULE 80 PVC PIPE WITH PVC FITTINGS AND SOLVENT WELDED JOINTS. PVC WELDING SOLVENTS SHALL HAVE A VOC CONTENT NOT MORE THAN 510 G/L AND PRIMER SHALL NOT HAVE A VOC CONTENT MORE THAN 550 G/L. PITCH AT MIN. 1 PERCENT SLOPE. PROVIDE DEEP SEAL TRAP SIZED TO SUIT SYSTEM
- PRESSURE AT EACH AC UNIT- SUBMIT CALCULATIONS INDICATING BASIS OF TRAP DEPTH FOR EACH UNIT. d. INSULATE WITH 1/2 INCH THICK INSULATION.

- PIPE WELDING: CONFORM TO ANSI B31.1. PREPARE ALL PIPE ENDS BY BEVELING. MAKE ALL BUTT WELDS FULL PENETRATION. USE FACTORY FITTINGS FOR TEES, ELBOWS, AND BRANCH CONNECTIONS.
- 4. VALVES AND SPECIALTIES: GENERAL LOW PRESSURE STEAM AND CONDENSATE (15 PSIG AND LESS): CLASS 125. INSTALL WITH STEMS HORIZONTAL OR ABOVE. ALL VALVES OF THE SAME MANUFACTURER.
- SIZE VALVES TO MATCH PIPING. b. BALL AND GATE VALVES: BRONZE BODY, THREADED OR SOLDER ENDS, CLASS 150; NIBCO,
- c. BUTTERFLY VALVES: CLASS 150 DUCTILE IRON LUG STYLE BODY, ONE PIECE STAINLESS STEEL SHAFT. NICKEL OR CADMIUM PLATED DISC. BUNA—N OR NEOPRENE SEAT: NIBCO. JENKINS OR FAIRBANKS.
- d. CHECK VALVES: CLASS 250 CAST IRON FLANGED BODY. SPRING LOADED WAFER DISC. BRONZE TRIM; NIBCO OR CENTERLINE
- PRESSURE RELIEF AND REGULATOR VALVES: WATTS OR AMTROL. PRESSURE/TEMPERATURE TAPPINGS: PETES PLUGS.
- THERMOMETERS: 9 INCH COLUMN, SEPARATE WELL; TRERICE OR WEKSLER. PRESSURE GAUGES: 4 1/2 INCH DIAM, FURNISH WITH GAUGE COCK; TRERICE.
- FLEXIBLE CONNECTORS: GARLOCK STYLE 8100, 150 PSIG WORKING PRESSURE AUTOMATIC AIR VENT: AMTROL NO. 720. AIR SEPARATOR: AMTROL NO. 721.
- STRAINER: BRONZE OR CAST IRON TO SUIT PIPING. Y-PATTERN WITH BRASS OR STAINLESS STEEL SCREEN. FLANGED FOR 2-1/2" AND LARGER. ARMSTRONG, SARCO. BACKFLOW PREVENTER: DUAL CHECK TYPE. WATTS SERIES 7 THREADED FLEXIBLE CONNECTOR: GALVANIZED STEEL TO SUIT APPLICATION. MINIMUM BRAIDED LENGTH: 12 TIMES NOMINAL PIPE SIZE. METRAFLEX.
- a. ALL PIPING, METAL PARTS OF VALVES, EQUIPMENT, AND EQUIPMENT SUPPORTS EXPOSED IN FINISHED SPACES OR EXPOSED TO WEATHER OUTSIDE OF BUILDING SHALL BE PRIMED AND FINISH PAINTED WITH EXTERIOR BLACK EQUIPMENT ENAMEL b. Provide PIPE IDENTIFICATION MARKING FOR ALL PIPING TO MATCH EXISTING SYSTEM IN

BUILDING. FOR NEW CONSTRUCTION OR WHERE NO EXISTING SYSTEM EXISTS. USE

STANDARD SETON "SETMARK". MARK PIPE SERVICE AND DIRECTION OF FLOW FOR ALL PIPE RUNS AT 50 FEET ON CENTER MAXIMUM. c. PROVIDE BRASS VALVE TAGS FOR EACH VALVE, EXCEPT INDIVIDUAL SHUTOFF OR LOCAL CONTROL VALVES ON FIXTURES.

F. PIPING — PLUMBING

1. DOMESTIC WATER PIPING: a. TYPE L COPPER TUBING WITH WROUGHT COPPER FITTINGS AND 95/5 SOLDER JOINTS. TEST WITH WATER AT 100 PSI FOR 4 HOURS. b. INSULATE PIPE WITH 1/2 INCH THICK INSULATION.

c. PROVIDE PIPE IDENTIFICATION AND PAINT PER LOCAL CODES.

NATURAL GAS PIPING: a. LOW PRESSURE (16 INCH WC AND LESS): SCHEDULE 40 BLACK STEEL PIPE ASTM A53 OR A120 WITH CLASS 125 BLACK THREADED CAST IRON FITTINGS AND THREADED JOINTS b. HIGH PRESSURE (ABOVE 16 INCHES WC): SCHEDULE 40 BLACK STEEL PIPE, ASTM A53 OR A120 WITH 150 LB, FORGED STEEL, BUTT WELDING FITTINGS AND WELDED JOINTS.

G. HANGERS AND SUPPORTS

- FACTORY FABRICATED HANGERS AND SUPPORTS. MSS-SP-58/2009 FOR ACCEPTABLE TYPES, INSTALLATION AND SPACING. USE PLASTIC COATED SUPPORTS FOR COPPER TUBING. EXPANSION BOLTS/SHIELDS: RED HEAD, HILTI OR WEJ-IT SELF DRILLING OR STEEL SHIELD, LOAD RATED. DO NOT USE DRILLED ANCHORS IN POST TENSION SLABS WITHOUT APPROVAL OF OWNER. DO NOT CUT REINFORCING STEEL WITH DRILLED INSERTS.
- 2. ROOF MOUNTED EQUIPMENT AND PIPING: SUSPENDED FANS: COMBINATION STEEL SPRING/NEOPRENE IN SHEAR HANGERS EXCEPT USE NEOPRENE IN SHEAR FOR FANS LESS THAN 1/2 H.P. - KORFUND SERIES H. b. MANUFACTURER: VIBRATION MOUNTING AND CONTROLS, MASON, INDUSTRIES, KORFUND.

H. THERMAL INSULATION AND DUCT LINING

- DOMESTIC WATER AND HEATING HOT WATER SYSTEMS PIPE, FITTINGS, AND VALVE INSULATION: a. Premolded Fiberglass PIPE insulation with Paper-Free Vapor Barrier all Servici JACKET AND FIBERGLASS FILLED ZESTON FITTING COVERS. MAKE INSULATION CONTINUOUS
- AT SLEEVES AND SUPPORTS. b. JACKET SHALL BE FABRICATED ENTIRELY OF CLEANABLE MATERIALS THAT DO NOT SUPPORT MOLD GROWTH, AND SHALL BE IMPERVIOUS TO MOISTURE. PROVIDE WITH AN INTEGRAL ADHESIVE CLOSURE SYSTEM. SEALED WITH A COMPATIBLE. MANUFACTURER APPROVED MOLD-RESISTANT VAPOR BARRIER MASTIC.
- PROVIDE 20 GAGE SHIELDS AT SUPPORTS. PROVIDE WEATHERPROOF, FACTORY FABRICATED, ALUMINUM JACKET FOR PIPING, FITTINGS AND VALVES ABOVE ROOF.
- CONDENSATE DRAIN PIPING INSULATION: a. FLEXIBLE ELASTOMERIC MATERIAL UTILIZING CLOSED-CELL, SPONGE- OR EXPANDED-RUBBER MATERIALS. COMPLY WITH ASTM C 534. TYPE I FOR TUBULAR
- b. ACCEPTABLE MANUFACTURERS: ARMACELL LLC, ARMAFLEX; K-FLEX USA, INSUL-LOCK, INSUL-TUBE AND K-FLEX LS. ACCEPTABLE MANUFACTURERS: a. JOHNS MANVILLE, OWENS-CORNING, KNAUF, ARMSTRONG.
- PIPING ASJ COVERING SHALL BE OWENS CORNING 'EVOLUTION' SERIES OR EQUAL. PVC PIPE COVERS SHALL BE ZESTON/CEELCO OR EQUAL. ALL MATERIALS SHALL COMPLY WITH APPLICABLE PROVISIONS OF NFPA 90A. 4. EXECUTION:
- a. INSTALL ALL INSULATION, SEALANTS AND COVERINGS IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. MAINTAIN INTEGRITY OF VAPOR BARRIER FOR ALL COLD INSULATION SYSTEMS. DO NOT USE STAPLES OR OTHER PENETRATING FASTENERS. SEAL ALL JOINTS & SEAMS WITH COMPATIBLE MASTIC SEALANT APPROVED BY THE INSULATION MANUFACTURER FOR THE APPLICATION. SEAL AFTER BALANCING AND ADJUSTING OF SYSTEM TO AVOID DISTURBING THE INSULATION AFTER IT HAS BEEN SEALED.

I. DUCTWORK

- FABRICATE AND INSTALL IN ACCORDANCE WITH SMACNA STANDARDS FOR APPLICABLE PRESSURE
- 2. BOILER FLUE: a. UL LISTED, FACTORY FABRICATED, DOUBLE WALL METALBESTOS MODEL DF OR IPS BOILER FLUE AS REQUIRED TO SUIT APPLICATION, WITH ALL REQUIRED ACCESSORIES INCLUDING ROOF CAP, WALL SUPPORT UNITS, SUPPORT PLATES, DRAIN SECTION, ELBOWS, TRANSITIONS, FLASHING AND THIMBLES.
 - b. INNER LINER SHALL BE TYPE 430 STAINLESS STEEL SUITABLE FOR CONDENSING ENVIRONMENTS. OUTER JACKET SHALL BE ALUMINIZED STEEL.
 - PROVIDE MINIMUM 1" CERAMIC FIBER INSULATION INTERNAL TO SYSTEM, BETWEEN INNER AND OUTER WALLS. SYSTEM SHALL BE RATED FOR SERVICE WITH 1000°F CONTINUOUS
- OPERATION, 1400°F INTERMITTENT OPERATION. e. MANUFACTURERS: METALBESTOS, HEAT FAB, AND DURAVENT.

J. TESTING AND BALANCING

- BALANCE NEW AND EXISTING AIR DISTRIBUTION SYSTEMS TO PROVIDE INDICATED AIR QUANTITIES. INCLUDING BUT NOT LIMITED TO THE FOLLOWING: a. BOILERS
- BOILER PUMPS
- EXHAUSTO FANS AND VARIABLE SPEED CONTROLLERS. d. BOILER BAROMETRIC DAMPERS.

USE INDEPENDENT BALANCING SUBCONTRACTOR CERTIFIED BY THE NEBB OR AABC. PROVIDE 1/8" SCALE REPRODUCIBLE DRAWINGS WHICH ARE KEYED TO NUMBERED EQUIPMENT AND DEVICES AS SHOWN ON DRAWINGS AND BALANCE REPORT. SUBMIT 4 COPIES OF DRAWINGS AND REPORT FOR APPROVAL. 3. INSPECT ALL DAMPERS AND CONTROLS AND NOTIFY OWNER OF ANY DEFICIENCIES AND LIST ANY

EQUIPMENT

1. INSTALL, TEST AND START-UP IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. STARTUP SHALL BE PERFORMED BY TECHNICIANS CURRENTLY CERTIFIED BY THE FACTORY FOR EACH

DEFICIENT EQUIPMENT IN BALANCING REPORT.

- 2. CLEAN, INSPECT, AND ADJUST AS REQUIRED ALL EXISTING EXHAUST FANS TO REMAIN. NOTIFY OWNER OF ANY DEFICIENCIES. 3. INSTALL ALL EQUIPMENT MAINTAINING MANUFACTURER'S RECOMMENDED, AND CODE REQUIRED CLEARANCES.
- 4. BOILER a. THE BOILER SHALL BEAR THE ASME "H" STAMP FOR 160 PSI WORKING PRESSURE AND SHALL BE NATIONAL BOARD LISTED. THE 316L STAINLESS STEEL COMBUSTION CHAMBER SHALL BE DESIGNED TO DRAIN CONDENSATION TO THE BOTTOM OF THE HEAT EXCHANGER ASSEMBLY. A BUILT-IN TRAP SHALL ALLOW CONDENSATION TO DRAIN FROM THE HEAT EXCHANGER ASSEMBLY. THE COMPLETE HEAT EXCHANGER ASSEMBLY SHALL CARRY A TEN
- (10) YEAR WARRANTY. THE BOILER SHALL COMPLY WITH THE ENERGY EFFICIENCY REQUIREMENTS OF THE LATEST EDITION OF THE ASHRAE 90.1 STANDARD AND THE MINIMUM EFFICIENCY REQUIREMENTS OF THE LATEST EDITION OF THE BTS2000 STANDARD. THE BOILER SHALL OPERATE AT A MINIMUM OF 94% THERMAL EFFICIENCY AT FULL FIRE. ALL MODELS SHALL OPERATE UP TO 98% THERMAL EFFICIENCY WITH RETURN WATER TEMPERATURES AT 100°F OR BELOW. THE BOILER SHALL BE CERTIFIED FOR INDOOR INSTALLATION.
- THE BOILER SHALL BE CONSTRUCTED WITH A HEAVY GAUGE STEEL JACKET ASSEMBLY, PRIMED AND PRE-PAINTED ON BOTH SIDES. THE COMBUSTION CHAMBER SHALL BE SEALED AND COMPLETELY ENCLOSED, INDEPENDENT OF THE OUTER JACKET ASSEMBLY, SO THAT INTEGRITY OF THE OUTER JACKET DOES NOT AFFECT A PROPER SEAL. A BURNER/FLAME OBSERVATION PORT SHALL BE PROVIDED. THE BURNER SHALL BE A PREMIX DESIGN AND CONSTRUCTED OF HIGH TEMPERATURE STAINLESS STEEL WITH A WOVEN METAL FIBER OUTER COVERING TO PROVIDE MODULATING FIRING RATES. THE BOILER SHALL BE SUPPLIED WITH A GAS VALVE DESIGNED WITH NEGATIVE PRESSURE REGULATION AND BE EQUIPPED WITH A VARIABLE SPEED BLOWER SYSTEM, TO PRECISELY CONTROL THE FUEL/AIR MIXTURE TO PROVIDE MODULATING BOILER FIRING RATES FOR MAXIMUM EFFICIENCY. THE BOILER SHALL OPERATE IN A SAFE CONDITION AT A DERATED OUTPUT
- WITH GAS SUPPLY PRESSURES AS LOW AS 4 INCHES OF WATER COLUMN. THE BOILER SHALL UTILIZE A 24 VAC CONTROL CIRCUIT AND COMPONENTS. THE CONTROL SYSTEM SHALL HAVE AN ELECTRONIC DISPLAY FOR BOILER SET-UP. BOILER STATUS, AND BOILER DIAGNOSTICS. ALL COMPONENTS SHALL BE EASILY ACCESSED AND SERVICEABLE FROM THE FRONT AND TOP OF THE JACKET. THE BOILER SHALL BE EQUIPPED WITH; A TEMPERATURE/PRESSURE GAUGE, HIGH LIMIT TEMPERATURE CONTROL CERTIFIED TO UL353, ASME CERTIFIED PRESSURE RELIEF VALVE, OUTLET WATER TEMPERATURE SENSOR, RETURN WATER TEMPERATURE SENSOR, A UL 353 CERTIFIED FLUE TEMPERATURE SENSOR, OUTDOOR AIR SENSOR, LOW WATER FLOW PROTECTION AND
- BUILT-IN ADJUSTABLE FREEZE PROTECTION. THE BOILER SHALL BE CAPABLE OF CONTROLLING A VARIABLE SPEED BOILER PUMP TO KEEP A CONSTANT DELTA T AT ALL MODULATION RATES. THE BOILER SHALL HAVE THE CAPABILITY TO ACCEPT A 0-10 VDC INPUT CONNECTION FOR BMS CONTROL OF MODULATION OR SETPOINT, ENABLE DISABLE OF THE BOILER, VARIABLE SYSTEM PUMP SIGNAL AND A 0-10VDC OUTPUT OF BOILER MODULATION RATE. THE BOILER SHALL HAVE A BUILT-IN "CASCADE" WITH SEQUENCING OPTIONS FOR "LEAD LAG" OR "EFFICIENCY OPTIMIZED" MODULATION LOGIC. WITH BOTH CAPABLE OF ROTATION WHILE MAINTAINING MODULATION OF UP TO EIGHT BOILERS WITHOUT UTILIZATION OF AN EXTERNAL
- CONTROLLER. SUPPLY VOLTAGE SHALL BE 120 VOLT / 60 HERTZ / SINGLE PHASE. THE BOILER SHALL BE EQUIPPED WITH TWO TERMINAL STRIPS FOR ELECTRICAL CONNECTION. A LOW VOLTAGE CONNECTION BOARD WITH 42 DATA POINTS FOR SAFETY AND OPERATING CONTROLS. I.E., AUXILIARY RELAY, AUXILIARY PROVING SWITCH, ALARM CONTACTS, RUNTIME CONTACTS, MANUAL RESET LOW WATER CUTOFF, FLOW SWITCH, HIGH AND LOW GAS PRESSURE SWITCHES. TANK THERMOSTAT. THREE WALL THERMOSTAT/ZONE CONTROLS, SYSTEM SUPPLY SENSOR, OUTDOOR SENSOR, BUILDING MANAGEMENT SYSTEM SIGNAL. CONTROL CONTACTS AND CASCADE CONTROL CIRCUIT. A HIGH VOLTAGE TERMINAL STRIP SHALL BE PROVIDED FOR SUPPLY VOLTAGE. THE HIGH VOLTAGE TERMINAL STRIP PLUS INTEGRAL RELAYS ARE PROVIDED FOR INDEPENDENT PUMP CONTROL OF THE SYSTEM
- PUMP AND THE BOILER PUMP. THE BOILER SHALL HAVE AN INDEPENDENT LABORATORY RATING FOR OXIDES OF NITROGEN (NO_V) OF 20 PPM OR LESS CORRECTED TO 3% O₂. THE MANUFACTURER SHALL VERIFY PROPER OPERATION OF THE BURNER, ALL CONTROLS AND THE HEAT EXCHANGER BY CONNECTION TO WATER AND VENTING FOR A FACTORY FIRE TEST PRIOR TO SHIPPING.
- PROVIDE A CONDENSATE NEUTRALIZATION KIT FOR EACH BOILER, BMS GATEWAY TO CENTRAL CONTROL SYSTEMS, SIDEWALL VENT KIT.

MANUFACTURERS: PATTERSON KELLEY - STORM OR EQUAL.

L. AUTOMATIC TEMPERATURE CONTROLS

PER OPERATING SEQUENCES INDICATED.

THROUGH EXISTING BCS.

- 5. PROVIDE AUTOMATIC TEMPERATURE CONTROL SYSTEMS TO AFFECT COMPLETE OPERATING SYSTEMS
- PROVIDE REQUIRED ATC POWER CONNECTIONS TO CIRCUIT BREAKER PANELS. COMPLY WITH LATEST EDITION ON THE NEC. RUN ALL EXPOSED WIRING IN EMT. USE PLENUM RATED CABLE FOR LOW VOLTAGE WIRING (24V & LESS) CONCEALED IN WALLS.
- DEMONSTRATE SYSTEM OPERATION TO OWNER. 9. AUTOMATIC TEMPERATURE CONTROL SYSTEM AND EQUIPMENT SHALL BE OF SAME MANUFACTURER AS EXISTING BUILDING TEMPERATURE CONTROL SYSTEM (DELTA-SOUTHLAND).
- 10. UPDATE GRAPHICS OF EXISTING BUILDING CONTROLS SYSTEM TO INDICATE NEW COMPONENTS ADDED, IN IDENTICAL FASHION TO SIMILAR EXISTING EQUIPMENT CURRENTLY CONTROLLED BY THE 11. EXTEND EXISTING BUILDING CONTROLS SYSTEM TO NEW EQUIPMENT AS FOLLOWS: a. Provide monitoring and setpoint adjustment of heat-timer boiler controller

M. TEMPERATURE CONTROL SEQUENCES

- 1. BOILER BOILER SHALL BE ENERGIZED THROUGH THE BCS. CONTROLS CONTRACTOR TO COORDINATE TIE-IN TO EXISTING BOILER CONTROL PANEL.
 - BOILER PANEL ALARM SIGNAL SHALL BE MONITORED BY BCS. WHEN BOILER IS ENERGIZED, EXHAUST $\underline{\mathsf{EF}}-1$ SHALL BE ENERGIZED.

N. COMMISSIONING CONTRACTOR TO DEVELOP A COMMISSIONING PLAN FOR THE PROJECT TO DOCUMENT OPERATION

- OF ALL EQUIPMENT. SUBMIT PLAN TO THE OWNER AND ENGINEER FOR APPROVAL PRIOR TO THE COMMISSIONING. ALL SYSTEMS TO BE DEMONSTRATED TO THE OWNER'S REPRESENTATIVES AND ALL CONTRACTORS TO BE ON SITE DURING THE DEMONSTRATION(S). PROVIDE REMOTE COMMUNICATIONS DEVICES, AS NEEDED TO PERFORM THE DEMONSTRATIONS. EQUIPMENT TO BE DEMONSTRATED ARE AS FOLLOWS:
- BOILER VENTING FAN
- BOILERS (CONTROL INTEGRATION PER DRAWING M501) BOILER PUMPS
- BOILER SEQUENCING

BY THE OWNER AND ENGINEER.

GAS DETECTION SYSTEM (ALARM STAGES AND REMOTE SIGNALS) CONTROLS INTERFACE AND OPERATION CONTRACTOR TO PROVIDE WRITTEN REPORT OF COMMISSIONING PLAN FOR REVIEW AND APPROVAL

SUPPLY AIR CONDENSATE DRAIN PIPING AIR CONDITIONING AIR CONDITIONING UNIT ABOVE FINISHED FLOOR RETURN AIR, OUTSIDE AIR LOW PRESSURE STEAM AIR HANDLING UNIT ARCHITECTURAL AUTOMATIC TEMPERATURE CONTROL RETURN GRILLE PUMPED CONDENSATE RETURN BRITISH THERMAL UNIT EXHAUST AIR BOILER FEED WATER CEILING DIFFUSER CUBIC FEET MINUTE CHILLED WATER SUPPLY EXISTING DUCTWORK CEILING, COOLING EXISTING TO BE REMOVED OR RELOCADTED CHILLED WATER RETURN CONDENSATE DRY BULB DRYER EXHAUST HOT WATER SUPPLY **NEW SHEETMETAL DUCTWORK** DIAMETER HOT WATER RETURN DUCTWORK WITH SOUND LINING **FXHAUST** EXISTING TO REMAIN BOILER HOT WATER SUPPLY FLEXIBLE DUCTWORK ENTERING AIR TEMPERATURE ENERGY EFFICIENCY RATIO EXHAUST GRILLE BOILER HOT WATER RETURN FLEXIBLE DUCT CONNECTION ELECTRIC HEATING COIL FXHAUST REGISTER $\longrightarrow \bowtie \longrightarrow$ GATE VALVE DUCT ELBOW WITH TURNING VANES EXTERNAL STATIC PRESSURE RADIUS DUCT ELBOW CHECK VALVE FIRE DAMPER FULL LOAD AMPS DUCT TEE WITH TURNING VANES BALANCING VALVE FLD FLOOR DRAIN FLAT OVAL DUCT, FUEL OIL FEET PER MINUTE / [BUTTERFLY VALVE DUCT TURNING DOWN GAI VANI7FD DUCT TURNING UP GENERAL CONTRACTOR BALL VALVE GALLONS PER HOUR GALLONS PER MINUTE R DUCT CHANGE IN ELEVATION R = RISE, D = DROPCONCENTRIC REDUCER GRAVITY VENTILATOR HEAT PUMP, HORSEPOWER DESIGNATES KEY NOTE NUMBER ECCENTRIC REDUCER INSIDE DIAMETER DIRECTION OF AIR FLOW RELIEF OR SAFETY VALVE KITCHEN EXHAUST KILOWATT POINT OF CONNECTION, NEW TO EXISTING PRESSURE REDUCING VALVE LEAVING AIR TEMPERATURE POINT OF DISCONNECTION FROM EXISTING LINEAR DIFFUSER LOW PRESSURE STEAM LOCKED ROTOR AMPS RISER DESIGNATION FLEXIBLE PIPE CONNECTION LEAVING WATER TEMPERATURE — RISER NUMBER BTU PER HOUR (THOUSANDS) SCREWED UNION MINIMUM CIRCUIT AMPS MOTOR OPERATED DAMPER FLOW SENSING DEVICE NORMALLY CLOSED PRESSURE SENSING DEVICE NOT IN CONTRACT PRESSURE GAUGE & COCK NORMALLY OPEN NEW LOCATION OF RELOCATED MATERIAL TEMPERATURE SENSING DEVICE THERMOMETER NOT TO SCALE OUTSIDE AIR TWO WAY MOTOR OPERATED VALVE OPPOSED BLADE DAMPER ON CENTER THREE WAY MOTOR OPERATED VALVE OUTSIDE DIAMETER PUMPED CONDENSATE BACK FLOW PREVENTER POWER ROOF VENTILATOR POUNDS PER SQUARE INCH PSI PRESSURE/TEMPERATURE TAPPING EXISTING TO BE REMOVED FLANGED UNION RETURN AIR RETURN GRILLE RELATIVE HUMIDITY EXISTING TO BE RELOCATED ROOFTOP A/C UNIT PITCH OF PIPE SMOKE DETECTOR ARROW INDICATES DIRECTION OF FLOW SOUND LINING STATIC PRESSURE, STAIRWELL PRESSURIZATION SUPPLY REGISTER T-STAT THERMOSTAT PIPE DOWN TOILET EXHAUST TOTAL STATIC PRESSURE TYPICAL UNIT HEATER BOTTOM PIPE TAKE-OFF UNDERWRITERS LABORATORY UNLESS NOTED OTHERWISE UNO VOLT VOLUME DAMPER WET BULB WATER GAUGE WIRE MESH SCREEN

SYMBOLS AND ABBREVIATIONS

GENERAL NOTES

- ALL EXISTING WORK TO REMAIN IS SHOWN WITH DASHED LINES. ALL NEW WORK AND RELOCATED WORK IS SHOWN WITH SOLID LINES. CROSS-HATCHING INDICATES ALL WORK TO BE REMOVED OR RELOCATED.
- 2. INSPECT, CALIBRATE AND VERIFY OPERATION OF ALL EXISTING HEAT HOT WATER SYSTEM COMPONENTS; INCLUDING VALVES, PRIMARY/STANDBY LOOP PUMPS, SEPARATORS, CONTROL VALVES, STRAINERS, ETC. REPORT ANY DEFICIENCIES TO OWNER AND REPLACE UPON OWNER'S APPROVAL.
- 3. EXISTING THERMOSTATS AND SENSORS ARE INTEGRATED TO BASE BUILDING BCS NETWORK. MAINTAIN ALL EXISTING SENSORS, CONTROL WIRING AND CONTROL VALVES ASSOCIATED WITH HEATING HOT WATER SYSTEM.
- COORDINATE ALL HEATING HOT WATER SYSTEM SHUT DOWN, DRAIN DOWN AND REFILL SCOPE WITH BUILDING OWNER AND FACILITIES MANAGEMENT GROUP.

SHEET LIST

- MOO1 MECHANICAL SYMBOLS AND ABBREVIATIONS
- M101 PENTHOUSE MECHANICAL DEMOLITION PLANS M201 PENTHOUSE - MECHANICAL NEW WORK PLANS
- M501 MECHANICAL SCHEDULES AND DETAILS

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MECHANICAL COVER SHEET

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REVISIONS

<u>DATE</u> <u>DESCRIPTION</u>

09/13/22 BID SET

03/31/22 ISSUED FOR REVIEW

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MECHANICAL

PENTHOUSE

<u>Drawn:</u> JNP <u>Checked:</u> WKM

DEMOLITION PLAN

7 DEMOLISH AND REMOVE ENTIRE LENGTH OF EXISTING 30" BOILER FLUE, INCLUDING EXTERIOR SECTION.

FOR REUSE AND RECONFIGURATION AS NEEDED.

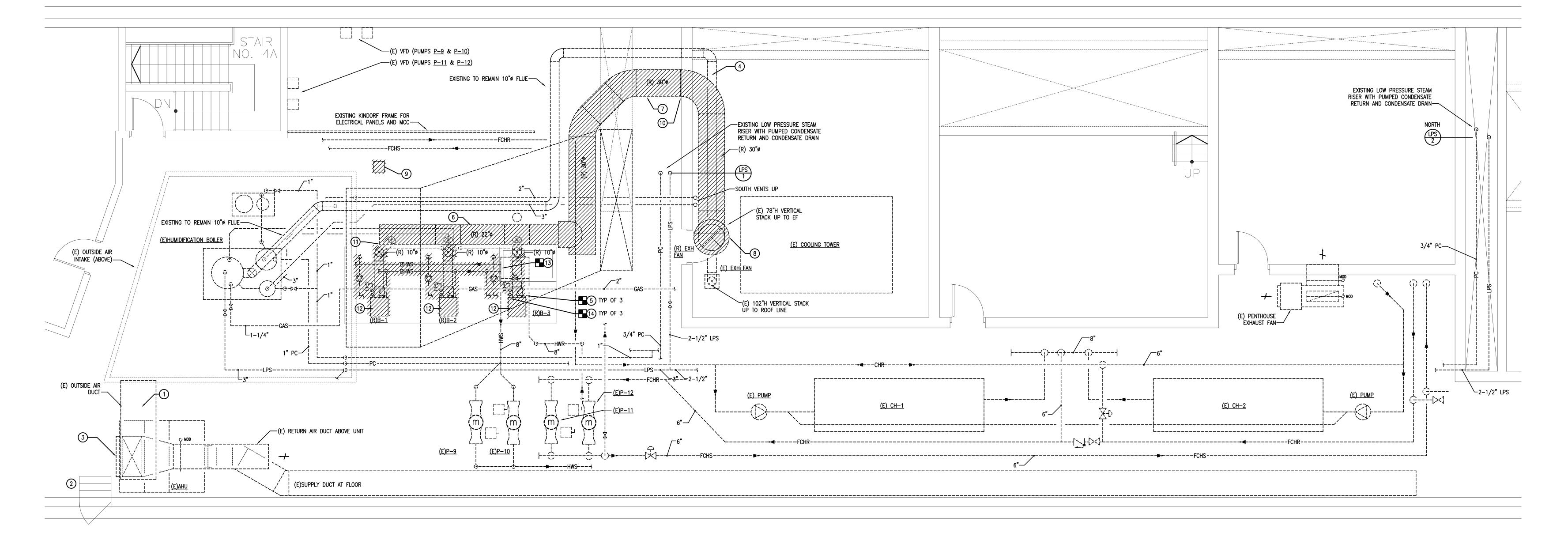
9 DEMOLISH AND REMOVE EXISTING BOILER CONTROL PANEL. RETAIN EXISTING PANEL SUPPORT BRACKETS AND ELECTRICAL CIRCUIT FOR REUSE.

EXISTING OPENING TO BE REDUCED IN SIZE. CLOSE EXCESS OPENING AS NEEDED TO ACCOMMODATE NEW FLUE DIAMETER. SURROUNDING MATERIALS. PAINT TO MATCH EXISTING.

REMOVE FLUE SECTION AT CONNECTION TO BOILER, AS NOTED. TYPICAL OF ALL 3 BOILERS.

DEMOLISH EXISTING BOILER AND ASSOCIATED CONTROLS.
DISCONNECT ALL FLUE CONNECTIONS, HWS AND HWR PIPING,
CIRCULATION PUMPS, GAS CONNECTION AND ELECTRICAL
CIRCUITING. CAP AND MAKE SAFE FOR CONNECTION TO NEW
BOILER AS INDICATED ON NEW WORK PLAN.

DISCONNECT EXISTING HWS/R PIPING FROM EXISTING BOILER EQUIPMENT.





- SEE SHEET MOO1 FOR SYMBOLS, ABBREVIATIONS, AND GENERAL NOTES.
- OF EXISTING HOT WATER BOILER SYSTEM AND ASSOCIATED
- SYSTEM AT COMPLETION OF WORK. AND DUCTWORK SYSTEMS INSTALLED WITHIN THE SPACE. PIPING SYSTEMS OF THE HUMIDIFICATION BOILER AND

DRAWING NOTES

- 2. SEE SHEET M501 FOR MECHANICAL SCHEDULES AND DETAILS. 3. CONTRACTOR SHALL COORDINATE ISOLATION AND DRAIN DOWN
- EQUIPMENT PRIOR TO COMMENCING WORK.
- 4. COORDINATE REFILL OF SYSTEM AND RE-ENERGIZE OF BOILER
- 5. PENTHOUSE EXISTING CONDITIONS DO NOT SHOW ALL PIPING ASSOCIATED COMPONENTS ARE SHOWN FOR REFERENCE. CONTRACTOR SHALL FIELD VERIFY ALL PIPE SIZING AND ROUTING.

KEY NOTES

- 1) REUSE EXISTING OUTSIDE AIR DUCT SERVING (E) PENTHOUSE AIR HANDLING UNIT.
- 2 RETAIN FULL PATHWAY TO DOOR SERVING ROOFTOP ACCESS THROUGHOUT CONSTRUCTION.
- DEMOLISH AND REMOVE (E) AIR HANDLING UNIT MIXING BOX DAMPER ACTUATORS AT TOP AND REAR INLETS. GREASE AND REFURBISH EXISTING DAMPERS.
- EXISTING TO REMAIN 10" BOILER FLUE SERVING HUMIDIFICATION BOILER SYSTEM. COORDINATE DEMOLITION SCOPE AND NEW WORK SCOPE WITH EXISTING FLUE ROUTING AND ASSOCIATED MOUNTING/SUPPORTS.
- DISCONNECT EXISTING 10" BOILER FLUE FROM EXISTING BOILER EQUIPMENT. DEMOLISH AND REMOVE LENGTH OF FLUE SECTION (WHERE INDICATED) AND BAROMETRIC DAMPER.
- 8 DEMOLISH AND REMOVE EXISTING EXHAUSTO EXHAUST FAN ON TOP OF BOILER FLUE. MAINTAIN FAN SUPPORT STRUCTURE
- MAINTAIN TOP EDGE OF OPENING TO INSTALL NEW FLUE AS HIGH AS POSSIBLE. PATCH WALL WITH CMU BLOCK TO MATCH

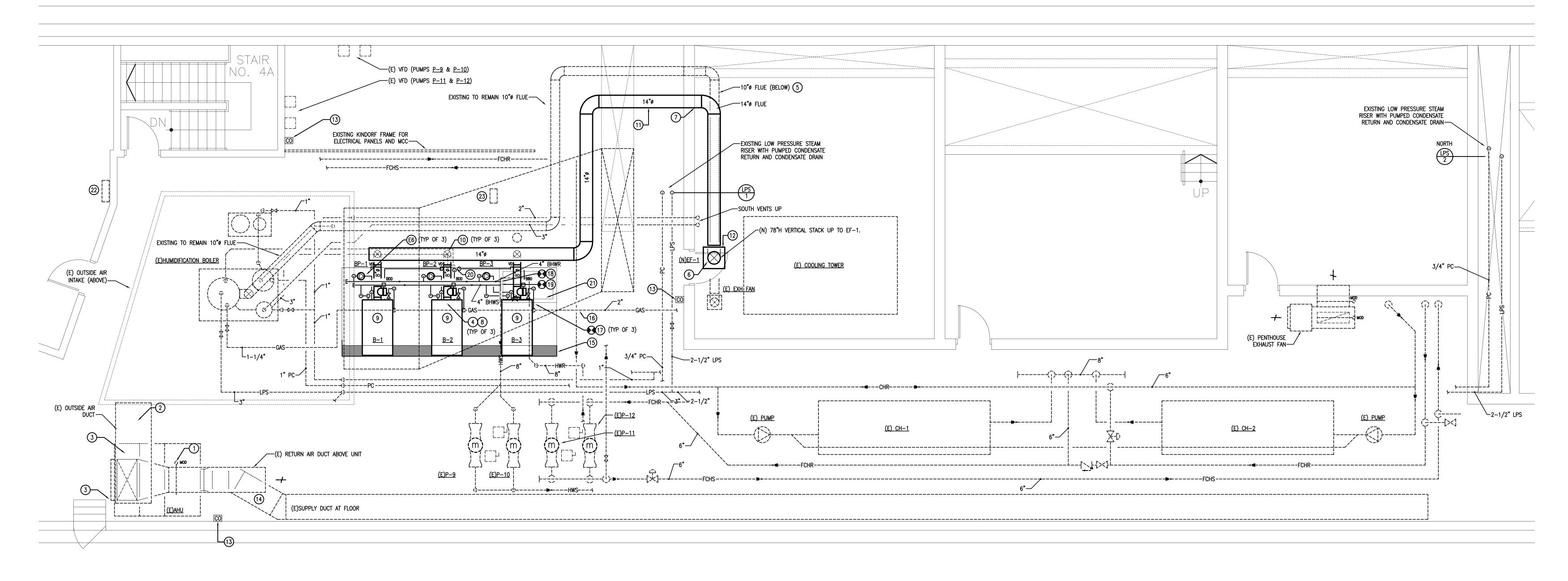
- DISCONNECT EXISTING GAS PIPING FROM EXISTING BOILER EQUIPMENT.
 - Job: 2022-1256-00 Sheet No.

09/13/22 BID SET

Job: 2022–1256–00 Sheet No.

Scale:
VARIES

Drawn: JNP
Checked: WKM



N PENTHOUSE NEW WORK PLAN SCALE: 1/4"=1'-0"

DRAWING NOTES

- 1. SEE SHEET MOO1 FOR SYMBOLS, ABBREVIATIONS, AND
- GENERAL NOTES.

 2. SEE SHEET M501 FOR MECHANICAL SCHEDULES AND DETAILS.

 3. CONTRACTOR SHALL COORDINATE ISOLATION AND DRAIN DOWN OF EXISTING HOT WATER BOILER SYSTEM AND ASSOCIATED EQUIPMENT PRIOR TO COMMENCING WORK.
- COORDINATE REFILL OF SYSTEM AND RE-ENERGIZE OF BOILER SYSTEM AT COMPLETION OF WORK.
 PENTHOUSE EXISTING CONDITIONS DO NOT SHOW ALL PIPING AND DUCTWORK SYSTEMS INSTALLED WITHIN THE SPACE. PIPING SYSTEMS OF THE HUMIDIFICATION BOILER AND

ASSOCIATED COMPONENTS ARE SHOWN FOR REFERENCE.

CONTRACTOR SHALL FIELD VERIFY ALL PIPE SIZING AND

KEY NOTES

- CLOSE EXISTING RETURN AIR DAMPER TO ALLOW THE DAMPER AT THE EXISTING MIXING BOX TO BE USED FOR OUTSIDE AIR CONTROL ONLY.
- 2 EXISTING 40x40 OUTSIDE AIR DUCT SERVING (E) PENTHOUSE AIR HANDLING UNIT CONNECTED TO BE REUSED. PROVIDE NEW DAMPER ACTUATOR AT UNIT MIXING BOX.
- PROVIDE NEW MOTOR OPERATED DAMPER ACTUATORS SERVING EXISTING AIR HANDLING UNIT MIXING BOX DAMPERS.
- NEW MATERIAL SHALL BE BASIS OF DESIGN: SELKIRK "PS"
 GAS VENT WITH STAINLESS STEEL INTERIOR AND EXTERIOR LINERS. REUSE EXISTING HANGERS AND PROVIDE NEW AS REQUIRED.

 EXISTING TO REMAIN 10"Ø BOILER FLUE SERVING
- HUMIDIFICATION BOILER SYSTEM. COORDINATE DEMOLITION SCOPE AND NEW WORK SCOPE WITH EXISTING FLUE ROUTING AND ASSOCIATED MOUNTING/SUPPORTS.

 6 SUPPORT VERTICAL PORTION OF FLUE FROM WALL USING FLUE MANUFACTURER PROVIDED WALL SUPPORT INSTALLED IN

ACCORDANCE WITH MANUFACTURER RECOMMENDATION.

- 7 PROVIDE FLASHING WHERE FLUE VENT PENETRATES WALL.

 8 PROVIDE NEW FLUE CONNECTION TO EQUIPMENT. COORDINATE SIZE WITH MANUFACTURER. PROVIDE RATED ACCESSORY FLUE BALANCING DAMPER AND BAROMETRIC RELIEF DAMPER IN FLUE CONNECTION WHERE INDICATED. PROVIDE ALL NEW FLUE SECTION AND FITTINGS AS INDICATED. BASIS OF DESIGN
- 9 NEW BOILER TO REPLACE EXISTING EQUIPMENT. RECONNECT EQUIPMENT TO EXISTING HWS/R, GAS, DRAIN PIPING. PROVIDE NEW FLUE PIPING CONNECTION AS INDICATED.
- RECONNECT NEW EQUIPMENT FLUE TO COMMON 14" HEADER. BASIS OF DESIGN SELKIRK PS (TYPICAL OF 3).
- PROVIDE ENTIRELY NEW LENGTH OF 14"Ø COMMON BOILER FLUE TO BUILDING EXTERIOR. BASIS OF DESIGN: SELKIRK PS. PROVIDE STAINLESS STEEL INNER AND OUTER LINERS FOR EXTERIOR APPLICATIONS. PROVIDE STAINLESS STEEL INNER AND ALUMINUM OUTER LINER FOR INTERIOR INSTALLATIONS.
- NEW EXHAUST FAN EF-1 ATOP NEW 14" BOILER FLUE. PROPERLY SUPPORT FAN AT TOP OF FLUE WITH MODIFIED EXISTING OR NEW SUPPORT FRAME.

- PENTHOUSE MONITORING SYSTEM DETECTOR FOR CO AND NO2.
 MOUNT SENSORS 5'-0" ABOVE FINISHED FLOOR. PROVIDE
 PROTECTIVE COVER. BASIS OF DESIGN: ACI (AUTOMATION
 COMPONENTS, INC) B5 TOXIC & COMBUSTIBLE SENSOR WITH
 BACNET PROTOCOL.
- DE-ACTIVATE EXISTING SENSOR ON EMS SYSTEM.
- (PLAN SOUTH) TOWARD SERVICE WALKWAY. CONCRETE PAD SHALL BE ENLARGED TO HELP ACCOMMODATE THE LONGER FOOTPRINT OF THE NEW BOILER EQUIPMENT.
- CONTRACTOR SHALL FIELD VERIFY ISOLATION VAVLES AND COORDINATE LOCATION TO ISOLATE GAS PIPING HEADER, IN ORDER TO DISCONNECT AND RECONNECT NEW GAS TAP CONNECTIONS FOR EACH BOILER.
- NEW GAS PIPING RUN-OUT WITH NEW ISOLATION VALVE (TYPICAL OF 3).
- RECONNECT NEW HWR BRANCH PIPING TO EXISTING ISOLATION VALVE. MATCH SIZE OF EXISTING BRANCH PIPING.
- 19 RECONNECT NEW HWS BRANCH PIPING TO EXISTING ISOLATION VALVE. MATCH SIZE OF EXISTING BRANCH PIPING.
- PROVIDE NEW ACID NEUTRALIZER KIT AND DRAIN PIPING CONNECTION TO EACH BOILER AND ROUTE TO EXISTING FLOOR DRAIN (TYPICAL OF 3).
- PROVIDE CONCRETE INFILL AT THE BACK OF THE EXISTING DRAIN TROUGH (AS NEEDED) TO ACCOMMODATE FOOTPRINT OF NEW BOILER B-3.

 BUILDING CONTROL SYSTEM PANELS ARE LOCATED IN THE
- ENGINEERING OFFICE. CONTROLS CONTRACTOR TO COORDINATE EXACT PANEL TIE—IN POINT TO THE EXISTING SYSTEM.

 23 LOCATION OF BOILER EXHAUST CONTROL PANEL. MODIFY AS REQUIRED TO ACCOMMODATE NEW FAN OPERATION.

DUAL SENSING CO & NOX DETECTOR BACNET ENABLED, MICROPROCESSOR BASED GAS TRANSMITTER PAIRED WITH ELECTROCHEMICAL GAS SENSOR. SENSORS NETWORKED DIGITALLY WITH BACNET ENABLED CONTROLLERS.

BASIS OF DESIGN: AUTOMATION COMPONENTS INC B5 TOXIC & COMBUSTIBLE SENSOR WITH BACNET PROTOCOL.

PROVIDE SENSOR WITH 0-1000 PPM CARBON MONOXIDE (CO) DETECTION, 0-10 PPM NITROGEN DIOXIDE (NO2) DETECTION AND STANDARD ENCLOSURE. MOUNT SENSOR 9-18 INCHES ABOVE THE FLOOR. PROVIDE CONDUIT FOR CONTROL WIRING TO PROTECT FROM DAMAGE. UNITS TO HAVE SPACE AUDIBLE ALARMS FOR EACH STAGE (1 THROUGH 3) AND SEND STAGED ALARM SIGNALS TO THE BUILDING CONTROL SYSTEM VIA BACNet. ALARM STAGING (ADJUSTABLE) WILL BE AS FOLLOWS: CARBON MONOXIDE:

STAGE 1: 10 PPM
STAGE 2: 35 PPM

STAGE 1: 10 PPM
STAGE 2: 35 PPM
STAGE 3: 100 PPM

NITROGEN DIOXIDE:
STAGE 1: 0.50 PPM
STAGE 2: 1.0 PPM
STAGE 3: 2.0 PPM

HEATING BOILER CONTROLLER INTEGRATION

MANUFACTURER PROVIDED HEATING BOILER CONTROL PANEL SHALL BE INTERFACED WITH EXISTING BASE BUILDING BCS SYSTEM (DELTA — SOUTHLAND). COORDINATE BOILER CONTROL PANEL COMMUNICATION PROTOCOL TO MATCH BCS REQUIREMENTS. PROVIDE READ/WRITE CONTROL POINTS FOR BOILER CONTROL PANEL AS FOLLOWS:

HARDWIRED CONNECTION:

BMS REMOTE ENABLE/DISABLE

BOILER SUPPLY AND RETURN TEMPERATURE
STACK TEMPERATURE
HEADER TEMPERATURE
HEAT EXCHANGER TEMPERATURE
OUTDOOR AIR TEMPERATURE

ACTIVE DEMAND STATE
BOILER STATE
FLAME SIGNAL
FAN SPEED
FIRING RATE

ERROR CODE
ERROR TYPE
BURNER CONTROL CYCLE COUNT
BURNER CONTROL RUN HOURS
BOILER LOW WATER ALARM
BOILER HIGH TEMPERATURE ALARM
BOILER LOAD STATUS (% MAX RATED)
BOILER LOAD LIMIT (% MAX RATED)

WRITE:

RESET BOILER TEMPERATURE/PRESSURE SET POINT
REMOTE BOILER START/STOP
RESET BOILER LOAD LIMIT (% MAX RATED)

EXHAUSTO BOILER FLUE FAN SCHEDULE

FAN TYPES:

PRV POWER ROOF VENTILATOR

	EXTINOSTO DOILLIN TEGL TYIN SOTTEDOLL											
NO.	LOCATION AND/ OR SERVICE	TYPE	CFM	S.P. (W.G.)	DRIVE	RPM	WHEEL DIA.	ELECTRICAL		NOTES	BASIS OF DESIGN	
		HIFL						HP	VOLT/ø	NOILS	BASIS OF BESIGN	
EF-1	14"ø BOILER FLUE	PRV	1000	0.25"	DIRECT	1600	_	FRAC	115/1	1–10	enervex - RSV	

PROVIDE MOTOR DISCONNECT SWITCH IN NEMA 4X ENCLOSURE
 PROVIDE ECB 31 MODULATING DRAFT CONTROL W/PROBE AND XTP2

PROVIDE MSC EDRIVE MOTOR CONTROLLER
 PROVIDE 14" STEEL CHIMNEY ADAPTER
 PROVIDE 3 BLAST GATES.

NOTES:

5. PROVIDE 14 STEEL CHIMNET ADAPTER

5. PROVIDE 3 BLAST GATES.

6. LOCATE FAN CONTROL PANEL ADJACENT TO BOILER CONTROL PANEL.

7. LOCATE FAN VARIABLE SPEED SENSORS IN FLUE PER MANUFACTURER RECOMMENDATIONS.

8. DRAFT INDUCER SHALL BE INTERLOCKED WITH BOILER APPLIANCES. IN THE EVENT OF A FAN FAILURE, THE

INTERLOCKED BOILERS SHALL BE DE-ENERGIZED.

9. IF ALTERNATE MANUFACTURER IS SELECTED, PROVIDE EQUIVALENT ACCESSORIES NECESSARY FOR COMPLETE

OPERATIONAL SYSTEM.

O. CONTRACTOR SHALL COORDINATE FINAL FAN SELECTION OF DRAFT INDUCER WITH APPROVED FLUE VENT DESIGN

AND APPROVED BOILER MANUFACTURER AIRFLOW REQUIREMENTS. VERIFY THAT FAN IS CAPABLE OF MAINTAINING THE MINIMUM REQUIRED INLET PRESSURE, BASED UPON THE FLUE SYSTEM DESIGN AND ASSOCIATED PRESSURE LOSSES.

COMMON FLUE VENT

FLUE MATERIAL: METALBESTOS PS, OR EQUAL.
SIZE AS NOTED ON FLOORPLANS WITH BAROMETRIC RELIEF ACCESSORY.

CONTRACTOR SHALL BE RESPONSIBLE TO FIELD COORDINATE THE PRECISE FLUE ROUTING WITH FLUE VENDOR/MANUFACTURER. PROVIDE FULL SUBMITTAL PACKAGE, INCLUDING FABRICATION DRAWINGS, TO INDICATE ALL PIPE LENGTHS, FITTINGS, AND TRANSITIONS.

CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF FLUE SYSTEM. COORDINATE WITH SUBMITTED BOILER EQUIPMENT TO CONFIRM DRAFT AIRFLOW REQUIREMENTS. FLUE SYSTEM AND ASSOCIATED DRAFT INDUCER FAN SELECTION SHALL BE CONFIGURED TO MAINTAIN THE MINIMUM INLET PRESSURE REQUIRED.

					GA	\S-F	IRED	HO	ΓWA	TER	BOIL	ER :	SCH	EDULE											
	LOCATION AND/OR SERVICE	MBH	MBH	EFF.	GPM	EWT 'F	IWT •E	CONNECTIONS					INLET GAS	INLET GAS ELECT			NOTES	BASIS OF DESIGN							
LOCATION AND/OR SERVICE	INPUT	INPUT (INPUT	INPUT	INPUT	INPUT	INPUT	INPUT	OUTPUT	LTT.	GPM	Ewi F	L LWI F	HWS	HWR	CD	GAS	INTAKE	VENT	PRESSURE "WG	VOLT/ø	AMPS	MOCP	NOIES	(PATTERSON KELLEY)
1	PENTHOUSE - HEATING HOT WATER	1,250	1,212	97%	60	120	160	2 1/2"	2 1/2"	3/4"	1 1/2"	8"	8"	14.0" MAX, 3.5" MIN	208/1	-	20	1–7	P-K STORM: ST1250						
2	PENTHOUSE — HEATING HOT WATER	1,250	1,212	97%	60	120	160	2 1/2"	2 1/2"	3/4"	1 1/2"	8"	8"	14.0" MAX, 3.5" MIN	208/1	-	20	1–7	P-K STORM: ST1250						
3	PENTHOUSE - HEATING HOT WATER	1,250	1,212	97%	60	120	160	2 1/2"	2 1/2"	3/4"	1 1/2"	8"	8"	14.0" MAX, 3.5" MIN	208/1	_	20	1–7	P-K STORM: ST1250						

NOTES:

1. MAXIMUM WORKING PRESSURE 160 PSIG.
2. EXTEND NEW DISCHARGE PIPE FROM PRESSURE RELIEF VALVE FULL SIZE TO FLOOR DRAIN.

FLUE: METALBESTOS PS, SIZE AS NOTED ON FLOORPLANS AND PROVIDE WITH BAROMETRIC RELIEF ACCESSORY.
 BOILER SHALL BE OPERATED BY MULTI-STAGE BOILER CONTROL PANEL, TO EQUALIZE RUNTIME, CASCADE BOILER SEQUENCING AND MANAGE FAULTS.

5. BOILER CONTROLS SHALL BE BACNET COMPATIBLE WITH BTL LISTING. CONTROLS SHALL UTILIZE BACNET IP OR BACNET MSTP COMMUNICATION PROTOCOL. COORDINATE INTEGRATION OF BOILER CONTROLS WITH BASE BUILDING CONTROL SYSTEM (DELTA CONTROLS WITH COPPERTREE SOFTWARE) AND BUILDING ANALYTICS SYSTEM

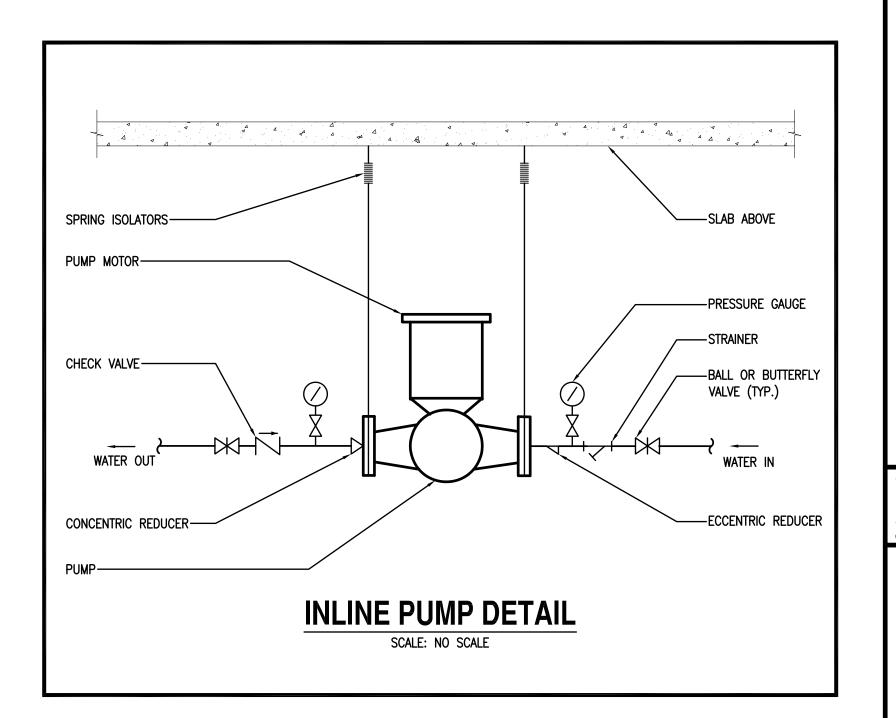
CONTROL SYSTEM (DELTA CONTROLS WITH COPPERTREE SOFTWARE) AND BUILDING ANALYTICS SYSTEM.

6. BOILER SHALL MAINTAIN A MINIMUM TURNDOWN RATIO OF 10:1

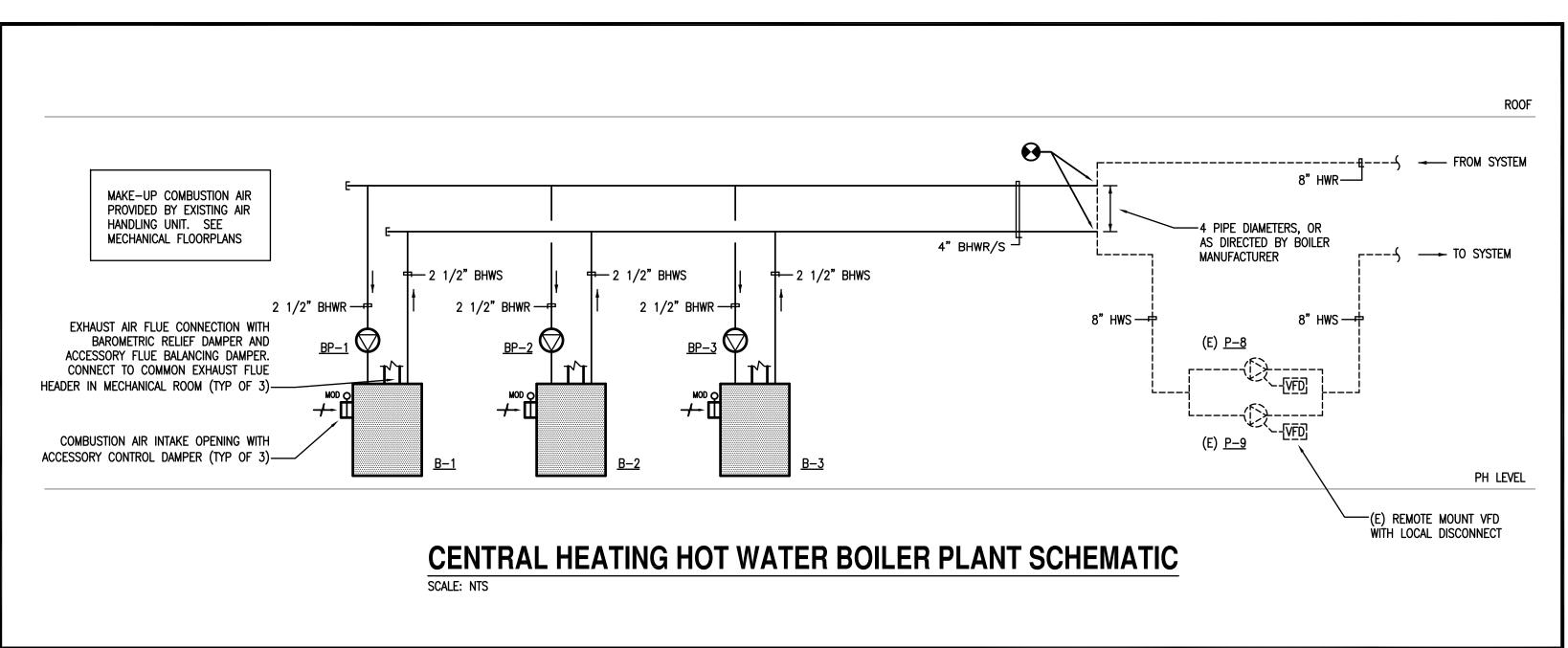
7. PROVIDE COMBUSTION AIR INTAKE DAMPER ACCESSORY WITH INTEGRAL END LIMIT SWITCH. WIRE TO RESPECTIVE

BOILER AIR DAMPER INTERLOCK CIRCUIT. CONTRACTOR SHALL PROVIDE EXTERNAL POWER SOURCE.

NO	LOCATION AND OD SERVICE	דער <i>ד</i> ער דער דער דער דער דער דער דער דער דער ד	ODM	ווה (בד)	RPM		ELECTR	CAL DATA	NOTEC	S BASIS OF DESIGN
NO.	LOCATION AND/OR SERVICE	TYPE	GPM	HD (FT)	IZLIVI	MIN EFF	HP	VOLT/ø	NOTES	
BP-1	BOILER LOOP PUMP	IL	60	45	1760	55	2	208/3	1–2	ARMSTRONG - 4380 (1.
BP-2	BOILER LOOP PUMP	IL	60	45	1760	55	2	208/3	1-2	ARMSTRONG - 4380 (1.
BP-3	BOILER LOOP PUMP	L	60	45	1760	55	2	208/3	1-2	ARMSTRONG - 4380 (1.
NOTES:							PUMP TYPES	<u>}:</u>		



HORIZONTAL SPLIT CASE INLINE







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<u>DATE</u>	DESCRIPTION
03/31/22	ISSUED FOR REVIEW
09/13/22	BID SET

09/13/22 BID SET

Sheet Title:
MECHANICAL
SCHEDULES AND
DETAILS

0: 2022-1256-00 Sheet No.

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RIES

Wn: JNP