



ENGINEERING SFRVICES

# ALL SEASONS CLOTHING COMPANY **RETAIL VENTILATION**

**KENAI SUPPLY BUILDING** WASILLA SHOPS CIRCLE WASILLA, ALASKA



3812 Spenard Road, Suite 200 ANCHORAGE, AK 99517

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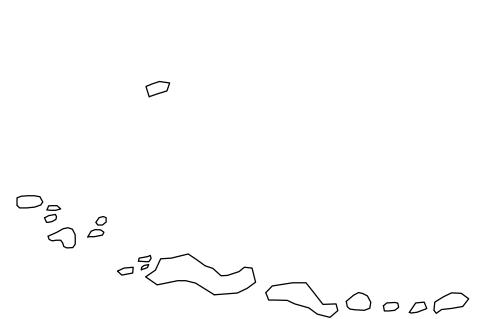
E-4 ELECTRICAL SPECIFICATIONS

# ALASKA RAILROAD CORPORATION

# P.O. BOX 107500, ANCHORAGE, ALASKA 99510-7500

# **Consulting Engineers, Inc.**

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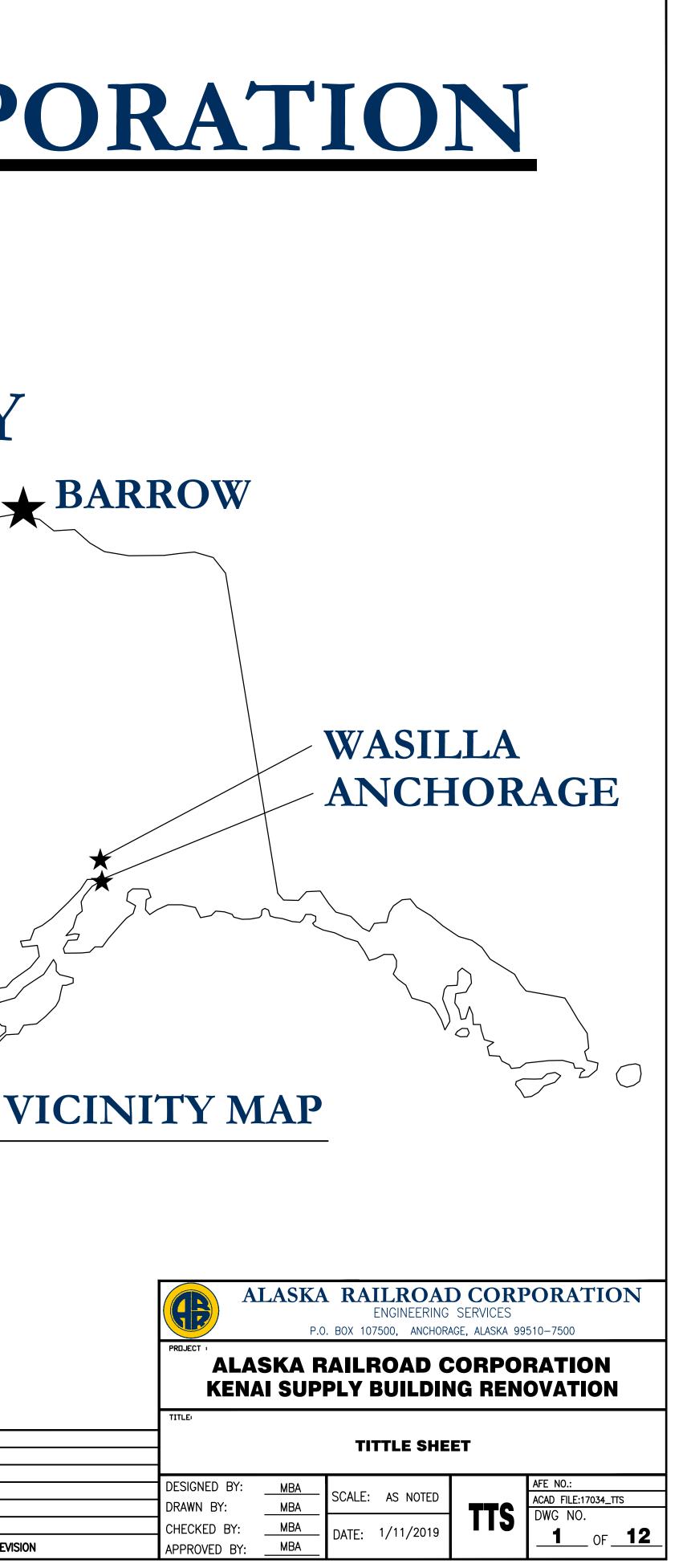
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HEATING COIL SCHEDULE	BOILER SCHEDULE	LEGEND & ABBREVIATIONS
SYMBOL    LOCATION    MBH    MAX CFM    VEL FPM    GPM    AIR TEMP IN    FLUID    FLUID    TEMP. $\triangle$ P    MAX.    VALVE    RELATED      SYMBOL    LOCATION    MBH    MAX CFM    VEL FPM    GPM    AIR TEMP    FLUID    TEMP. $\triangle$ P    MAX.    VALVE    RELATED	AGA GROSS	ABBR. EXPLANATION SYMBOL
	SYMBOL  TYPE  FUEL  INPUT  OUTPUT  MOTOR    SYMBOL  TYPE  FUEL  MBH  MBH  HP  VOLTS/PH  DESIGN BASIS PRODUCT	AAV AUTOMATIC AIR VENT Ü
(E)HC-1 HALL 114 7.8 500 MAX 0.8 70 WATER 190 170 0.15" 2.0' 2-WAY HRV-1		AFF ABOVE FINISHED FLOOR
HC-2 GARAGE 107 229 6,100 MAX 16.9 20 55 50% PG 180 160 0.15" 2.0' 3-WAY AHU-1	(E) = 1 BOILER   120   GAS   505   247     12071	BDD BACKDRAFT DAMPER
HC-3 RETAIL 101 63.4 3,450 MAX 6.3 55 72 WATER 190 170 0.15" 2.0' 2-WAY REHEAT COIL	(E) B-2 CAST IRON H20 GAS 305 247 120/1 WEIL MCLAIN PFG-06	BD  BALANCING DAMPER  Image: Constraint of the second secon
HC-3 RETAIL 101 63.4 3,450 MAX 6.3 55 72 WATER 190 170 0.15 2.0 2-WAY COIL HC-4 STORAGE 216 10.7 1,280 MAX 2.4 55 72 WATER 190 170 0.15" 2.0' 2-WAY COIL REHEAT COIL	BOILER	BALANCING/ISOLATION VALVE  Image: Constraint of the second secon
HC-4 STORAGE 216 10.7 1,280 MAX 2.4 55 72 WATER 190 170 0.15 2.0 2-WAY COIL HC-5 STORAGE 216 19.5 1,370 MAX 2.5 55 72 WATER 190 170 0.15" 2.0' 2-WAY COIL REHEAT COIL		CFM CUBIC FEET/MINUTE
	HEAT EXCHANGER SCHEDULES	CO CLEANOUT
		CV CHECK VALVE
	SYMBOL MBH HOT COLD HOT COLD IN OUT IN OUT HOT COLD DESIGN BASIS PRODUCT	CW COLD WATER
	HX-1 229 H 2 0 PG 15.6 16.9 190 160 150 180 0.53 PSI 0.76 PSI BRAZE PLATE, 1-1/4"NPT	(D) DEMOLISH
FAN SCHEDULE		(E) EXISTING
		E/AEXHAUST AIRFCOFLOOR CLEANOUT $\otimes$
SYMBOL LOCATION CFM TOT EXT RPM FPM SIZE WHL USE HP /VOLTS / PH DESIGN BASIS PRODUCT		FDC FIRE DEPARTMENT CONNECTION
AHU-1 GARAGE 107 6,100 2.9 1.0 1,706 1,307 22.25 PLEN S/A 7.5/208/3 TRANE MODEL CSAA012UA, MIXING	TANK SCHEDULE	FDFLOOR DRAINID
	TOTAL	FLEXIBLE DUCT
AHU-1    GARAGE 107 6,100    2.9    1.0    1,706    1,307    22.25    PLEN    S/A    7.5/208/3    TRANE MODEL CSAA012UA, MIXING BOX W/ FILTER, HEATING COIL, COOLING COIL, S/A FAN SECTION 30"H PERFORATED PLENUM, FACTORY VFD, UC600 CONTROL, LCD, ENTHALPY CONTROL, MIN 0/A 3,390 CFM	SYMBOL FUNCTION MEDIUM GALLONS MATERIALS LABEL DESIGN BASIS PRODUCT	GS GLYCOL SUPPLYGS
MIN O/A 3,390 CFM	$(-) = (-1/2)^{\circ} SPIROVENT MODEL VIR150 COPPER CONFERENCE$	GR GLYCOL RETURNGR
	(E)AS-1AIRSEPARATORWATERBRASSI-1/2"SPIROVENTMODELVJR150COPPERCOALESCING(E)AS-2AIRSEPARATORWATERBRASSIntervent<	HB  HOSE BIBB    HC  HEATING COIL
RF-1 ROOF 6,100 0.5 515 E/A 1-1/2 /208/3 GREENHECK GB 300-VGD-15, VFD,	(E)AS-2 AIR SEPARATOR WATER BRASS MEDIUM, BRASS BODY, AUTO AIR VENT, 4.5 LBS	HC  HEATING COIL    HW  HOT WATER
	AS-3 AIR & DIRT 50% P.G BRASS 1-1/2" SPIROVENT VDR-150FT, COPPER COALESCING MEDIUM, BRASS BODY, AUTO AIR VENT, 9.0 LBS	HWC HOT WATER CIRCULATION
	(E)ET-1 FXPANSION WATER 6.0 STEEL/ FLEXCON MODEL HXT-60,	HWR  HEATING WATER RETURN  —HWR—
	(E)ET-1    EXPANSION    WATER    6.0    BUTYL     ACCEPTANCE VOLUME = 3.0      (E)ET-2    HYDRONIC    STEEL/     FLEXCON MODEL    HXT-60,      (E)ET-2    FXPANSION    WATER    6.0    BUTYL     ACCEPTANCE VOLUME = 3.0	HWS HEATING WATER SUPPLY
ROOF HOOD SCHEDULE	(E)ET-1HYDRONIC EXPANSIONWATER6.0STEEL/ BUTYLFLEXCON MODEL HXT-60, ACCEPTANCE VOLUME = 3.0(E)ET-2HYDRONIC EXPANSIONWATER6.0STEEL/ BUTYLFLEXCON MODEL HXT-60, ACCEPTANCE VOLUME = 3.0ET-4HYDRONIC EXPANSION50% P.G. 6.0STEEL/ BUTYLFLEXCON MODEL HXT-60, ACCEPTANCE VOLUME = 3.0	MOD MOTOR OPERATED DAMPER
	ET-4 EXPANSION 50% P.G. 6.0 BUTYL ACCEPTANCE VOLUME = 3.0 AXIOM MODEL MIX SAME REPORT OF A SAME AND A S	
SYMBOL  SERVICE  AIR  SP  THROAT AREA  CURB  CAP  VELOCITY    SYMBOL  SERVICE  CFM  IN  IN  IN  IN  VELOCITY	GT-1 GLYCOL MIX 50% P.G. 6.6 AXIOM MODEL MF200, POLYETHYLENE CONTAINER, PRV, DIAPHRAGM PUMP, LOW LEVEL ALARM, 50 W, 120 V, 1Ø	MOV  3-WAY MOTOR OPERATED VALVE  ₩    NIC  NOT IN CONTRACT
RH-1 AHU-1 0/A 6,100 0.087 38 x 38 44 x 44 608 GREENHECK MODEL FGI, ALUMINUM, WITH		NIC  NOT IN CONTRACT    O/A  OUTSIDE AIR
		PIPE ANCHOR $\sim$
	PUMP SCHEDULE	PIPE GUIDE ————————————————————————————————————
		POC POINT OF CONNECTION
gas fired heating unit schedule	SYMBOL  LOCATION  SERVICE  FLUID  GPM  HEAD  RPM  MOTOR  DESIGN  BASIS  PRODUCT	PRESSURE GAGE  Import    PRV  PRESSURE RELIEF VALVE  Import
SYMBOL TYPE FUEL MBH CEN DESIGN DASIS PRODUCT	(E)PMP-1 MECH BUILDING WATER 190 10.2 1/3 /120/1 GRUNDFOS UPS40-40/4	PRVPRESSURE RELIEF VALVEStateR/ARETURN AIR, RELIEF AIRState
SYMBOL TYPE FUEL IN OUT CFM RPM AMPS HP/VOLTS/PH DESIGN BASIS PRODUCT	(E)PMP-2 ROOM 3, HC-1 WATER 190 4.8 1/20 /120/1 TACO HEC-2, FLOW CHECK, EC MOTOR	RV RELIEF VALVE
GUH-1HORIZONTAL GUH-2UNIT HEATER GAS 100 80.5 1,900 2.1 1/8 /120/1 LENNOX MODEL LF24-100S, HORIZONTAL DISCHARGE, PROPELLER UNIT HEATER	$(D)PMP-3 \xrightarrow{\text{MECH}}{\text{ROOM}} UH-6A  WATER  190    =-  1/20  /120/1  CONSTANT  POWER  CONTROL$	RETURN AIR SLOT
	CDROOMS, HC=1Image: Constant former control(D)PMP-3MECH ROOMUH-6AWATER190Image: Constant former controlPMP-4MECH ROOMBUILDING VENTILATIONWATER19026.822Image: Constant former controlPMP-5MECH ROOMHC-250% PG18016.9191100 44002.5A/115/1TACOVR3452-FC1A01, ECM, 0-10VDCPMP-5MECH ROOMHC-250% PG18016.9191100 44002.5A/115/1TACOVR3452-FC1A01, ECM, 0-10VDC	RETURN/EXHAUST AIR REG. OR GRILLE
	PMP-4    MECH ROOM    BUILDING VENTILATION    WATER    190    26.8    22     0.68    120/1    TACO    VR15, EC    MOTOR, LEAD    LAG, LAG, D-10VDC      DUID F    MECH    MATER    190    26.8    22     0.68    120/1    TACO    VR15, EC    MOTOR, LEAD    LAG, D-10VDC    NOUT, PRESSURE    CONTROL      DUID F    MECH    MATER    190    26.8    1100    26.8    120/1    TACO    VR3452=EC1A01    ECM    0=10VDC	S SANITARY SOIL
	PMP-5 MECH ROOM HC-2 PG 180 16.9 19 1100 2.5A /115/1 TACO VR3452-FC1A01, ECM, 0-10VDC INPUT, PRESSURE CONTROL, LEAD/LAG	S/A  SUPPLY AIR    STRAINER WITH DRAIN VALVE
COOLING COIL SCHEDULE		
SYMBOL    LOCATION    TOTAL    CFM    VEL    EAT    LIQUID    PRESS.    DESIGN    DESIGN <th< th=""><th></th><th>STATIC PRESSURE SENSOR</th></th<>		STATIC PRESSURE SENSOR
		SUPPLY AIR SLOT W/FLEX DUCT
CC-1 GARAGE 107 153 MBH 6,100 500 75°F 115°F 133 MBH 6,100 MAX DX 55°F 45°F R-410A 0.02 PSI ALUMINUM, INTERTWINED CIRCUITS	AIR OUTLET SCHEDULE	SUPPLY AIR REG. GRILLE, OR DIFFUSER 🖉 🕂
	SYMBOL UNIT SIZE SCFM FINISH USE DESIGN BASIS PRODUCT	TW  TEMPERED WATER  —
		THERMALLY INSULATED DUCT OR PIPE  THERMOMETER
	B SEE SEE WHITE R/A PRICE MODEL 630L, ALUMINUM, 3/4" BLADE SPACING, 35 DEGREE DEFLECTION,	THERMOMETERT'STATTHERMOSTATT
CONDENSING UNIT SCHEDULE	A    PLAN    PLAN    POWDER    S/A    S/A    POSITION    ADJUSTMENT, DUCT    MOUNT      B    SEE    SEE    SEE    WHITE    R/A    PRICE    MODEL    630L, ALUMINUM, 3/4"    BLADE    SPACING, 35    DEGREE    DEFLECTION,      B    PLAN    PLAN    POWDER    R/A    PRICE    MODEL    630L, ALUMINUM, 3/4"    BLADE    SPACING, 35    DEGREE    DEFLECTION,      C    SEE    SEE    WHITE    S/A    PRICE    MODEL    620, DOUBLE    DEFLECTION, 3/4"    BLADE    SPACING, FRONT    BLADES    PARALLEL      C    SEE    SEE    WHITE    S/A    PRICE    MODEL    620, DOUBLE    DEFLECTION, 3/4"    BLADE    SPACING, FRONT    BLADES    PARALLEL      C    PLAN    PLAN    POWDER    S/A    TO <long< td="">    DIMENSION.    WALL    OR    DUCT    MOUNT    AS    SHOWN.</long<>	T'STATRETURN AIR THERMOSTATII
SYMBOL  TONS  ARI NET  EDB  LDB  UNIT  FLUID  MCA  ELECTRICAL    MFS  VOLTS/PH  DESIGN  BASIS  PRODUCT	Y IPLAN IPLAN IPOWDERI 7/1 TO LONG DIMENSION. WALL OR DUCT MOUNT AS SHOWN.	UNION ——II——
CU-1 12.5 MBH 67'F 95'F 2 SCROLL R-410A 55 12.4 70 208/3 TRANE MODEL TTA15043D, MODULATING LOW AMB. KIT, COMPRESSOR ANTI-SHORT CYCLE TIMER,		V      VENT
CU-1 12.5 150 80°F 55°F 2 SCROLL R-410A 55 MBH 67°F 95°F 1 FAN 12.4 70 208/3 CRANK CASE HEATER, RAWAL APR CONTROL, STEEL SPRING ISOLATOR		VTR VENT THRU ROOF
SPRING ISOLATOR		WCO  WALL CLEANOUT    W  WASTE
		THIS IS A STANDARD LEGEND, SOME SYMBOLS SHOWN ON LEGEND
Fan Sound Power Schedule		ARE NOT NECESSARILY ON THE DRAWING.

	Fan schedule													
SYMBOL	LOCATION	CFM	S. TOT	P. EXT	RPM	O.V. FPM	TY SIZE		USE	MOTOR HP/VOLTS/PH	DESIGN BASIS PRODUCT			
AHU-1	GARAGE 107	6,100	2.9	1.0	1,706	1,307	22.25	PLEN	S/A	7.5/208/3	TRANE MODEL CSAA012UA, MIXING BOX W/ FILTER, HEATING COIL,			
											COOLING COIL, S/A FAN SECTION			
											TRANE MODEL CSAA012UA, MIXING BOX W/ FILTER, HEATING COIL, COOLING COIL, S/A FAN SECTION 30"H PERFORATED PLENUM, FACTORY VFD, UC600 CONTROL, LCD, ENTHALPY CONTROL, MIN 0/A 3,390 CFM			
RF-1	ROOF	6,100	0.5		515				E/A	1-1/2 /208/3	GREENHECK GB 300-VGD-15, VFD, 0-10VDC INPUT, ROOF FAN			

SYMBOL	SERVICE	AIR CFM	SP IN	THROAT AREA IN x IN	CURB CAP IN x IN	VELOCITY	DESIGN BASIS PRODUCT
RH-1	AHU-1 0/A	6,100	0.087	38 x 38	44 x 44	608	GREENHECK MODEL FGI, ALUMINUM, WIT 1/2" BIRD SCREEN

				GA	s fif	red I	HEAT	'ING	UNIT	SCHE
SYMBOL	TYPE	FUEL	MI IN	3H OUT	CFM	RPM	TOTAL AMPS		OTOR OLTS/PH	DI
GUH-1 GUH-2	HORIZONTAL UNIT HEATER	GAS	100	80.5	1,900		2.1	1/8	/120/1	LENNO) HORIZC

	COOLING COIL SCHEDULE														
SYMBOL	LOCATION RELATED SYSTEM	TOTAL SENSIBLE	CFM	VEL FPM	TYPE	EAT LAT	LIQUID SUCTION	FLUID	PRESS. DROP	DESIGN BASIS PRODUCT					
CC-1	GARAGE 107 AHU—1	153 MBH 133 MBH	6,100	500 MAX	DX	75°F 55°F	115°F 45°F	R-410A	0.02 PSI	I4 ROW, 1/2″ DIA, 94 FPF & ALUMINUM, INTERTWINED CIRCUITS					
L					1	1									

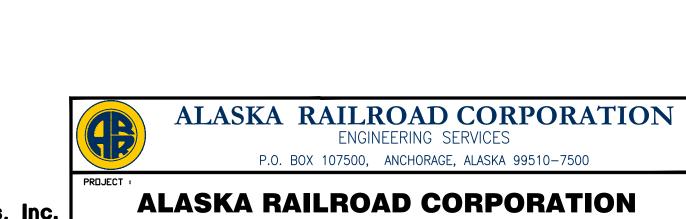
	CONDENSING UNIT SCHEDULE														
SYMBOL	TONS	ARI NET		LDB AMB.	UNIT CONFIG.	FLUID IEER	4	ELECTRICAL VOLTS/PH	DESIGN BASIS PRODUCT						
CU-1	12.5	150 MBH	80°F 67°F	55°F 95°F	2 SCROLL 1 FAN	R-410A 12.4	55 70	208/3	TRANE MODEL TTA15043D, MODULATING LOW AMB. KIT, COMPRESSOR ANTI-SHORT CYCLE TIMER, CRANK CASE HEATER, RAWAL APR CONTROL, STEEL SPRING ISOLATOR						

	Fan Sound Power Schedule																		
OCTAVE BAND FREQUENCY OCTAVE BAND FREQUENCY																			
		1	2	3	4	5	6	7	8		1	2	3	4	5	6	7	8	
SYSTEM	FAN	63	125	250	500	1K	2K	4K	8K	FAN	63	125	250	500	1K	2K	4K	8K	
AHU-1	SF-1	74	74	70	77	70	69	66	53	RF-1	78	81	73	63	60	57	50	46	

				BOIL	LER (	SCHEDU	LE				Legend & Abbreviatio	ns
	Ţ		AGA	GROSS	, <u> </u>					ABBR.	EXPLANATION	SYMBOL
SYMBOL	ТҮРЕ	FLUID (%) FUEI		OUTPUT				SIGN BASIS PRODUCT		AAV	AUTOMATIC AIR VENT	
				MBH	HP	VOLTS/PH				AFF	ABOVE FINISHED FLOOR	·
(E) B-1	CAST IRON BOILER	H20 GAS	305	247		120/1	WEIL NO	CLAIN PFG-06		BDD	BACKDRAFT DAMPER	
<u> </u>	CAST IDON				+		WFIL MC	CLAIN PFG-06		BD	BALANCING DAMPER	
(E) B-2	BOILER	H20 GAS	305	247		120/1					BALANCING/ISOLATION VALVE	
	<u></u>										BALL VALVE	
										CFM	CUBIC FEET/MINUTE	
				AT EX(		NGER SO	.CHED(			CO	CLEANOUT	
										CV	CHECK VALVE	/
SYMBOL				HOT TEMP		LD TEMP.PR I OUT F	<u>RESS. DRO</u> HOT COL		RODUCT	CW	COLD WATER	<u> </u>
										(D)	DEMOLISH	
HX-1	229 H 2 C	0 PG 15.6	6 16.9 1	190 160	50   150	0 180 0.5	<u>53 PSI 0.76</u>	PSI BRAZE PLATE, 1–1/4"NPT	· <b>L</b> ·	(E)	EXISTING	
										E/A	EXHAUST AIR	
										FCO	FLOOR CLEANOUT	 ⊗
										FDC	FIRE DEPARTMENT CONNECTION	
				taf	NK S'	CHEDUL	LE			FD	FLOOR DRAIN	
		<u> </u>	T								FLEXIBLE DUCT	
			TOTAL VOLUME							GS	GLYCOL SUPPLY	GS
SYMBOL	FUNCTION	MEDIUM	GALLON		IALS   L/	.ABEL	DESIGN	BASIS PRODUCT	I	GG	GLYCOL RETURN	GR
(-)،2-1				BRASS			72" SPIR	ROVENT MODEL VJR150, COPPE ASS BODY, AUTO AIR VENT, 4.5	R COALESCING	HB	HOSE BIBB	
	AIR SEPARAT						<u>,UM, BKA:</u> , 77" SPIF	<u>S BODY, AUTU AIK VENT, 4.0</u>	DEP COALESCING	НВ	HEATING COIL	
	AIR SEPARAT	ORWATER		BRASS			<u>IUM, BRA</u> S	ROVENT MODEL VJR150, COPPE ASS BODY, AUTO AIR VENT, 4.5	) LBS	HW	HOT WATER	
AS-3	AIR & DIRT SEPARATOR	50% P.G.	.	BRASS	-	1-1 MEDI	1/2" SPIR( DIUM, BRAS	ROVENT_VDR—150FT, COPPER_C ASS_BODY, AUTO_AIR_VENT, 9.0		HWC	HOT WATER CIRCULATION	
	HYDRONIC EXPANSION	WATER	6.0	STEEL/	/	FLEX	<u>XCON MO</u> L	DEL HXT-60, VOLUME = $3.0$		HWR	HEATING WATER RETURN	HWR
(E)ET-1				<u>BUTYĽ</u> STEEL/	7	AUUR FLE	PTANCE	$\frac{\text{VOLUME}}{\text{DEL}} = 3.0$		HWR	HEATING WATER SUPPLY	——HWR—— ——HWS——
(E)ET-2	HYDRONIC EXPANSION	WATER	6.0	BUTYĽ			EPTANCE	DEL HXT-60, VOLUME = $3.0$		MOD	MOTOR OPERATED DAMPER	
ET-4	HYDRONIC EXPANSION	50% P.G.	. 6.0	STEEL/ BUTYL	-	FLEX ACCE	XCON MOE EPTANCE Y	DEL HXT-60, VOLUME = 3.0	I	MOD	2-WAY MOTOR OPERATED DAMPER	
o <del>.</del> .	GLYCOL MIX						JM_ <u>MODE</u> L	L MF200, POLYETHYLENE CONTA PUMP, LOW LEVEL ALARM, 50 V	AINER, PRV,			× ×
GT-1	TANK	50% P.G.	. 6.6		<u> </u>	DIAPI	HRAGM P	UMP, LOW LEVEL ALARM, DU	<u>W, 120 V, 1ø</u>	MOV	3-WAY MOTOR OPERATED VALVE	
										NIC		
										O/A		
											PIPE ANCHOR	
				PU	IMP (	SCHEDU	儿臣		I			
			FLUID	חו					——————————————————————————————————————	POC	POINT OF CONNECTION	
SYMBOL	LOCATION	SERVICE		TEMP. GPN	PM HEAI FT.	AD RPM H	MOTOR HP/VOLTS		RODUCT		PRESSURE GAGE	
(E)PMP-1	1 MECH ROOM	BUILDING HEAT		190 10.		1,	1/3 /120/		+ The second sec	PRV	PRESSURE RELIEF VALVE	
								/ 3 SPEED	OK FO MOTOR	R/A	RETURN AIR, RELIEF AIR	
(E)PMP-2		UH-1 TO 3, HC-1	WATER 19	190 4.8	.8	1,	1/20 /120		ROL	RV	RELIEF VALVE	\$
(D)PMP-3		UH-6A	WATER 19	190 ––	-	-    1,	1/20 /115		CK, EC MUIUR		RETURN AIR SLOT	
PMP-4	MECH ROOM	BUILDING VENTILATION	WATER 19	190 26.	6.8 22	> 0	).68 /120		LEAD / LAG,		RETURN/EXHAUST AIR REG. OR GRILLE	
	ROOM MECH							<u>/'  0-10VDC IN/UUI, μκες</u> ΤΔΟΟ VR3452-FC1A01.	SURE CUNIKUL	S S/A	SANITARY SOIL	
PMP-5	MECH ROOM	HC-2	50% 18 PG 18	180 16.	6.9 19	$\begin{array}{c} 1100\\4400\end{array}$ 2.	2.5A /115,	5/1 TACO VR3452-FC1A01, E INPUT, PRESSURE CONTR	RŎĽ, ĽĔADŹĽĂĞ	S/A		
-			Í I				-		I		STRAINER WITH DRAIN VALVE	
			·	I		<u>.</u>		l		SL	ACOUSTICALLY LINED DUCT	
											STATIC PRESSURE SENSOR	<u>SP</u>
				air oi	יו עצע עי	et sche	iemin F				SUPPLY AIR SLOT W/FLEX DUCT	
·			<del></del>				<u>2005</u>		——————————————————————————————————————		SUPPLY AIR REG. GRILLE, OR DIFFUSER	
SYMBOL	UNIT SIZE S		USE				DESIGN	BASIS PRODUCT	I	TW	TEMPERED WATER	TW
				NOF MODE	ARCD				——————————————————————————————————————		THERMALLY INSULATED DUCT OR PIPE	
		EE WHITE LAN POWDER	<u>, X   S/A   3' </u> ř	<u>    Positijon    </u> 7	<u>ADJŲŠŤ</u>	MENT, DUCT	<u>MOŬŇŤ</u>	S, NECK SIZE SEE DRAWING,			THERMOMETER	
B	SEE SE	EE WHITE LAN POWDER	R   R / A   DUC	JCT MOUNT	L 630L, T	, ALUMINUM,	, 3/4 BLA	ADE SPACING, 35 DEGREE DEFLE	ECTION,		THERMOSTAT	1
		EE WHITE LAN POWDER	- S/A PR'		L_620,	DOUBLE DE	FLECTION,	3/4" BLADE SPACING, FRONT BI	JLADES PARALLEL	T'STAT		
$\sim$	<u>PLAN IFL</u>	AN IYUWULP		<u>LONG WIN</u>	<u>/ENSIUN</u>	<u>I. WALL UP</u>	<u> </u>	OUNT AS SHOWN.	<b>_</b>		UNION	
										V	VENT	T
										VTR	VENT THRU ROOF	<b>₽</b>
										WCO	WALL CLEANOUT	
										W	WASTE	1
										THIS IS /	A STANDARD LEGEND, SOME SYMBOLS SHOW	<b>VN ON LEGEN</b>

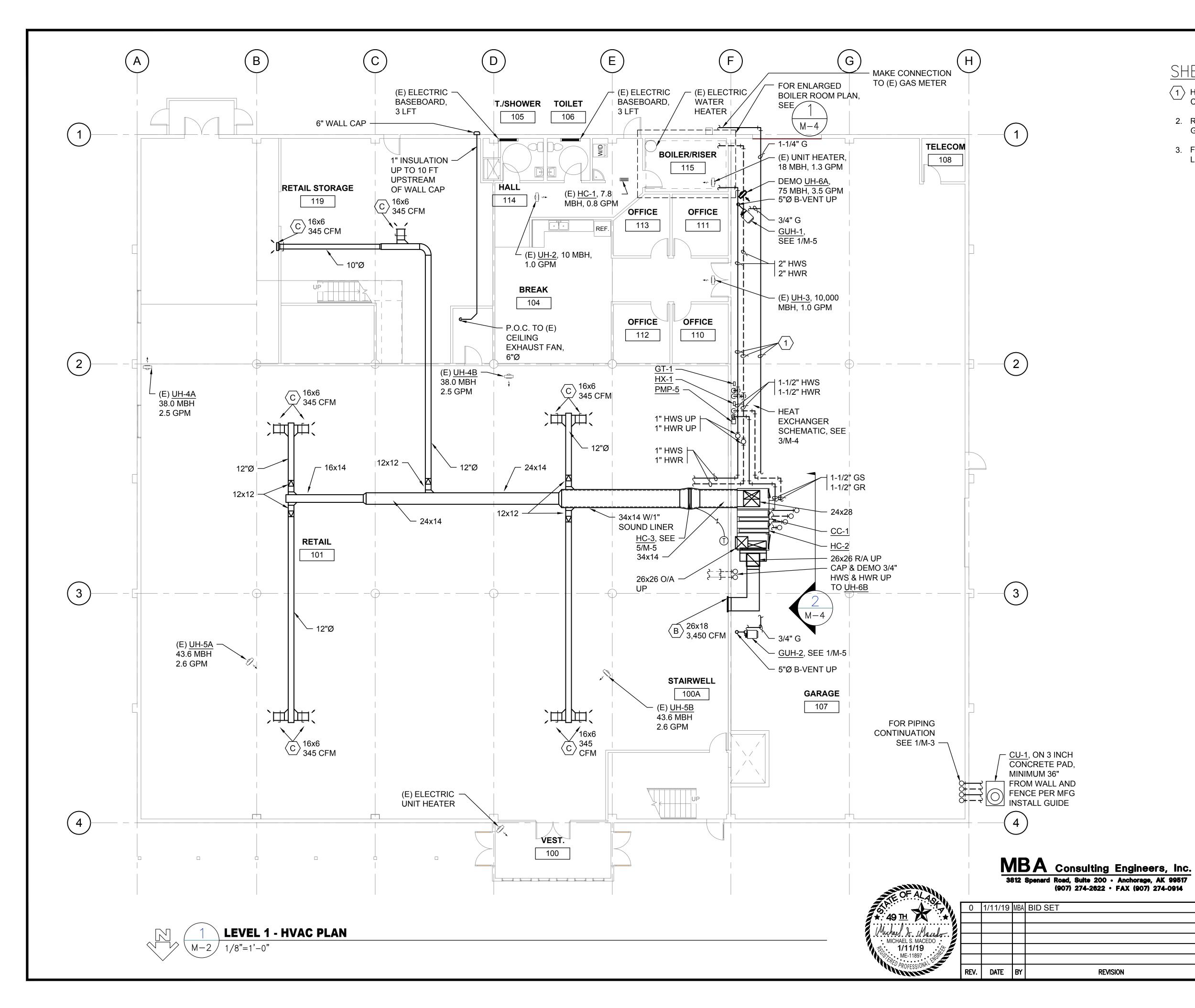
BOILER SCHEDULE		Legend & Abbreviatio	NS
AGA GROSS	ABBR.	EXPLANATION	SYMBOL
FLUID INPUT OUTPUT MOTOR	AAV	AUTOMATIC AIR VENT	<u> </u>
SYMBOL TYPE (%) FUEL MBH MBH HP VOLTS/PH DESIGN BASIS PRODUCT	AFF	ABOVE FINISHED FLOOR	
(E) B-1 CAST IRON H20 GAS 305 247 120/1 WEIL MCLAIN PFG-06			
S BOILER	BDD	BACKDRAFT DAMPER	
(E) B-2 CAST IRON H20 GAS 305 247 120/1 WEIL MCLAIN PFG-06	BD		
BOILER 120 0A3 303 247 12071		BALANCING/ISOLATION VALVE	
		BALL VALVE	
	CFM	CUBIC FEET/MINUTE	
HEAT EXCHANGER SCHEDULES	CO	CLEANOUT	
FLUID GPM HOT TEMP. COLD TEMP. PRESS. DROP	CV	CHECK VALVE	
SYMBOL MBH HOT COLD HOT COLD IN OUT IN OUT HOT COLD DESIGN BASIS PRODUCT	CW	COLD WATER	
	(D)	DEMOLISH	
$HX-1$ 229 $H_2O$ $PG''$ 15.6 16.9 190 160 150 180 0.53 PSI 0.76 PSI BRAZE PLATE, $1-1/4"$ NPT	(E)	EXISTING	
	E/A	EXHAUST AIR	
	FCO	FLOOR CLEANOUT	8
	FDC	FIRE DEPARTMENT CONNECTION	
TANK SCHEDULE	FD	FLOOR DRAIN	
		FLEXIBLE DUCT	
	GS	GLYCOL SUPPLY	GS-
SYMBOL FUNCTION MEDIUM VOLUME GALLONS MATERIALS LABEL DESIGN BASIS PRODUCT			
	GR	GLYCOL RETURN	
E)AS-1 AIR SEPARATOR WATER BRASS <u>MEDIUM, BRASS BODY, AUTO AIR VENT, 4.5 LBS</u> E)AS-2 AIR SEPARATOR WATER BRASS <u>MEDIUM, BRASS BODY, AUTO AIR VENT, 4.5 LBS</u> E)AS-2 AIR SEPARATOR WATER BRASS <u>MEDIUM, BRASS BODY, AUTO AIR VENT, 4.5 LBS</u>	HB	HOSE BIBB	
E)AS-2 AIR SEPARATOR WATER BRASS MEDIUM, BRASS BODY, AUTO AIR VENT, 4.5 LBS	HC	HEATING COIL	
A A A A A A A A A A A A A A A A A A A	HW	HOT WATER	
AS-3 <u>SEPARATOR</u> 50% P.G BRASS MEDIUM, BRASS BODY, AUTO AIR VENT, 9.0 LBS	HWC	HOT WATER CIRCULATION	
E)ET-1 EXPANSION WATER 6.0 STEEL/ FLEXCON MODEL HXT-60, BUTYL ACCEPTANCE VOLUME = 3.0	HWR	HEATING WATER RETURN	HWR-
E)ET-2 EXPANSION WATER 6.0 STEEL/ FLEXCON MODEL HXT-60, BUTYL ACCEPTANCE VOLUME = 3.0	HWS	HEATING WATER SUPPLY	HWS-
	MOD	MOTOR OPERATED DAMPER	
$\frac{\text{ET}-4}{\text{EXPANSION}} = \frac{50\% \text{ P.G.}}{50\% \text{ P.G.}} = \frac{6.0}{\text{BUTYL}} = 11200000000000000000000000000000000000$	MOV	2-WAY MOTOR OPERATED VALVE	₩
GT-1 GLYCOL MIX 50% P.G. 6.6 AXIOM MODEL MF200, POLYETHYLENE CONTAINER, PRV, DIAPHRAGM PUMP, LOW LEVEL ALARM, 50 W, 120 V, 10	MOV	3-WAY MOTOR OPERATED VALVE	
	NIC	NOT IN CONTRACT	
	O/A	OUTSIDE AIR	
		PIPE ANCHOR	——————————————————————————————————————
		PIPE GUIDE	
PUMP SCHEDULE	POC	POINT OF CONNECTION	
SYMBOL LOCATION SERVICE FLUID GPM HEAD RPM HEAD RPM DESIGN BASIS PRODUCT		PRESSURE GAGE	
ITTE IEMP. ITTE IEMP. IFI.   HP/VOLIS/PH	PRV	PRESSURE RELIEF VALVE	
E)PMP-1 MECH BUILDING WATER 190 10.2 = 1/3 /120/1 GRUNDFOS UPS40-40/4	R/A	RETURN AIR, RELIEF AIR	
ENDLE A MECH UH-1 TO WATER 400 A A LOUID - 400 (400 (400 (400 CHEC-2 FLOW CHECK FC MOTOR)	RV	RELIEF VALVE	
$\frac{1}{1} = \frac{1}{1} = \frac{1}$		RETURN AIR SLOT	
D)PMP-3 MECH UH-6A WATER 190 == 1/20 /115/1 TACO HEC-2, FLOW CHECK, EC MOTOR CONSTANT POWER CONTROL		RETURN/EXHAUST AIR REG. OR GRILLE	
PMP-4 MECH BUILDING WATER 190 26.8 22 = 0.68 /120/1 TACO VR15, EC MOTOR, LEAD / LAG, VENTILATION WATER 190 26.8 22 = 0.68 /120/1 0-10VDC IN/OUT, PRESSURE CONTROL	6		
PMP-4MECH ROOMBUILDING VENTILATIONWATER19026.8220.68/120/1TACOVR15, ECMOTOR, LEADLAG, LAG, O-10VDCPMP-5MECH ROOMHC-250% PG18016.9191100 44002.5A/115/1TACOVR3452-FC1A01, ECM, O-10VDC	S S/A	SANITARY SOIL	
PMP-5 MECH ROOM HC-2 50% 180 16.9 19 1100 2.5A /115/1 TACO VR3452-FC1A01, ECM, 0-10VDC INPUT, PRESSURE CONTROL, LEAD/LAG	S/A		
		STRAINER WITH DRAIN VALVE	'¥
	SL	ACOUSTICALLY LINED DUCT	É
		STATIC PRESSURE SENSOR	<del>SP</del>
		SUPPLY AIR SLOT W/FLEX DUCT	
AIR OUTLET SCHEDULE		SUPPLY AIR REG. GRILLE, OR DIFFUSER	<del>ا</del> ک
SYMBOL UNIT SIZE SCFM FINISH USE DESIGN BASIS PRODUCT	TW	TEMPERED WATER	TW-
/ SEE SEE WHITE AL DRICE MODEL ADOD ALLIMINIUM A CONICE NEOR SIZE SEE DAMAINO		THERMALLY INSULATED DUCT OR PIPE	
A SEE SEE WHITE S/A PRICE MODEL ARCD, ALUMINUM, 4 CONES, NECK SIZE SEE DRAWING, PLAN PLAN POWDER S/A POSITION ADJUSTMENT, DUCT MOUNT		THERMOMETER	
B SEE SEE WHITE R/A PRICE MODEL 630L, ALUMINUM, 3/4" BLADE SPACING, 35 DEGREE DEFLECTION, DUCT MOUNT	T'STAT	THERMOSTAT	Ū
C PLAN PLAN POWDER ' DOCT MOUNT C SEE SEE WHITE S/A PRICE MODEL 620, DOUBLE DEFLECTION, 3/4" BLADE SPACING, FRONT BLADES PARALLEL PLAN PLAN POWDER S/A TO LONG DIMENSION. WALL OR DUCT MOUNT AS SHOWN.	T'STAT	RETURN AIR THERMOSTAT	
C SEE SEE WHITE S/A PRICE MODEL 620, DOUBLE DEFLECTION, 3/4" BLADE SPACING, FRONT BLADES PARALLEL PLAN POWDER S/A TO LONG DIMENSION. WALL OR DUCT MOUNT AS SHOWN.		UNION	
	V	VENT	·
	VTR	VENT THRU ROOF	
	WCO	WALL CLEANOUT	ĭ
	WCC	WALL CLLANOUT	
			1





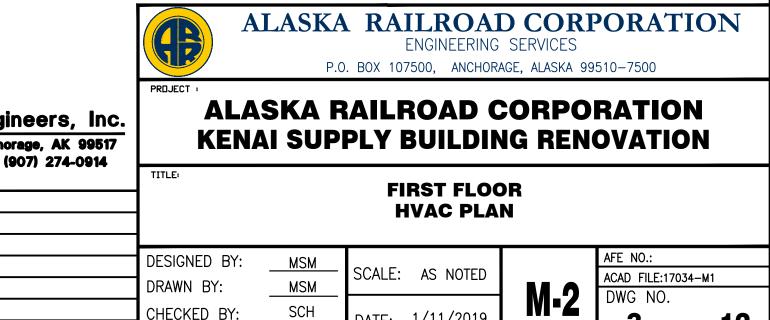
**KENAI SUPPLY BUILDING RENOVATION** 

• FAX (90/) 2/4-0914											
	MECHANICAL LEGEND & SCHEDULES										
	DESIGNED BY:	MSM			AFE NO.:						
			SCALE: AS NOTED		ACAD FILE:17034-M-1						
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## SHEET NOTES:

- $\langle 1 \rangle$  HEATING AND GAS LINES SHOWN DIAGRAMMATICALLY FOR CLARITY. ROUTE LINES ON WALL.
- 2. ROUTE NEW DUCTWORK IN RETAIL EXPOSED, UNDER CEILING GRID.
- 3. FIELD VERIFY SPRINKLER HEAD AND SECURITY CAMERA LOCATIONS. ADJUST DUCT ROUTING TO AVOID OBSTRUCTIONS.



DATE: 1/11/2019

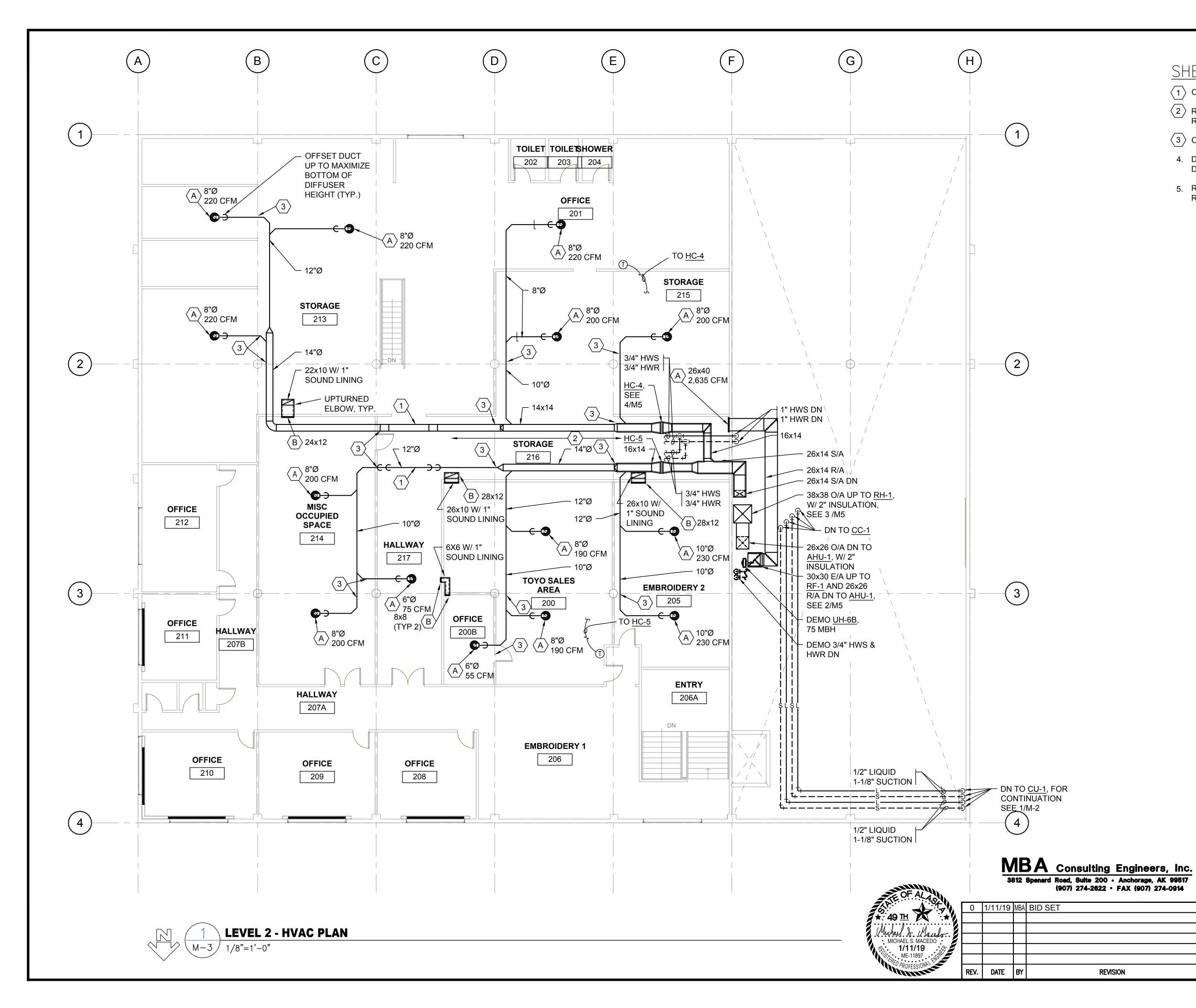
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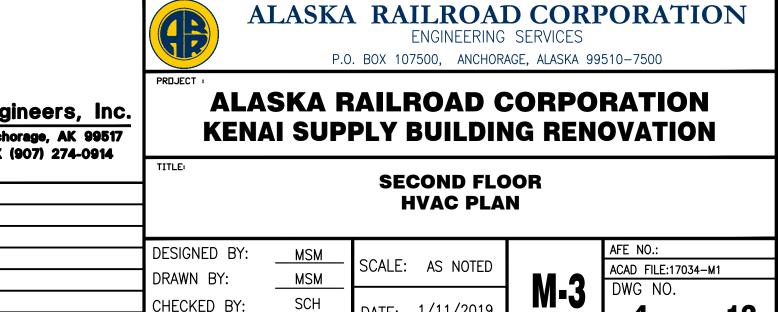
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# SHEET NOTES:

 $\langle 1 \rangle$  OFFSET DUCTWORK OVER LIGHTS RUNNING DOWN HALLWAY 217.

- $\langle 2 \rangle$  RELOCATE SPRINKLER HEADS AND BRANCHES IN STORAGE 216 AS REQUIRED TO RUN DUCT MAINS.
- $\langle 3 \rangle$  OFFSET UNDER BEAM, THIS LOCATION.
- 4. DUCTWORK SHALL BE ROUTED TIGHT TO BEAMS. BOTTOM OF DUCT SHALL REMAIN HIGHER THAN 7-6" PER IBC.
- 5. RECONFIGURE SPRINKLER BRANCH LINES AND HEADS AS REQUIRED TO ACCOMMODATE HVAC SYSTEM.



DATE: 1/11/2019

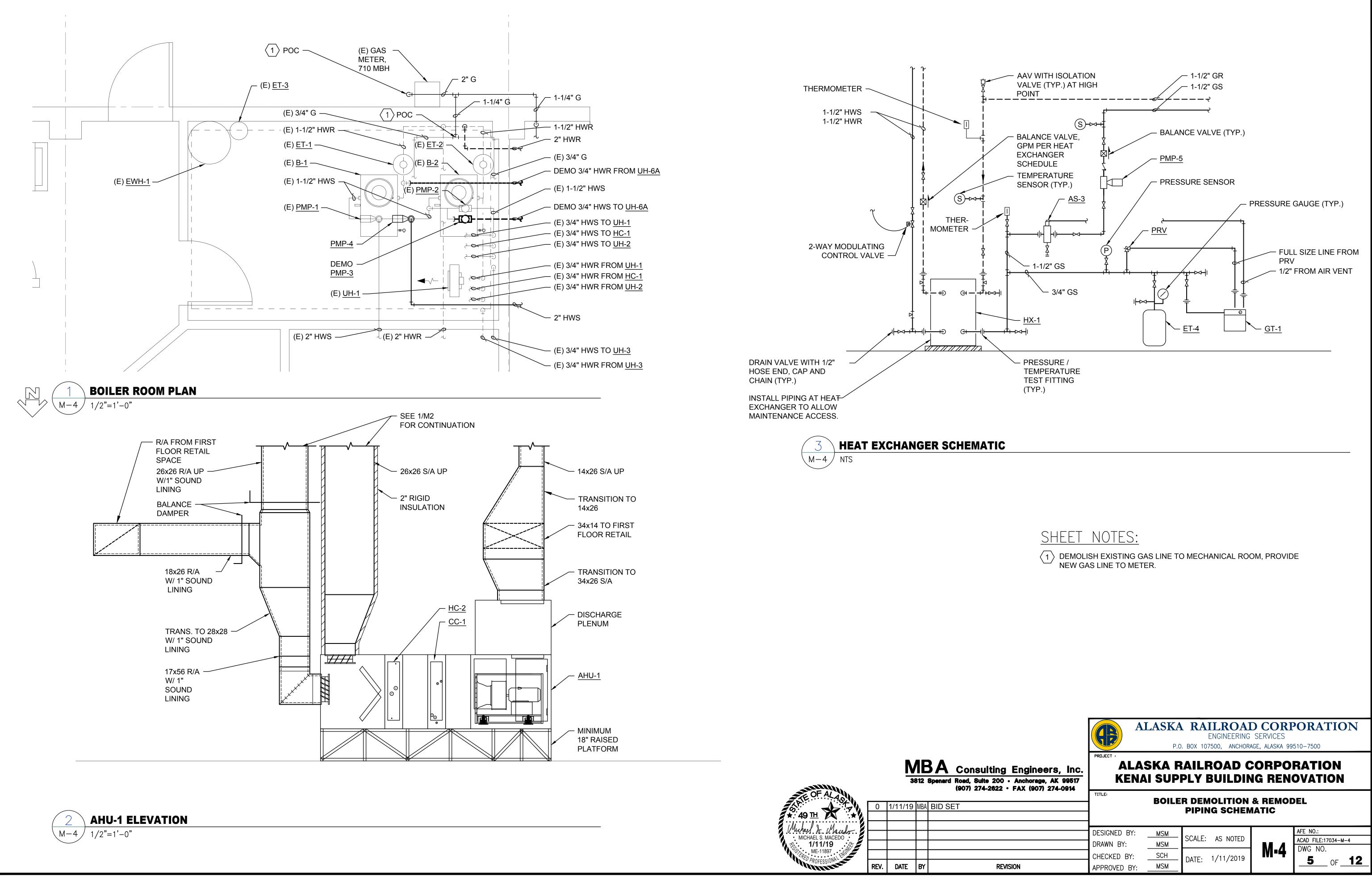
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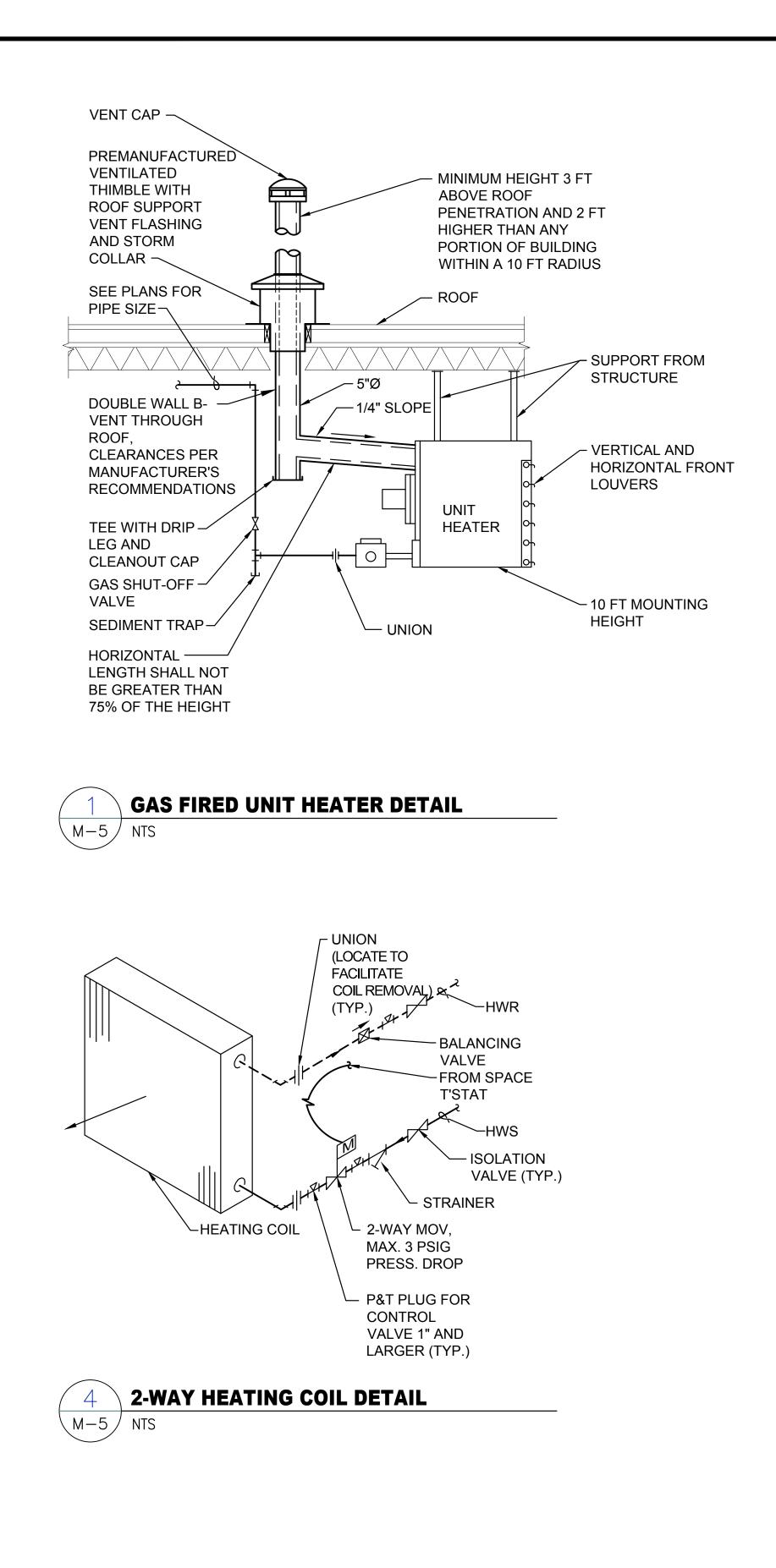
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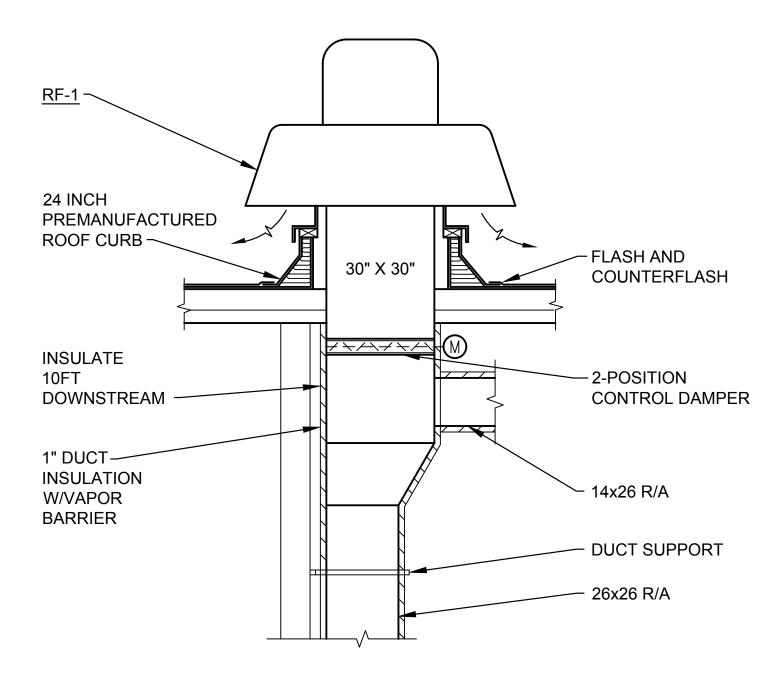
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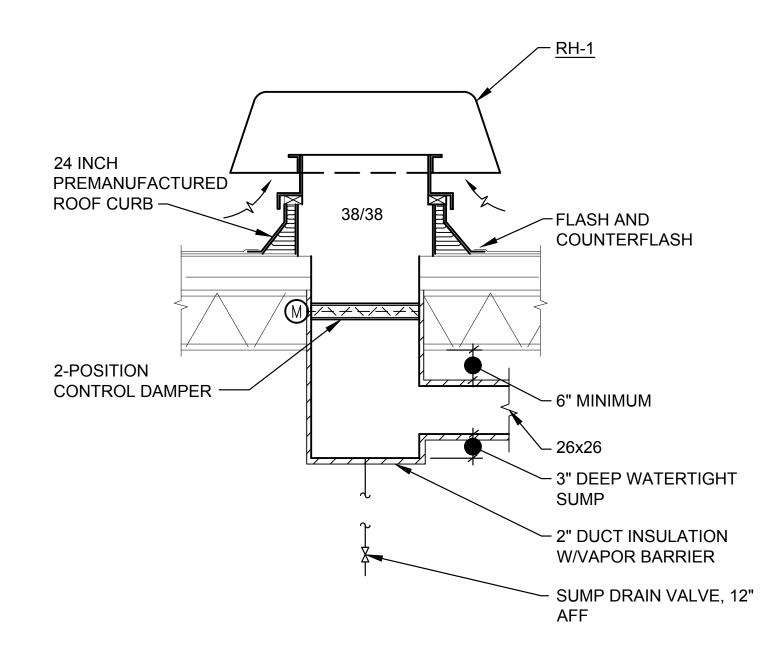
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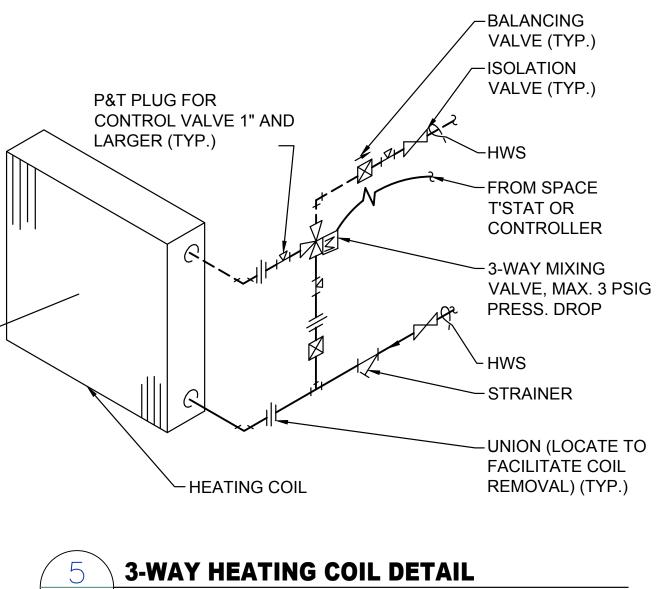
REVISION













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		ENGINEERING	<b>D CORPORATION</b> SERVICES AGE, ALASKA 99510–7500	1
Engineers, Inc. • Anchorage, AK 99517 • FAX (907) 274-0914			CORPORATION	
	TITLE	DETAILS		
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ISION	APPROVED BY:	MSM			01

#### **DIVISION 15 - MECHANICAL**

#### PART 1 - GENERAL

- 1.1 WORK INCLUDED
  - A. Work consists of providing labor, products, and in performing all operations required for the complete operating installation of all mechanical systems as shown and specified, in strict accordance with specifications, applicable drawings, terms, and conditions of the contract and all applicable codes and ordinances governing installation of the various mechanical systems. Correlate all work fully with the work of other crafts. Provide all systems complete and in proper operating order.
- 1.2 REGULATORY REQUIREMENTS
  - A. Comply with all applicable local, state, and national codes, ordinances and regulations in existence at bid date affecting materials and methods of installation of the mechanical systems. Follow recommended practices as set down by ASME, SMACNA, International Building Code, International Mechanical Code. Uniform Plumbing Code. International Fire Code, National Electrical Code, AGA, and OSHA as they apply to this project except in cases where statutes govern.
- 1.3 MANUFACTURER'S WARRANTIES
  - A. In the event of equipment or component failure, it is the Contractor's responsibility to repair or replace such defective equipment or components and bear all associated costs. The Contractor shall pursue Manufacturer's written implied warranties to the extent necessary to obtain replacement equipment or components prior to any other action being initiated.
- 1.4 ELECTRICAL WORK
  - A. All wiring shall be in accordance with NEC, State and Local Codes.
- 1.5 TESTS AND INSPECTIONS
  - A. Schedule, obtain, and pay all fees and/or services required by local authorities and by these specifications, to test the mechanical systems as specified.
  - B. Deficiencies: Immediately correct all deficiencies, which are evidenced during the tests and repeat tests until system is approved. Do not cover or conceal piping, equipment, or other portions of the mechanical installations until satisfactory tests are made and approved.
  - C. Completion: Upon completion of the mechanical installation, demonstrate to the contracting agency's satisfaction that the systems have been installed in a satisfactory manner in accordance with the plans, specifications, and applicable codes. Demonstrate dynamic operation of all systems. Show that all controls are operable and are properly adjusted in accordance with the requirements of the final systems balance, that all systems are properly balanced, that all equipment operates properly, that filters and strainers are clean, and that all components of all systems are installed and adjusted for proper operation.

- 1.6 PROJECT/SITE CONDITIONS
  - A. Install work in locations shown on drawings, unless prevented by project conditions.
  - B. Provide information showing proposed rearrangement of work to meet project conditions, including changes to work specified in other sections or interference with site conditions not in the contract. Obtain permission of Owner before proceeding.
- 1.7 SUBMITTALS
  - A. Submittal review is for general design and arrangement only and does not relieve the contractor from any requirements of contract documents. Provision of a complete and satisfactory working installation is the sole responsibility of the contractor.
  - B. Submittals shall be made in accordance with Division 1 requirements.
- 1.8 OPERATION AND MAINTENANCE MANUALS
  - A. Provide Operation and Maintenance (O&M) Manuals for training of and future reference by, Owner's personnel in operation and maintenance of systems and related equipment. Bind each manual in a hard-backed, loose-leaf, three-ring binder. Use 8-1/2" x 11" white paper.
  - B. Submittal of O&M Manuals shall be made in accordance with Division 1 requirements.
- 1.9 SEISMIC RESTRAINT
- A. Contractor shall submit structural calculations and structurally engineered shop drawings for seismic restraint of all new mechanical components and equipment, including ductwork and piping. Calculations to be performed in accordance with the requirements of Chapter 16 of the 2012 International Building Code and are to be stamped by a registered professional structural engineer licensed in the State of Alaska.
- B. Seismic Restraint design to be based on Seismic Occupancy Category II and Seismic Design Category D.
- PART 2 PRODUCTS

#### 2.1 SUPPORTS AND ANCHORS

- 2.1.1 PIPE HANGERS AND SUPPORTS
  - A. Hangers for pipe sizes 1/2 to 1-1/2 inch: Adjustable swivel, loop hanger.
  - B. Hangers for pipe sizes 2 to 4 inches: Adjustable, swivel.
  - C. Michigan Hanger Co. Model No. 100 for steel and plastic and Model #101 for copper pipe.
  - D. Piping support spacing per Uniform Plumbing Code.
  - E. Install hangers to provide minimum  $\frac{1}{2}$  inch space between finished covering and adjacent work. Place a hanger within 12 inches of each horizontal elbow. Use hangers with 1-1/2 inch minimum vertical adjustments.
- 2.1.2 HANGER RODS
  - A. Steel hanger rods: Threaded both ends, threaded one end, or continuous threaded.

#### 2.1.3 SLEEVES

- Acrylic sealant.
- insulation wrapping.
- - eight feet on center.
  - feet on center.
- 2.2 MECHANICAL IDENTIFICATION

2.2.1 EQUIPMENT

A. Plastic Nameplates: color.

### 2.2.2 VALVES AND PUMPS

A. Plastic Tags: Laminated three-layer plastic with engraved white letters on dark contrasting background color. Tag size minimum of 1-1/2 inch diameter.

#### A. Sleeves for piping and ductwork through non-fire rated floors, beams, walls, footings, and potentially wet floors: Form with steel pipe or 18 gauge galvanized steel. Extend sleeves through floors one inch above finished floor level. Caulk sleeves full depth and provide floor plate. Where piping or ductwork penetrates ceiling or wall, close off space between pipe or duct and adjacent work with fire-stopping insulation and caulk seal airtight. Provide close fitting metal collar or escutcheon covers at both sides of penetration. Fire stopping insulation: Glass fiber type, non-combustible. Caulk:

B. Sleeves for pipes through fire rated and fire resistive floors and walls, and fireproofing: Prefabricated fire rated sleeves including seals, UL listed.

C. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous

D. Install chrome-plated steel escutcheons at finished surfaces.

#### 2.1.4 DUCTWORK HANGERS AND SUPPORTS

A. Ducts 24 inches and less: Provide with one inch x 18 gauge straps fastened to ductwork and to building construction. Space not more than eight feet on center.

B. Ducts 25 inches through 42 inches: Provide mild steel rods fastened to angle iron stiffeners with nuts and to building construction with appropriate inserts, flanges, or clamps. Space not more than

C. Ducts over 42 inches: Fasten hanger rods to angle stiffeners not more than four

D. Recommended methods of fastening bracing to ductwork, include riveting, bolting, and tack welding.

Laminated three-layer plastic with engraved white letters on dark contrasting background

B. Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.

#### 2.2.3 PIPING

- A. Stencils: With clean cut symbols and letters indicating flow direction arrow and fluid being conveyed.
- B. Stencil Paint: Semi-gloss enamel, colors conforming to ASME A13.1.
- C. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering, and indicating flow direction arrow and fluid being conveyed. Brandystrap-on, Seton or approved.
- D. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings. Brandystrap-on, Craftmark, Seton or approved.
- E. Underground Plastic Pipe Markers: Bright colored continuously printed plastic ribbon tape of not less than 6 inch wide by 4 mil thick, manufactured for direct burial service.

#### 2.2.4 DUCTWORK

- A. Identify ductwork with plastic nameplates or stenciled painting. Identify as to air handling unit number, and area served.
- 2.2.5. VALVE CHART AND SCHEDULE
- A. Provide valve chart and schedule in aluminum frame with clear plastic shield. Install at location as directed.

#### 2.3 PIPING INSULATION

#### 2.3.1 INSULATION

- A. Acceptable Manufacturers: Armstrong, Certainteed, Manville, Knauf, Pittsburgh Corning.
- B. Glass fiber insulation: ASTM C547, "K" value of 0.24 at 75 degrees F. noncombustible, minimum service temperature -20, maximum service temperature 300 degrees F, maximum moisture absorption 0.20 percent by volume, vapor retarder jacket composed of white Kraft paper and aluminum foil laminate. Flame spread/smoke developed rating of 25/50 or less in accordance with UL 723.

#### 2.3.2 HOT PIPING REQUIREMENTS

#### A. Insulation and Jacket.

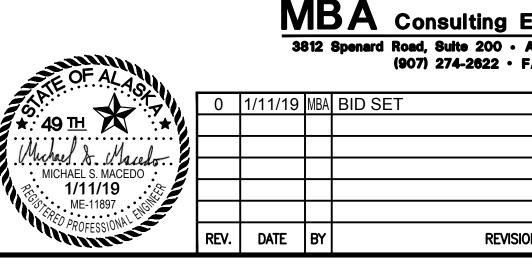
- 1. On piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation at such locations. Insulate flanges and unions at equipment when fluid temperatures exceeds 140 degrees F. Insulate fittings, joints, and valves with same insulation and thickness as scheduled. Staples may be used to seal jackets.
- 2. Cover insulation on fittings with pre-molded PVC fittings covers.
- 3. Indoor, exposed applications: Size for finish paint application.
- B. Insulate heating water or glycol supply and return lines thru 2 inches with 1 inch thick glass fiber insulation, and lines over 2 inches with 1-1/2 inch insulation.
- C. Insulate all domestic hot water lines with  $\frac{1}{2}$  inch thick glass fiber insulation.

#### 2.3.4 SPECIAL INSULATION REQUIREMENTS

A. Insulate refrigeration suction line with 1 inch Armaflex or equal.

#### 2.3.5 DUCT INSULATION REQUIREMENTS

- A. Insulate outside air ductwork with 2 inch of rigid glass fiber insulation, k = .24 at 75 degrees F, 450 degrees F service temperature, 0.02 perm vapor transmission, 5 percent water vapor sorption.
- B. Insulate interior concealed supply air duct with 1-1/2 inches FSK faced flexible duct wrap, k = .24 at 75 degrees F, 250 degrees F service temperature, .02 perm vapor transmission, 5 percent water vapor sorption.
- B. Insulate exhaust air ductwork with 1 inch rigid FSK faced glass fiber insulation, k =.24 at 75 degrees F, 450 degrees F service temperature .02 perm vapor transmission, 5 percent water vapor sorption.
- C. Duct liner, Certainteed Toughgard Type 150 or equal.



#### 2.4 SPRINKLER SYSTEM

- A. Provide system design, materials, tools, equipment, supervision, labor, and transportation to complete the work and obtain specified performance.
- B. Provide a complete wet type sprinkler system.
- C. Coordinate and resolve details to achieve compatibility between the sprinkler system and other building elements.
- D. Provide system to IBC and NFPA 13 requirements.
- E. Interface system with building fire and smoke alarm system
- F. Conceal piping, except in mechanical spaces and unfinished spaces.
- G. All materials shall bear UL or FM label or marking.
- H. Coordinate sprinkler system piping and head locations with ceiling types, light fixtures. air diffusers, ducts, and structural members.
- Center heads in two directions in ceiling tiles.

### 2.5 PLUMBING AND HYDRONIC PIPING

### 2.5.1 MATERIALS

A. Heating Glycol Piping, Above Grade.

- 1. Steel Pipe: ASTM A53, Schedule 40, black. Fittings: ASTM B16.3, malleable iron or ASTM A234, forged steel welding type fittings. Joints: AWS D1.1. welded.
- 2. Copper Tubing: ASTM B88, Type L, hard drawn. Fittings: ANSI/ASME B16.18 cast brass or ASME B16.22 solder wrought copper. Joints: ASTM B32, solder, Engelhard "Silvabrite 100" or other approved lead-free solder. Compatible with glycol.
- Cross Linked Polyethylene Barrier Tubing: ASTM F876 and F877, DIN Standard 4726 oxygen diffusion barrier, rated at 100 PSI @ 180 degrees F, Uponer hePEX, Viega ViegaPEX, Zurn ZurnPEX or approved equal.

- G. Natural Gas Piping, Buried Beyond 5 feet of Building.
- 1. Polyethylene Pipe: ASTM D2513, SDR 11.5. Fittings: ASTM D2683 or ASTM D2513 socket type. Joints: Fusion welded.
- H. Natural Gas Piping, Above Ground
- 1. Steel Pipe: ASTM A53 Schedule 40 black. Fittings: ASME B16.3 malleable iron, or ASTM A234, forged steel welding type. Joints: NFPA 54, threaded or welded to ASME B31.1, ASME B31.2, ASME B31.9 and ASME Sec. 1. Gas pressure of 2 lbs. or more to be welded fittings and welded joints only.
- 2.5.2 FLANGES, UNIONS, AND COUPLINGS
  - A. Pipe size 2 inches and under: Piping: bronze unions for copper pipe, soldered joints.
  - B. Dielectric connections: Union with galvanized or plated steel threaded end copper solder end, water impervious isolation barrier.

### 2.5.3 VALVES

- A. Select valves of the best quality and type suited for the specific service and piping system used. Minimum working pressure rating 125 psig steam or 150 psig W.O.G. Ball valves are to be used in lieu of gate valves for shut-off and isolation service.
- B. Ball valves: Up to and including 3 inches: Bronze or stainless steel body, 400 psi W.O.G. - 150 S.W.P., standard port stainless steel or bronze ball, Teflon seats, and stuffing box ring, lever handle, solder or threaded ends. Seat material to be compatible with fluid handled.

#### 2.6 REFRIGERATION PIPING

- 2.6.1 MATERIALS
  - A. Copper Tubing: ASTM B280, Type ACR hard drawn or annealed.
    - 1. Fittings: ASME B16.22 wrought copper.
  - 2. Joints: Braze AWS A5.8 Bcup silver/phosphorous/copper alloy with melting range 1190 to 1480 degrees
  - B. Copper Tubing to 7/8-inch OD: ASTM B88, Type K, annealed.
    - 1. Fittings: ASME B16.26 cast copper.
    - 2. Joints: Flared.
  - C. Pre-charged line sets.

#### **SEE M-7 FOR CONTINUATION**

	A A	LASKA	RAILROAI ENGINEERING		PORATION
Engineers, Inc. Anchorage, AK 99517		SKA R	AILROAD C	ORPO	RATION
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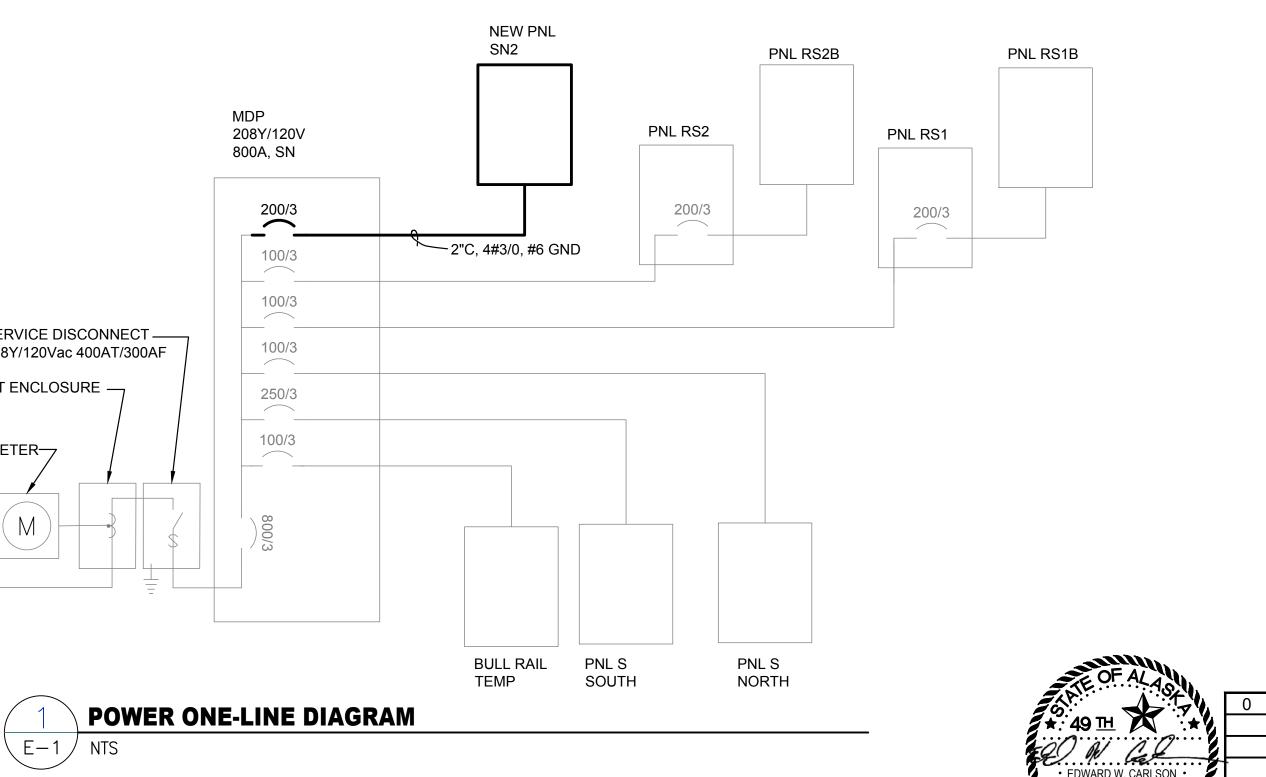
PO	wer legend
	ELECTRICAL POWER PANEL
	ELECTRICAL DISTRIBUTION PANEL
	ELECTRICAL LIGHTING PANEL
	PANELBOARD CABINET FLUSH MOUNT
	PANELBOARD CABINET SURFACE MOUNT
X WIDE / X DEEP	SWITCHBOARD NEW
X WIDE / X DEEP	SWITCHBOARD EXISTING
$\mathbb{M}$	METER
Ľ√	CONTROLLER/DISCONNECT
	UNFUSED DISCONNECT
	FUSED DISCONNECT
	VARIABLE FREQUENCY DRIVE
$\boxtimes$	CONTROLLER
ΗH	CONTACTOR
6	MOTOR SINGLE PHASE
×	MOTOR SINGLE PHASE : X = HORSE POWER
$\phi$	MOTOR 3PH
$(\mathbf{x})$	MOTOR 3PH : X = HORSE POWER
G	GENERATOR POWER
T	TRANSFORMER
\$ T	THERMAL SWITCH

	NEL: MDP [E]	MOUN		<u>AINS</u> JGS		<u>OPTK</u> FEED	ΓHRL		SHUNT TRIP ISO GND BAR	
LOCATIO	LOCATION: ROOM 107		🖸 FLUSH 🛛 CB			SUBFE	EED I	UG	SUBFEED BRKR 🗹 SOLID NEUTRAL	
VOLTAGE	E: 208Y/120 VOLT	3	PHASE	4 WIRE		800		В	10k AIC	
NOTE	CIRCUIT DESCRIPTION	KVA		СКТ	СКТ	AMP	Ρ	KVA	CIRCUIT DESCRIPTION	NOTE
			1	1	2		/			
	PANEL SS JDA36250 250 AMP		250 3		4	100	3		PANEL RS1 FA36100 100 AMP	
			/	5	6					
			/	7	8		/			
	PANEL BR FA32100 100 AMP		100 3		10	100	3		PANEL RS2 FA36100 100 AMP	
				11	12	/				
1		37.1		13	14		/			
	PANEL S NORTH 2 (SN 2)		200 3		16	100	3		PANEL SN FA36100 100 AMP	
				17	18	/				
	ACE		/,	19	20				SPACE	
	ACE		/,	21	22				SPACE	
	ACE		/,	23	24				SPACE	
	ACE		/,	25	26				SPACE	
	ACE		/,	27	28				SPACE	
	ACE		/,	29	30				MAIN	
	ACE		/,	31	32		/		MAIN	
	ACE		/,	33	34		/		MAIN	
	ACE			35	36		/		MAIN	
	ACE			37	38		/		MAIN	
	ACE			39	40		/		MAIN	
	ACE			41	42		/		MAIN	
	TED LOAD:		37.1 KVA			NOTE:				
DEMAND	LOAD:		37.1 KVA	A 103.0	) A	1. PRC	VIDE	NEW C	IRCUIT BREAKER TO FEED NEW PANEL	
DATE:										
REV:										

## ABBREVIATIONS

[E] EXISTING TO REMAIN

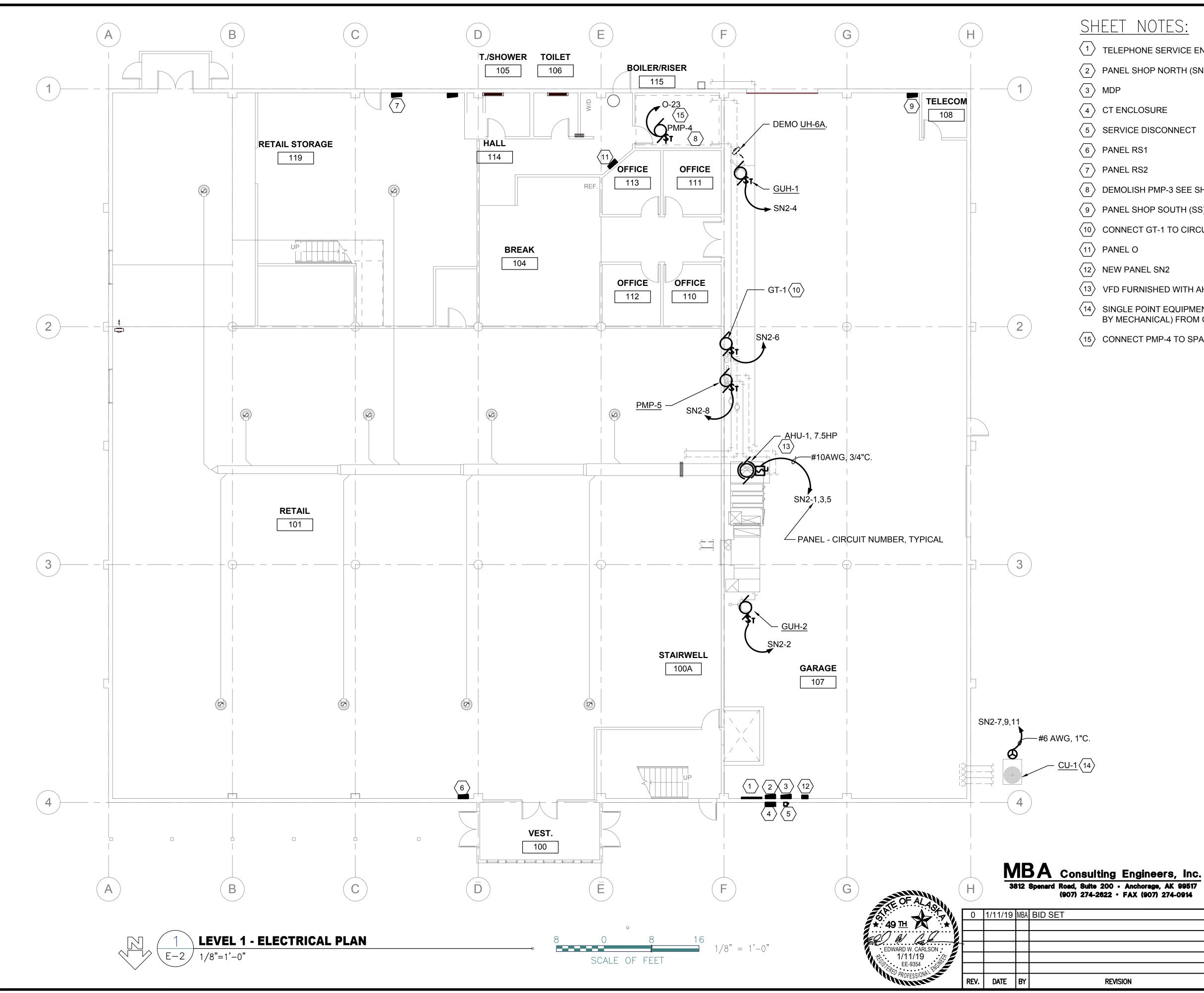
MDP 208Y/120V 800A, SN 200/3 100/3 \_\_\_\_\_ 100/3 SERVICE DISCONNECT \_\_\_\_\_ 208Y/120Vac 400AT/300AF 100/3 250/3 \_ 100/3  $\frown$ Μ 800/ ω. 



PANEL: SN2 (NEW)	MOUN		<u>INS</u>	-	OPTIONS FEEDTHRU	F	SHUNT TRIP DISO GND BAR	
PROJECT: ARRC KENAI SUPPLY BLDG		ACE 🖸 LUO	SS		FEEDIARU		SHUNT TRIP DISC GND BAR	
OCATION: ROOM 107	G FLUSI	⊣ ∎св			SUBFEED L	UG 🗖	SUBFEED BRKR 🗹 SOLID NEUTRAI	-
/OLTAGE: 208Y/120 VOLT	3	PHASE 4	WIRE		200 A ML	C	10k AIC	
NOTE CIRCUIT DESCRIPTION	KVA		СКТ	СКТ	AMP / P	KVA	CIRCUIT DESCRIPTION	NOT
			1	2	20 1		GUH-1 (1/8 HP)	
AHU-1 (7.5 HP)	8.8	50 3	3	4	20 1		GUH-2 (1/8 HP)	
			5	6	20 1		GT-1 (50W)	
			7	8	20 1	0.3	PMP-5	
CU-1 (MCA 55)	19.8	70 3	9	10	20 1		SPARE	
			11	12	20 / 1		SPARE	
		/	13	14	20 1		SPARE	
RF-1 (1.5 HP)	2.4	15 3	15	16	20 / 1		SPARE	
			17	18	20 1		SPARE	
SPACE			19	20			SPACE	
SPACE			21	22			SPACE	
SPACE			23	24			SPACE	
SPACE			25	26			SPACE	
SPACE			27	28			SPACE	
SPACE			29	30			SPACE	
SPACE			31	32			SPACE	
SPACE			33	34			SPACE	
SPACE			35	36			SPACE	
SPACE			37	38			SPACE	
SPACE			39	40			SPACE	
SPACE			41	42			SPACE	
CONNECTED LOAD:		32.7 KVA	90.7	A	NOTE:			
DEMAND LOAD:		37.1 KVA	103.1	А				
DATE:								·

		NEC 220.87 Service L	oad C	alc (addi	ition to an	existing	service	)
		KENAI SUPPLY WASI	ILLA					
		Existing Load						
Aaximum Demand		kW (1-year history as reported	ed by th	e utility)				
Power Factor		Estimated						
Feeder Load	40.07	kVA Connected Load						
Demand Factor	125%	NEC 220.87(2)						
Calculated Load		kVA Demand Load	162	Amps				
		NowLood						
Voltage 208	<u> </u>	New Load Phase						—
	0	Fliase				NEC	NEC	
					<u>kVA</u>	Factor	<u>kVA</u>	
PANEL Loa								
PANEL SN2	2				32.20	= :	37.1	_
		Misc Total			32.20	)	37.10	)
		New Load Total			32.20	) kVA	37.1	0 kVA
					89.38	3 Amps	102.98	8 Amps
		Total Now Load Sum	manu					
		Total New Load Sumr	11a1 y		Composito	J		
					Connected Load		NEC Load	
		Existing Load			46.67	- kVA	58.33	_ kVA
		New Load			32.20	kVA	37.10	kVA
		Total Service Load			78.87	= kVA	95.43	= kVA
					219	Amps	265	Amps
		Existing Service Size	300	Amps	208	Volts	3	Phase
		Will Provide	12%	Spare Ca		VOICO	U	THASE
					<b>/</b>			

				<b>BA</b> Consulting Engineers, Inc. Spenard Road, Suite 200 • Anchorage, AK 99517 (907) 274-2622 • FAX (907) 274-0914	KENAI SUPPLY BUILDING RENOVATION					
	0	1/11/19	MBA	BID SET	TITLE		LEGEND, SCHE AND POWER ON			
EDWARD W. CARLSON そ、1/11/19	`				DESIGNED BY: DRAWN BY:	EWC SNS	SCALE: AS NOTED	E 4	AFE NO.: ACAD FILE:17034-M1	
STERED PROFESSIONAL HOME	REV.	DATE	BY	REVISION	CHECKED BY: APPROVED BY:	EWC EWC	DATE: 1/11/2019	E-1	DWG NO. 9OF12	



## SHEET NOTES:

1 TELEPHONE SERVICE ENTRANCE

 $\langle 2 \rangle$  PANEL SHOP NORTH (SN)

5 SERVICE DISCONNECT

 $\langle 8 \rangle$  DEMOLISH PMP-3 SEE SHEET M-4.

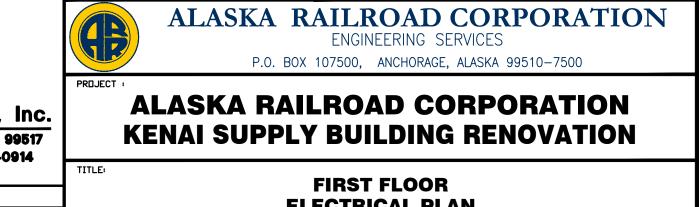
 $\langle 9 \rangle$  PANEL SHOP SOUTH (SS)

 $\langle 10 \rangle$  CONNECT GT-1 TO CIRCUIT INDICATED IN PANEL SN2.

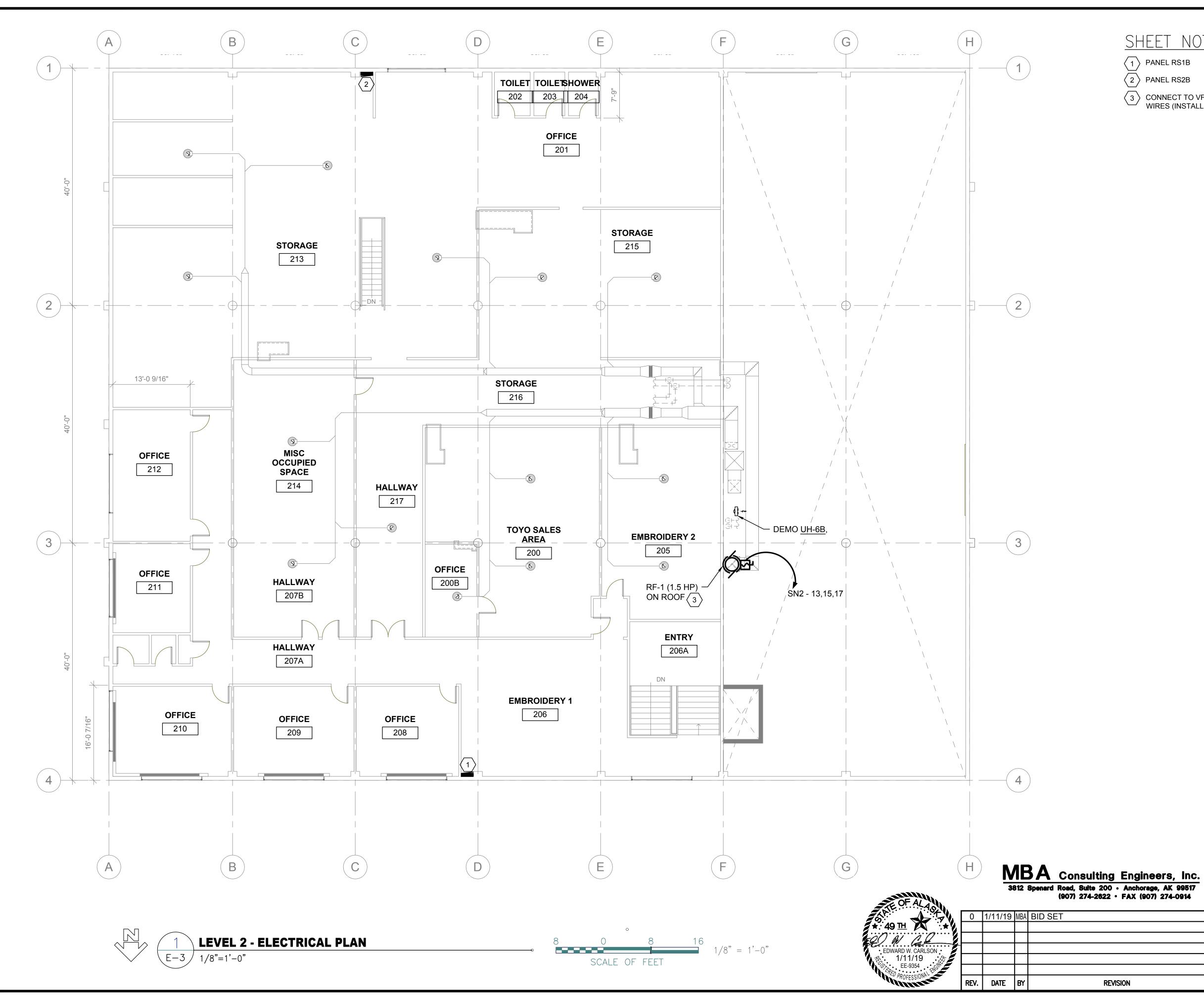
 $\langle 13 \rangle$  VFD FURNISHED WITH AHU-1

SINGLE POINT EQUIPMENT CONNECTION. PROVIDE CONDUIT FOR CONTROL WIRES (INSTALLED BY MECHANICAL) FROM CU-1 TO AHU-1.

 $\langle 15 \rangle$  CONNECT PMP-4 TO SPARE 20A/1P CIRCUIT BREAKER IN PANEL O.



			ELECTRICAL F	PLAN	
	DESIGNED BY:	EWC			AFE NO.:
	DRAWN BY:	SNS	SCALE: AS NOTED	EO	ACAD FILE:17034-M1 DWG NO.
	CHECKED BY:	EWC	DATE: 1/11/2019	<b>E-2</b>	
SION	APPROVED BY:	EWC			<u>10</u> OF <u>12</u>



# <u>SHEET NOTES:</u>

 $\left< 1 \right>$  PANEL RS1B

 $\langle 2 \rangle$  PANEL RS2B

(3) CONNECT TO VFD FURNISHED WITH EF-1. PROVIDE CONDUIT FOR CONTROL WIRES (INSTALLED BY MECHANICAL) FROM EF-1 TO AHU-1.



DESIGNED BY:      EWC      SCALE:      AS NOTED      AFE NO.:        DRAWN BY:      SNS      SCALE:      AS NOTED      ACAD FILE:17034-M1        DRAWN BY:      EWC      DATE:      1/11/2019      DWG NO.				PLAN	
APPROVED BY:	SION	DRAWN BY:	SNS EWC	 E-3	ACAD FILE:17034-M1 DWG NO.

## PART 1 - GENERAL

- 1.1 SCOPE
  - PROVIDE COMPLETE ELECTRICAL SYSTEMS AS SHOWN ON DRAWINGS AND SPECIFIED. FURNISH ALL LABOR, EQUIPMENT, APPLIANCES, MATERIALS, AND PERFORM OPERATIONS REQUIRED FOR COMPLETE INSTALLATION IN ACCORDANCE WITH ALL SECTIONS OF SPECIFICATIONS, DRAWINGS, CODES, AND CONDITIONS OF CONTRACT.
- 1.2 CODES, STANDARDS, FEES, PERMITS
- A. COMPLY WITH LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, NATIONAL ELECTRICAL SAFETY CODE, LOCAL CODES, AMENDMENTS, ORDINANCES AND REQUIREMENTS OF UTILITY COMPANIES' FURNISHING SERVICES TO INSTALLATION. COMPLY WITH NEMA, UL, ANSI, ICEA AND OTHER INDUSTRY STANDARDS. COMPLY WITH REQUIREMENTS OF IBC, IMC, UPC, AND OTHER APPLICABLE CODES.
- B. SECURE AND PAY FOR ALL INSPECTIONS, FEES, PERMITS, ETC., REQUIRED BY LOCAL AND STATE AGENCIES.
- 1.3 DRAWINGS
- A. ELECTRICAL DRAWINGS ARE DIAGRAMMATIC AND DO NOT SHOW ALL FEATURES OF WORK. INSTALL ELECTRICAL ITEMS TO PROVIDE SYMMETRICAL APPEARANCE. DO NOT SCALE DRAWINGS. REVIEW OTHER DRAWINGS AND ADJUST WORK TO CONFORM TO CONDITIONS SHOWN, VERIFY FIELD CONDITIONS, IMMEDIATELY CONTACT THE OWNER'S REPRESENTATIVE FOR CLARIFICATION OF QUESTIONABLE, OBSCURE ITEMS, OR APPARENT CONFLICTS. THE OWNER'S REPRESENTATIVE'S DECISION IS FINAL FOR ALL CLARIFICATIONS REQUESTED. EXTRA COST RESULTING FROM A CONDITION WHERE CLARIFICATION WAS NOT REQUESTED: MADE AT NO INCREASE IN CONTRACT AMOUNT UNLESS EXTRA COST IS APPROVED IN WRITING.
- 1.4 WORKMANSHIP
- A. CONSIDERED AS IMPORTANT AS ELECTRICAL AND MECHANICAL EFFICIENCY AND SUBJECT TO APPROVAL. EMPLOY WORKMEN SKILLED IN TRADE AND FAMILIAR WITH PARTICULAR TECHNIQUES APPLICABLE TO VARIOUS SECTIONS OF WORK. INSTALL IN ACCORDANCE WITH NECA "STANDARD PRACTICES FOR GOOD WORKMANSHIP IN ELECTRICAL CONTRACTING."
- 1.5 COORDINATION
- A. COORDINATE WITH OTHER TRADES FOR PROPER INSTALLATION AND TIMELY EXECUTION. ANY CHANGES NECESSITATED BY FAILURE TO PROPERLY COORDINATE WORK: MADE AT NO INCREASE IN CONTRACT AMOUNT
- B. VERIFY INFORMATION SHOWN ON PLANS WITH EQUIPMENT ITEMS ACTUALLY FURNISHED WHERE EQUIPMENT IS FURNISHED OR INSTALLED BY OTHERS. NOTIFY OWNER'S REPRESENTATIVE OF ANY CONFLICTS.
- 1.6 REMODEL WORK
- A. EXISTING CONDITIONS NOTED ON THE DRAWINGS WERE PREPARED FROM PREVIOUS CONSTRUCTION DRAWINGS. VISIT SITE, VERIFY EXISTING CONDITIONS AND ALLOW ADEQUATE MONIES TO COVER ADDITIONAL WORK REQUIRED AS A RESULT OF AS-BUILT CONDITIONS. ASSUME THAT THE AS-BUILT INFORMATION DOES NOT INDICATE EXACT CONDUIT ROUTING OR CIRCUITING. INCLUDE NECESSARY WORK TO PROVIDE CIRCUIT CONTINUITY TO EXISTING CIRCUITS THAT MAY BE AFFECTED BY NEW WORK. CUT BACK EXISTING WORK BEING REMOVED OR ABANDONED BEYOND FINISHED SURFACES TO ALLOW REPAIR AND REFINISHING. ASSUME CONDITION OF WIRING IS SUITABLE FOR RECONNECTING.
- B. NOTIFY OWNER'S REPRESENTATIVE OF ANY FIELD CONDITIONS WHERE CONTRACTOR CANNOT REUSE EXISTING MATERIAL OR EQUIPMENT BECAUSE OF DETERIORATED CONDITIONS. ALSO NOTIFY OWNER'S REPRESENTATIVE OF ANY EXISTING CONDITIONS WHICH MAY BE CONSIDERED UNSAFE OR IN NEED OF REPAIR.
- 1.7 SUBMITTALS
  - A. SUBMITTAL REVIEW IS FOR GENERAL DESIGN AND ARRANGEMENT ONLY AND DOES NOT RELIEVE THE CONTRACTOR FROM ANY REQUIREMENTS OF CONTRACT DOCUMENTS. PROVISION OF A COMPLETE AND SATISFACTORY WORKING INSTALLATION IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- 1.8 PROJECT COMPLETION
- A. THOROUGHLY CLEAN INSIDE AND OUT ALL FIXTURES AND EQUIPMENT. CLEAN PREMISES OF CONSTRUCTION DEBRIS. CALL FOR FINAL CONSTRUCTION OBSERVATION. CONDUCT OPERATING TEST FOR APPROVAL. DEMONSTRATE INSTALLATION TO OPERATE SATISFACTORILY IN ACCORDANCE WITH REQUIREMENTS OF CONTRACT DOCUMENTS. PROVIDE PERSONNEL TO ASSIST ENGINEER IN REMOVAL AND REPLACEMENT OF EQUIPMENT FOR OBSERVATION PURPOSES.
- B. SHOULD ANY PORTION OF INSTALLATION FAIL, REPAIR OR REPLACE ITEMS UNTIL ITEMS CAN BE DEMONSTRATED TO COMPLY.
- C. FIRE ALARM AND EMERGENCY SYSTEMS MUST BE OPERATIONAL PRIOR TO OCCUPANCY.
- D. SUBMIT A LETTER CERTIFYING COMPLETION OF PROJECT IN ACCORDANCE WITH PLANS AND SPECIFICATIONS. TURN OVER RECORD DRAWINGS TO OWNER.
- 1.9 GUARANTEE
- A. GUARANTEE ALL MATERIAL TO BE NEW, ALL WORK TO BE FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP FOR ONE YEAR FROM DATE OF FINAL ACCEPTANCE. REPAIR OR REPLACE ANY WORK OR MATERIAL DEEMED DEFECTIVE DURING THE GUARANTEE PERIOD AT NO COST TO THE OWNER.
- PART 2 PRODUCTS
- 2.1 RACEWAYS

- DEGREES F AND LISTED FOR DIRECT BURY.
- STRUCTURAL STEEL MEMBERS AND GYPSUM WALL BOARD.
- F. PROVIDE PULL WIRE IN RACEWAYS INSTALLED BUT LEFT EMPTY.
- 2.2 WIRE AND CABLE
  - WIRING MAY BE #14.

  - NO. 10 AWG MINIMUM.
  - INSTALLED IN SINGLE RACEWAY.
  - RECOMMENDED BY MANUFACTURER.
  - MANUFACTURER'S DIAGRAMS OR RECOMMENDATIONS.
  - **BELOW 20 DEGREES F.**
  - H. CONNECTIONS:
    - 1. #6 AND LARGER: SOLDERLESS LUGS.
    - SHELL.
  - PER MANUFACTURER'S RECOMMENDATIONS.
- 2.3 BOXES
  - CONCRETE OR CONCRETE BLOCK WALLS.

  - FINISHED FLOOR TO CENTERLINE OF OUTLET:
  - WALL SWITCHES, PUBLIC TELEF CONVENIENCE OUTLETS, INDIVID WEATHERPROOF OUTLETS
  - TENSIONS AND TO FACILITATE WORK.
- 2.4 PANELBOARDS AND OVERCURRENT PROTECTION

A. GALVANIZED RIGID STEEL CONDUIT OR INTERMEDIATE METAL CONDUIT: USE IN DAMP OR WET LOCATIONS, UNDERGROUND, IN CONCRETE OR CMU, WHERE SUBJECT TO PHYSICAL DAMAGE, FOR SERVICE CONDUCTORS AND PANELBOARD FEEDERS.

B. ELECTRICAL METALLIC TUBING: USE IN ALL OTHER AREAS UNLESS OTHERWISE INDICATED. PROVIDE RAINTIGHT/CONCRETE-TIGHT COMPRESSION FITTINGS.

C. FLEXIBLE METALLIC CONDUIT: USE FOR FINAL CONNECTIONS TO FIXTURES AND EQUIPMENT TO ISOLATE VIBRATION OR ALLOW RELOCATION. PROVIDE FLEXIBLE WATERTIGHT CONDUIT IN DAMP OR WET LOCATIONS (PUMPS, KITCHEN EQUIPMENT, ETC.). WHERE USED OUTDOORS, USE LIQUIDTIGHT FLEXIBLE CONDUIT RATED FOR -60

D. NO CONDUIT ALLOWED EMBEDDED IN SPRAY-APPLIED FIREPROOFING OR BETWEEN

E. UNLESS NOTED, INSTALL RACEWAYS CONCEALED EXCEPT AT SURFACE CABINETS, MOTOR AND EQUIPMENT CONNECTIONS, AND IN UTILITY ROOMS. LOCATE RACEWAYS TO NOT ENDANGER STRENGTH OF STRUCTURAL MEMBERS, AND SIX INCHES MINIMUM FROM PARALLEL RUNS OF HEAT PIPING. DO NOT INSTALL RACEWAYS IN OR THROUGH STRUCTURAL MEMBERS UNLESS SPECIFICALLY APPROVED. CROSS EXPANSION JOINTS WITH EXPANSION FITTINGS AND BONDING CONDUCTOR.

G. WATERPROOF ALL ROOF AND EXTERIOR WALL PENETRATIONS AS APPROVED.

A. INSTALL ALL CONDUCTORS IN APPROVED RACEWAY SYSTEMS. TYPE MC CABLE MAY BE USED WITHIN THE LIMITS OF THE NEC UNLESS OTHERWISE NOTED ON DRAWINGS. ALL CONDUCTOR SIZES BASED ON COPPER, #12 AWG MINIMUM EXCEPT CONTROL

B. MINIMUM INSULATION RATING: 75 DEGREES C, 600 VOLT. IN LIGHTING FIXTURE CHANNELS, HIGH TEMPERATURE AREAS: 90 DEGREES C, 600 VOLT.

C. 120 VOLT BRANCH CIRCUIT LENGTHS FROM PANEL TO FIRST OUTLET EXCEEDING 75':

D. INCREASE CONDUCTOR SIZES TO #10 AWG OR USE 90 DEGREES C-RATED INSULATION TO OFFSET DERATING FACTOR. WHEN MORE THAN THREE 20 AMP CONDUCTORS ARE

E. CABLE FOR FIRE ALARM SYSTEMS AND OTHER SPECIAL INSTALLATIONS: AS DESCRIBED UNDER OTHER SECTIONS OF SPECIFICATIONS, NOTED ON DRAWINGS, OR

F. COLOR CODE 120/208 VOLT SYSTEMS: BLACK, RED, BLUE AND WHITE. CODE SOUND AND SIGNAL SYSTEMS WIRING AND ANY SPECIAL EQUIPMENT IN ACCORDANCE WITH

G. INSTALL NO THERMOPLASTIC INSULATED CONDUCTORS WHEN TEMPERATURE IS

2. #8 AND SMALLER: INSULATED WIRE NUT CONNECTOR, IDEAL "WINGNUT" HARD

I. LOW VOLTAGE, SPECIAL PURPOSE, COAXIAL CABLES, ETC.: INSTALL AND TERMINATE

A. WHERE CONDUIT SYSTEMS OR MC CABLE IS USED, PROVIDE GALVANIZED OR CADMIUM PLATED. ONE PIECE PRESSED OR WELDED STEEL WITH DEVICE FINISH RING AND GANG COVER. FOUR INCH SQUARE OR OCTAGONAL, 1-1/2" DEEP MINIMUM SIZE. PROVIDE STEEL SQUARE CORNER MASONRY BOXES AND FINISH RINGS IN MASONRY,

B. THROUGH WALL BOXES NOT PERMITTED. PROVIDE SIX INCH MINIMUM NIPPLE BETWEEN OUTLETS SHOWN BACK-TO-BACK ON COMMON WALLS. MINIMUM 24" SEPARATION IN FIRE-RATED WALLS AND PENETRATIONS. SET FLUSH WITH WALL OR CEILING FINISH. PROVIDE ISOLATION BARRIER BETWEEN DISSIMILAR VOLTAGES IN SAME OUTLET AND WHERE LINE-TO-LINE VOLTAGE EXCEEDS 300 VOLTS.

C. VERIFY LOCATION OF ALL OUTLETS. UNLESS NOTED, MOUNT OUTLETS AS FOLLOWS,

PHONE OUTLETS	4'-0"
IDUAL TELEPHONE OUTLETS	1'-6"
	2'-6"

D. PROVIDE ADDITIONAL PULL BOXES AS REQUIRED TO AVOID EXCESS PULLING

A. SQUARE D TYPE NOOD SERIES. SIMILAR EQUIPMENT BY OTHER MANUFACTURERS ACCEPTABLE. SIEMENS EQUIPMENT IS NOT ACCEPTABLE. SAME MANUFACTURER AND KEYED ALIKE THROUGHOUT PROJECT. FACTORY ASSEMBLED PANELS WITH THERMAL MAGNETIC BRANCH BREAKERS, MAIN LUGS OR CIRCUIT BREAKER, ETC., AS SHOWN. PROVIDE DEAD FRONT CONSTRUCTION, FLUSH OR SURFACE MOUNTED AS SHOWN, 20" WIDE, 5-3/4" DEEP UNLESS OTHERWISE INDICATED. PROVIDE DOORS WITH CONCEALED HINGES, FLUSH KEYED HANDLES. PROVIDE TYPED CIRCUIT DIRECTORIES ON DOOR IN FRAME WITH PROTECTIVE PLASTIC COVERING. DIRECTORY TO INCLUDE CIRCUIT NUMBER, CIRCUIT USE, ETC. SEE DRAWINGS FOR ADDITIONAL REQUIREMENTS. MOUNT TOP OF CABINET AT 6'-6" UNLESS NOTED.

- B. PROVIDE CIRCUIT BREAKERS OF THERMAL MAGNETIC TYPE, QUICK-MAKE. QUICK-BREAK WITH A MINIMUM OF 10,000 AIC RATING AT 120/208 VOLT. MEET NEMA STANDARD AB1. PROVIDE HIGH INTERRUPTING CAPACITY AND NON-FUSE TYPE CURRENT LIMITING CIRCUIT BREAKERS WHERE SHOWN. PROVIDE MULTI-POLE BREAKERS WITH INTERNAL COMMON TRIP.
- C. PROVIDE "SWITCHING RATED" CIRCUIT BREAKERS FOR ALL LIGHTING CIRCUITS CONTROLLED AT THE PANELBOARD. PROVIDE CIRCUIT BREAKERS DESIGNATED "GFI" EQUIPPED WITH INTEGRAL CLASS A GROUND FAULT CIRCUIT INTERRUPTER SET TO TRIP ON GROUND FAULT OF SIX MILLIAMPS OR GREATER.
- 2.5 WIRING DEVICES
  - A. DUPLEX RECEPTACLES: 20 AMP. 125 VOLT. NEMA TYPE 5-20R. MEET FEDERAL SPECIFICATION W-C-596F TESTS. COLOR TO MATCH EXISTING. PROVIDE OUTLETS DESIGNATED GFI WITH INTEGRAL CLASS A GROUND FAULT CIRCUIT INTERRUPTER UL 943-LISTED.
  - R SPECIAL OUTLETS: CAPACITY, VOLTAGE AND NEMA CONFIGURATION NOTED, SAME QUALITY AS DUPLEX RECEPTACLES.
  - C. SWITCHES: 20 AMP, 120/277 VOLT, MEET FEDERAL SPECIFICATION W-S-896E, UL #20, SELF-GROUNDING. COLOR AS DIRECTED.
  - D. DEVICE PLATES: UL LISTED, ONE PIECE FLUSH PLATES STAINLESS STEEL. USE GALVANIZED PLATES FOR EXPOSED WIRING, GASKETED POLYCARBONATE SELF-CLOSING WEATHERPROOF PLATES OUTDOORS, U.L. LISTED FOR WET LOCATIONS WHILE IN USE.
- 2.6 MOTORS CONNECTIONS
  - A. UNLESS OTHERWISE INDICATED, HEATING, VENTILATING AND PLUMBING EQUIPMENT MOTORS AND CONTROLS ARE FURNISHED, SET IN PLACE, AND WIRED IN ACCORDANCE WITH THE FOLLOWING SCHEDULE: (COORDINATE ALL WORK WITH MECHANICAL.)

(MC = MECHANICAL CONTRACTOR) (EC = ELECTRICAL CONTRACTOR)

ITEM	FURNISHED BY	SET IN PLACE BY	WIRED POWER	WIRED CONTROL
EQUIPMENT MOTORS	MC	MC	EC	MC
MAGNETIC MOTOR STARTERS:				
a)AUTOMATICALLY CONTROLLED WITH OR WITHOUT HOA SWITCHES	EC	EC	EC	MC
b)MANUALLY CONTROLLED	EC	EC	EC	EC
c)IN PACKAGED EQUIPMENT	MC	MC	EC	MC
DISCONNECT SWITCHES, MANUAL MOTOR STARTERS, THERMAL OVERLOAD SWITCHES	EC	EC	EC	
CONTROL RELAYS, TRANS- FORMERS, TIME CLOCKS, THERMOSTATS, VALVES, FLOAT CONTROLS, DAMPER MOTORS, EP AND PE SWITCHES, OTHER MISCELLANEOUS CONTROLS	MC	МС	МС	MC

B. APPLIANCE AND MISCELLANEOUS EQUIPMENT CONNECTIONS.

- PROVIDE AND MAKE ALL FINAL ELECTRICAL CONNECTIONS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND SHOP DRAWINGS FOR EQUIPMENT FURNISHED BY OTHERS. PROVIDE FLEXIBLE CONDUIT; TYPE SO OR ST RUBBER CORDS WITH GROUNDING CONDUCTOR: PIGTAILS, KELLEMS, CAPS, ETC., AS REQUIRED FOR AN OPERATING SYSTEM.
- PROVIDE OUTLETS AT LOCATIONS TO CONVENIENTLY SERVE EQUIPMENT. PROVIDE RECEPTACLES AS REQUIRED TO MATCH CORD CAPS ON EQUIPMENT FURNISHED. PROVIDE DIRECT WIRING OR RECEPTACLES FOR FINAL CONNECTION TO EQUIPMENT AS REQUIRED FOR PARTICULAR EQUIPMENT FURNISHED.
- 2.7 MOTOR STARTER AND DISCONNECTS
  - A. PROVIDE EACH MOTOR WITH DISCONNECTING MEANS AND WITH SUITABLE CONTROLLER OR OTHER DEVICE AS REQUIRED, COMPLETE WITH MANUAL OR AUTOMATIC CONTROL OF STANDARD NEMA SIZES.

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- B. PROVIDE ACROSS-THE-LINE COMBINATION STARTER-DISCONNECT MAGNETIC STARTERS WITH AMBIENT COMPENSATED THERMAL OVERLOAD PROTECTION SET AT 115% MEASURED FULL LOAD CURRENT IN EACH UNGROUNDED PHASE WITH MAINTENANCE-FREE, DOUBLE BREAK, SOLID SILVER ALLOY CONTACTS.
- C. ARRANGE CONTROL CIRCUITS FOR MANUAL, AUTO AND OTHER SIGNAL INPUTS FROM MECHANICAL CONTROL PANELS, AND ARRANGE CONTROL POWER TO DE-ENERGIZE CONTROL CIRCUITS WHENEVER OPERATING POWER SUPPLY TO PARTICULAR EQUIPMENT IS DISCONNECTED.
- D. PROVIDE HORSEPOWER RATED MANUAL MOTOR STARTING SWITCH WITH THERMAL OVERLOAD PROTECTION FOR EACH SINGLE PHASE MOTOR. SIZE HEATERS FOR 115% MEASURED FULL LOAD CURRENT.
- E. WHERE SHOWN, PROVIDE FUSED SWITCH TYPE COMBINATION STARTERS FOR ALL THREE PHASE MOTORS RATED 7.0 FULL LOAD AMPERES AND BELOW. SIZE FUSES FOR APPROXIMATELY 115% OF MOTOR FULL LOAD CURRENT. PROVIDE NON-FUSED SWITCH TYPE FOR ALL THREE PHASE MOTORS RATED ABOVE 7.0 FULL LOAD AMPERES.
- F. DISCONNECTS: HEAVY DUTY SAFETY SWITCHES, CIRCUIT BREAKERS OR MANUAL MOTOR STARTING SWITCHES.
- 2.8 GROUNDING
  - A. GROUND ALL ELECTRICAL DEVICES, MOTORS, METALLIC PIPING, DUCTWORK, METAL FRAMING, ETC., IN ACCORDANCE WITH N.E.C. ARTICLE 250.
  - B. PROVIDE SEPARATE GREEN GROUNDING CONDUCTOR IN ALL FEEDERS, BRANCH CIRCUITS, AND EQUIPMENT CORDS.
- PART 3 EXECUTION
- 3.1 GENERAL
  - A. INSTALL ALL MATERIAL AND EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, INSTRUCTIONS AND INSTALLATION DRAWINGS, UNLESS OTHERWISE INDICATED AND IN ACCORDANCE WITH NECA'S "STANDARD PRACTICES FOR GOOD WORKMANSHIP IN ELECTRICAL CONTRACTING".
  - B. SEAL PENETRATIONS WITH UL-LISTED FIREPROOFING MATERIALS TO MAINTAIN FIREPROOFING INTEGRITY AND WATERTIGHTNESS.
  - C. SEAL AIRTIGHT ALL PENETRATIONS THROUGH SMOKE PARTITIONING, FAN PLENUMS, DUCTWORK, AND VAPOR BARRIERS.
  - D. REPLACE OR REPAIR ANY SPRAY-APPLIED FIREPROOFING OR INSULATION DAMAGED BY INSTALLATION OF ELECTRICAL EQUIPMENT.
  - E. REPAIR ALL DAMAGE TO FINISHED SURFACES WHERE CAUSED BY INSTALLATION OF ELECTRICAL EQUIPMENT.
  - F. PROVIDE PROPER IDENTIFICATION FOR PANELS, SWITCHES, OR ANY ITEM OF ELECTRICAL EQUIPMENT USED AS A CONTROL DEVICE OR DISCONNECTING MEANS FOR ANY EQUIPMENT. IDENTIFY BOXES CONTAINING EMERGENCY CIRCUITS PER N.E.C. ARTICLE 700-9.
  - G. PROVIDE UPDATED TYPED PANEL SCHEDULES.
- 3.2 SUPPORTS
  - A. SUPPORT RACEWAYS ON APPROVED TYPES OF WALL BRACKETS, CEILING TRAPEZE HANGERS OR MALLEABLE IRON STRAPS. PLUMBERS PERFORATED STRAP NOT PERMITTED AS MEANS OF SUPPORT.
  - B. DO NOT SUSPEND RACEWAYS OR EQUIPMENT FROM CEILING TIE WIRE OR T-BAR, FROM STEAM, WATER OR OTHER PIPING OR DUCTWORK, BUT SUPPORT INDEPENDENTLY.
  - C. ANCHOR EQUIPMENT TO THE BUILDING STRUCTURE TO RESIST SEISMIC DESIGN CATEGORY D EARTHQUAKE FORCES. PROVIDE ADEQUATE BACKING AT STRUCTURAL ATTACHMENT POINTS TO ACCEPT THE FORCES INVOLVED.
  - D. SECURE BOXES, WALL BRACKETS, CABINETS AND HANGERS BY MEANS OF TOGGLE BOLTS IN HOLLOW MASONRY AND GYPBOARD; PRESET INSERTS OR EXPANSION BOLTS IN SOLID MASONRY AND CONCRETE; MACHINE SCREWS, BOLTS OR WELDING ON METAL SURFACES: AND WOOD SCREWS IN WOOD CONSTRUCTION.
- 3.3 AS-BUILT DRAWINGS
  - A. KEEP CLEAN SET OF PRINTS AT JOB SITE AND RECORD ALL ELECTRICAL CHANGES THAT OCCURRED DURING CONSTRUCTION. FAILURE TO DO SO MAY DELAY PAYMENT.
  - B. AT END OF CONSTRUCTION, PROVIDE ONE COMPLETE SET OF DRAWINGS INDICATING ALL FIELD CHANGES FOR RECORD PURPOSES TO THE OWNER'S REPRESENTATIVE.

	<b>B</b>			NEERING	SERVICES	<b>PORATION</b> 1510-7500		
neers, Inc. rage, AK 99517 907) 274-0914	ALASKA RAILROAD CORPORATION KENAI SUPPLY BUILDING RENOVATION							
	DESIGNED BY DRAWN BY:	EWC	SCALE: AS	NOTED	Е Л	AFE NO.: ACAD FILE:17034-E4		

DATE: 1/11/2019

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DWG NO.

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