# MIDLAND PUBLIC SHOOLS

600 E. Carpenter Street Midland, MI 48640



## H.H. DOW HIGH SCHOOL - BOILER REPLACEMENT

DATE: 04/26/2024

ISSUANCE: BIDS/PERMITS

#### MECHANICAL:

MO.O MECHANICAL GENERAL INFORMATION

D1.1 BOILER ROOM - MECHANICAL DEMOLITION PLAN

M1.1 BOILER ROOM — MECHANICAL PLAN
M5.0 MECHANICAL DETAILS & SCHEDULES

M8.0 MECHANICAL TEMPERATURE CONTROL DIAGRAMS

#### ELECTRICAL:

EO.O ELECTRICAL GENERAL INFORMATION

ED1.1 BOILER ROOM - ELECTRICAL DEMOLITION PLAN

E1.1 BOILER ROOM — ELECTRICAL PLAN

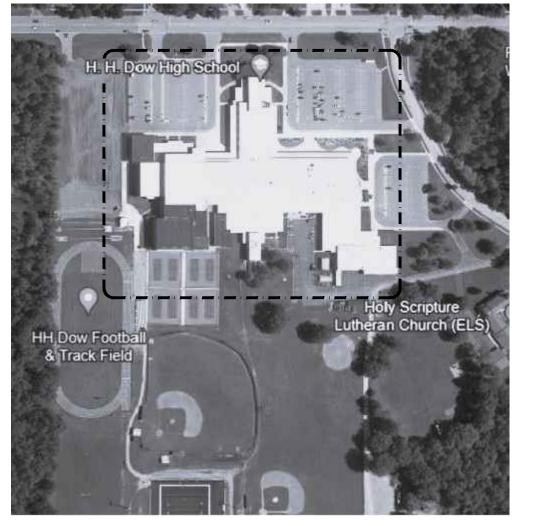
E5.0 ELECTRICAL DETAILS, DIAGRAMS, & ONE-LINE DIAGRAMS

E6.0 ELECTRICAL PANEL SCHEDULES

#### MEP ENGINEERS:



LOCATION:
H.H DOW HIGH SCHOOL
3901 N. Saginaw Road
Midland, MI 48640



MAP IMAGE

ABBREV.	DESCRIPTION
AAV	AUTOMATIC AIR VENT / AIR ADMITTANCE VA
AD	ACCESS DOOR
AE	AIR EXTRACTOR
AFF	ABOVE FINISHED FLOOR
APD	AIR PRESSURE DROP
ASR	AUTOMATIC SPRINKLER RISER
BFP	BACKFLOW PREVENTER
BHP	BRAKE HORSEPOWER
BOD	BOTTOM OF DUCT
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNITS PER HOUR
BWV	BACKWATER VALVE
CAP	CAPACITY
CAV	CONSTANT AIR VOLUME
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE  CIRCULATING
CLG	
CLG	COOLING  CLEAN OUT
CONT	CONTINUATION OR CONTINUED
CONV	CONTINUATION OR CONTINUED  CONVECTOR
CUH	CABINET UNIT HEATER
CV	CONTROL VALVE
DB	DRY BULB TEMPERATURE
DEG	DEGREES
DDC	DIRECT DIGITAL CONTROL
DN	DOWN
DTC	DRAIN TILE CONNECTION
DWH	DOMESTIC WATER HEATER
(E)	EXISTING
EA/EXH	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EDB	ENTERING DRY BULB TEMPERATURE
EF	EXHAUST FAN
EJ	EXPANSION JOINT
EL	ELEVATION
ELECT	ELECTRICAL
EMS	ENERGY MANAGEMENT SYSTEM
ESP	EXTERNAL STATIC PRESSURE
EWB	ENTERING WET BULB TEMPERATURE
EWC	ELECTRIC WATER COOLER
<b>'</b> F	DEGREES FAHRENHEIT
FA	FACE AREA (COIL) / FREE AREA (LOUVER
FC	FLEXIBLE CONNECTION
FD	FLOOR DRAIN
FDC	FIRE DEPARTMENT CONNECTION
FH	FIRE HYDRANT
FHC	FIRE HOSE CABINET
FHR	FIRE HOSE RACK
FHV	FIRE HOSE VALVE
FLA	FULL LOAD AMPS
FLR	FLOOR
FPM	FEET PER MINUTE
FFD	FUNNEL FLOOR DRAIN
FFE	FINISHED FLOOR ELEVATION
FS	FLOOR SINK
FT	FEET
FURN	FURNISHED
FV	FACE VELOCITY
FVC	FIRE VALVE CABINET
GAL	GALLON
GPH	GALLONS PER HOUR
	GALLONS PER MINUTE
GPM	GALLONS FER MINOTE
GPM HB	HOSE BIBB

ABBREV.	DESCRIPTION
HR	HOUR
HTG	HEATING
HYD	HYDRANT
HZ	HERTZ
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IN	INCHES
INST	INSTALLED
INV	INVERT
ISP	INTERNAL STATIC PRESSURE
IW	INDIRECT WASTE
KW	KILOWATT
LAT	LEAVING AIR TEMPERATURE
LAV LBS/HR	POUNDS PER HOUR
LDB	LEAVING DRY BULB TEMPERATURE
LRA	LOCKED ROTOR AMPS
LWB	LEAVING WET BULB TEMPERATURE
MAV	MANUAL AIR VENT
MAX	MAXIMUM MAXIMUM
MBH	1000 BRITISH THERMAL UNITS PER HOUR
MCA	MINIMUM CIRCUIT AMPACITY
MECH	MECHANICAL
MFR	MANUFACTURER
мн	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MOD	MOTOR OPERATED DAMPER (AUTOMATIC)
MOP	MAXIMUM OVER-CURRENT PROTECTION
N.C.	NOISE CRITERIA
NIC	NOT IN CONTRACT
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NOM	NOMINAL
OA	OUTSIDE AIR
OBD	OPPOSED BLADE DAMPER
OC	ON CENTER / CENTER TO CENTER
OD	OUTSIDE DIAMETER
OED	OPEN ENDED DUCT
ORS	OVERFLOW ROOF SUMP
OS&Y PD	OUTSIDE SCREW AND YOKE  PRESSURE DROP (FEET OF WATER)
PRV	PRESSURE REDUCING VALVE
PSIA	POUNDS PER SQUARE INCH — ABSOLUTE
PSIG	POUNDS PER SQUARE INCH - GAUGE
PT	PRESSURE / TEMPERATURE PORT
RA	RETURN AIR
RH	RELATIVE HUMIDITY
REQD	REQUIRED
REL.A	RELIEF AIR
RPM	REVOLUTIONS PER MINUTE
RPZ	REDUCED PRESSURE ZONE
RS	ROOF SUMP
SA	SUPPLY AIR
SH	SHOWER
SP	STATIC PRESSURE
SqFt / SF	SQUARE FOOT/SQUARE FEET
SS	SERVICE SINK
TC	TEMPERATURE CONTROL
T & P	TEMPERATURE AND PRESSURE
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
	_
UG UH	UNDERGROUND  UNIT HEATER

MECHANICAL ABBREVIATIONS		
ABBREV.	DESCRIPTION	
UR	URINAL	
VD	VOLUME DAMPER (MANUALLY ADJUSTABLE)	
VTR	VENT THRU ROOF	
W	WASTE	
W&V	WASTE AND VENT	
WB	WET BULB TEMPERATURE	
WC	WATER CLOSET	
WG	WATER GAUGE	
WH	WALL HYDRANT	

ADDDE: (	DECODINE
ABBREV.	DESCRIPTION
·····	PIPE ELBOW UP
	PIPE ELBOW DOWN
<del></del>	PIPE TEE DOWN
<b>—</b>	DIRECTION OF FLOW
——  <u>——</u>	UNION
<del></del>	STRAINER
	CONCENTRIC REDUCER
	ECCENTRIC REDUCER
	EXPANSION JOINT
	FLEXIBLE CONNECTION
<del></del>	PIPE ANCHOR
	PIPE GUIDE
	PIPE CAP OR PLUG
$\longrightarrow$	ISOLATION VALVE
	CIRCULATING PUMP
	GLOBE VALVE
<u>Б</u>	BALL VALVE
—  <i>y</i> / ——	BUTTERFLY VALVE
<del></del>	BACKWATER VALVE
<b>∑</b>	ANGLE VALVE
<b>→</b> \	CHECK VALVE (SWING)
<b> </b> %	CHECK VALVE (SPRING)
	PLUG VALVE
<u></u> ₩—	NEEDLE VALVE
	OUTSIDE SCREW AND YOKE VALVE (OS&Y)
$\nearrow$	PRESSURE REGULATING VALVE
[5]	SOLENOID VALVE
	CONTROL VALVE (2-WAY / 3-WAY)
	CENTRIFUGAL FAN
) 6	AUTOMATIC GAS SHUT-OFF VALVE
© Œ—	
	TRAP (PLAN VIEW)
	FLOOR DRAIN / FUNNEL FLOOR DRAIN (PLAN VIEW)
<u> </u>	FLOOR DRAIN / FUNNEL FLOOR DRAIN (ELEVATION)
<u></u>	ROOF SUMP
0 CO 	CLEAN OUT (IN FLOOR)
	CLEAN OUT (IN LINE)
-  wco	CLEAN OUT (WALL)
BFP	BACKFLOW PREVENTER
<b>1</b> /₩-₩	WATER METER ASSEMBLY
+	HOSE BIBB, WALL HYDRANT
_	DIRECTION OF PIPE PITCH
<u></u>	SPRINKLER HEAD (UPRIGHT)
$\triangleleft$	SPRINKLER HEAD (SIDEWALL)
—FS	FLOW SWITCH
ď,	SIAMESE CONNECTION (YARD)
$\rightarrow$	SIAMESE CONNECTION (WALL MOUNTED)
ь	FIRE HYDRANT
- <u>&gt;</u>	FLOW MEASURING DEVICE
Ø	BALANCING VALVE
₩	COMBINATION FLOW MEASURING AND BALANCING DEVICE
AAV	AUTOMATIC AIR VALVE
-	

M	ECHANICAL SYMBOLS
ABBREV.	DESCRIPTION
<b>5</b>	RECTANGULAR TAKE-OFF (SINGLE LINE)
	RECTANGULAR TAKE-OFF (DOUBLE LINE)
<del>\</del>	ROUND TAKE-OFF (SINGLE LINE)
	ROUND TAKE-OFF (DOUBLE LINE)
	SPIN-IN FITTING (WITH VOLUME DAMPER)
	ELBOW (WITH TURNING VANES)
	RADIUS RECTANGULAR ELBOW
	RADIUS ROUND ELBOW
	RECTANGULAR ELBOW UP
	ROUND ELBOW UP
	RECTANGULAR ELBOW DOWN
	ROUND ELBOW DOWN
	CONCENTRIC TRANSITION (DOUBLE LINE)
$\leftarrow$	CONCENTRIC TRANSITION (SINGLE LINE)
	ECCENTRIC TRANSITION (DOUBLE LINE)
<b>├-</b>	ECCENTRIC TRANSITION (SINGLE LINE)
R	INCLINED RISE IN DIRECTION OF AIR FLOW (DOUBLE LINE)
<u> </u>	INCLINED RISE IN DIRECTION OF AIR FLOW (SINGLE LINE)
D	INCLINED DROP IN DIRECTION OF AIR FLOW (DOUBLE LINE)
<u> </u>	INCLINED DROP IN DIRECTION OF AIR FLOW (SINGLE LINE)
	FLEXIBLE CONNECTION
	FLEXIBLE DUCT CONNECTION TO SUPPLY DIFFUSER
<b>F</b>	SUPPLY DIFFUSER
	LINEAR SLOT DIFFUSER
<b>\</b>	RETURN OR EXHAUST GRILLE
#	TRANSFER GRILLE
	CROSS SECTION OF SUPPLY AIR DUCT
	CROSS SECTION OF EXHAUST OR RETURN AIR DUCT
	EXISTING FIRE DAMPER (HORIZONTAL)
	NEW
	EXISTING FIRE DAMPER (VERTICAL) NEW
<b>▼</b>	EXISTING
<b>—</b>	SMOKE DAMPER NEW
	EXISTING  COMBINATION FIRE/SMOKE DAMPER  (VERTICAL)
<u> </u>	NEW (VEINTONE)  EXISTING
	COMBINATION FIRE/SMOKE DAMPER NEW (HORIZONTAL)
	VOLUME DAMPER (MANUALLY ADJUSTABLE)
— - <u>M</u>	MOTORIZED DAMPER
SD	SMOKE DETECTOR
(CO2)	CO2 SENSOR
T	THERMOSTAT OR TEMPERATURE SENSOR
$\bigoplus$	HUMIDISTAT OR HUMIDITY SENSOR
¬0→ →	RETURN OR EXHAUST / SUPPLY AIR FLOW

RETURN OR EXHAUST / SUPPLY AIR FLOW

ABBREV.	DESCRIPTION
CA	COMPRESSED AIR PIPING
CD	CONDENSATE DRAIN PIPING
DT	DRAIN TILE
F	FIRE PROTECTION PIPING
—FOR—	FUEL OIL RETURN PIPING
F0S	FUEL OIL SUPPLY PIPING
G	NATURAL GAS PIPING
—BCW—	BOOSTED-DOMESTIC COLD WATER PIPING
BHW	BOOSTED-DOMESTIC HOT WATER PIPING
CW	DOMESTIC COLD WATER PIPING
—NPCW—	NON POTABLE COLD WATER PIPING
TW	TEMPERED WATER PIPING
HW	DOMESTIC HOT WATER PIPING
-HW(XXX)	DOMESTIC HOT WATER PIPING CIRCULATED AT XXX TEMPERATURE
—HWR——	DOMESTIC HOT WATER RETURN PIPING
—SAN——	SANITARY WASTE PIPING
—PSAN——	PUMPED SANITARY PIPING
V	VENT PIPING
ST	STORM SEWER PIPING
—PST——	PUMPED STORM PIPING
RC	RAIN CONDUCTOR PIPING
ORC	OVERFLOW RAIN CONDUCTOR PIPING
—CHWR—	CHILLED WATER RETURN PIPING
—CHWS—	CHILLED WATER SUPPLY PIPING
CWR	CONDENSER WATER RETURN PIPING
CWS	CONDENSER WATER SUPPLY PIPING
—HHWR—	HEATING HOT WATER RETURN PIPING
—HHWS——	HEATING HOT WATER SUPPLY PIPING
—HPLR——	HEAT PUMP LOOP RETURN PIPING
—HPLS—	HEAT PUMP LOOP SUPPLY PIPING
RL	REFRIGERANT LIQUID PIPING
RS	REFRIGERANT SUCTION PIPING
—HGB——	HOT GAS BY-PASS PIPING
—GXHR——	GEO HEAT EXCHANGE RETURN
—GXHS—	GEO HEAT EXCHANGE SUPPLY
—STM——	STEAM PIPING
—HPS——	HIGH PRESSURE STEAM PIPING
—LPS——	LOW PRESSURE STEAM PIPING
—	STEAM CONDENSATE RETURN PIPING
—PCR—	PUMPED STEAM CONDENSATE RETURN PIPING
—LPC——	LOW PRESSURE CONDENSATE PIPING
——HPC——	HIGH PRESSURE CONDENSATE PIPING
MA	MEDICAL AIR PIPING
N	NITROGEN GAS PIPING
02	OXYGEN GAS PIPING
VAC	VACUUM PIPING

PIPING LEGEND

APPLICABLE CODES AND REGULATIONS		
YEAR	CODE	
2015	MICHIGAN BUILDING CODE	
2015	MICHIGAN REHABILITATION CODE FOR EXISTING BUILDINGS	
2021	MICHIGAN MECHANICAL CODE	
2015	MICHIGAN UNIFORM ENERGY CODE	
2015	INTERNATIONAL FIRE CODE	
2021	INTERNATIONAL FUEL GAS CODE	
2012	NFPA 101 WITH BFS AMENDMENTS	
2009	ICC/ANSI ACCESSIBLE AND USABLE BUILDING & FACILITIES	
-	AMERICANS WITH DISABILITIES ACT ACCESSIBILITIES GUIDELINE (ADA—AG)	

DRAWING INDEX		
SHT NO	DESCRIPTION	
M0.0	MECHANICAL GENERAL INFORMATION	
MD1.1	BOILER ROOM - MECHANICAL DEMOLITION PLAN	
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M5.0	MECHANICAL DETAILS & SCHEDULES	
M8.0	MECHANICAL TEMPERATURE CONTROL DIAGRAMS	

NEW WORK KEY NOTE NO. 1  DEMOLITION KEY NOTE NO. 1  EF-1  EQUIPMENT TAG  AIR TERMINAL TAG:  S = SUPFRED R = RETURN RECK SIZE = 10x10  T = TRANCE CFM = 100 (TYPICAL FOR 2)  EXISTING DEVICES OR EQUIPMENT  WEW OR MODIFIED DEVICES OR EQUIPMENT  EXISTING SYSTEM COMPONENT TO BE REMOVE		
EF-1 EQUIPMENT TAG  AIR TERMINAL TAG:  S = SUPE R = RETU R = RETU R = RETU R = RETU NECK SIZE = 10×10 CFM = 100 (TYPICAL FOR 2)  EXISTING DEVICES OR EQUIPMENT  NEW OR MODIFIED DEVICES OR EQUIPMENT		
AIR TERMINAL TAG:  S = SUPER R = RETU  10x10 100-2  IE: DIFFUSER TYPE = S-1 NECK SIZE = 10x10 T = TRAN CFM = 100 (TYPICAL FOR 2)  EXISTING DEVICES OR EQUIPMENT  NEW OR MODIFIED DEVICES OR EQUIPMENT		
S-1 10x10 100-2  IE: DIFFUSER TYPE = S-1 NECK SIZE = 10x10 CFM = 100 (TYPICAL FOR 2)  EXISTING DEVICES OR EQUIPMENT  NEW OR MODIFIED DEVICES OR EQUIPMENT		
(/ / / / EVISTING SYSTEM COMPONENT TO BE DEMOVE		
EXISTING STSTEM COMPONENT TO BE REMOVE		
POINT OF NEW CONNECTION		
SECTION NO. 4  M5.2  SHEET M5.2 ON WHICH SECTION DRAWN		
SECTION  SCALE: 1/4" = 1' - 0"  SHEET M5.2 ON WHICH SECTION IS CUT (ENLARGED PARTIAL PLAN SIMILAR)		

DRAWING INDEX				
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DRAWING NOTATION			
SYMBOL	DESCRIPTION		
1	NEW WORK KEY NOTE NO. 1		
1	DEMOLITION KEY NOTE NO. 1		
<u>EF-1</u>	EQUIPMENT TAG		
S-1 10x10 100-2	AIR TERMINAL TAG: $S = SUPPLY$ $R = RETURN$ IE: DIFFUSER TYPE = S-1 $E = EXHAUST$ $NECK SIZE = 10x10 T = TRANSFER$ $CFM = 100 (TYPICAL FOR 2)$		
	EXISTING DEVICES OR EQUIPMENT		
	NEW OR MODIFIED DEVICES OR EQUIPMENT		
4///	EXISTING SYSTEM COMPONENT TO BE REMOVED		
<b>\</b>	POINT OF NEW CONNECTION		
SECTION NO. 4  4  M5.2  SHEET M5.2 ON WHICH SECTION DRAWN			
SECTION  SCALE: 1/4" = 1' - 0"  SHEET M5.2 ON WHICH SECTION IS CUT (ENLARGED PARTIAL PLAN SIMILAR)			
	YSTEM RISER S: SANITARY ESIGNATION D: DOMESTIC WATER H: HVAC PIPING SP: STAIRWELL PRESSURIZATION V: VENT - RISER NUMBER E: EXHAUST		

SE	<b>5</b> ®
<b>UL</b>	

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MIDLAND PUBLIC SCHOOLS 600 East Carpenter Street Midland, MI 48640

PROJECT:

MIDLAND PUBLIC SCHOOLS DOW HIGH SCHOOL BOILER REPLACEMENT 600 East Carpenter Street Midland, MI 48640

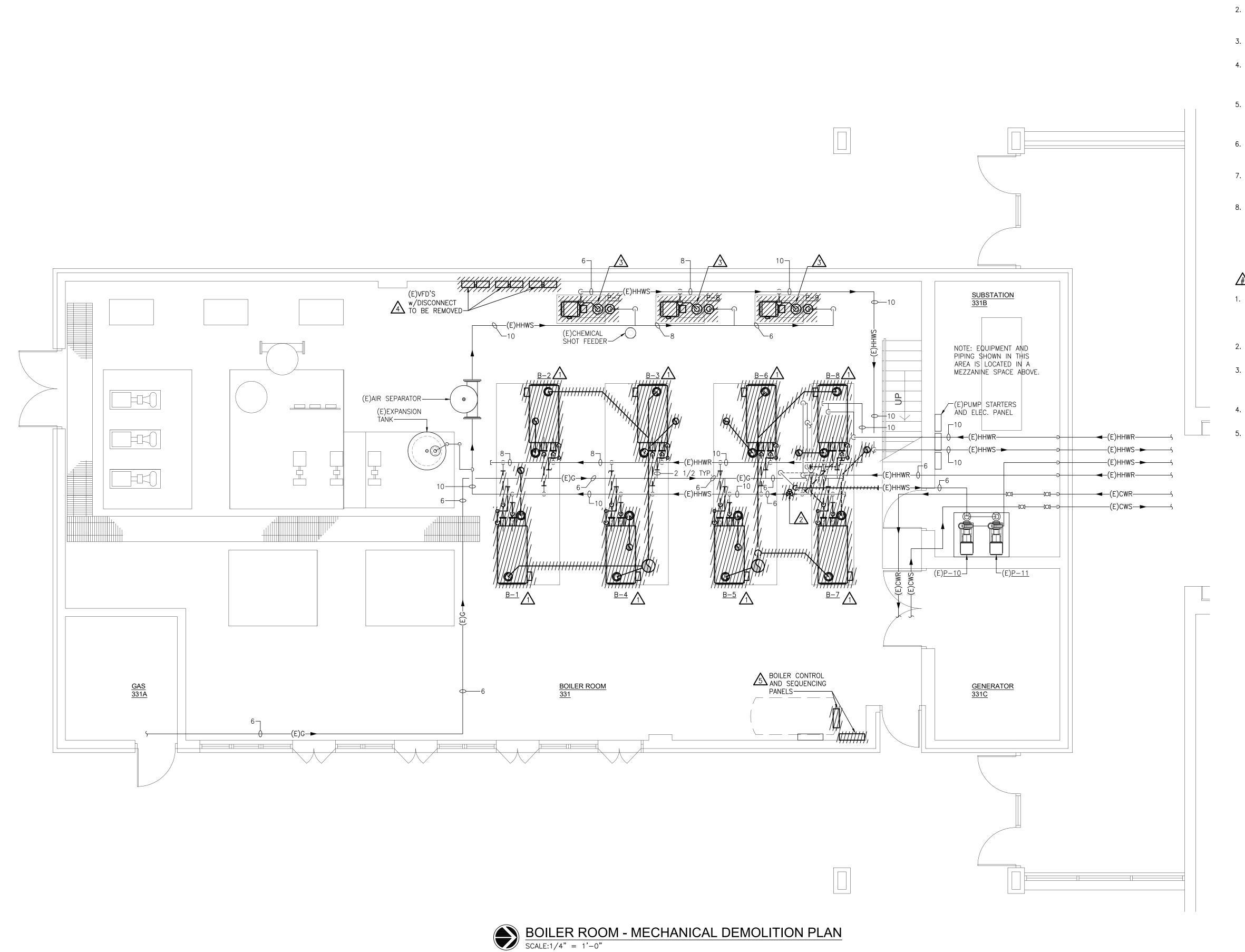
ISSUED FOR: 04/26/2024 DATE BIDS/PERMITS ISSUED

SHEET TITLE:

DESIGNER: ENGINEER:

MECHANICAL GENERAL INFORMATION

SHEET NUMBER:



#### MECHANICAL DEMOLITION NOTES

- THESE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL EXTENT OF WORK TO BE PERFORMED. THE EXACT EXTENT OF DEMOLITION SHALL BE AS REQUIRED BY THE NEW WORK.
- 2. PRIOR TO COMMENCEMENT OF WORK, CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH EXISTING SITE CONDITIONS, SYSTEMS, AND UTILITIES. NOTIFY ARCHITECT OF ANY INTERFERENCES OR DISCREPANCIES.
- 3. VERIFY DEPTH, SIZE, LOCATIONS AND CONDITION OF EXISTING UTILITIES IN THE FIELD. INCLUDING POINTS OF CONNECTION PRIOR TO STARTING ANY WORK.
- 4. ANY INTERRUPTIONS OF EXISTING SERVICES AND/OR EQUIPMENT SHALL BE PERFORMED AT A TIME APPROVED IN ADVANCE BY THE OWNER'S REPRESENTATIVE SO AS NOT TO INTERFERE WITH THE PRESENT BUILDING'S OPERATION.
- ALL ITEMS ON DEMOLITION PLAN SHALL BE CONSIDERED EXISTING UNLESS OTHERWISE NOTED. ALL WORK INDICATED ON PLANS HAS BEEN LOCATED PER EXISTING DRAWINGS AND/OR FIELD OBSERVATION AND REQUIRES FIELD VERIFICATION.
- 6. ALL ITEMS INDICATED WITH CROSS—HATCHING SHALL BE REMOVED COMPLETE, WITH ALL RELATED ITEMS INCLUDING HANGERS, SUPPORTS, INSULATION, CONTROLS, ETC. CAP ALL OPEN ENDED PIPES AND DUCTS.
- CONTROLS, ETC. CAP ALL OPEN ENDED PIPES AND DUCTS.

  7. ALL EXISTING WORK TO REMAIN SHALL BE PROTECTED FROM DAMAGE. WHERE DUCT OR PIPE INSULATION HAS BEEN DAMAGED DURING DEMOLITION, THE

CONTRACTOR SHALL REPAIR INSULATION AS REQUIRED TO MATCH EXISTING.

8. THE OWNER SHALL HAVE FIRST RIGHT OF REFUSAL ON ALL EQUIPMENT BEING REMOVED. ALL ITEMS REMOVED SHALL BE LEGALLY DISPOSED OF. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXISTING RELOCATED AND OWNER PROVIDED EQUIPMENT.

#### 

- 1. COORDINATE WITH OWNER AND ALLOW OWNER TO SALVAGE BOILER COMPONENTS PRIOR TO DEMOLITION AND DISPOSAL OF BOILER. WHEN OWNER IS COMPLETED, REMOVE BOILER COMPLETE, INCLUDING OUTDOOR AIR INTAKE, BOILER FLUES, PIPING AT EACH BOILER AND OTHER MISC. COMPONENTS. PREPARE PIPING FOR NEW CONNETIONS.
- REMOVE MOTORIZED VALVE AND ACTUATOR COMPLETE. PREPARE PIPING FOR NEW VALVE.
- 3. CAREFULLY DISCONNECT AND REMOVE EXISTING PUMP, PIPING AND SPECIALTIES. SEPARATE PUMP FROM PIPING SPECIALTIES AND SALVAGE PUMP FOR OWNER. COORDINATE WITH OWNER AND DISPOSE OF ALL OTHER ITEMS WHICH ARE DEMOLISHED.
- 4. CAREFULLY REMOVE AND SALVAGE VFDs AND DISCONNECTS AND RETURN TO OWNER.
- 5. REMOVE ALL OBSOLETE BOILER CONTROLS, SEQUENCING PANEL, OTHER OBSOLETE CONTROL DEVICES, AND OBSOLETE CONDUIT AND BOXES. LOCKING ENCLOSURE CAN BE REUSED IF NEEDED. PRIOR TO DEMOLITION, VERIFY IF ANY CONTROL DEVICES OR TRANE CONTROLLERS ARE USED FOR THE WITH THE CHILLED WATER OR DOMESTIC WATER SYSTEMS WITHIN THE ROOM. INFORM OWNER AND DO NOT DEMO IF REQUIRED FOR OTHER SYSTEMS.



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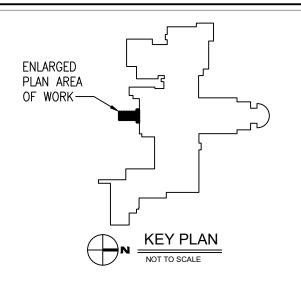
MIDLAND PUBLIC SCHOOLS

600 East Carpenter Street Midland, MI 48640

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MIDLAND PUBLIC SCHOOLS
DOW HIGH SCHOOL
BOILER REPLACEMENT

600 East Carpenter Street
Midland, MI 48640



|| Seal:

SSUED FOR:	
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DESIGNER:

04/26/2024

SHEET TITLE:

BIDS/PERMITS

ISSUED

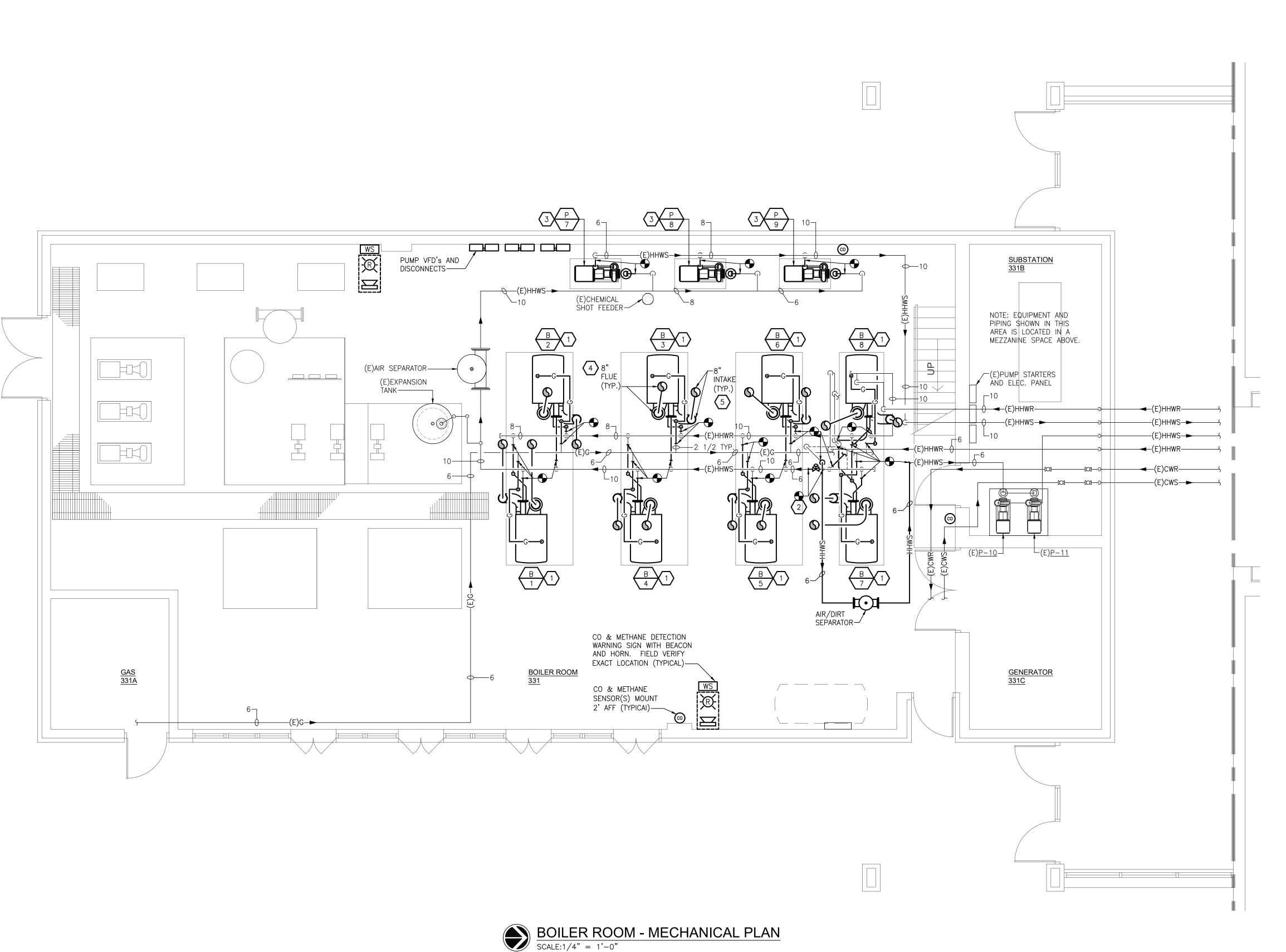
BOILER ROOM -MECHANICAL DEMOLITION PLAN

SHEET NUMBER

MD1.1

0 1/2" 1" 2"

ACCURATE WHEN PRINTED TO SCALE



#### **HVAC GENERAL NOTES**

- 1. THESE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL EXTENT OF THE WORK. PROVIDE HVAC SYSTEMS COMPLETE PER SPECIFICATION, SMACNA STANDARDS, AND PER APPLICABLE CODES INCLUDING ALL NECESSARY OFFSETS, FITTINGS, SPECIAL RADIUS OR MITERED ELBOWS WHICH ARE REQUIRED DUE TO SPACE CONSTRAINTS OR STRUCTURAL CONDITIONS OR OTHER CONDITIONS.
- 2. CONTRACTOR SHALL COORDINATE THEIR WORK WITH THE WORK OF ALL OTHER TRADES. PROVIDE ACCESS AROUND ALL NEW EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. VERIFY ALL CLEARANCES PRIOR TO THE FABRICATION OF
- 3. DUCTWORK/PIPING SHALL BE ROUTED AS HIGH AS POSSIBLE AND SHALL NOT BE LOCATED OVER ELECTRICAL EQUIPMENT/PANELS. PROVIDE REQUIRED CLEARANCE IN FRONT OF ELECTRICAL EQUIPMENT. DUCTWORK/PIPING SHALL NOT INTERFERE WITH ELECTRICAL EQUIPMENT CLEARANCE.
- 4. DUCTWORK/PIPING SHALL NOT BE INSTALLED IN A LOCATION THAT RESTRICTS THE ACCESS TO MECHANICAL DEVICES REQUIRING ACCESS.
- 5. THE CONTRACTOR SHALL PROVIDE ALL MISCELLANEOUS SUPPORTING STEEL, ETC. FOR THE PROPER INSTALLATION OF ALL MECHANICAL SYSTEMS.
- 6. COORDINATE FLOOR, WALL, ROOF PENETRATIONS, LOUVER SIZES, PAD LOCATIONS ETC. WITH ARCHITECTURAL TRADES. SEAL ALL PIPING AND DUCT PENETRATIONS.
- 7. FOR EQUIPMENT VALVING, COMPONENT, AND PIPING ARRANGEMENT, REFER TO PIPING DIAGRAMS AND DETAILS.
- 8. PROVIDE CODE REQUIRED CLEARANCE/ACCESS DOORS FOR DAMPERS, VALVES, AND CLEANOUTS LOCATED IN WALLS OR ABOVE HARD CEILINGS. COORDINATE LOCATIONS WITH ARCHITECT. REFER TO ARCHITECTURAL PLANS FOR CEILING TYPES
- 9. CONNECTION TO EQUIPMENT SHALL BE VERIFIED WITH MANUFACTURER'S CERTIFIED DRAWINGS. TRANSITIONS TO ALL EQUIPMENT SHALL BE VERIFIED AND PROVIDED FOR EQUIPMENT FURNISHED.
- 10. ROOF MOUNTED EQUIPMENT REQUIRING SERVICE SHALL BE LOCATED A MINIMUM OF 10 FEET FROM ROOF EDGES. WHERE EQUIPMENT CAN'T BE LOCATED AWAY FROM ROOF EDGE AND GUARD RAILS ARE NOT PROVIDED, PROVIDE PERMANENT FALL ARREST ANCHORAGE CONNECTION DEVICE THAT COMPLIES WITH ANSI/ASSE Z 359.1.

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#### **KEYED NOTES**

- BOILER ON EXISTING CONCRETE PAD. CONNECT TO HEADERS WITH NEW PIPING, VALVES AND SPECIALTIES AS INDICATED. REFER TO PIPING AND CONTROL DIAGRAMS FOR ADDITIONAL INFORMATION.
- 2. PROVIDE NEW MOTORIZED, 2-POSITION VALVE IN LOCATION OF EXISTING. FIELD VERIFY FLANGE TO FLANGE DIMENSIONS PRIOR TO ORDERING OR MODIFY PIPING AS REQUIRED FOR VALVE INSTALLATION.
- 3. PUMP ON EXISTING CONCRETE PAD. CONNECT TO HEADERS WITH NEW PIPING, VALVES AND SPECIALTIES. REFER TO PIPING AND CONTROL DIAGRAMS FOR ADDITIONAL INFORMATION.
- 4. BOILER FLUE UP THROUGH ROOF. ROOF IS APPROXIMATELY 26 FEET ABOVE FINISH FLOOR. FIELD VERIFY EXACT ROUTING AND PROVIDE OFFSETS AS NECESSARY TO AVOID EXISTING STRUCTURE OR OTHER OBSTACLES. MINIMIZE ELBOWS, USE 45s IN LIEU OF 90s AS MUCH AS POSSIBLE AND PROVIDE AT LEAST 5 FEET BETWEEN ELBOWS. TERMINATE APPROXIMATELY 7' ABOVE ROOF PER MANUFACTURER INSTRUCTIONS. PROVIDE ROOF CURB, FLASHING, COUNTER FLASHING AND STORM COLOR AT ROOF PENETRATION. PROVIDE ANGLE IRON AS NECESSARY TO FRAME OPENING BELOW ROOF.
- 5. BOILER COMBUSTION AIR INTAKE DUCT UP THROUGH ROOF. ROOF IS APPROXIMATELY 26 FEET ABOVE FINISH FLOOR. FIELD VERIFY EXACT ROUTING AND PROVIDE OFFSETS AS NECESSARY TO AVOID EXISTING STRUCTURE OR OTHER OBSTACLES. MINIMIZE ELBOWS, USE 45s IN LIEU OF 90s AS MUCH AS POSSIBLE AND PROVIDE AT LEAST 5 FEET BETWEEN ELBOWS. TERMINATE WITH GOOSENECK, APPROXIMATELY 3' ABOVE ROOF PER MANUFACTURER INSTRUCTIONS. PROVIDE ROOF CURB, FLASHING, COUNTER FLASHING AND STORM COLOR AT ROOF PENETRATION. PROVIDE ANGLE IRON AS NECESSARY TO FRAME OPENING BELOW ROOF.



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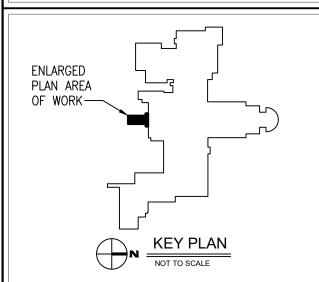
MIDLAND PUBLIC SCHOOLS

600 East Carpenter Street Midland, MI 48640

PROJECT:

MIDLAND PUBLIC SCHOOLS
DOW HIGH SCHOOL
BOILER REPLACEMENT

600 East Carpenter Street Midland, MI 48640



Seal:

ISSUED FOR:	
BIDS/PERMITS	04/26/202
ISSUED	DATE

SHEET TITLE:

DESIGNER: ENGINEER:

BOILER ROOM -MECHANICAL PLAN

SHEET NUMBER:

M1.1

1/2" 1" 2"

	BOILER SCHEDULE																
	FUEL	INPUT	OUTPUT	PRESSURE	RELIEF		WATER	(GLYCOL)		E	ELECTRICAL			DISCON	NECT	MANUFACTURER/	
UNIT ID	TYPE	(MBH)	(MBH)	RATING (PSIG)	VALVE (PSIG)	EWT °F	LWT °F	FLOW (GPM)	WPD (FT)	VOLTS	PHASE	FLA	FURN.	INST.	TYPE	MODEL NO.	REMARKS
B-1	NAT. GAS	2000	1740	160	55	140	180	87	<7	120	1	16	Е	Е	SWITCH	AERCO BMK 2000	
B-2	NAT. GAS	2000	1740	160	55	140	180	87	<7	120	1	16	Е	E	SWITCH	AERCO BMK 2000	
B-3	NAT. GAS	2000	1740	160	55	140	180	87	<7	120	1	16	Е	E	SWITCH	AERCO BMK 2000	
B-4	NAT. GAS	2000	1740	160	55	140	180	87	<7	120	1	16	Е	E	SWITCH	AERCO BMK 2000	
B-5	NAT. GAS	2000	1740	160	55	140	180	87	<7	120	1	16	Е	E	SWITCH	AERCO BMK 2000	
B-6	NAT. GAS	2000	1740	160	55	140	180	87	<7	120	1	16	Е	E	SWITCH	AERCO BMK 2000	
B-7	NAT. GAS	2000	1740	160	55	140	180	87	<7	120	1	16	Е	E	SWITCH	AERCO BMK 2000	
B-8	NAT. GAS	2000	1740	160	55	140	180	87	<7	120	1	16	E	E	SWITCH	AERCO BMK 2000	

1. PERFORMANCE DATA IS BASED ON WATER, UNLESS OTHERWISE NOTED.

2. PROVIDE CONDENSATE NEUTRALIZATION KIT.

	PUMP SCHEDULE															
			FLOW	HEAD	MIN %					DISCONNECT		ECT	STARTER		MANUEACTURED /	
UNIT ID	SERVICE	TYPE	(GPM)	(FT)	EFF	ВНР	HP	VOLTS	PHASE	FURN.	INST.	TYPE	FURN.	INST.	MANUFACTURER/ MODEL NO.	REMARKS
P-1	HEATING HOT WATER	END SUCTION	400	67	76	8.1	15	208	3	М	E	VFD W/DISC	<b>ж</b> . М	E	BELL & GOSSETT SERIES 1510 SIZE 3BD	
P-2	HEATING HOT WATER	END SUCTION	400	67	76	8.1	15	208	3	М	E	VFD W/DISC	Э. М	E	BELL & GOSSETT SERIES 1510 SIZE 3BD	
P-3	HEATING HOT WATER	END SUCTION	400	67	76	8.1	15	208	3	М	E	VFD W/DISC	Э. М	E	BELL & GOSSETT SERIES 1510 SIZE 3BD	

AUTOMATIC AIR VENT

—(E)AIR/DIRT SEPARATOR

FLOW MEASURING AND BALANCE

VALVE (TYP)— CHECK VALVE

CONTROL VALVE

(TYP)—

(E)EXPANSION TANK

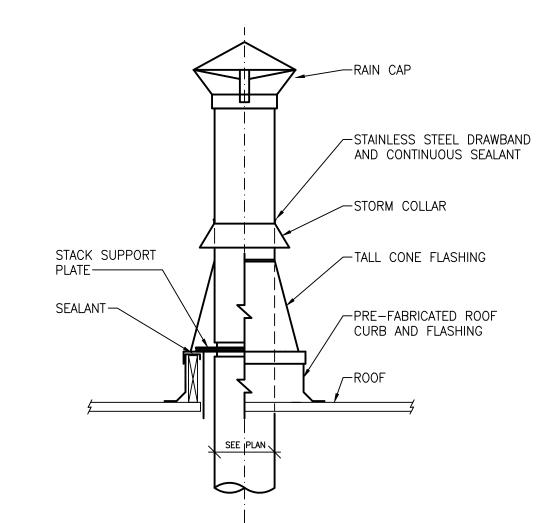
#### NOTES:

1. PERFORMANCE BASED ON WATER, UNLESS OTHERWISE INDICATED.

——(E)HHWS—<del>►</del>

ISOLATION VALVE

2. PUMPS SHALL BE NON-OVERLOADING.

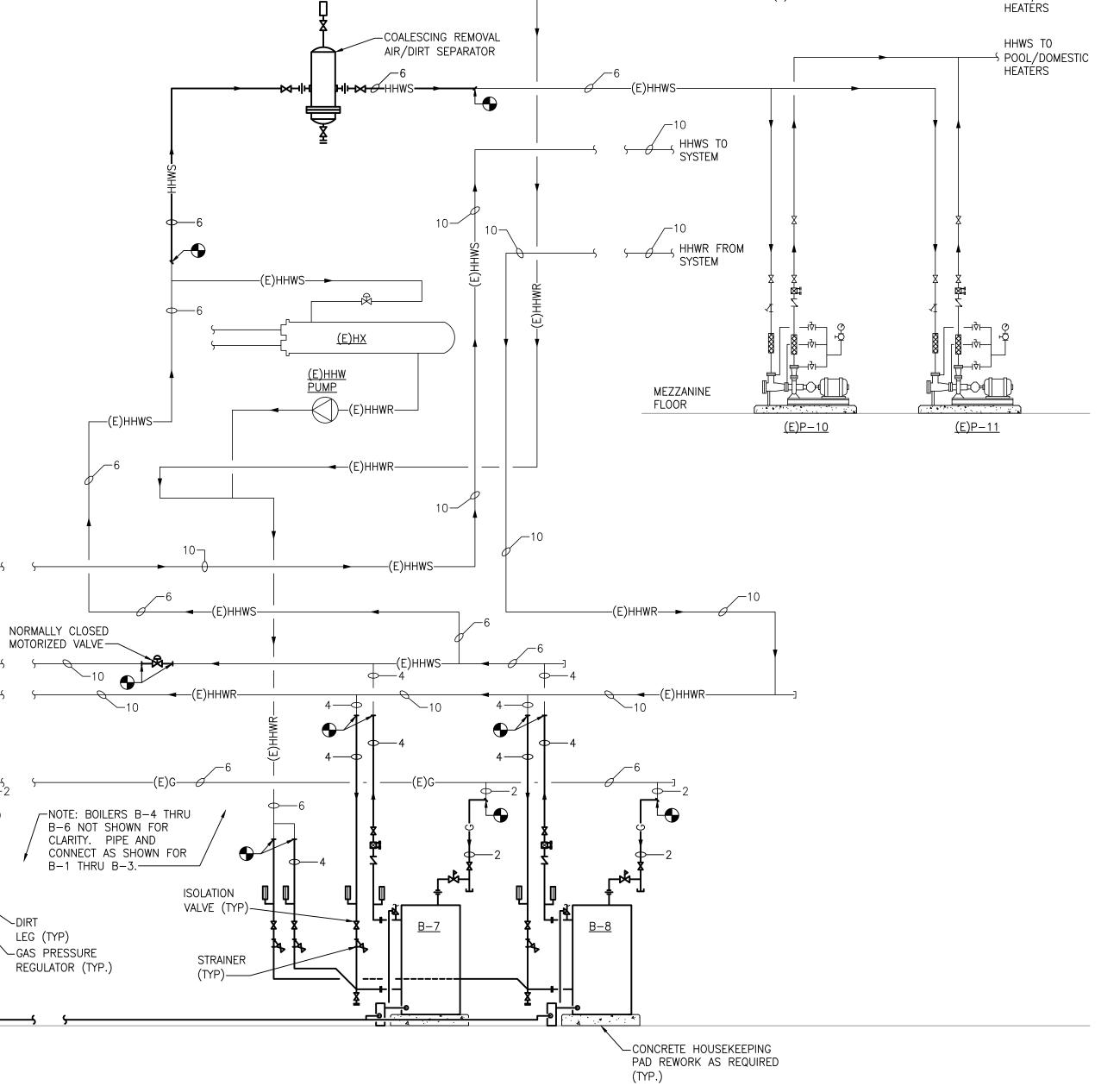


#### CONDENSING BOILER STACK DETAIL

NO SCALE

1. PROVIDE STACK SUPPORTS, GUIDES AND EXPANSION SECTIONS AS REQUIRED

PER MANUFACTURER'S INSTRUCTIONS.
2. COORDINATE INSTALLATION OF STACK SUPPORTS DURING CONSTRUCTION.



HEATING HOT WATER SYSTEM PIPING DIAGRAM

CONDENSATE NEUTRALIZER (TYP)————

<u>B-2</u>

LEG (TYP)



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MIDLAND PUBLIC SCHOOLS

600 East Carpenter Street Midland, MI 48640

PROJECT:

MIDLAND PUBLIC SCHOOLS DOW HIGH SCHOOL BOILER REPLACEMENT

600 East Carpenter Street Midland, MI 48640

Seal:

HHWR FROM → POOL/DOMESTIC

ISSUED FOR:

04/26/2024 BIDS/PERMITS ISSUED DATE

DESIGNER: **ENGINEER:** 

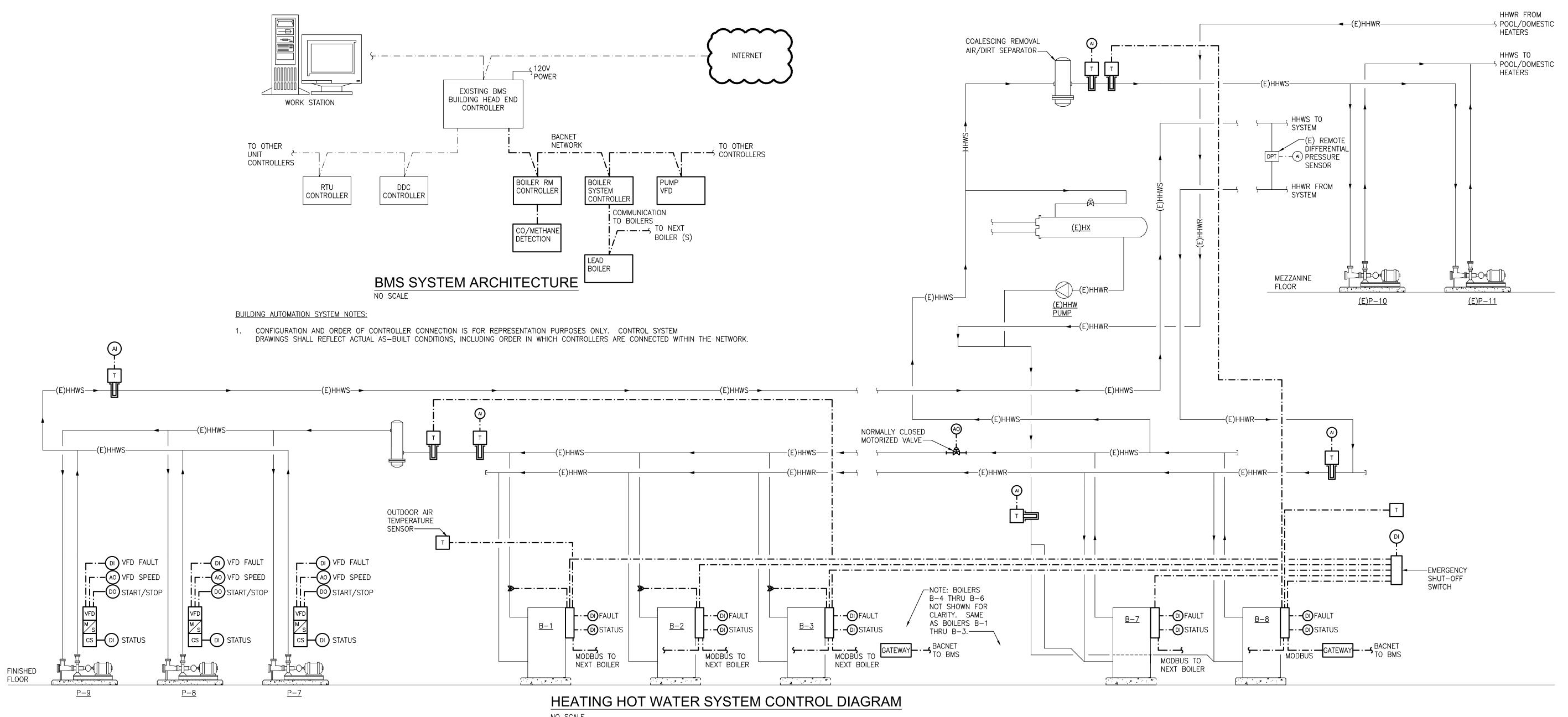
SHEET TITLE:

MECHANICAL DETAILS & SCHEDULES

SHEET NUMBER:

ALTHOUGH NOT
SHOWN, PROVIDE
INCREASER OR
REDUCER AT PUMP
CONNECTION AS
REQUIRED.

FINISHED FLOOR



	WATER SUPPLY ET SCHEDULE RU B-6					
OUTSIDE AIR TEMP.	HHWS TEMPERATURE					
≤ 60°F	140°F					
≤ 20°F	180°F					

HEATING HOT WATER SUPPLY (HHWS) RESET SCHEDULE									
` B−7 THRU B−8									
OUTSIDE AIR TEMP.	HHWS TEMPERATURE								
≤ 60°F	160°F								
≤ 20°F	180°F								

#### NO SCALE HEATING HOT WATER SYSTEM SEQUENCE OF OPERATIONS:

NOTE: ALL SETPOINTS AND TIME INTERVALS SHALL BE ADJUSTABLE BY THE SYSTEM OPERATOR.

BOILERS B-1 THRU B-6 AND PUMPS P-7, P-8 AND P-9 (LOWER TEMPERATURE RESET SYSTEM)

- WITH THE HYDRONIC HEATING PUMPS' HAND/AUTO/OFF SWITCH IN THE "AUTO" POSITION, THE DDC SYSTEM SHALL ENERGIZE THE LEAD PUMP. ONE OF THE PUMPS SHALL BE DESIGNATED "LEAD PUMP" AND SHALL OPERATE CONTINUOUSLY. THE OTHER PUMPS SHALL SERVE AS THE LAG PUMPS. WHEN THE LEAD PUMP IS OPERATING AT 80% (ADJ.) AND THE LOAD IS INCREASING, THE 1<sup>ST</sup> LAG PUMP SHALL BE STARTED AND BOTH PUMPS SHALL MODULATE IN UNISON TO MAINTAIN THE SYSTEM PRESSURE. IF BOTH PUMPS REACH 90% (ADJ) AND THE LOAD IS INCREASING, THE 2<sup>ND</sup> LAG PUMP SHALL BE STARTED AND ALL PUMPS SHALL MODULATE IN UNISON TO MAINTAIN THE SYSTEM DIFFERENTIAL PRESSURE. AS THE LOAD DECREASES, THE LAG PUMPS SHALL BE STOPPED IN REVERSE OF THE STARTING PROCEDURE.
- 2. THE DDC SYSTEM SHALL ALTERNATE LEAD PUMP BASED ON RUN TIME HOURS OR AT THE BEGINNING OF EACH MONTH.
- 3. EACH PUMP WILL PROVE OPERATION TO THE DDC SYSTEM WITH ITS CURRENT SWITCH. IF A PUMP FAILS, AN ALARM WILL BE SENT TO THE DDC SYSTEM AND THE NEXT PUMP WILL BE ACTIVATED.
- 4. PUMP SPEED SHALL MODULATE TO MAINTAIN HEATING HOT WATER DIFFERENTIAL PRESSURE AT THE EXISTING DP TRANSMITTER.
- 5. WHEN ENABLED BY THE BMS, THE BOILER CONTROL PANEL (INTERNAL TO THE LEAD BOILER) SHALL CONTROL THE SEQUENCING AND FIRING OF THE BOILERS TO MAINTAIN THE SYSTEM SUPPLY WATER TEMPERATURE BASED ON AN INDOOR/OUTDOOR RESET SCHEDULE. IF A BOILER FAILS TO START, AN ALARM WILL BE GENERATED AND STANDBY BOILERS WILL BE ACTIVATED.
- 6. BOILER OPERATION: UPON A CALL TO START, THE BOILER'S ISOLATION VALVE SHALL BE OPENED BY THE BOILER INTERNAL CONTROLS. THE BOILER SHALL THEN START AND MODULATE IT'S FIRING RATE TO MAINTAIN THE BOILER LEAVING WATER TEMPERATURE SETPOINT.
- 8. WHEN THE EMERGENCY SHUT OFF SWITCH IS ACTIVATED, THE BOILERS SHALL IMMEDIATELY BE DE-ENERGIZED AND AN ALARM SHALL BE SENT TO THE BMS (THRU MONITORING OF THE EMERGENCY SHUT-OFF SWITCH).
- 9. THE BUILDING DDC SYSTEM SHALL MONITOR ALL TEMPERATURE POINTS INDICATED, BOILER STATUS, BOILER ALARM, PUMP STATUS, SPEED, COMMAND AND ALARM, AND OUTSIDE AIR TEMPERATURE.

#### BOILERS B-7 AND B-8 AND PUMPS P-10 AND P-11 (HIGH TEMPERATURE RESET SYSTEM)

SUPPLY HEADER NORMALLY CLOSED, 2-WAY, MOTORIZED VALVE.

- 1. WITH THE HYDRONIC HEATING PUMPS' HAND/AUTO/OFF SWITCH IN THE "AUTO" POSITION, THE DDC SYSTEM SHALL ENERGIZE THE LEAD PUMP. ONE OF THE PUMPS SHALL BE DESIGNATED "LEAD PUMP" AND SHALL OPERATE CONTINUOUSLY. THE OTHER PUMP SHALL SERVE AS THE STANDBY PUMP. THESE PUMPS PROVIDE HEATING HOT WATER TO THE POOL AND DOMESTIC HOT WATER HEATERS.
- 2. THE DDC SYSTEM SHALL ALTERNATE LEAD PUMP BASED ON RUN TIME HOURS OR AT THE BEGINNING OF EACH MONTH.
- 3. EACH PUMP WILL PROVE OPERATION TO THE DDC SYSTEM WITH ITS CURRENT SWITCH. IF THE LEAD PUMP FAILS, AN ALARM WILL BE SENT TO THE DDC SYSTEM AND THE STAND-BY PUMP WILL BE ACTIVATED.
- 5. WHEN ENABLED BY THE BMS, THE BOILER CONTROL PANEL (INTERNAL TO THE LEAD BOILER) SHALL CONTROL THE SEQUENCING AND FIRING OF THE BOILERS TO MAINTAIN THE SYSTEM SUPPLY WATER TEMPERATURE BASED ON AN INDOOR/OUTDOOR RESET SCHEDULE. IF A BOILER FAILS TO START, AN ALARM WILL BE GENERATED AND THE STANDBY BOILER WILL BE ACTIVATED.
- 8. WHEN THE EMERGENCY SHUT OFF SWITCH IS ACTIVATED, THE BOILERS SHALL IMMEDIATELY BE DE-ENERGIZED AND AN ALARM SHALL BE SENT TO THE BMS (THRU MONITORING OF THE EMERGENCY SHUT-OFF SWITCH).
- 9. THE BUILDING DDC SYSTEM SHALL MONITOR ALL TEMPERATURE POINTS INDICATED, BOILER STATUS, BOILER ALARM, PUMP STATUS, SPEED, COMMAND AND ALARM, AND OUTSIDE AIR TEMPERATURE.
- 1. THE VALVE SHALL BE NORMALLY CLOSED. THE VALVE IS MANUALLY CONTROLLED BY THE SYSTEM OPERATOR THRU THE DDC SYSTEMS. THE VALVE SHOULD BE OPENED BY THE OPERATOR WHEN ADDITIONAL CAPACITY IS NEEDED BY EITHER B-1 THRU B-6 OR B-7 THRU B-8.
- 2. UPON OPENING THE VALVE, THE DDC SYSTEM SHALL OVERRIDE THE HEATING HOT WATER SET POINT OF BOILERS B-1 THRU B-6 TO MATCH THE HEATING HOT WATER SETPOINT OF BOILERS B-7 AND B-8.
- 3. THE VALVE POSITION SHALL BE REPORTED AT THE BMS AND SHALL BE CONSIDERED "IN ALARM" WHEN IN THE OPEN POSITION.

#### CO MONITORING

1. THE CO DETECTION IN THE BOILER ROOM SHALL BE PROVIDED FOR LOCAL AUDIO AND VISUAL ALARMS. WHEN THE ALARMS ARE ACTIVE, IT SHALL BE REPORTED TO THE BMS.



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MIDLAND PUBLIC SCHOOLS 600 East Carpenter Street Midland, MI 48640

MIDLAND PUBLIC SCHOOLS DOW HIGH SCHOOL BOILER REPLACEMENT

600 East Carpenter Street Midland, MI 48640

ISSUED FOR:	
BIDS/PERMITS	04/26/2024
ISSUED	DATE

**ENGINEER:** 

SHEET TITLE:

**DESIGNER:** 

**MECHANICAL** TEMPERATURE CONTROL DIAGRAMS

SHEET NUMBER:

	COPPER FEEDER SCHEDULE									
FEEDER (AMPS)	COND. SIZE	2 WIRE WITH GROUND	FEEDER (AMPS)	COND. SIZE	3 WIRE WITH GROUND	FEEDER (AMPS)	COND. SIZE	4 WIRE WITH GROUND		
(15S)	12	2#12, 1#12 GND IN 3/4"C	(15)	12	3#12, 1#12 GND IN 3/4"C	(15N)	12	4#12, 1#12 GND IN 3/4"C		
20S	12	2#12, 1#12 GND IN 3/4"C	20	12	3#12, 1#12 GND IN 3/4"C	20N	12	4#12, 1#12 GND IN 3/4"C		
<b>25S</b>	10	2#10, 1#10 GND IN 3/4"C	25	10	3#10, 1#10 GND IN 3/4"C	(25N)	10	4#10, 1#10 GND IN 3/4"C		
<u>30S</u>	10	2#10, 1#10 GND IN 3/4"C	30	10	3#10, 1#10 GND IN 3/4"C	30N	10	4#10, 1#10 GND IN 3/4"C		
<u>35S</u>	8	2#8, 1#10 GND IN 3/4"C	35	8	3#8, 1#10 GND IN 3/4"C	(35N)	8	4#8, 1#10 GND IN 3/4"C		
<b>40S</b>	8	2#8, 1#10 GND IN 3/4"C	40	8	3#8, 1#10 GND IN 3/4"C	40N	8	4#8, 1#10 GND IN 3/4"C		
<b>45S</b>	6	2#6, 1#10 GND IN 3/4"C	45	6	3#6, 1#10 GND IN 3/4"C	45N	6	4#6, 1#10 GND IN 1"C		
<b>50S</b>	6	2#6, 1#10 GND IN 3/4"C	50	6	3#6, 1#10 GND IN 3/4"C	(50N)	6	4#6, 1#10 GND IN 1"C		
(60S)	4	2#4, 1#10 GND IN 1"C	60	4	3#4, 1#10 GND IN 1"C	(60N)	4	4#4, 1#10 GND IN 1 1/4"C		
(70S)	4	2#4, 1#8 GND IN 1"C	70	4	3#4, 1#8 GND IN 1"C	70N	4	4#4, 1#8 GND IN 1 1/4"C		
<b>80S</b>	3	2#3, 1#8 GND IN 1"C	80	3	3#3, 1#8 GND IN 1"C	(80N)	3	4#3, 1#8 GND IN 1 1/4"C		
90\$	2	2#2, 1#8 GND IN 1"C	90	2	3#2, 1#8 GND IN 1 1/4"C	90N	2	4#2, 1#8 GND IN 1 1/2"C		
(100S)	1	2#1, 1#8 GND IN 1 1/4"C	(100)	1	3#1, 1#8 GND IN 1 1/4"C	(100N)	1	4#1, 1#8 GND IN 1 1/2"C		
			(110)	2	3#2, 1#6 IN 1 1/4"C	(110N)	2	4#2, 1#6 GND IN 1 1/4"C		
			(125)	1	3#1, 1#6 GND IN 1 1/4"C	(125N)	1	4#1, 1#6 GND IN 1 1/2"C		
			(150)	1/0	3#1/0, 1#6 GND IN 1 1/2"C	(150N)	1/0	4#1/0, 1#6 GND IN 2"C		
			(175)	2/0	3#2/0, 1#6 GND IN 1 1/2"C	(175N)	2/0	4#2/0, 1#6 GND IN 2"C		
			200	3/0	3#3/0, 1#6 GND IN 2"C	(200N)	3/0	4#3/0, 1#6 GND IN 2"C		
			225	4/0	3#4/0, 1#4 GND IN 2"C	(225N)	4/0	4#4/0, 1#4 GND IN 2 1/2"C		
			250	250	3-250 KCMIL, 1#4 GND IN 2"C	(250N)	250	4-250 KCMIL, 1#4 GND IN 2 1/2"C		
			300	350	3-350 KCMIL, 1#4 GND IN 2"C	(300N)	350	4-350 KCMIL, 1#4 GND IN 3"C		
			350	500	3-500 KCMIL, 1#3 GND IN 3"C	(350N)	500	4-500 KCMIL, 1#3 GND IN 3 1/2"C		
			400	600	3-600 KCMIL, 1#3 GND IN 3 1/2"C	400N	600	4-600 KCMIL, 1#3 GND IN 4"C		
			450	2-4/0	(2) 3#4/0, 1#2 GND IN 2"C	450N	2-4/0	(2) 4#4/0, 1#2 GND IN 2 1/2"C		
			500	2-250	(2) 3-250 KCMIL, 1#2 GND IN 2 1/2"C	(500N)	2-250	(2) 4-250 KCMIL, 1#1 GND IN 3"C		
			600	2-350	(2) 3-350 KCMIL, 1#1 GND IN 2 1/2"C	(600N)	2-350	(2) 4-350 KCMIL, 1#1 GND IN 3"C		
			700	2-500	(2) 3-500 KCMIL, 1#1/0 GND IN 3"C	(700N)	2-500	(2) 4-500 KCMIL, 1#1/0 GND IN 3 1/2"C		
			800	2-600	(2) 3-600 KCMIL, 1#1/0 GND IN 3 1/2"C	(800N)	2-600	(2) 4-600 KCMIL, 1#1/0 GND IN 4"C		
			(1000)	3-500	(3) 3-500 KCMIL, 1#2/0 GND IN 3"C	(1000N)	3-500	(3) 4-500 KCMIL, 1#2/0 GND IN 3 1/2"C		
			(1200)	3-600	(3) 3-600 KCMIL, 1#3/0 GND IN 4"C	(1200N)	3-600	(3) 4-600 KCMIL, 1#3/0 GND IN 4"C		
			(1600)	4-600	(4) 3-600 KCMIL, 1#4/0 GND IN 4"C	(1600N)	4-600	(4) 4-600 KCMIL, 1#4/0 GND IN 4"C		
			2000	5-600	(5) 3-600 KCMIL, 1-250 KCMIL GND IN 4"C	(2000N)	5-600	(5) 4-600 KCMIL, 1-250 KCMIL GND IN 4"C		
			2500	7-500	(7) 3-500 KCMIL, 1-350 KCMIL GND IN 3 1/2"C	2500N	7-500	(7) 4-500 KCMIL, 1-350 KCMIL GND IN 3 1/2"C		
			3000	8-500	(8) 3-500 KCMIL, 1-400 KCMIL GND IN 3 1/2"C	3000N	8-500	(8) 4-500 KCMIL, 1-400 KCMIL GND IN 3 1/2"C		
			4000	10-600	(10) 3-600 KCMIL, 1-500 KCMIL GND IN 4"C	4000N	10-600	(10) 4-600 KCMIL, 1-500 KCMIL GND IN 4"C		
			5000	12-600	(12) 3-600 KCMIL, 1-700 KCMIL GND IN 4"C	(5000N)	12-600	(12) 4-600 KCMIL, 1-700 KCMIL GND IN 4"C		
			6000	15-600	(15) 3-600 KCMIL, 1-500 KCMIL GND IN 4"C	(6000N)	15-600	(15) 4-600 KCMIL, 1-800 KCMIL GND IN 4"C		
NOTES:						•				

#### NOTES:

1. AMPACITIES FOR FEEDER SIZES ARE BASED ON N.E.C. CODE 110-14. (TERMINATION PROVISIONS FOR EQUIPMENT RATED 100A OR LESS ARE RATED FOR USE WITH CONDUCTORS RATED 60°C. TERMINATION PROVISIONS FOR EQUIPMENT RATED GREATER THAN 100A ARE RATED FOR USE WITH CONDUCTORS RATED 75°C.)

2. CONTRACTOR MAY OPTIONALLY USE 1/2" CONDUIT IN LIEU OF 3/4" CONDUIT FOR #10 AND #12 CONDUCTORS.

3. CONDUIT FILL IS BASED ON 40% FILL USING SINGLE CONDUCTOR BUILDING WIRE OF INSULATION TYPES THHN, THWN, THWN-2, XHH, XHHW, AND XHHW-2 IN RMC. FOR OTHER RACEWAY TYPES REFER TO APPROPRIATE N.E.C. APPENDIX C TABLES.

4. EQUIPMENT GROUND SIZING BASED ON N.E.C. TABLE 250.122.

	LIGHTING CONTROLS LEGEND								
	SYMBOL	DESCRIPTION							
	\$ SINGLE POLE SWITCH								
	\$3	THREE WAY SWITCH							
	\$4	FOUR WAY SWITCH							
	\$L	\$L LIGHT CONTROL LOCATION							
	G GENERATOR TRANSFER DEVICE								
	GENERATOR TRANSFER DEVICE								

TECHNOLOGY SYMBOL LIST								
SYMBOL	SYMBOL DESCRIPTION							
	CAMERA							
CR	R CARD READER							
	TECHNOLOGY OUTLET - 6" ABOVE COUNTER							
▼	TECHNOLOGY OUTLET - FLOOR							
▼	TECHNOLOGY OUTLET - WALL							
DH	MAGNETIC DOOR HOLDER							
•	PUSH BUTTON							
S	SPEAKER							
$\vdash \bigcirc$	WALL CLOCK — SINGLE FACE							
$\vdash \bigoplus$	WALL CLOCK — DOUBLE FACE							
	WALL CLOCK AND SPEAKER UNIT							
WAP								

NOTES:

1. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR BOX AND CONDUIT FOR ALL DEVICES INDICATED.

SYMBOL	DESCRIPTION					
•	CONDUIT DOWN					
0	CONDUIT UP					
4	DISCONNECT SWITCH - NON FUSED					
4	DISCONNECT SWITCH - FUSED					
4	DISCONNECT SWITCH - COMB. MOTOR STARTER					
ELECTRICAL PANEL						
•	GROUNDING ROD					
Ŧ	GROUND					
т-г	GROUNDING BAR					
J	JUNCTION BOX					
M	METER					
<b>\( \lambda \)</b>	MOTOR - SINGLE PHASE					
<b>\</b> @\	MOTOR — THREE PHASE					
\$м	MOTOR RATED SWITCH					
φ	POWER RECEPTACLE - SIMPLEX TYPE					
φ	POWER RECEPTACLE - DUPLEX TYPE					
<del>+</del>	POWER RECEPTACLE — DUPLEX 6" ABOVE COUNTER					
Pusb	POWER RECEPTACLE - USB/DUPLEX COMBO. DEVICE					
#	POWER RECEPTACLE - QUADRUPLEX TYPE					
FB	POWER RECEPTACLE - RECESSED FLOOR TYPE					
PT	POWER RECEPTACLE - POKE THRU TYPE					
$\Theta$	POWER RECEPTACLE - SPECIALTY TYPE					
TC	TIME CLOCK					
Т	TRANSFORMER					

NOTES:

1. ALL DEVICE RATINGS/SIZES SHALL BE COORDINATED WITH PLANS AND SCHEDULES.

FIRE	ALARM SYN	MBOLLIST
1 11 1		VIDOL LIO

SYMBOL DESCRIPTION	
FICI AUDIBLE DEVICE/WALL MOUNTED	
F VISUAL DEVICE/WALL MOUNTED	
FO COMBO AUDIBLE/VISUAL DEVICE/WALL MOUNTED	
F AUDIBLE DEVICE/CEILING MOUNTED	
VISUAL DEVICE/CEILING MOUNTED	
COMBO AUDIBLE/VISUAL DEVICE/CEILING MOUNTI	ΞD
CS CO ALARM/SMOKE DETECTOR	
SMOKE DETECTOR	
CO ALARM	
DUCT MOUNTED SMOKE DETECTOR	
HEAT DETECTOR	
□ FIRE DEPARTMENT COMMUNICATION OUTLET	
EXISTING COMBINATION FIRE/SMOKE DAMPER	
NEW (HORIZONTAL)	
EXISTING COMBINATION FIRE/SMOKE DAMPER	
NEW (VERTICAL)	
F MANUAL PULL STATION	
FS FLOW SWITCH	
TS) TAMPER SWITCH	
FAA FIRE ALARM ANNUNCIATOR PANEL	
FACP FIRE ALARM CONTROL PANEL	
I/O INPUT/OUTPUT CONTROL MODULE	
NOTES:  1. DRAWINGS INDICATE DESIGN INTENT ONLY, FINAL LOCATIONS A	ND

NOTES:

1. DRAWINGS INDICATE DESIGN INTENT ONLY, FINAL LOCATIONS AND DEVICE SPECIFICATIONS SHALL BE PROVIDED BY FIRE ALARM MANUFACTURER. REFER TO PROJECT SPECIFICATIONS FOR APPROVED MANUFACTURERS.

2. FIRE DETECTION AND SIGNALING DEVICES ARE SHOWN FOR COORDINATION PURPOSES. FINAL SYSTEM DESIGN TO BE PERFORMED BY CONTRACTOR AND SUPPLIER FOR OFFICIAL SUBMISSION. COORDINATE ALL DEVICE QUANTITIES AND LOCATIONS WITH SUPPLIER PRIOR TO INSTALLATION. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL NECESSARY PATHWAYS, POWER SUPPLIES AND DEVICES PER SUPPLIER CONTRACT DOCUMENTS.

ABBREV.	DESCRIPTION
AFF	ABOVE FINISHED FLOOR
Α	AMPERE
AF	AMPERE FUSE/AMPERE FRAME
AWG	AMERICAN WIRE GAUGE
AT	AMPERE TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AIC	AVAILABLE INTERRUPTING CURRENT (AMPS)
С	CONDUIT OR CEILING MOUNTED
СВ	CIRCUIT BREAKER
CL	CONTROL LOAD
CU	COPPER
CT	CURRENT TRANSFORMER
DIA	DIAMETER
DISC EMT	DISCONNECT  ELECTRICAL METALLIC TUBING
EWC	ELECTRIC WATER COOLER
EPO	EMERGENCY POWER OFF
(E)	EXISTING ELECTRICAL EQUIPMENT OR WORK
FA	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
FLA	FULL LOAD AMPS
F	FUSE
G/GRD	GROUND
GFCI/GFI	GROUND FAULT CIRCUIT INTERRUPTER
НОА	HAND-OFF-AUTO
HP	HORSEPOWER
IG	ISOLATED GROUND
KV	KILOVOLT
KVA	KILOVOLT AMPERE
KW	KILOWATT
KWH	KILOWATT HOUR
LP	LIGHTING PANEL
МСВ	MAIN CIRCUIT BREAKER
MDP	MAIN DISTRIBUTION PANEL
MLO	MAIN LUG ONLY
MAX	MAXIMUM
MIN	MINIMUM NATIONAL ELECTRICAL CODE
NEC NEMA	NATIONAL ELECTRICAL CODE  NATIONAL ELECTRICAL MANUFACTURERS ASSOC
N/NEU	NEUTRAL
NF	NON-FUSIBLE
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NIC	NOT IN CONTRACT
PH. OR Ø	PHASE
Р	POLE
PF	POWER FACTOR
PVC	POLYVINYL CHLORIDE (PLASTIC)
(R)	RELOCATED EXISTING ELECTRICAL EQUIPMENT
(RR)	REMOVE AND REINSTALL
RMC	RIGID METALLIC CONDUIT
RP	RECEPTACLE PANEL
TBB	TELEPHONE BACKBOARD
TYP.	TYPICAL
UC	UNDER COUNTER
UL	UNDERWRITERS LABORATORIES
UPS	UNINTERRUPTIBLE POWER SUPPLY
USB	UNIVERSAL SERIAL BUS
٧	VOLT

VOLT AMPERE

WIRE GUARD

WEATHERPROOF

TRANSFORMER

	DRAWING INDEX									
SHT NO	DESCRIPTION									
E0.0	ELECTRICAL GENERAL INFORMATION									
ED1.1	BOILER ROOM - ELECTRICAL DEMOLITION PLAN									
E1.1	BOILER ROOM - ELECTRICAL PLAN									
E5.0	ELECTRICAL DIAGRAMS & PANEL SCHEDULES									

[	DRAWING NOTATION												
SYMBOL	DESCRIPTION												
L1	LIGHTING FIXTURE TAG												
1	CONSTRUCTION KEY NOTE NUMBER 1												
1	DEMOLITION KEY NOTE NUMBER 1												
20	COPPER FEEDER SIZE TAG (REFER TO FEEDER SCHEDULE)												
20	ALUMINUM FEEDER SIZE TAG (REFER TO FEEDER SCHEDULE)												
<u>EQUIPMENT</u>	EQUIPMENT TAG												
	EXISTING DEVICES OR EQUIPMENT												
	NEW OR MODIFIED DEVICES OR EQUIPMENT												
	NEW OR MODIFIED UNDERGROUND WIRING												
\$/////// <u></u>	EXISTING SYSTEM COMPONENT TO BE REMOVED												
•	POINT OF NEW CONNECTION												
_	SHEET E5.2 ON WHICH SECTION IS DRAWN												
6 E5.2	SECTION  SCALE: 1/4" = 1' - 0"  SHEET E5.2 ON WHICH SECTION IS CUT (ENLARGED PARTIAL PLAN SIMILAR)												
LIGHTING CON SPACE TYPE													

	THE TAG DOES NOT REFLECT THE QUANTITY OF CONTROL S REQUIRED IN THE AREA.
	APPLICABLE CODES AND REGULATIONS
YEAR	CODE
2015	MICHIGAN BUILDING CODE
2015	MICHIGAN ENERGY CODE
2015	MICHIGAN RESIDENTIAL CODE
2015	MICHIGAN REHABILITATION CODE
2023	MICHIGAN ELECTRICAL CODE RULES, PART 8
2023	NATIONAL ELECTRICAL CODE (NFPA 70)
2013	NFPA 20
2013	NFPA 72
2013	NFPA 101
2013	NFPA 110
2009	ICC A117.1 ACCESSIBLE AND USABLE BUILDINGS & FACILITIES
1985	DETROIT ELEVATOR CODE



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MIDLAND PUBLIC SCHOOLS

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Midland, MI 48640

ROJECT:

MIDLAND PUBLIC SCHOOLS
DOW HIGH SCHOOL
BOILER REPLACEMENT

600 East Carpenter Street Midland, MI 48640

Seal:

ISSUED FOR:

BIDS/PERMITS 04/26/2024
ISSUED DATE

DESIGNER:
ENGINEER:

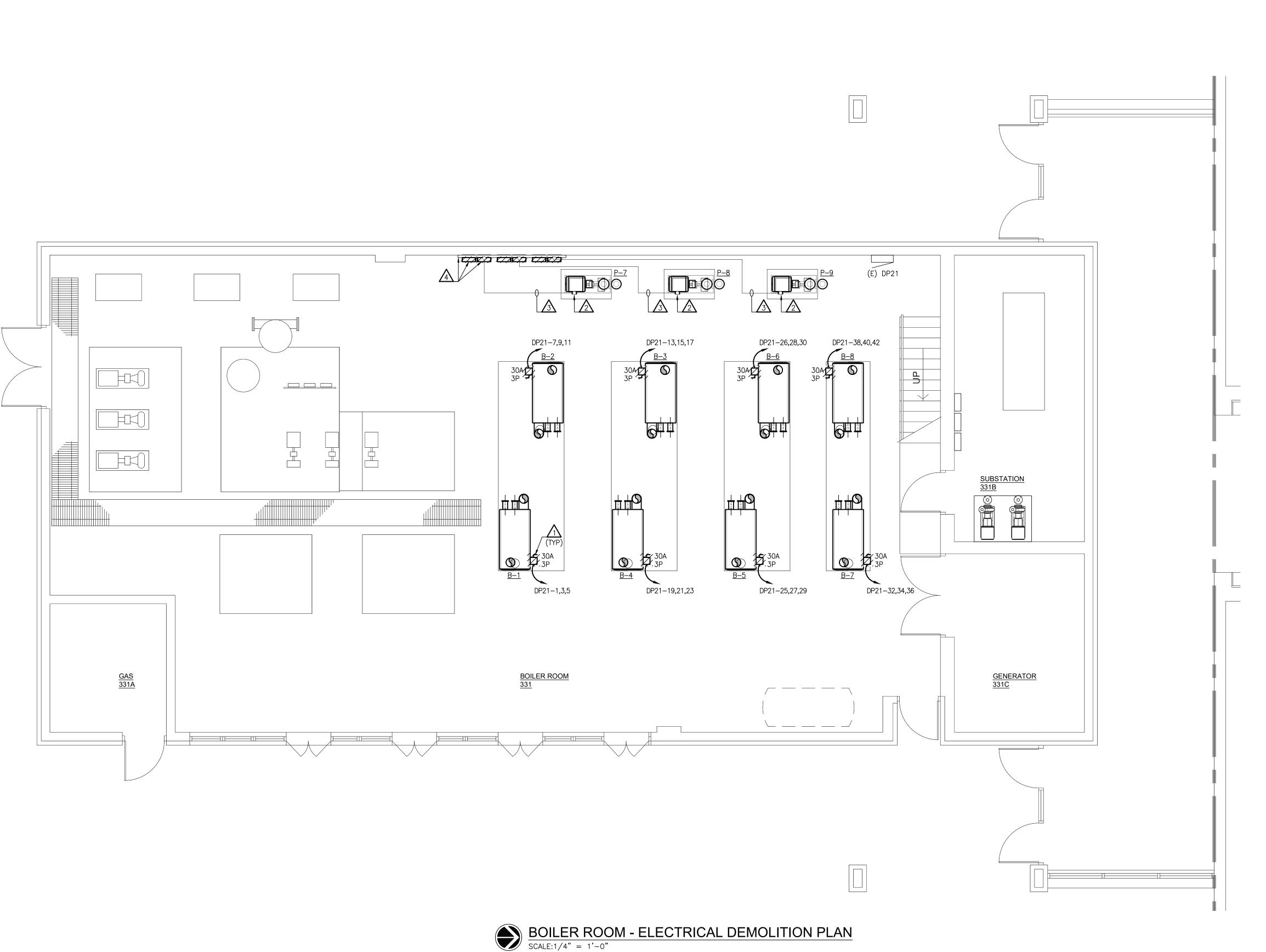
SHEET TITLE:

ELECTRICAL GENERAL INFORMATION

SHEET NUMBER:

0.0

<sup>2.</sup> LOW VOLTAGE CONTRACTOR SHALL PROVIDE EXACT SPECIFICATIONS AND LOCATIONS OF ALL DEVICES.



### **ELECTRICAL DEMOLITION NOTES**

- VISIT THE SITE PRIOR TO SUBMISSION OF BID TO EXAMINE THE EXISTING CONDITIONS AND THE EXTENT OF DEMOLITION WORK.
- 2. EXAMINE THE DRAWINGS OF OTHER TRADES, BE FAMILIAR WITH THE DEMOLITION
- REQUIRED BY OTHER TRADES.

  3. PERFORM ALL INCIDENTAL ELECTRICAL DEMOLITION AND/OR RELOCATION OF DEVICES AND EQUIPMENT REQUIRED TO FACILITATE THE DEMOLITION WORK OF
- OTHER TRADES.

  4. COORDINATE WITH NEW WORK PLANS, ONE LINE, AND RISER DIAGRAMS FOR
- EXTENT OF DEMOLITION WORK.

  5. COORDINATE ANY SHUTDOWN OF EXISTING SERVICES AND EQUIPMENT REMAINING IN USE WITH OWNERS' REPRESENTATIVE. WHERE EXISTING BUILDING SERVICE IS
- REQUIRED TO BE SHUT DOWN, INCLUDE ALL ASSOCIATED OVERTIME COST TO PERFORM THIS WORK DURING EVENING AND WEEKENDS. INCLUDE ALL COSTS FOR PROVIDING TEMPORARY POWER.
- 6. REMOVE ALL CONDUIT AND WIRE BACK TO NEAREST UPSTREAM DEVICE REMAINING IN SERVICE.
- 7. WHERE DEMOLITION WORK AFFECTS ELECTRICAL SERVICE TO DOWNSTREAM DEVICES TO REMAIN; EXTEND CONDUIT AND WIRE AS REQUIRED TO MAINTAIN ELECTRICAL SERVICE.
- 8. PROVIDE BLANK COVER PLATES WHERE SWITCHES AND DEVICES ARE REMOVED AND WALL REMAINS INTACT. MARK ALL UNUSED CIRCUIT BREAKERS AS "SPARE".
- CONTRACTOR TO TAG ALL CIRCUITS AT BOTH ENDS AFFECTED BY THIS SCOPE OF WORK.
- 10. CONTRACTOR SHALL PROVIDE UPDATED, TYPED—IN DIRECTORIES FOR ALL PANELS AFFECTED BY THIS SCOPE OF WORK.
- 11. CONTRACTOR SHALL VERIFY ALL UNDERGROUND AND IN-SLAB UTILITIES LOCATIONS PRIOR TO SAW CUTTING OR PENETRATING ANY FLOOR SLABS. CONTRACTOR SHALL REPAIR ALL UTILITIES DAMAGED BY SAW CUTTING.

#### DEMOLITION KEYED NOTES

- ELECTRICAL CONTRACTOR TO DISCONNECT AND REMOVE EXISTING DISCONNECT SWITCH ON BOILER AND RETURN FEEDERS, AS INDICATED, BACK TO SOURCE. CONDUIT TO REMAIN FOR NEW CIRCUITS. REFER TO NEW WORK PLANS.
- 2. ELECTRICAL CONTRACTOR TO DISCONNECT INCOMING CONDUIT FROM PUMP JUNCTION BOX. MAINTAIN INCOMING EXISTING CIRCUITS, AS INDICATED FOR NEW PUMPS.
- 3. EXISTING CONDUIT & FEEDERS FROM PUMP TO ASSOCIATED DISCONNECTS TO REMAIN FOR NEW PUMPS. REFER TO NEW WORK PLANS.
- 4. EXISTING PUMP VFD'S, AND DISCONNECTS TO BE DISCONNECTED AND REMOVED. RETURN VFD'S AND DISCONNECTS TO OWNER. MAINTAIN EXISTING WIRE—WAY. EXISTING CIRCUITS TO REMAIN FOR NEW VFD'S AND DISCONNECTS BY MECHANICAL TRADES, INSTALLED BY ELECTRICAL CONTRACTOR. REFER TO NEW WORK PLANS



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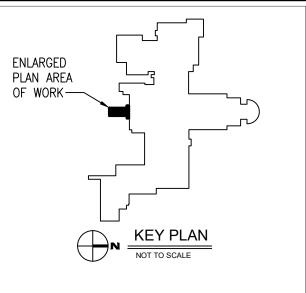
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DESIGNER: ENGINEER:

SHEET TITLE:

BOILER ROOM - ELECTRICAL

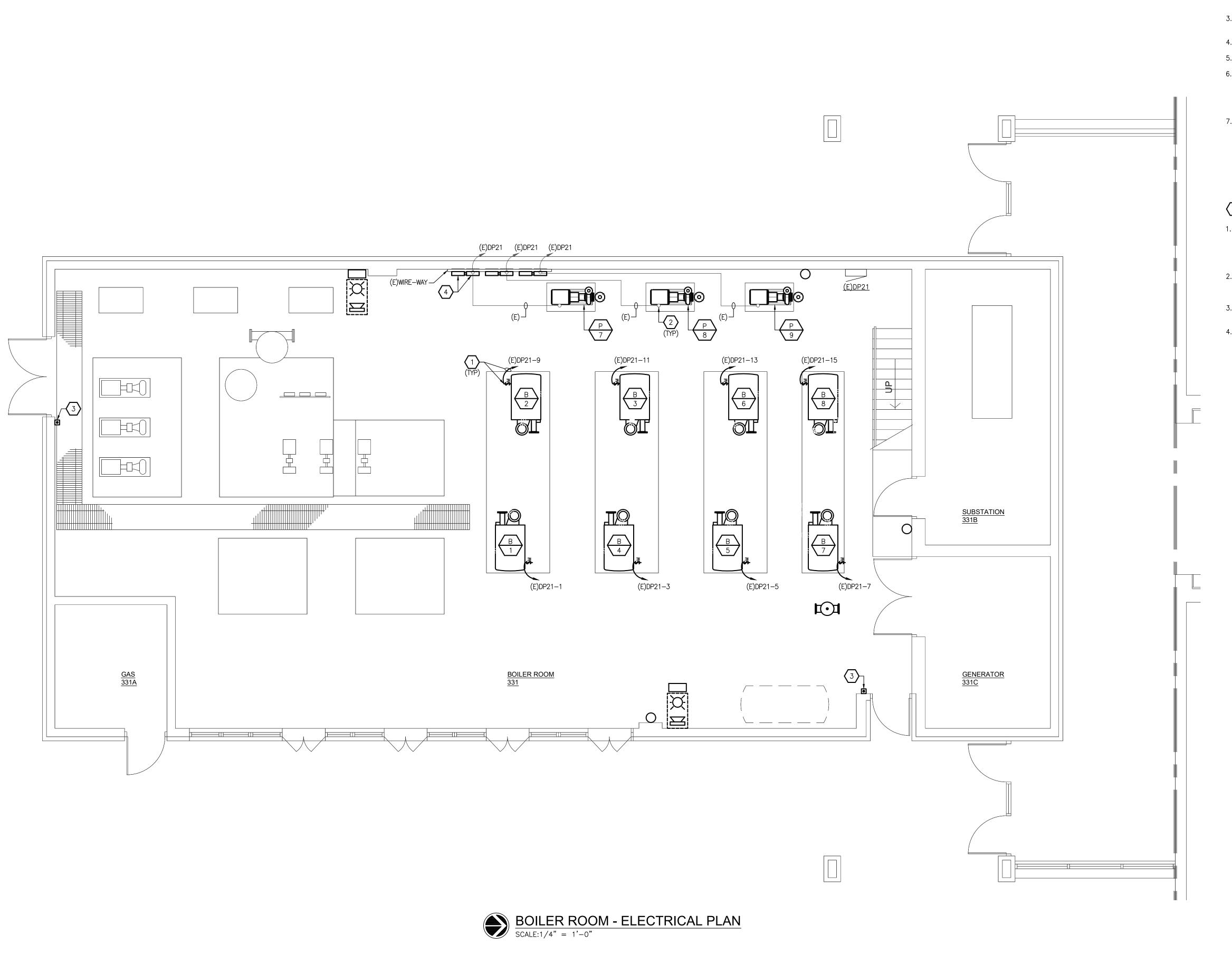
DEMOLITION PLAN

SHEET NUMB

ED1.1

0 1/2" 1" 2"

ACCURATE WHEN PRINTED TO SCALE



#### POWER GENERAL NOTES

- ALL RECEPTACLES ON EXTERIOR, IN KITCHEN, IN CONCESSION, IN LABORATORY, AND WITHIN 6'-0" OF SINK OR OTHER WATER SUPPLY SHALL BE READILY ACCESSIBLE GFCI TYPE RECEPTACLE.
- 2. REFER TO ARCHITECTURAL FLOOR PLANS AND ELEVATIONS TO VERIFY LOCATION OF DEVICES
- 3. ALL CONDUITS SERVING 120 VOLTS OR GREATER SHALL INCLUDE A GROUND
- 4. ALL CONDUITS SHALL BE ROUTED CONCEALED UNLESS NOTED OTHERWISE.
- 5. ALL 120 VOLT CIRCUITS SHALL UTILIZE A SEPARATE NEUTRAL.
- 6. RECEPTACLES INSTALLED IN ELEVATOR HOISTWAY(S), ELEVATOR MACHINE ROOM(S), CONTROL ROOM(S)/SPACE(S) SHALL BE GROUND FAULT CIRCUIT INTERRUPTER TYPE (GFCI) WITH THE EXCEPTION OF A DEDICATED SINGLE PHASE RECEPTACLE SUPPLYING AN ELEVATOR PIT SUMP PUMP SHALL NOT BE A GFCI TYPE RECEPTACLE.
- 7. ALL BRANCH CIRCUITS THAT SUPPLY 125-V SINGLE PHASE, 15 AND 20 AMP OUTLETS TO BE INSTALLED IN DWELLING UNIT FAMILY ROOMS, DINING ROOMS, LIVING ROOMS, PARLORS, LIBRARIES, RECREATION ROOMS, CLOSETS, HALLWAYS OR SIMILAR ROOMS OR AREAS SHALL BE PROTECTED BY A LISTED ARC-FAULT CIRCUIT INTERRUPTER; COMBINATION-TYPE, INSTALLED TO PROVIDE PROTECTION OF THE BRANCH CIRCUIT.

### KEYED NOTES

- 1. ELECTRICAL CONTRACTOR TO PROVIDE NEW LOCKABLE MOTOR RATED SWITCH FOR BOILERS. FEED NEW BOILERS FROM EXISTING CIRCUITS MADE AVAILABLE FROM DEMOLISHED BOILERS. PROVIDE NEW 20A, 1P CIRCUIT BREAKERS IN EXISTING I—LINE PANEL BOARD. CIRCUIT NUMBERS AS INDICATED, EXTEND CONDUIT AS REQUIRED.
- ELECTRICAL CONTRACTOR TO RECONNECT CONDUIT AND FEEDERS INTO NEW PUMP JUNCTION BOX PROVIDED WITH EQUIPMENT. EXTEND CONDUIT AND FEEDERS AS REQUIRED.
- 3. ELECTRICAL CONTRACTOR TO CONNECT NEW EMERGENCY PUSH BUTTON FOR NEW BOILERS. REFER TO DETAIL FOR ADDITIONAL INFORMATION.
- 4. NEW PUMP VFD'S AND DISCONNECT PROVIDED WITH MECHANICAL EQUIPMENT. ELECTRICAL CONTRACTOR TO UTILIZE EXISTING CIRCUITS THAT SERVED DEMOLISHED VFD'S AND DISCONNECTS. EXTEND CONDUIT AND WIRE AS REQUIRED.



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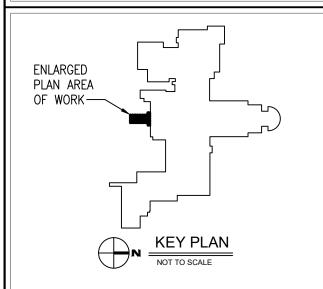
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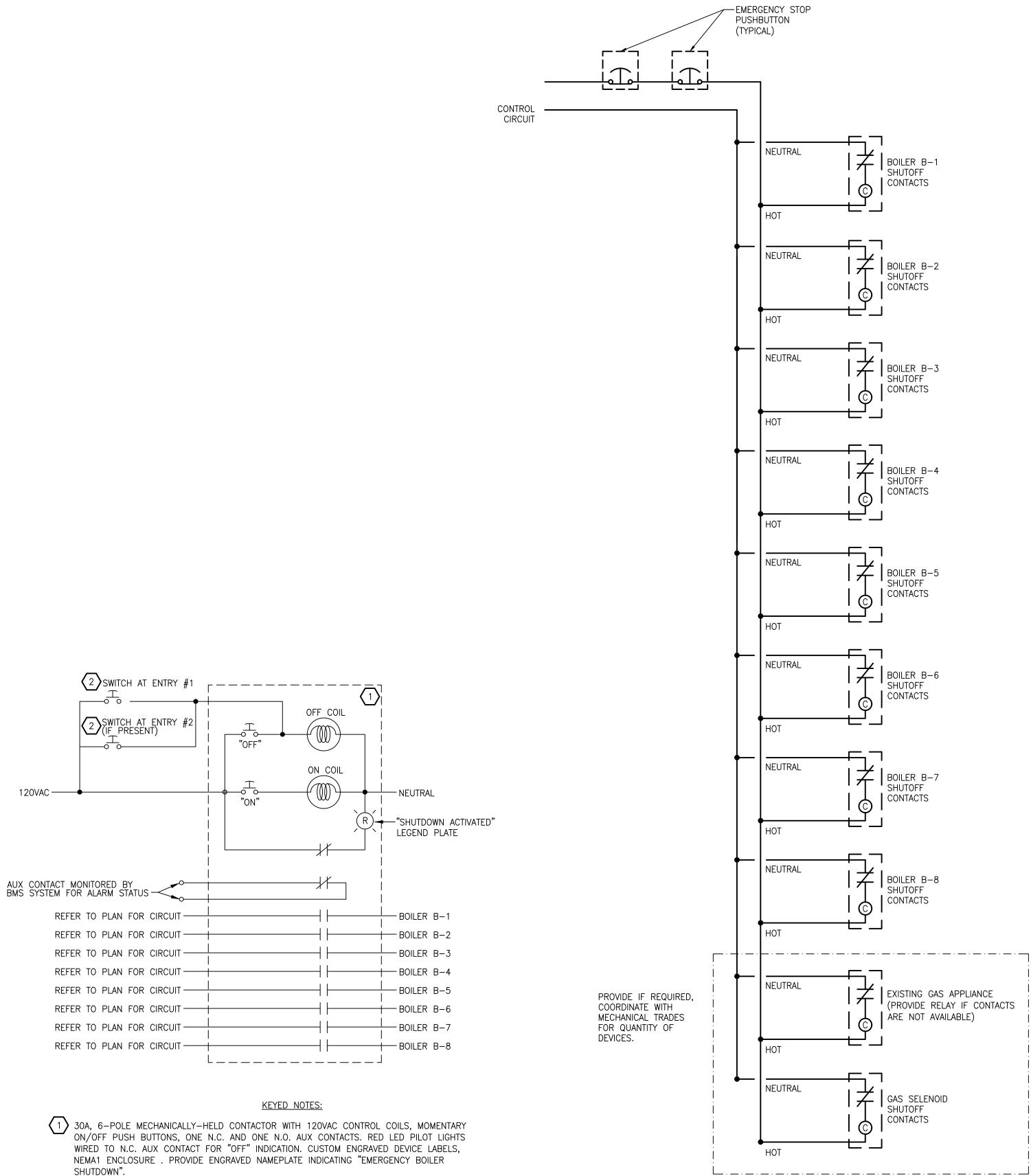
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BOILER ROOM - ELECTRICAL PLAN

SHFFT NUMB

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RED MOMENTARY PUSHBUTTON SWITCH MOUNTED ON YELLOW POLYCARBONATE BODY, CLEAR POLYCARBONATE HINGED COVER, CUSTOM LABEL "BOILER SHUTDOWN".

SCALE: NOT TO SCALE

BOILER EMERGENCY SHUTDOWN CONTROL DIAGRAM

BOILER ROOM SHUTOFF CONTROL DIAGRAM
SCALE: NOT TO SCALE

NOTES—
1. PROVIDE PUSHBUTTON AT EACH DOOR OUT OF BOILER ROOM.

2. PROVIDE ENGRAVED FACEPLATE WITH 'BOILER E-STOP' AT EACH PUSHBUTTON WITH PROTECTIVE COVER/RING.

3. EXTEND CIRCUIT TO ALL BOILERS IN ROOM.

Panel Designation		-	Main	: 40	00A 1	ИLO		P-P Voltage: 208							
Panel Location:  Fed From: SUB STATION #2  Feeder Size: EXISTING						Bus	ssing	: 40	00A			: 120			
						round	d Bus	<b>:</b> S1	TAND	ARD				Phase	: 3
						Mou	ntina	<b>:</b> SI	URFA	CF				Wire	: 4
				utral			OL .		in SC Inf	errunting		: 35KAIC			
	Light	Recept	Cont	nonC	ОС	1	ØØ			ОС	nonC	Cont	Recept		II
Remarks	Load	Load	Load	Load	Prot	СКТ	A B			Prot	Load	Load	Load	Load	Remarks
	i			1800		1	Х	Ť	2		1800				
existing boiler 1				1800	15	3	X		4	15	1800				EXISTING AIR COMP
				1800	1	5		X	6	7	1800				1
				1800		7	Х		8		3600				
EXISTING BOILER 2				1800	15	9	X		10	100	3600				EXISTING PUMP 7
				1800	1	11		X	12	1	3600				1
				1800		13	Х		14		3600				
existing boiler 3				1800	15	15	X		16	100	3600				EXISTING PUMP 8
				1800		17		X	18		3600				
				1800	15	19	Х		20		3600				
EXISITING BOILER 4				1800		21	Х	仜	22	100	3600				EXISTING PUMP 9
				1800		23		Х			3600				
				1800		25	Х		26		1800				
EXISTING BOILER 5				1800	15		X	. [	28	15	1800				existing boiler 6
				1800		29		Х			1800				
				3600		31	Х		32		1800				
existing				3600	] 100	33	X		34	15	1800				EXISTING BOILER 7
				3600	]	35		X	36		1800				
				3600		37	Х		38		1800				
existing				3600	100	39	X		40	15	1800				EXISTING BOILER 8
				3600	1	41		X	42	1	1800				1
	"			•											
	Connected Load											Demand			
Load Description	ØA	ØB	ØС	Total			Fac				ØA	ØB	ØС	Total	]
Lighting or Continous Load (Volt-Amps)	0	0	0	0			1.2				0	0	0	0	]
180VA Receptacle Load (Volt-Amps)	0	0	0	0			) (First				0	0	0	0	Receptacle Demand Factor per Article
	_	nount ove		0		0.5	50 (>		VA)		0	0	0	0	220.44 of the National Electrical Code.
Continuous Load (Volt-Amps)	0	0	0	0			1.2				0	0	0	0	_
Non-Continuous Load (Volt-Amps)	34200	34200	34200	102600			1.0				34200	34200	34200	102600	
Total Load (kVA)	34.20	34.20	34.20	102.60	1	_				Recept	34.20	34.20	34.20	102.60	]
Total Ampacity (Amps)	284.8	284.8	284.8	284.8		-	-			r load	284.8	284.8	284.8	284.8	_
Minimum Feeder Sizing (Amps)	284.8	284.8	284.8	284.8	8 < per NEC Article 215.2>					284.8	284.8	284.8	284.8		

Panel Designation	: <b>(E)</b> I	<b>DP21</b>	W/N	EW LOA	ADS	N	Nain:	: 40	0A M	LO			P-P V	/oltage:	208	
Panel Location		Bus	sing:	: 40	00A				P-N V	oltage:	120					
Fed From: SUB STATION #2									AND/	A RD				Phase:		
														Wire:		
Feeder Size: EXISTING							Mounting: SURFACE  Neutral: 100%						<b>L</b>		·	
													errupting		33KAIC	
Remarks	Light Load	Recept Load	Cont Load	nonC Load	OC Prot	СКТ	Ø Ø A B	c C	СКТ	OC Prot	nonC Load	Cont Load	Recept Load	Light Load	Remarks	
NEW BOILER 1				1920	20		X		2		1800					
NEW BOILER 4				1920	20	3	X		4	15	1800				existing air comp	
NEW BOILER 5				1920	20	5		X	6		1800					
NEW BOILER 7				1920	20	7	x		8		3600					
NEW BOILER 2				1920	20	9	X		10	100	3600				EXISTING PUMP 7	
NEW BOILER 3				1920	20	11		X	12		3600					
NEW BOILER 6				1920	20	13	x		14		3600					
NEW BOILER 8				1920	20	15	Х		16	100	3600				EXISTING PUMP 8	
SPACE						17		X	18		3600					
SPACE						19	X		20		3600					
SPACE						21	X		22	100	3600				EXISTING PUMP 9	
SPACE						23		X	24		3600					
SPACE							X		26						SPACE	
SPACE						27	Х		28						SPACE	
SPACE						29		X	30						SPACE	
				3600		31	X _		32						SPACE	
existing				3600	100	33	X		34						SPACE	
				3600		35		X	36						SPACE	
				3600		37	x		38						SPACE	
existing				3600	100	39	X		40						SPACE	
				3600		41		x	42						SPACE	
	"	Connect													1	
and Danwinton	Tokal			Demo					Demand		Tal-d					
oad Description ighting or Continous Load (Volt-Amps)	ØA 0	ØB	ØC	Total			1.2				ØA	ØB	ØC	Total		
ISOVA Receptacle Load (Volt-Amps)	0	0	0	0		1 00	(First		<u>-\/Δ</u> \		0	0	0	0	   Receptacle Demand Factor per Article	
iouv A kecepiacie Loda (Voii-Amps)	_	0	0 = 106\/A	0			•				0	0	_		· · · · · · · · · · · · · · · · · · ·	
Continuous Load (Volt-Amps)	4	ount ove		0	0.50 (> 10kVA)			0	0	0	0	220.44 of the National Electrical Code.				
Von-Continuous Load (Volt-Amps)	0 25560	25560	0 23640	0 74760	1.25				25560	0 25560	23640	74760				
fotal Load (kVA)	25.56	25.56	23.64	74.76	125%	ofligh			and P	ecent	25.56	25.56	23.64	74.76		
otal Ampacity (Amps)	23.36	212.8	196.8	207.5		125% of Light/Cont and Recept					25.56	212.8	196.8	207.5		
					(<10kVA) load plus other load											

NOTES:

1. LOADS SHOWN BOLD ARE NEW. PROVIDE NEW 20A-1P BREAKER COMPATIBLE WITH I-LINE TYPE HCN PANEL BOARD. TYPES BD, BG, BJ, AND BK.

2. PROVIDE BLANK INSERTS FOR SPACES, AS INDICATED.

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DESIGNER: RWG

ENGINEER:

SHEET TITLE:

ELECTRICAL DIAGRAMS & PANEL SCHEDULES

SHEET NUMBER:

E5.0