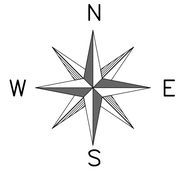
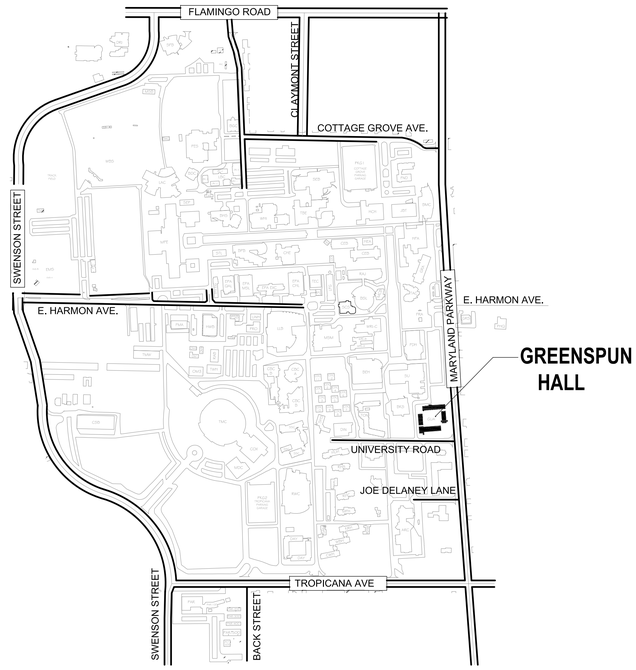
UNLV

GREENSPUN BUILDING
HEATING SYSTEM UPGRADE

UNIVERSITY OF NEVADA LAS VEGAS
4505 S. MARYLAND PKWY.
LAS VEGAS, NEVADA 89154



VICINITY MAP



DRAWING INDEX

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4505 S. MARYLAND PKWY.
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PROJECT: UNLV GUA HEATING SYSTEM UPGRADE

REVISIONS :

NO.	DATE	ISSUE

DRAWING TITLE :

PROJECT COVER SHEET

SIGMA'S Project No.	425DC1417
Consultant Project No.	-
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Drawn By	Checked By	Approved By
K.J.	F.S.	B.S.

File Name:

G1.01

CONSTRUCTION

MECHANICAL LEGEND, NOTES, AND SEQUENCE OF CONTROLS

SYMBOLS

— D —	D	DRAIN
——┤	CAP	CAP
—⋈—	(N.O.)	SHUT–OFF VALVE (GENERIC), NORMALLY OPEN
—⧓—	(N.C.)	SHUT–OFF VALVE (GENERIC), NORMALLY CLOSED
		CIRCUIT SETTER
		2–WAY MOTOR ACTUATED VALVE.
		3–WAY MOTOR ACTUATED VALVE.
		FLOW METER
		STRAINER
——HHWS——	HHWS	HEATING HOT WATER SUPPLY
——HHWR——	HHWR	HEATING HOT WATER RETURN
——PHHWS——	PHHWS	PRIMARY SYSTEM–HHWS
——PHHWR——	PHHWR	PRIMARY SYSTEM–HHWR
——SHHWS——	SHHWS	SECONDARY SYSTEM–HHWS
——SHHWR——	SHHWR	SECONDARY SYSTEM–HHWR
—CHWR →	CHWR	CHILLED WATER RETURN
—CHWS →	CHWS	CHILLED WATER SUPPLY
—HHWR →	HHWR	HEATING HOT WATER RETURN
—HHWS →	HHWS	HEATING HOT WATER SUPPLY
— CWR →	CWR	CONDENSER WATER RETURN
— CWS →	CWS	CONDENSER WATER SUPPLY
—(E)CHWR →	(E)CHWR	EXISTING CHILLED WATER RETURN
—(E)CHWS →	(E)CHWS	EXISTING CHILLED WATER SUPPLY
—(E)HHWR →	(E)HHWR	EXISTING HEATING HOT WATER RETURN
—(E)HHWS →	(E)HHWS	EXISTING HEATING HOT WATER SUPPLY
— (E)CWR →	(E)CWR	EXISTING CONDENSER WATER RETURN
— (E)CWS →	(E)CWS	EXISTING CONDENSER WATER SUPPLY
—— ——	(E)	EXISTING DUCTWORK
—— ——	(E)	EXISTING
//////////	(E)	EXISTING PIPING TO BE REMOVED
▨	(E)	EXISTING EQUIP. TO BE REMOVED
————	(N)	NEW
◆	P.O.D.	POINT OF DISCONNECT
⊗	P.O.C.	POINT OF CONNECTION
(XX)		NOTE REFERENCE

DETAIL / REFERENCE

XX — DETAIL/ TAG
XX — SHEET NUMBER

EQUIPMENT IDENTIFICATION SYMBOL

XX — EQUIPMENT TYPE
XX — EQUIPMENT IDENTIFIER

ABBREVIATIONS

ABV.	ABOVE
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AP	ACCESS PANEL
ARCH	ARCHITECTURAL
AS	AUTOMATIC FIRE SPRINKLER PIPING
ASS'Y.	ASSEMBLY
BEL	BELOW
BHP	BRAKE HORSEPOWER
BOT	BOTTOM
BTU	BRITISH THERMAL UNIT
BTUH	BTU PER HOUR
BV	BALANCING VALVE
C	CONVERTOR
CCSD	CLARK COUNTY SCHOOL DISTRICT
CFF	CAPPED FOR FUTURE
C.F.H.	CUBIC FEET PER HOUR
CLG.	CEILING
CONN	CONNECTION/ CONNECT
CFM	CUBIC FEET PER MINUTE
CONC	CONCRETE
COND	CONDENSATE
CONN	CONNECTION
CONT	CONTINUATION
CONTR.	CONTRACTOR
COTG	CLEANOUT TO GRADE
CU FT	CUBIC FEET
CU IN	CUBIC INCHES
CW	DOMESTIC COLD WATER
DIA	DIAMETER
DB	DRY BULB TEMPERATURE
DN.	DOWN
DR	DRAIN
DWG.	DRAWING
(E)	EXISTING
EA	EACH
EA	EXHAUST AIR
EF	EXHAUST FAN
EL	ELEVATION
ELEC	ELECTRICAL
ENT	ENTERING
EQUIP.	EQUIPMENT
EWC	ELECTRIC WATER COOLER
F	FIRE MAIN PIPING
FCO	FLOOR CLEANOUT
FCV	FLOW CONTROL VALVE
FD	FLOOR DRAIN
FDC	FIRE DEPARTMENT CONNECTION
FIN.FLR.	FINISH FLOOR
FLR.	FLOOR
FPM	FEET PER MINUTE
FS	FLOOR SINK
FT	FEET
F.U.	FIXTURE UNIT
GA	GAUGE
GAL	GALLON
GPM	GALLON PER MIN.
GV	GATE VALVE
H	HIGH
HB	HOSE BIBB
H.C.	HANDICAP
HP	HORSEPOWER
HZ	HERTZ
I.E.	INVERT ELEVATION
IN	INCHES
INT.	INTEGRAL
ICW	INDUSTRIAL WATER
KW	KILOWATT
LAV	LAVATORY
LBS	POUND
LVG	LEAVING
MAX	MAXIMUM
MBH	THOUSAND BTU PER HOUR
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MTD.	MOUNTED
(N)	NEW
NC	NORMALLY CLOSED
N.I.C.	NOT IN CONTRACT
NO	NORMALLY OPEN
NO.	NUMBER
NTS	NOT TO SCALE
OFD	OVERFLOW DRAINAGE PIPING
OPER.WT.	OPERATING WEIGHT
OPNG	OPENING
P	PUMP
PD	PRESSURE DROP
PG	PRESSURE GAUGE
PIV	POST INDICATING VALVE
PM	PROJECT MANAGER
POC	POINT OF CONNECTION
PRV	PRESSURE REDUCING VALVE ASSEMBLY
PSI	POUNDS PER SQUARE IN.
PSIG	PSI GAUGE
QTY	QUANTITY
RAD	RETURN AIR DUCT
RD	ROOF DRAIN
R.I.&C.	ROUGH–IN & CONNECT
RL	REFRIGERANT LINE
RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
RPM	REVOLUTIONS PER MINUTE
S	SINK
S OR W	SOIL OR WASTE PIPING
SAD	SUPPLY AIR DUCT
SD	STORM DRAIN
SL	SUCTION LINE
SP	STATIC PRESSURE
SQ.FT.	SQUARE FEET
SS	SERVICE SINK
TEMP	TEMPERATURE
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
UR	URINAL
UTR	UP THRU ROOF
V	SANITARY VENT PIPING
V.B.	VACUUM BREAKER
VEL	VELOCITY
VTR	VENT THROUGH ROOF
WB	WET BULB TEMPERATURE
WC	WATER CLOSET
WCO	WALL CLEAN OUT
WG	WATER GAGE
WH	WATER HEATER
W/	WITH

GENERAL NOTES

1. ALL WORK SHALL BE IN STRICT ACCORDANCE WITH THE APPROVED ENFORCED BUILDING, MECHANICAL AND PLUMBING CODES, AND AUTHORITIES HAVING JURISDICTIONS.
2. THE CONSTRUCTION IS WORK OF COMPLEX NATURE WHICH WILL REQUIRE ACCURATE PLANNING, CAREFUL PREPARATION AND EXECUTION TO DETAIL AND CLOSE SUPERVISION BY THE CONTRACTOR WHO WILL BE REQUIRED TO DO THIS WORK IN FULL COOPERATION WITH THE OTHER TRADES.
3. THE CONTRACTOR SHALL VERIFY ALL PIPING LOCATION, SIZE, PRESSURE AND AVAILABILITY PRIOR TO START OF ANY WORK.
4. THE CONTRACTOR SHALL COORDINATE FOR CLEARANCES PRIOR TO START OF ANY WORK.
5. THESE DRAWINGS ARE ESSENTIALLY DIAGRAMMATIC AND ARE NOT INTENDED TO INDICATE ALL NECESSARY OFFSETS OF PIPING. THE CONTRACTOR SHALL INSTALL MATERIAL AND EQUIPMENT IN A MANNER AS TO CONFORM TO STRUCTURE, AVOID OBSTRUCTIONS, PRESERVE HEADROOM, AND KEEP OPENINGS AND PASSAGEWAYS CLEAR. ALL INSTALLATIONS SHALL BE CONSISTENT WITH NORMALLY ACCEPTABLE INDUSTRY STANDARDS. CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE IN WRITING OF ANY DISCREPANCIES OR CONFLICTS THAT WOULD AFFECT THE SYSTEM PERFORMANCE OR WHICH WOULD INCUR ADDITIONAL COSTS. THIS NOTIFICATION SHALL BE MADE PRIOR TO THE INSTALLATION OF THE ITEMS CONCERNED.
6. EQUIPMENT INDICATED ON THIS DRAWING IS SHOWN IN APPROXIMATE POSITION(S). CONTRACTOR SHALL VERIFY ALL CONDITIONS INCLUDING EQUIPMENT LOCATIONS, P.O.C.'S, AND STRUCTURAL MEMBERS PRIOR TO INSTALLATION. IN ALL CASES, ADEQUATE ACCESS (PER MANUFACTURERS RECOMMENDATIONS AND CODE COMPLIANCE) FOR MAINTENANCE AND REPLACEMENT OF EQUIPMENT SHALL BE PROVIDED.
7. ALL WORK SHALL BE DONE IN ACCORDANCE WITH APPLICABLE CODES. NOTHING SHOWN IN THE PLANS OR STATED IN THE SPECIFICATIONS IS INTENDED TO INDICATE THAT THE INSTALLATION OR CONNECTIONS OF ANY ITEM OR DEVICE SHOULD BE DONE CONTRARY TO MANUFACTURERS INSTRUCTIONS AND ALL APPLICABLE CODES AND REGULATIONS. THE CONTRACTOR IS RESPONSIBLE TO INSURE THAT THE INSTALLATIONS AND CONNECTIONS OF ALL ITEMS AND DEVICES CONFORMS TO MANUFACTURERS INSTRUCTIONS AND TO ALL APPLICABLE CODES AND REGULATIONS.
8. ALL EQUIPMENT, MATERIAL, AND ALL CONNECTIONS THERE TO SHALL BE INSTALLED COMPLETE PER MANUFACTURERS INSTRUCTIONS TO PROVIDE A COMPLETE AND FULLY OPERATIONAL SYSTEM.
9. IF THE CONTRACTORS' USE OF SUBSTITUTE MATERIALS, EQUIPMENT OR METHODS OF INSTALLATION REQUIRES ANY CHANGES IN OTHER TRADES WORK FROM THAT SHOWN ON THE DRAWINGS, THE EXTRA COST OF THE OTHER TRADES WORK SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR INITIATING THE SUBSTITUTION.
10. SUBMITTALS: APPROVAL OF SUBMITTALS DOES NOT RELEASE THE CONTRACTOR FROM OBLIGATIONS TO FULLY COMPLY WITH ALL REQUIREMENTS OF THE CONSTRUCTION DOCUMENTS OR APPLICABLE CODE REGULATIONS.
11. BEFORE SUBMITTING BIDS FOR THE WORK THE CONTRACTOR SHALL MAKE A THOROUGH FIELD SURVEY OF THE WORK TO DETERMINE ANY INTERFERENCE THAT MAY AFFECT THE INSTALLATION OF THE WORK.
12. THE CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR, EQUIPMENT, APPURTENANCES, AND OTHER CONTRACTUAL ITEMS REQUIRED FOR THE COMPLETE INSTALLATION OF THE PIPING AND PLUMBING WORK TO THE SATISFACTION OF THE OWNER, AND ENGINEER.
13. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, LICENSES AND INSPECTIONS REQUIRED TO COMPLETE THE WORK, IF NECESSARY.
14. SEISMIC NOTE: SEISMIC BRACING AND ANCHORAGE OF PIPES SHALL BE PER IBC AND SMACNA SEISMIC MANUAL, "GUIDELINES FOR SEISMIC RESTRAINTS OF MECHANICAL SYSTEMS".
15. MAINTENANCE LABEL SHALL BE AFFIXED BY CONTRACTOR TO ALL EQUIPMENT AND A MAINTENANCE MANUAL SHALL BE PROVIDED TO OWNER.

DEMOLITION NOTES

1. CONTRACTOR SHALL VISIT THE SITE AND MAKE HIMSELF THOROUGHLY FAMILIAR WITH THE EXISTING CONDITIONS AND VERIFY THE EXISTING SITE CONDITIONS PRIOR TO BIDDING.
2. ALL WORK REQUIRED TO CHANGE THE EXISTING MECHANICAL ROOM INSTALLATION AS INDICATED SHALL BE PROVIDED.
3. REMOVE ALL EQUIPMENT, MISCELLANEOUS ITEMS, AND PIPING THAT INTERFERES WITH NEW CONSTRUCTION. EXTEND AND RECONNECT ANY INTERRUPTED SYSTEM TO OTHER EXISTING SYSTEMS WHICH REMAIN.
4. EXCEPT AS MAY BE SPECIFICALLY INDICATED OTHERWISE, ALL MATERIALS AND EQUIPMENT REMOVED FROM THE EXISTING INSTALLATION IN THE COURSE OF PERFORMING THE INDICATED WORK (AND NOT INDICATED TO BE REUSED) SHALL BE TREATED AS FOLLOWS:
   - 4.1. ALL DISCONNECTED AND/OR ABANDONED EQUIPMENT, PIPES, VALVES, FITTINGS, ELECTRICAL DEVICES, PANELS, BOXES, WIRING, CONDUITS AND CONTROLS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE SITE.
   - 4.2. ALL OTHER ITEMS REMOVED SHALL BE TURNED OVER TO THE OWNER, OR DISPOSED OF AS DIRECTED BY OWNER. COORDINATE WITH UNLV PROJECT MANAGER.
5. CONTRACTOR SHALL CLEAN ALL REMAINING ITEMS THAT ARE TO BE REUSED OR ARE TO REMAIN.
6. CONTRACTOR SHALL REMOVE ALL EXPOSED PIPES THAT ARE NOT IN USE.
7. CONTRACTOR SHALL PROVIDE ALL NECESSARY WORK AND MATERIALS TO MAINTAIN ALL EXISTING SYSTEMS IN OPERATION DURING AND AFTER CONSTRUCTION.
8. ALL EXISTING SYSTEMS INCLUDING EQUIPMENT, PIPES, ELECTRICAL, CONTROLS AND OTHER ITEMS WHICH ARE NOT TO BE DEMOLISHED SHALL REMAIN IN SERVICE THROUGHOUT THE CONSTRUCTION PERIOD.
9. UNLESS OTHERWISE NOTED ON DRAWINGS, ALL EXISTING EQUIPMENT, PIPES, BOXES, AND OTHER MECHANICAL AND ELECTRICAL SYSTEMS IN AREAS WHERE NEW WORK OCCURS SHALL BE REMOVED, EXCEPT WHEN SUCH ITEMS ARE REQUIRED TO MAINTAIN SERVICES TO OTHER AREAS. IN SUCH CASES, CONTRACTOR SHALL RELOCATE THESE ITEMS AND PROVIDE EQUIPMENT, PIPES, DAMPER, BOXES, AND CONTROL WHERE REQUIRED TO ACCOMMODATE THE NEW WORK. CONTRACTOR SHALL REMOVE ANY EXISTING ITEM, WHEN SUCH ITEM IS CONCEALED AND DOES NOT INTERFERE WITH NEW WORK.
10. ALL ABANDONED EQUIPMENT, PIPES, BOXES, ELECTRICAL AND CONTROLS SHALL BE REMOVED COMPLETELY BACK TO THE SOURCE; CAPPING OFF STUBS THAT MAY REMAIN.
11. INFORMATION GIVEN ON THE DRAWINGS ABOUT EXISTING INSTALLATIONS HAS BEEN OBTAINED FROM THE EXISTING CONDITION, BUT CANNOT BE GUARANTEED ACCURATE IN ALL RESPECTS. VERIFY ALL SUCH INFORMATION BEFORE PROCEEDING WITH ANY NEW WORK THAT MAY BE AFFECTED. INCLUDE AS PART OF THE CONTRACT ALL WORK REQUIRED TO PRODUCE THE INDICATED RESULT. THE CONTRACTOR SHALL OBTAIN ANY "AS–BUILT" DRAWINGS DIRECTLY FROM THE OWNER.
12. THESE DEMOLITION NOTES REFER TO ALL MECHANICAL PLANS WHERE DEMOLITION WORK IS BEING CARRIED OUT.
13. NEW AND/OR EXISTING EQUIPMENT INDICATED ON THIS DRAWING IS SHOWN IN APPROXIMATE POSITION(S). CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS INCLUDING EQUIPMENT LOCATIONS, P.O.D.'S, AND STRUCTURAL MEMBERS PRIOR TO INSTALLATION. IN ALL CASES, ADEQUATE ACCESS (PER MANUFACTURERS RECOMMENDATIONS AND CODE COMPLIANCE) FOR MAINTENANCE AND REPLACEMENT OF EQUIPMENT SHALL BE PROVIDED.
14. CONTRACTOR SHALL VERIFY ALL LOCATIONS, SIZES, P.O.D.'S, AND AVAILABILITY OF ALL EXISTING ITEMS (I.E. PIPING ETC.) PRIOR TO INSTALLATION OF ANY MATERIAL OR EQUIPMENT.
15. **THE CONTRACTOR SHALL BE RESPONSIBLE FOR LEGAL REMOVAL AND OR ABATEMENT OF ASBESTOS INSULATION. FIELD VERIFY PRIOR TO BID, AND VERIFY IF SUCH MATERIALS ENCOUNTERED IN THE WORK AREA.**
16. CONTRACTOR TO PROPERLY DISCONNECT, SALVAGE AND RETURN TO OWNER ALL EQUIPMENT, PIPING AND CONTROL COMPONENTS THAT ARE MARKED AND TAGGED BY UNLV FOR SALVAGE.

MECHANICAL INDEX

SPECIFIC NOTES

1. ALL PENETRATIONS THRU WALLS (INTERIOR OR EXTERIOR), CEILING, FLOOR, GRADE, ROOF AND CANOPY SHALL BE SEALED AIR AND WATER TIGHT WITH PROPER MATERIALS AND METHODS. DO NOT LEAVE ANY PORTION OF THE DEMOLISHED PIPING AND ACCESSORIES IN PLACE, EXPOSED OR VISIBLE IN ANY LOCATION. PATCH AND PAINT THE SURFACE TO MATCH EXISTING CONDITION. TYPICAL FOR EVERY AND ALL PENETRATIONS.
2. SEAL ALL PIPING PENETRATIONS THRU RATED ROOFS, WALLS AND CEILINGS TO MAINTAIN FIREPROOF RATINGS, AS APPLICABLE.
3. INSTALL INSULATION FOR EQUIPMENT, PUMPS. VALVES, ACCESSORIES AND FITTINGS REQUIRING ACCESS FOR MAINTENANCE, REPAIR, OR CLEANING, IN SUCH A MANNER THAT IT CAN BE EASILY REMOVED AND REPLACED WITHOUT DAMAGE.
4. INSTALL MANUAL AIR VENTS, EQUIPPED WITH BALL S.O.V (FOR ISOLATION) AT ALL HIGH POINTS OF THE PIPING. ALL AIR VENTS SHALL BE PIPED WITH COPPER TUBING AND DRAINED INTO AN APPROVED RECEPTOR. DRAIN PIPING SHALL BE SECURED AND ATTACHED TO SUPPORT STRUCTURE OR EQUIPMENT. CONSULT WITH UNLV PM (FACILITY MANAGEMENT) FOR ANY AREAS THAT MAY NEED SPECIAL INSTALLATION ARRANGEMENT.
5. ALL PIPING SHALL BE SEAMLESS. ALL FITTINGS SHALL BE MANUFACTURED FITTINGS. FIELD FABRICATED FITTINGS ARE NOT ALLOWED. ALL PIPING, FITTINGS, VALVES AND THEIR ACCESSORIES SHALL BE MADE IN USA.
6. PRIME AND PAINT ALL UN–INSULATED PIPING.
7. CONTRACTOR SHALL INSTALL THE PRIMARY–SECONDARY CONNECTIONS AS SHOWN IN THESE DRAWINGS.
8. CONSULT WITH UNLV PROJECT MANAGER AND COORDINATE AS REQUIRED.

ELECTRICAL WORK

CONTRACTOR SHALL PERFORM ALL NEW AND DEMO ELECTRICAL WORK AS REQUIRED TO MAKE A COMPLETE INSTALLATION FOR THIS PROJECT. ALL REQUIRED PANELS, MCC'S, DISCONNECT, CONDUITS AND WIRING (POWER AND CONTROLS) SHALL BE INSTALLED AND CONNECTED TO MAIN ELECTRICAL SWITCH BOARD AND MCC TO DELIVER A COMPLETE AND FULL OPERATIONAL SYSTEM, AS REQUIRED FOR INSTALLATION OF NEW BOILERS, AND PRIMARY PUMPS.

NEW BOILERS REQUIRE **230–208V POWER**. CONTRACTOR SHALL PROVIDE AND INSTALL REQUIRED POWER 9CONDUIT AND WIRING) FROM EXISTING ELECTRICAL PANEL TO NEW BOILERS. NEW PRIMARY PUMPS SHALL BE CONNECTED TO EXISTING POWER. THIS WORK SHALL BE PERFORMED BY LICENSED ELECTRICIAN AND PER NEC REQUIREMENTS.

ELECTRICAL CONTRACTOR SHALL DEMO ALL ABANDONED SERVICES, PANELS, DISCONNECTS, BOXES, CONDUITS AND WIRING COMPLETELY WITH HANGERS AND SUPPORTS. **EXISTING VFD FOR DEMOLISHED EQUIPMENT SHALL BE RETURNED TO OWNER**.

FILED VERIFY EXISTING CONDITIONS, CAPACITIES AND CONSULT WITH CCSD PM FOR HIS REQUIREMENTS PRIOR TO BID.

ARCHITECTURAL WORK

CONTRACTOR SHALL PERFORM ALL REQUIRED NEW AND DEMO ARCHITECTURAL WORK AS REQUIRED TO MAKE A COMPLETE INSTALLATION FOR THIS PROJECT. ALL REQUIRED SUPPORTS, PADS, OPENINGS, ETC. SHALL BE INSTALLED AS REQUIRED.

CONTRACTOR SHALL DEMO ALL ABANDONED AND UNUSED PADS, ETC. AND PATCH HOLES, IN WALLS, FLOORS, CEILING, ROOF AND PROTECT RATINGS, AS APPLICABLE, AND AS REQUIRED. REFER TO FLOOR PLAN AND DETAILS FOR INSTALLATION OF NEW CONCRETE PAD FOR BOILERS.

FILED VERIFY EXISTING CONDITIONS AND CONSULT WITH UNLV PM FOR HIS REQUIREMENTS PRIOR TO BID.

STRUCTURAL WORK

PROVIDE SUPPORT FOR EQUIPMENT AND PIPING IN ALL BUILDINGS, AS APPLICABLE AND REQUIRED BY CODE ALONG WITH SEISMIC CONTROLS. PROVIDE AND SUBMIT FOR APPROVAL, DESIGN AND CALCULATIONS AS REQUIRED NY LICENSED NEVADA STATE STRUCTURAL ENGINEER.

PROVIDE SUPPORT FOR EQUIPMENT (**BOILERS, PUMPS AND STACK**) AND **PIPING** SUPPORTS ALONG WITH SEISMIC CONTROLS, AS PER REQUIREMENTS OF STATE AND IBC. SUBMIT SHOP DRAWINGS FOR REVIEW AND APPROVAL.

FILED VERIFY EXISTING CONDITIONS AND CONSULT WITH UNLV PM FOR HIS REQUIREMENTS PRIOR TO BID.

WATER BALANCE NOTES

THE SERVICES DESCRIBED HEREIN SHALL BE PERFORMED BY THE AABC CERTIFIED TEST AND BALANCE AGENCY (TABA). TABA SHALL BE CONTRACTED SEPARATELY AND DIRECTLY BY THE OWNER (UNLV). THIS AGENCY SHALL BE A COMPANY SPECIALIZING IN THE ADJUSTING AND BALANCING OF SYSTEMS SPECIFIED IN THIS SECTION WITH MINIMUM THREE YEARS DOCUMENTED EXPERIENCE CERTIFIED BY AABC. WORK SHALL BE PERFORMED UNDER SUPERVISION OF AABC CERTIFIED TEST AND BALANCE ENGINEER AND REGISTERED ENGINEER. THE REPORT SHALL BE PRESENTED TO UNLV PM IN BOTH DIGITAL AND HARD COPY FORMATS.

1. WATER FLOW, IN AND OUT OF EACH BOILER, AND IN BOILER ROOM SHALL BE BALANCED PER INDIVIDUAL AND TOTAL GPM'S INDICATED IN THE BOILER SCHEDULE.
2. TABA SHALL TO TEST AND DOCUMENT THE PRESSURE DROP AT DESIGN FLOW RATE FOR ABOVE EQUIPMENT AND THEN, READ AND DOCUMENT THE TEMPERATURES AT BOTH ENTERING AND LEAVING SIDES OF:
   A. EACH BOILER,
   B. PRIMARY LOOP ,
   C. SECONDARY LOOP (BUILDING SIDE)
3. TABA SHALL TEST, ADJUST AND BALANCE WATER FLOW AND HEAD PRESSURE ACROSS EACH PUMP AND PROVIDE COMPLETE DATA (INCLUDING ELECTRICAL INFORMATION) FOR EACH PRIMARY AND SECONDARY PUMP.

SPECIAL INSPECTION

1

QUALITY ASSURANCE PLAN
1. SPECIAL INSPECTION SHALL BE PROVIDED BY THE OWNER ACCORDING TO IBC CHAPTER 17 FOR THE ITEMS IDENTIFIED IN THIS SECTION AND ON THE CONTRACT DOCUMENTS.
2. THE NAMES AND CREDENTIALS OF SPECIAL INSPECTORS TO BE USED SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT WHEN APPLYING FOR A BUILDING PERMIT.
3. SPECIAL INSPECTION REPORTS SHALL BE DELIVERED TO THE ENGINEER OF RECORD, ARCHITECT, AND OWNER (AS REQUESTED) BI–WEEKLY OR MORE FREQUENTLY AS REQUIRED BY THE INSPECTOR OR BUILDING OFFICIAL.
4. OFF–SITE FABRICATION: WHERE FABRICATION OF STRUCTURAL LOAD–BEARING MEMBERS AND ASSEMBLIES ARE BEING PERFORMED ON THE PREMISES OF A FABRICATOR'S SHOP, SPECIAL INSPECTION OF THE FABRICATED ITEMS SHALL BE IN ACCORDANCE WITH IBC SECTION 1704.2 UNLESS THE FABRICATOR IS APPROVED ACCORDING TO IBC SECTION 1704.2.5.2.
5. WELDING: WELDING INSPECTION SHALL BE PROVIDED IN ACCORDANCE WITH TABLE 1705.2.2.1 AND AISC 360. ELEMENTS THAT ARE PART OF THE SEISMIC–FORCE–RESISTING SYSTEM SHALL ALSO BE INSPECTED ACCORDING TO SECTION 1705.11 AND 1705.12.
6. HIGH–STRENGTH BOLTS: PERIODIC SPECIAL INSPECTION SHALL BE PROVIDED FOR INSTALLATION OF HIGH–STRENGTH BOLTS IN ACCORDANCE WITH AISC SPECIFICATIONS. SEE IBC SECTION 1704.3.3.
7. CONCRETE CONSTRUCTION: SPECIAL INSPECTIONS AND VERIFICATIONS SHALL BE PROVIDED IN ACCORDANCE WITH SECTION 1704.4 AND TABLE 1708.2.

SPECIAL INSPECTION SCHEDULE
(C)ONTINUOUS, (P)ERIODIC

1. MATERIAL VERIFICATION OF HIGH STRENGTH BOLTS, NUTS & WASHERS:	
1.1. IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS.	P
1.2. MANUFACTURER'S CERTIFICATE OF COMPLIANCE REQUIRED.	P
2. INSPECTION OF HIGH STRENGTH BOLTING:	
2.1. BEARING TYPE CONNECTIONS:	P
2.2. SLIP–CRITICAL CONNECTIONS:	C&P

CONCRETE: (C)ONTINUOUS, (P)ERIODIC

1. VERIFYING USE OF REQUIRED DESIGN MIX.	P
2. AT THE TIME FRESH CONCRETE IS SAMPLED TO FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE.	C
3. INSPECTION OF CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	C
4. INSPECTION OF MAINTENANCE OF SPECIFIED CURING TEMPERATURES AND TECHNIQUES.	P
5. VERIFICATION OF IN–SITU CONCRETE STRENGTH, PRIOR TO STRESSING OF TENDONS IN POST–TENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND STRUCTURAL SLABS.	P

MISCELLANEOUS ITEMS:
X EPOXY ANCHOR PLACEMENT

CONTROL NOTES

THE CONTROL SYSTEM SHALL BE FURNISHED, ENGINEERED AND INSTALLED BY "HONEYWELL INTERNATIONAL – HONEYWELL BUILDING SOLUTIONS".

LONWORK CONTROL SYSTEM, "HONEYWELL EBI "EXCELL 5000" BY HONEYWELL CONTROLS ARE CURRENTLY INSTALLED IN GUA BUILDING. BAS SHALL PROVIDE COMPLETE SUBMITTALS, GRAPHICS AND SOFTWARE POINTS LIST AND SUBMIT TO UNLV PRIOR TO START OF WORK FOR THEIR APPROVAL.

BAS/CONTROL CONTRACTOR SHALL PROVIDE THE FOLLOWINGS AS THEIR SCOPE OF SERVICES UNDER THIS PROJECT/CONTRACT.

PREPARE AND PRESENT CONTROL SUBMITTALS IN ELECTRONIC FORMAT AND MINIMUM OF **2** HARD COPIES, PROPERLY BONDED. SUBMIT TO UNLV PM FOR REVIEW, COMMENTS AND APPROVAL. DO NOT PROCEED WITH ANY WORK UNTIL CONTROLS SUBMITTALS ARE APPROVED.

BAS CONTRACTOR SHALL REUSE, RELOCATE AND RE–INSTALL EXISTING ACTIVE CONTROL DEVICES (TEMPERATURE SENSORS, ETC.) FROM EXISTING EQUIPMENT OR PIPING ONTO NEW CONFIGURED PIPING FOR ACHIEVING THE ABOVE REQUIRED SEQUENCE, AS WELL AS LOCAL OPERATION; AND FOR COMPLETE AND TROUBLE FREE OPERATION OF THE BUILDING LOOP (TERTIARY).

BAS CONTRACTOR SHALL PREPARE AND INSTALL NEW HARDWARE AND SOFTWARE AS NECESSARY AND AS SCOPE OF WORK FOR THIS PROJECT FOR CONTROLS UPGRADE OF THIS BUILDING AND ITS COOLING AND HEATING PLANT, AS STATED BELOW.

HEATING SYSTEMS OPERATION SHALL BE PROGRAMMED; SOFTWARE AND HARDWARE BE PREPARED AND INSTALLED FOR OPERATION OF THE BUILDINGS UTILIZING EXISTING EBI "EXCELL 5000". SEQUENCE OF OPERATION FOR START/STOP AND OPERATION OF THE EXISTING AIR HANDLING AND FAN COIL UNITS, THEIR ACCESSORIES (VAV BOXES AND CHILLED BEAMS), EXHAUST FANS, BUILDING HEATING WATER PUMPS, SHALL MEET THE REQUIREMENTS OF THIS SECTION AND BE PER "UNLV CONTROLS STANDARD".

MODIFIED BUILDING LOOP CONTROLS FOR **GUA** BUILDING SHALL OPERATE WITH ITS OWN INTERNAL CONTROLS AND INTERLOCKS AND BE CONNECTED TO B.A.S. FOR REMOTE START, STOP, MONITORING AND ALL OTHER FEATURES AS IS CURRENTLY IN OPERATION. CONSULT WITH FACILITY ENGINEERING DEPARTMENT'S REQUIREMENTS PRIOR TO BID FOR COMPLETE AND DETAIL SCOPE.

SECONDARY/BUILDING LOOP OPERATION SHALL ALSO BE INITIATED WHEN ANY 2–WAY (OR 3–WAY) CONTROL VALVE AT AIR HANDLING UNITS, FAN COIL UNITS AND THEIR ACCESSORIES START OPENING TO HEATING.

CONTROL CONTRACTOR TO VISIT THE SITE PRIOR TO BID. CONTRACTOR IS RESPONSIBLE FOR PROGRAMING, CONTROLS UPGRADE, INSTALLATION OF NEW INSTRUMENTATION AND ALL CHANGES NECESSARY TO MEET THE REQUIREMENTS OF THIS SPECIFICATIONS AND UNLV CONTROLS STANDARDS.

PROVIDE COMPLETE BAS CONTROLS, DEVICES, PANELS, CONDUITS, SOFTWARE, PROGRAMMING, INSTRUMENTATION, THERMOSTATS/SENSORS, AUTO OPERATION OF CONTROL VALVES, AND ALL OTHER CONTROLS RELATED TO MECHANICAL UPGRADE/MODIFICATION WORK AS SHOWN IN THESE DRAWINGS.

INSTALL NEW FLOW METER ON HEATING HOT WATER PIPING ON PRIMARY AND SECONDARY LOOPS AS SHOWN IN THE DRAWINGS AND AS RECOMMENDED BY, AND PER REQUIREMENTS OF THE MANUFACTURER. ENSURE FLOW METERS ARE WORKING PROPERLY AND ARE SET TO FLOW REQUIREMENTS AS LISTED IN WATER BALANCE NOTES. FLOW METERS SHALL BE MANUFACTURED BY **"ONICON, F–3500 SERIES"** MAGNETIC STYLE FLOW METER.

PROVIDE CONTROL CONDUITS AND RUN TO B.A.S. AS REQUIRED FOR CONTROL OF ALL EXISTING EQUIPMENT (BOILERS, ETC.) AND NEW PUMPS. RUN CONDUITS ALONG NEW PIPING AND ON THE SAME PIPING SUPPORTS SYSTEM. COORDINATE WITH UNLV PM FOR EXACT LOCATION AND P.O.C. TO B.A.S..

GRAPHICS SHALL BE PROVIDED BY CONTROL CONTRACTOR AND REVIEWED BY UNLV ENVIRONMENTAL SYSTEMS DEPARTMENT FOR APPROVAL, PRIOR TO INSTALLATION OF CONTROLS SYSTEMS. NEW GRAPHICS FOR HEATING SYSTEM (PRIOMARY–SECONDARY ARRANGEMENT) SHALL BE CREATED.

COORDINATE WITH WATER BALANCE CONTRACTOR, HIRED UNDER A SEPARATE CONTRACT BY UNLV.

SEQUENCE OF OPERATION

"SEQUENCE OF OPERATION" FOR CENTRAL PLANT – HEATING:

BAS CONTRACTOR SHALL UPGRADE EXISTING HARDWARE AND PROVIDE NEW SOFTWARE AND PROGRAMMING AS NECESSARY FOR THIS PROJECT FOR THE LIMITED CONTROLS UPGRADE OF THE HEATING LOOP IN THESE BUILDINGS, AS STATED BELOW.

THE BOILER LOOP (PRIMARY LOOP) IS DESIGNED TO PROVIDE **163°F** (ADJUSTABLE) HHWS TEMPERATURE (SEE SCHEDULES) TO THIS BUILDING. THE BUILDING HOT WATER SYSTEM (SECONDARY LOOP) IS DESIGNED TO PROVIDE **141°F** (ADJUSTABLE) HOT WATER SUPPLY TO ALL HOT WATER COILS OF AIR HANDLING UNITS, FAN COIL UNITS, VAV BOXES AND CHILLED BEAMS SERVING ALL SPACES IN THE BUILDING. CONTROL SEQUENCE SHALL BE PROVIDED TO INITIATE AND START OPERATION OF HEATING HOT WATER PLANT, PRIMARY AND SECONDARY LOOPS IN THE FOLLOWING SEQUENCE:

A. UPON RECEIVING A SIGNAL FROM OUTSIDE AIR SENSOR (ADJUSTABLE SETTING), PRIMARY LOOP WILL BE INITIATED AS DESCRIBED BELOW.
B. UPON RECEIVING A DEMAND SIGNAL FROM BUILDING LOOP (AIR HANDLER UNIT HEATING COIL VALVES), SECONDARY LOOP (SECONDARY/BUILDING PUMPS) WILL START AND OPERATE VIA VFD BASED ON THE DP READINGS IN THE SECONDARY LOOP.

CONTROL SEQUENCE SHALL START BOILER AND INITIATE PRIMARY LOOP OPERATION BASED ON OUTSIDE AIR TEMPERATURE SETTING (ADJUSTABLE). WHEN BOILER IS INITIATED BOILER IN–LINE PUMP SHALL START AND RUN TO CONFIRM FLOW THROUGH THE BOILER(S) VIA A FLOW SWITCH AND ELECTRICAL INTERLOCK. BOILER SHALL COMPLETE ITS INITIALIZING SEQUENCE AND BEGIN TO OPERATE THROUGH ITS ONBOARD CONTROLS AND TO MAINTAIN THE TEMPERATURE SETTING IN PRIMARY LOOP. SEQUENCE SHALL REVERSE, FIRST BOILER AND THEN PUMP SHALL STOP PER MANUFACTURER REQUIRED TIME DELAY (ADJUSTABLE) WHEN THE PRIMARY AND SECONDARY LOOP TEMPERATURE IS SATISFIED.

BOILERS INTERNAL CONTROLS **"HEATNET"** SHALL AUTOMATICALLY ALTERNATE THE BOILERS TO PROVIDE EQUAL OPERATING TIME FOR EACH BOILER. BOILER STAGING/MODULATING AND TEMPERATURE CONTROLS WILL BE FURNISHED, CONTROLLED BY ON BOARD CONTROLLER AND SHALL BE MONITORED BY BAS. BOILERS SHALL BE INITIALLY INITIATED BY BAS FOR HEATING SYSTEM OPERATION AND SHALL CONTINUE, THERE ON TO OPERATE VIA THEIR ON BOARD CONTROLLER TO MAINTAIN THE PRIMARY LOOP SET POINT. ALL CONTROL FEATURES INCLUDING BOILER PUMP SPEED CONTROL, LEAD–LAG, RESET BY CHANGE IN OUTDOOR AIR TEMPERATURE, SAFETIES, FAILURE, ALARM, ETC. SHALL BE PERFORMED BY BOILER CONTROLLER. BOILER MANUFACTURER SHALL PROGRAM B–1 CONTROLLER AS MASTER CONTROLLER AND B–2 AS SLAVE.

TEMPERATURE SENSORS SHALL BE INSTALLED ON MAIN SECONDARY SUPPLY AND RETURN HEADERS INSIDE THE BOILER/PUMP ROOM TO MONITOR THE MAIN LOOP TEMPERATURES (TOTAL OF TWO). IN ADDITION, TEMPERATURE SENSORS SHALL BE INSTALLED ON MAIN PRIMARY SUPPLY AND RETURN HEADER (TOTAL OF TWO) INSIDE THE BOILER ROOM AND ONE EACH FOR THE SUPPLY LEG FROM EACH BOILER (TOTAL OF TWO) TO CONTROL AND MONITOR THE COMPONENTS OF PRIMARY LOOP TEMPERATURES.

BOILER(S) FIRE STAGING AND TEMPERATURE CONTROLS IS FURNISHED, CONTROLLED AND MONITORED BY FACTORY MOUNTED **"HEATNET"** CONTROL MODULE. ONCE HEATING SYSTEM IS ENABLED, BAS SHALL NOT INTERFERE WITH PRIMARY LOOP OPERATION (BOILER START/STOP/SHUT DOWN/RESET, ETC.). BOILER'S INTERNAL CONTROLS SHALL MAINTAIN INITIATING THE BOILER, BOILER (IN–LINE) PRIMARY HEATING PUMP, AND PRIMARY (AND CONSEQUENTLY SECONDARY) LOOP TEMPERATURE.

WHEN A 2 OR 3–WAY CONTROL VALVE (EXISTING) FOR ANY HEATING COIL STARTS TO OPEN AND THE OUTDOOR TEMPERATURE IS BELOW **55°F** (ADJUSTABLE), BAS/DDC CONTROLLER STARTS HEATING HOT WATER SECONDARY/BUILDING LOOP PUMP **(HWP–3 OR 4)** TO MAINTAIN REQUIRED FLOW VIA VFD ON BUILDING LOOP. THESE EXISTING VFD'S SHALL MODULATE TO MAINTAIN THE EXISTING DIFFERENTIAL PRESSURE SET POINT IN THE SECONDARY LOOP SYSTEM. BAS SHALL PROVIDE AND INSTALL PROPER CONTROLS FOR HEATING HOT WATER SUPPLY AND RETURN TEMPERATURE AND FLOW READINGS AND MONITORING; START/STOP/STATUS/ALARM; SPEED CONTROL OF SECONDARY HEATING HOT WATER PUMPS AND THEIR VFD'S. BAS SHALL PROVIDE LEAD–LAG CAPABILITY AND FUNCTION FOR SECONDARY/BUILDING PUMPS. BAS SHALL MONITOR EACH PUMP THROUGH A CURRENT SENSOR AND AUTOMATICALLY ENERGIZES THE OTHER PUMP IF THE RUN PUMP FAILS. **HWP–3&4** SHALL BE INITIATED FOR SAFETY, FREEZE PROTECTION, NIGHT SET BACK AND EARLY MORNING WARM UP FUNCTIONS.

FREEZE SAFETY: TWO WAY CONTROL VALVE AT BOTH COOLING AND HEATING COILS OF THE AIR HANDLING UNITS **(AHU–X)** SHALL OPEN, AND SECONDARY/BUILDING HEATING HOT WATER PUMPS SHALL BE ENERGIZED, AND BOILER LOOP BE INITIATED (IF NECESSARY) AND REMAIN WORKING WHEN OUTSIDE AIR TEMPERATURE DROPS BELOW **32°F** (ADJUSTABLE) FOR AN ADJUSTABLE PERIOD OF TIME. THE OUTSIDE AIR DAMPER OF THE UNIT SHALL REMAIN CLOSED. THE SUPPLY AIR TEMPERATURE AT THE UNIT SHALL BE SET TO MAXIMUM OF 85°F (ADJUSTABLE), UNLESS THE UNIT IS IN OCCUPIED MODE.

BAS SHALL READ AND TRANSFER DATA COLLECTED BY NEW WATER METER INSTALLED ON HEATING SYSTEM MAKE UP WATER AND REPORT TOTAL WATER USAGE (IN GALLON OR CUBIC FEET) TO FRONT EN, AND MAINTAIN A TREND LOG.

RUN TIME LIMIT DIAGNOSTIC: BAS SHALL ACCUMULATE THE RUNTIME OF THE STATUS OF ASSOCIATED ROTATING EQUIPMENT (PUMPS, ETC.) AND GENERATE A MAINTENANCE ALARM TO INDICATE THAT THE UNIT IS IN NEED OF SERVICE.

INSTRUMENTATION AND EQUIPMENT INTERFACE REQUIREMENTS FOR HEATING HOT WATER SYSTEM

TEMPERATURE SENSORS
- PRIMARY SYSTEM
  - o BOILER HEATING WATER SUPPLY TEMPERATURE
  - o BOILER HEATING WATER RETURN TEMPERATURE
  - o COMMON HEATING WATER SUPPLY TEMPERATURE
  - o COMMON HEATING WATER RETURN TEMPERATURE
- SECONDARY SYSTEM
  - o COMMON HEATING WATER SUPPLY TEMPERATURE
  - o COMMON HEATING WATER RETURN TEMPERATURE
  - o EACH PARALLEL SYSTEM HEATING WATER SUPPLY TEMPERATURE
  - o EACH PARALLEL SYSTEM HEATING WATER RETURN TEMPERATURE

FLOW METERS
- PRIMARY SYSTEM (IF SHOWN IN DIAGRAMS)
  - o COMMON PRIMARY SYSTEM
- SECONDARY SYSTEM (IF SHOWN IN DIAGRAMS)
  - o COMMON SYSTEM HEATING WATER FLOW
  - o EACH PARALLEL SYSTEM HEATING WATER FLOW

DIFFERENTIAL PRESSURE SENSORS
- SECONDARY SYSTEM
  - o COMMON SYSTEM HEATING WATER DIFFERENTIAL PRESSURE, OR,
  - o EACH PARALLEL SYSTEM HEATING WATER FLOW

BOILERS
- ENABLE/DISABLE (BMCS, HARDWIRED)
- STATUS (BMCS, HARDWARE)
- ALARM (BMCS, HARDWIRED)
- BACNET INTERFACE, MSTP TO INCLUDE (ENGLISH LANGUAGE DISPLAY, NO CODE)
  - o UNIT STATUS
  - o ALARM
  - o SUPPLY TEMPERATURE
  - o RETURN TEMPERATURE
  - o HOURS
  - o GAS VALVE POSITION
  - o GAS CONSUMPTION
  - o VFD SPEED (WHERE APPLICABLE, COMBUSTION FAN)

VARIABLE SPEED DRIVES
FOR ALL APPLICATIONS (DO NOT USE BACNET OR LONWORKS)
- ENABLE/DISABLE
- STATUS (DO NOT USE CURRENT SENSORS)
- ALARM STATUS
- SPEED SIGNAL
- FEEDBACK

CONSTANT VOLUME PUMPS (PRIMARY BOILER PUMP)
- START/STOP
- STATUS (CURRENT SENSOR IS APPROVED FOR THIS APPLICATION)

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PROJECT : UNLV GUA HEATING SYSTEM UPGRADE

REVISIONS :

NO.	DATE	ISSUE
1	10.17.17	Plan Check–State

DRAWING TITLE :

MECHANICAL LEGEND, NOTES AND SEQUENCE OF CONTROLS

All dimensions, levels, layouts and field conditions shall be verified at the site by the contractor before proceeding with the work.

SIGMA'S Project No.		425DC1417
Consultant Project No.		-
Date:		08.23.2017
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File Name:		

M0.01

CONSTRUCTION

MECHANICAL SPECIFICATIONS

MECHANICAL SPECIFICATION

PART 1 – GENERAL:

1. THE CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR, EQUIPMENT, APPURTENANCES, AND OTHER CONTRACTUAL EXPENSES REQUIRED FOR THE COMPLETE INSTALLATION OF THE MECHANICAL WORK TO THE SATISFACTION OF THE OWNER, ARCHITECT, AND ENGINEER.

2. THE MECHANICAL WORK SHALL COMPLY WITH AND BE INSTALLED IN ACCORDANCE WITH ALL LEGALLY CONSTITUTED AUTHORITIES AND CODES HAVING JURISDICTION. NO WORK INDICATED ON DRAWINGS OR SPECIFICATIONS SHALL BE PERFORMED WITHOUT PLAN CHECK APPROVAL AND VALID PERMITS.

3. THE CONTRACTOR SHALL GUARANTEE ALL EQUIPMENT, APPARATUS, ACCESSORIES (I.E., THE ENTIRE INSTALLATION) AS FURNISHED BY HIM FOR A PERIOD OF ONE YEAR. THE CONTRACTOR SHALL REPAIR OR REPLACE ANY ITEM WHICH MAY PROVE DEFECTIVE WITHIN ONE (1) YEAR FROM THE DATE THE APPARATUS IS ACCEPTED AND PLACED IN OPERATION WITHOUT ANY ADDITIONAL COST TO THE OWNER.

4. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, LICENSES, AND INSPECTIONS REQUIRED TO COMPLETE THE MECHANICAL WORK.

5. THE DRAWING INDICATES IN DIAGRAMMATIC FORM ARRANGEMENTS DESIRED FOR PRINCIPAL APPARATUS, PIPING CONDUIT, ETC., AND SHALL BE FOLLOWED AS CLOSELY AS POSSIBLE. SCALED AND FIGURED DIMENSIONS ARE APPROXIMATE AND ARE GIVEN FOR ESTIMATE PURPOSES ONLY. BEFORE PROCEEDING WITH ANY WORK, CHECK AND VERIFY EXISTING CONDITIONS, DIMENSIONS, SIZES AND ASSUME FULL RESPONSIBILITY FOR FITTING–IN OF EQUIPMENT, MATERIALS, AND ADJUSTMENT OF ANY EXISTING DUCTWORK AND PIPING (INCLUDING PROVISION FOR OFFSETS, BENDS, ELBOWS, ETC.).

6. THE CONTRACTOR SHALL MAKE A THOROUGH FIELD SURVEY TO DETERMINE ANY EXISTING CONDITION THAT MAY AFFECT THE INSTALLATION OF THE WORK. BY THE ACT OF SUBMITTING A BID, THE CONTRACTOR IS DEEMED TO HAVE MADE FIELD SURVEY AND HAS ACCEPTED THE EXISTING CONDITIONS THAT MAY AFFECT HIS WORK. APPOINTMENTS FOR FIELD SURVEY SHALL BE MADE THROUGH THE OWNER REPRESENTATIVE.

7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING, AND PATCHING TO COMPLETE THE INSTALLATION OF THE MECHANICAL WORK. ALL EXPOSED FINISHED AREAS THAT ARE DAMAGED AS A RESULT OF THIS WORK SHALL BE REPAIRED TO MATCH THE EXISTING CONDITIONS AT NO ADDITIONAL COST TO THE OWNER.

8. ALL CONSTRUCTION SITES SHALL BE PROPERLY PROTECTED WITH BARRICADES, WARNING FLAGS, FENCING, AND LIGHTS AS REQUIRED BY CODE AND THE OWNER'S SECURITY DEPARTMENT. PROVIDE SHORING, BRACING, AND ACCESS LADDERS AS REQUIRED BY CODE. TAKE EXTRA CARE TO INSTRUCT ALL PERSONNEL ON SAFETY PROCEDURES. TAKE CARE TO AVOID DAMAGE TO ADJACENT DUCTWORK, PIPING AND ELECTRIC SERVICES.

9. ALL UTILITY SHUT–DOWNS SHALL BE SCHEDULED AT LEAST TWO (2) DAYS IN ADVANCE THROUGH THE OWNER. PROVIDE CONTINUOUS "FIRE WATCH GUARD" TO ALL AREAS AFFECTED BY SHUT–DOWN OF ANY FIRE PROTECTION WATER SERVICE. THE CONTRACTOR'S OPERATION SHALL CAUSE NO UNNECESSARY INCONVENIENCE TO THE BUILDING'S PREMISES. THE ACCESS RIGHTS TO THE PUBLIC SHALL BE CONSIDERED AT ALL TIMES.

10. SHOP DRAWINGS AND MATERIAL LISTS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AT LEAST THIRTY (30) DAYS PRIOR TO THE START OF ANY WORK. NO WORK INDICATED ON ANY OF THE PLANS OR SHOP DRAWINGS SHALL BE PERFORMED, UNTIL THE SHOP DRAWINGS HAVE BEEN REVIEWED BY THE ENGINEER.

11. IF THE CONTRACTORS' USE OF SUBSTITUTE MATERIALS, EQUIPMENT OR METHODS OF INSTALLATION REQUIRES ANY CHANGES IN OTHER TRADES WORK FROM THAT SHOWN ON THE DRAWINGS, THE EXTRA COST OF THE OTHER TRADES WORK SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR INITIATING THE SUBSTITUTION.

12. APPROVAL OF THE SUBMITTALS DOES NOT RELEASE THE CONTRACTOR FROM OBLIGATIONS TO FULLY COMPLY WITH ALL REQUIREMENTS OF THE CONSTRUCTION DOCUMENTS OR APPLICABLE CODES.

13. THE CONTRACTOR SHALL SUBMIT TWO (2) COMPLETE SETS OF AS–BUILT DRAWINGS, OPERATIONAL AND MAINTENANCE MANUALS, IN BOTH HARD COPY AND DIGITAL (PDF) FORMAT, TO THE OWNER AS PERMANENT RECORDS AT SUCCESSFUL COMPLETION OF WORK, BEFORE FINAL PAYMENT CAN BE APPROVED BY THE OWNER REPRESENTATIVE.

PART 2 – MATERIALS:

1. PRODUCTS:
A. BOILERS SHALL BE AS SCHEDULED IN SCHEDULES AND PLANS OR APPROVED EQUAL.
B. VFD'S SHALL BE "ABB", "DONFOS" OR APPROVED EQUAL. VFD SHALL BE PROVIDED, SUPPLIED AND INSTALLED WITH DISCONNECT SWITCH AND INTEGRATED BYPASS.
C. PUMPS SHALL BE AS SCHEDULED ON THESE DRAWINGS OR APPROVED EQUAL.
D. AIR SEPARATORS SHALL BE AS SCHEDULED ON THESE DRAWINGS. NO APPROVED EQUAL.

2. PIPING SHALL BE PROVIDED AS FOLLOWS:
PIPING AND FITTINGS SHALL MANUFACTURED IN USA AND BE PROVIDED AS FOLLOWS, OR APPROVED EQUALS:
A. ALL PIPING, EXCEPT WHERE EXISTING PIPING IS INDICATED TO BE REUSED, SHALL BE NEW SEAMLESS PIPING MATERIALS. PIPING SCHEDULE, MATERIALS, CONSTRUCTION, SUPPORT, SEISMIC RESTRAINT, AND INSTALLATION SHALL BE IN ACCORDANCE WITH THE MECHANICAL CODE, IBC, AND SMACNA "GUIDELINES FOR THE RESTRAINT OF MECHANICAL SYSTEMS AND PLUMBING PIPING SYSTEMS". PIPING AND FITTINGS MATERIALS AND METHODS SHALL MATCH EXISTING PIPING MATERIAL. HEATING HOT WATER PIPING SHALL BE EITHER;
a. STEEL PIPE, ASTM A53 OR A106, SCHEDULE 40 BLACK STEEL PIPING; WITH ANSI/ASTM B16.3, MALLEABLE IRON OR ASTM A234, FORGED STEEL WELDING TYPE FITTINGS; AND WITH SCREWED, OR WELDED JOINTS. Or,
b. COPPER TUBING, ASTM B88, TYPE "K" OR "L", HARD DRAWN; WITH CAST BRASS OR SOLDER WROUGHT COPPER FITTINGS; AND WITH ASTM B32, SOLDER, GRADE

3. VALVES AND HYDRONIC PIPING SPECIALTIES SHALL BE MANUFACTURED IN USA AND PROVIDED AS FOLLOWS:
  A. BALL VALVES 2" AND SMALLER SHALL BE 2–PIECE BRONZE WITH STAINLESS STEEL BALL, TFE SEAT, AND LEVER OPERATOR FOR SCREWED, OR SOLDERED CONNECTION BY NIBCO OR STOCKHAM. PROVIDE LEVER ARM EXTENSION TO CLEAR INSULATION ON ALL CHILLED AND HOT WATER SERVICE VALVES.
  B. BUTTERFLY VALVES 2½" THRU 6" SHALL BE LUG TYPE, DRILLED AND TAPPED FOR DEAD END SERVICE. 6" THRU 12" SHALL BE GEAR TYPE, BY NIBCO OR APPROVED EQUAL.
  C. BALANCING COCKS 2" AND SMALLER SHALL BE BRONZE BODY, CLASS 150 BY NIBCO OR ARMSTRONG.
  D. STRAINERS 2" AND SMALLER SHALL BE "Y" PATTERN, CLASS 150, BRONZE BODY, STAINLESS STEEL PLUG, SCREWED. 2½" THRU 12" SHALL BE CI BODY FLANGED TYPE, BY NIBCO OR ARMSTRONG
  E. FLOW CONTROL VALVES SHALL BE 2 PSI MAXIMUM PRESSURE DROP, THREADED OR THREADED FLANGE.
  F. PRESSURE AND TEMPERATURE TAPS (PETE'S PLUG II) SHALL BE BRASS BODY AND CAP, 1/4" NPT BY PETERSON EQUIPMENT.
  G. DIELECTRIC UNIONS SHALL BE PROVIDED TO JOIN DISSIMILAR MATERIALS TO PREVENT GALVANIC CORROSION BY NIBCO OR WATTS.

4. PLUMBING PIPING SHALL BE PROVIDED AS FOLLOWS. ALL PIPING, EXCEPT WHERE EXISTING PIPING IS INDICATED TO BE REUSED, SHALL BE NEW PIPING MATERIALS. PIPE SIZE, MATERIALS, SUPPORT, SEISMIC RESTRAINT, AND INSTALLATION SHALL BE IN ACCORDANCE WITH THE UNIFORM PLUMBING CODE, IAPMO CONSTRUCTION HANDBOOKS, AND SMACNA GUIDELINES.
a. INDUSTRIAL WATER PIPING ABOVE GROUND SHALL BE TYPE "L" COPPER WITH WROUGHT COPPER FITTINGS FOR 95–5 SOLDER, OR APPROVED COPPER VICTAULIC ROLL–GROVE COMPRESSION FITTINGS.
b. GAS PIPING SHALL BE SCHEDULE 40 BLACK STEEL A–53, GRADE B, WITH ANSI/ASTM B16.3, MALLEABLE IRON OR ASTM A234, FORGED STEEL WELDING TYPE FITTINGS; AND WITH SCREWED, OR WELDED JOINTS.
c. DRAIN/CONDENSATE DRAIN PIPING SHALL BE TYPE "L" COPPER WITH WROUGHT COPPER FITTINGS FOR 95–5 SOLDER. PLASTIC PIPING IS NOT ACCEPTABLE FOR CONDENSATE DRAIN PIPING.

5. VALVES AND PLUMBING PIPING SPECIALTIES SHALL BE PROVIDED AS FOLLOWS:
  A. BALL VALVES SHALL BE 2–PIECE BRASS OR BRONZE BODY WITH STAINLESS STEEL BALL, TFE SEAT, AND LEVER OPERATOR FOR SCREWED OR SOLDERED CONNECTION BY NIBCO. PROVIDE LEVER ARM EXTENSION TO CLEAR INSULATION ON ALL HOT WATER SERVICE VALVES.
  B. WATER HAMMER ARRESTORS SHALL BE J.R. SMITH HYDROTROL.
  C. CHECK VALVES 2–INCHES AND SMALLER FOR NON–PUMP SERVICE SHALL BE "Y" PATTERN BRONZE BODY, SWING LIFT, NON–SLAM, METAL TO METAL SEAT, FOR SCREWED CONNECTION BY WATTS.
  D. DIELECTRIC UNIONS SHALL BE PROVIDED TO JOIN DISSIMILAR MATERIALS. DIELECTRIC UNIONS SHALL BE WATTS SERIES 3000 SCREWED OR SOLDERED CONNECTION.
  E. ESCUTCHEONS SHALL BE CHROME PLATED BRASS OR STAINLESS STEEL.

6. PROVIDE PIPE HANGERS TO SUPPORT PIPING. PIPE HANGER CONSTRUCTION, MATERIALS, ATTACHMENT TO THE STRUCTURE, AND OVERALL INSTALLATION SHALL BE IN ACCORDANCE WITH THE UNIFORM PLUMBING CODE, IAPMO, AND SMACNA "GUIDELINES FOR THE RESTRAINT OF MECHANICAL SYSTEMS AND PLUMBING PIPING SYSTEMS". PROVIDE DIELECTRIC SPACERS FOR USE WITH COPPER PIPING.

7. FIRE RATED PENETRATION SEALS FOR FLOORS, CEILING AND WALLS SHALL BE PROSET SYSTEM "A" FOR COPPER AND STEEL PIPING.

8. PROVIDE PIPE SLEEVES AND ESCUTCHEON PLATES FOR PIPES RUNNING THROUGH WALLS, PARTITIONS, CEILING AND FLOORS EXPOSED TO VIEW. ESCUTCHEON PLATES SHALL BE CHROME PLATED BRASS OR STAINLESS STEEL.

9. THERMAL INSULATION FOR ABOVE GRADE HYDRONIC PIPING SHALL BE PROVIDED AS FOLLOWS:
A.. PIPE INSULATION: PIPE INSULATION SHALL BE MULTISERVICE–TYPE SUITABLE FOR ALL LINES OPERATING FROM –20° TO 500° F. INSULATION SHALL BE RIGID, TYPE A, CLOSED CELL FOAM INSULATION, TRYMER 1800 OR APPROVED EQUAL, 0.19 180 DAY AGED K–FACTOR AT 75 DEG. F MEAN.
B. THERMAL CONDUCTIVITY (BTU/HOUR SQUARE FOOT DEGREES F./INCH) SHALL NOT EXCEED:
AT 75° F. MEAN TEMPERATURE 0.22
AT 100° F. MEAN TEMPERATURE 0.23
AT 200° F. MEAN TEMPERATURE 0.25
C. VAPOR BARRIER JACKET FOR ABOVE GRADE PIPING SHALL BE HEAVY DUTY ALL SERVICE JACKET (ASJ) CONSISTING OF LAMINATED ALUMINUM FOIL, GLASS REINFORCING AND WHITE BUILDING PAPER. PERM RATING SHALL BE 0.01. VAPOR BARRIER TO FORM A VAPOR TIGHT SYSTEM.
D. PREMOLDED PIPE FITTING COVERS: INTERIOR USED COVERS SHALL BE FACTORY–PREMOLDED ONE–PIECE POLYVINYL CHLORIDE (PVC–FR). COVERS SHALL HAVE A SNOW–WHITE FINISH AND SHALL WITHSTAND SURFACE OPERATING TEMPERATURES FROM 35 TO 150 DEGREES F. CONTINUOUS USAGE. ALL COVERS SHALL CONFORM TO FEDERAL SPECIFICATION L–P–535, COMPOSITION A, TYPE II, AND SHALL BE CEEL–CO. SERIES 100, CERTAINTEED "SNAP–FORM," ZESTON.

10. PIPES AND/OR CONDUITS PASSING THROUGH WALL, FLOORS AND PARTITIONS SHALL BE PROVIDED WITH SLEEVES. SLEEVES PASSING THROUGH WATER PROOFING OF DAMP PROOFING SHALL BE WATER TIGHT. SLEEVES PASSING THROUGH FIRE RATED CONSTRUCTION SHALL BE FIRE PROOFED WITH MATERIAL APPROVED FOR THE RATING OF THE STRUCTURE AND U.L. LISTED.

PART 3 – EXECUTION:

1. THE DRAWING INDICATES IN DIAGRAMMATIC FORM ARRANGEMENTS DESIRED FOR PRINCIPAL APPARATUS, PIPING CONDUIT, ETC., AND SHALL BE FOLLOWED AS CLOSELY AS POSSIBLE. SCALED AND FIGURED DIMENSIONS ARE APPROXIMATE AND ARE GIVEN FOR ESTIMATE PURPOSES ONLY. OFFSET AND TRANSITION TO AVOID OBSTRUCTIONS IN PATH OF DUCTWORK AND PIPING INDICATED ON PLANS. BEFORE PROCEEDING WITH ANY WORK, CHECK AND VERIFY EXISTING CONDITIONS, DIMENSIONS, SIZES AND ASSUME FULL RESPONSIBILITY FOR FITTING–IN OF EQUIPMENT AND MATERIALS, (INCLUDING PROVISION FOR OFFSETS, BENDS, ELBOWS, ETC.).

2. EQUIPMENT, AND PIPING SHALL BE INSTALLED TO RUN PARALLEL OR PERPENDICULAR TO THE BUILDING STRUCTURE AND SHALL BE ARRANGED TO FORM NEAT SYMMETRICAL PATTERNS TO ASSURE THE BEST POSSIBLE APPEARANCE. HANGERS ON PARALLEL ADJACENT PIPING SHALL BE IN LINE WITH EACH OTHER AND PARALLEL TO THE LINES OF THE BUILDING STRUCTURE. ALL PIPING SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE ONLY, NO PIPING SHALL BE SUPPORTED FROM OTHER PIPING OR AIR CONDITIONING DUCTWORK.

3. PROVIDE HANGERS TO SUPPORT DUCTWORK AND EQUIPMENT. DUCT AND PIPE HANGER CONSTRUCTION, MATERIALS, ATTACHMENT TO THE STRUCTURE, AND OVERALL INSTALLATION SHALL BE IN ACCORDANCE WITH THE MECHANICAL CODE, PLUMBING CODE, AND SMACNA "GUIDELINES FOR THE RESTRAINT OF MECHANICAL SYSTEMS AND PLUMBING PIPING SYSTEMS".

4. HOLD PIPING TIGHT TO UNDERSIDE OF STRUCTURE ABOVE TO MAXIMIZE FREE SPACE IN CEILING. COORDINATE LOCATION OF PIPING TO AVOID CREATING INTERFERENCES WITH OTHER TRADES SUCH AS PLUMBING, ELECTRICAL, LIGHTING, ETC.

5. PIPING AND COMPONENTS SHALL BE SPACED SO THAT A THREADED PIPE FITTING MAY BE REMOVED BETWEEN ADJACENT PIPES. NOT LESS THAN 1/2–INCH OF CLEAR SPACE SHALL EXIST BETWEEN THE FINISHED SURFACE AND OTHER WORK, AND BETWEEN FINISHED SURFACE OF PARALLEL ADJACENT PIPING.

6. ELECTRICAL CONTRACTOR SHALL PROVIDE CONDUIT AND PULL WIRING FOR CONTROLS. FINAL CONNECTION TO CONTROLS SHALL BE BY MECHANICAL CONTRACTOR.

7. FIRE RATED SEALS SHALL BE PROVIDED AT ALL PENETRATIONS THROUGH FIRE RATED AREAS.

8. TEST GAS PIPING PER UPC AND ALL HEATING (HHWS AND HHWR, AS APPLICABLE UNDER THIS PROJECT) WATER PIPING HYDROSTATICALLY AT 125 PSI FOR 8–HOURS WITH NO CIRCULATING LOSS OF PRESSURE. RESEAL AND RETEST UNTIL THE ENTIRE PIPING SYSTEM PASSES.

9. BALANCE AND ADJUST ALL FLOWS FOR LISTED GPM'S. SUBMIT A QUALIFIED TEST AND BALANCE REPORT, IN BOTH HARD COPY AND DIGITAL (PDF) FORMAT, BY INDEPENDENT AABC REGISTERED AIR BALANCE CONTRACTOR TO THE ENGINEER FOR REVIEW.

10. AT THE COMPLETION OF THE WORK, ALL PARTS OF THE INSTALLATION SHALL BE THOROUGHLY CLEANED. ALL FIXTURES, VALVES, PIPES, AND FITTINGS SHALL BE CLEANED OF GREASE, METAL CUTTINGS, SLUDGE, AND OTHER DEBRIS THAT MAY HAVE ACCUMULATED DURING INSTALLATION.

11. THE OWNER SHALL BE RESPONSIBLE FOR LEGAL REMOVAL AND OR ABATEMENT OF ASBESTOS INSULATION. CONTACT THE OWNER'S REPRESENTATIVE FOR INSTRUCTIONS, IF ENCOUNTERED IN THE WORK AREA.

12. INSTALL DRAINS AT ALL LOW POINTS OF PIPING. TYPICAL FOR ALL.

13. INSTALL MANUAL AIR VENT AT HIGH POINTS OF PIPING. TYPICAL FOR ALL.

SPECIFICATION-WATER TREATMENT

A. PREPARATION:
PLACE TERMINAL CONTROL VALVES IN CLOSED POSITION DURING CLEANING. SYSTEMS SHALL BE OPERATIONAL, FILLED, STARTED, AND VENTED PRIOR TO CLEANING. SYSTEMS SHALL NOT BE IN OPERATION MORE THAN 24 HOURS PRIOR TO CLEANING. THIS INCLUDES ALL PUMPS AND BOILERS.

B. CLEANING SEQUENCE:
CONCENTRATION SHALL BE ONE POUND PER 100 GALLONS OF WATER CONTAINED IN THE SYSTEM FOR HOT SYSTEMS. ADD CLEANER TO CLOSED SYSTEMS AT CONCENTRATION AS RECOMMENDED BY MANUFACTURER. CIRCULATE THE CLEANING SOLUTION THROUGHOUT THE SYSTEM TO 95° F. APPLY HEAT WHILE CIRCULATING, SLOWLY RAISING TEMPERATURE TO 160 DEGREE F. AND MAINTAIN FOR 12 HOURS MINIMUM. REMOVE HEAT AND CIRCULATE TO 100 DEGREE F. OR LESS. DRAIN SYSTEMS AS QUICKLY AS POSSIBLE AND REFILL WITH CLEAN WATER. CIRCULATE FOR 6 HOURS AT DESIGN TEMPERATURES, THEN DRAIN. REFILL WITH CLEAN WATER AND REPEAT UNTIL SYSTEM CLEANER IS REMOVED. USE NEUTRALIZER AGENTS ON RECOMMENDATION OF SYSTEM CLEANER SUPPLIER AND APPROVAL OF UNLV REPRESENTATIVE. FLUSH OPEN SYSTEMS WITH CLEAN WATER FOR ONE HOUR MINIMUM. DRAIN COMPLETELY AND REFILL. REMOVE, CLEAN, AND REPLACE STRAINER SCREENS. INSPECT, REMOVE SLUDGE, AND FLUSH LOW POINTS WITH CLEAN WATER AFTER CLEANING PROCESS IS COMPLETED. INCLUDE DISASSEMBLY OF COMPONENTS AS REQUIRED. APPLY CHEMICALS VIA EXISTING WATER TREATMENT SYSTEM AS REQUIRED.

SPECIFICATION-BOILERS

GAS FIRED CONDENSING BOILER

PART 1 – GENERAL
1.1 SUBMITTALS
  A. GENERAL: TAG SUBMITTED DATA WITH THE CORRESPONDING DESIGNATION OF THAT ITEM AS SCHEDULED IN THE CONSTRUCTION DOCUMENTS. ALL INFORMATION SUBMITTED SHALL BE INDIVIDUALLY "TAGGED" TO EASILY IDENTIFY IT WITH THE CORRESPONDING MATERIAL OR EQUIPMENT. FAILURE TO COMPLY WITH THIS REQUIREMENT WILL RESULT IN THAT ITEM OR, AT THE DISCRETION OF THE ENGINEER, ALL ITEMS SUBMITTED, BEING REJECTED WITHOUT BEING REVIEWED.
  B. PRODUCT DATA: FURNISH CATALOG INFORMATION, CERTIFIED DRAWINGS, AND RATED CAPACITIES FOR THE PRODUCT INDICATED.
  C. OPERATION AND MAINTENANCE DATA: PROVIDE INSTALLATION, OPERATION AND MAINTENANCE (IOM) MANUALS ON ALL EQUIPMENT, FACTORY ASSEMBLY DRAWINGS AND FIELD INSTALLATION DRAWINGS AS REQUIRED FOR A COMPLETE EXPLANATION AND DESCRIPTION OF ALL ITEMS OF EQUIPMENT. INCLUDE INSTALLATION INSTRUCTIONS, ASSEMBLY VIEWS, LUBRICATION INSTRUCTIONS, AND REPLACEMENT PARTS LISTS.

1.2 QUALITY ASSURANCE
  A. THE BOILER SHALL COMPLY WITH THE ENERGY EFFICIENCY REQUIREMENTS OF THE LATEST EDITION OF THE ASHRAE 90.1 STANDARD AND ADDENDUM.
  B. WARRANTY: WARRANTY AS STATED IN THIS SPECIFICATIONS SHALL COVER THE HEAT EXCHANGER FOR LEAKAGE, THERMAL SHOCK, OR OTHER MALFUNCTION CAUSED BY DEFECTS IN MATERIALS AND/OR WORKMANSHIP.
  C. PROVIDE CERTIFIED EQUIPMENT START–UP AND, AN IN–THE–FIELD CERTIFIED TRAINING SESSION. A COPY OF THE START–UP REPORT SHALL BE SUBMITTED TO THE ENGINEER.
  D. THE BOILER SHALL BEAR THE ASME "H" STAMP FOR 160 PSI WORKING PRESSURE AND SHALL BE NATIONAL BOARD LISTED.

PART 2 – PRODUCTS
2.1 MANUFACTURERS
  A. AVAILABLE MANUFACTURERS: MANUFACTURER SHALL BE A COMPANY SPECIALIZING IN MANUFACTURING THE PRODUCTS SPECIFIED IN THIS SECTION WITH MINIMUM FIVE (5) YEARS EXPERIENCE. SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING BOILERS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
  MANUFACTURERS: RBI, LOCHINVAR, PK OR APPROVED EQUAL.

2.2 COMPONENTS:
  A. THE BOILER SHALL BE AS SPECIFIED IN DRAWINGS OR APPROVED EQUAL. THE BOILER SHALL BE CONDENSING AND CAPABLE OF FULL MODULATION WITH A TURNDOWN RATIO OF 5:1.
  B. THE BOILER SHALL BEAR THE ASME "H" STAMP FOR 160 PSI WORKING PRESSURE AND SHALL BE NATIONAL BOARD LISTED. THERE SHALL BE NO BANDING MATERIAL, BOLTS, GASKETS OR "O" RINGS IN THE HEADER CONSTRUCTION. THE BOILER SHALL HAVE A 316L STAINLESS STEEL, FIRE TUBE HEAT EXCHANGER. THE HEAT EXCHANGER SHALL BE DESIGNED FOR A SINGLE–PASS, FLOW THROUGH DESIGN AND WILL DRAIN CONDENSATION TO THE BOTTOM OF THE VESSEL. THE COMPLETE HEAT EXCHANGER ASSEMBLY SHALL CARRY A MINIMUM OF TEN (10) YEAR LIMITED WARRANTY.
  C. THE BOILER SHALL BE CERTIFIED AND LISTED BY C.S.A. INTERNATIONAL UNDER THE LATEST EDITION OF THE HARMONIZED ANSI Z21.13 TEST STANDARD FOR THE U.S. AND CANADA. THE BOILER SHALL COMPLY WITH THE ENERGY EFFICIENCY REQUIREMENTS OF THE LATEST EDITION OF THE ASHRAE 90.1 STANDARD AND THE MINIMUM EFFICIENCY REQUIREMENTS OF THE LATEST EDITION OF THE ASHRAE 103 STANDARD. THE BOILER SHALL OPERATE AT A MINIMUM OF 92% THERMAL EFFICIENCY AT FULL FIRE AS REGISTERED WITH AHRI. ALL MODELS SHALL OPERATE UP TO 99% THERMAL EFFICIENCY WITH RETURN WATER TEMPERATURES AT 90°F OR BELOW. THE BOILER SHALL BE CERTIFIED FOR INDOOR INSTALLATION.
  D. THE BOILER SHALL BE CONSTRUCTED WITH A HEAVY GAUGE STEEL JACKET ASSEMBLY, PRIMED AND PRE–PAINTED ON BOTH SIDES. THE COMBUSTION CHAMBER SHALL BE SEALED AND COMPLETELY ENCLOSED, INDEPENDENT OF THE OUTER JACKET ASSEMBLY, SO THAT INTEGRITY OF THE OUTER JACKET DOES NOT AFFECT A PROPER SEAL. A BURNER/FLAME OBSERVATION PORT SHALL BE PROVIDED. THE BURNER SHALL BE A PREMIX DESIGN AND CONSTRUCTED OF HIGH TEMPERATURE STAINLESS STEEL WITH A WOVEN METAL FIBER OUTER COVERING TO PROVIDE MODULATING FIRING RATES. THE BOILER SHALL BE SUPPLIED WITH A GAS VALVE DESIGNED WITH NEGATIVE PRESSURE REGULATION AND BE EQUIPPED WITH A VARIABLE SPEED BLOWER SYSTEM, TO PRECISELY CONTROL THE FUEL/AIR MIXTURE TO PROVIDE MODULATING BOILER FIRING RATES FOR MAXIMUM EFFICIENCY. THE BOILER SHALL OPERATE IN A SAFE CONDITION AT A DERATED OUTPUT WITH GAS SUPPLY PRESSURES AS LOW AS 4 INCHES OF WATER COLUMN. THE BURNER FLAME SHALL BE IGNITED BY SPARK IGNITION PILOT WITH FLAME MONITORING VIA A UV FLAME SCANNER.
  E. THE BOILER SHALL UTILIZE A 110 VAC CONTROL CIRCUIT AND COMPONENTS. THE CONTROL SYSTEM SHALL HAVE A LIQUID CRYSTAL TOUCH SCREEN DISPLAY FOR BOILER SET–UP, BOILER STATUS, AND BOILER DIAGNOSTICS. ALL COMPONENTS SHALL BE EASILY ACCESSED AND BE SERVICEABLE. THE BOILER SHALL BE EQUIPPED WITH A TEMPERATURE/PRESSURE GAUGE; HIGH LIMIT TEMPERATURE CONTROL WITH MANUAL RESET; ASME CERTIFIED PRESSURE RELIEF VALVE SET FOR 50 PSI (STANDARD); OUTLET WATER TEMPERATURE SENSOR; RETURN WATER TEMPERATURE SENSOR; OUTDOOR AIR SENSOR, FLUE TEMPERATURE SENSOR; HIGH AND LOW GAS PRESSURE SWITCHES, LOW WATER CUT OFF WITH MANUAL RESET AND FLOW SWITCH AND A CONDENSATE TRAP FOR THE HEAT EXCHANGER CONDENSATE DRAIN.
  F. THE BOILER SHALL FEATURE THE "SMART TOUCH™" CONTROL WITH A LIQUID CRYSTAL TOUCH SCREEN DISPLAY, PASSWORD SECURITY, OUTDOOR AIR RESET, PUMP DELAY WITH FREEZE PROTECTION, BOILER PUMP EXERCISE , DOMESTIC HOT WATER PRIORITIZATION AND PC PORT CONNECTION. THE BOILER SHALL HAVE ALARM CONTACTS FOR ANY FAILURES, RUNTIME CONTACTS AND DATA LOGGING OF RUNTIME, IGNITION ATTEMPTS AND IGNITION FAILURES. THE BOILER SHALL ALLOW **LONWORKS** INPUT CONNECTION FOR BMS CONTROL AND HAVE BUILT–IN "CASCADE" TO SEQUENCE AND ROTATE WHILE MAINTAINING MODULATION OF UP TO 16 BOILERS WITHOUT UTILIZATION OF AN EXTERNAL CONTROLLER. THE CONTROL MAY BE COMPATIBLE WITH OPTIONAL **LONWORKS** COMMUNICATION.
  G. THE BOILER SHALL BE EQUIPPED WITH TWO TERMINAL STRIPS FOR ELECTRICAL CONNECTION. A LOW VOLTAGE CONNECTION BOARD WITH 30 DATA POINTS FOR SAFETY AND OPERATING CONTROLS, I.E., ALARM CONTACTS, RUNTIME CONTACTS, LOUVER PROVING SWITCH, TWO PRESSURE SWITCHES, REMOTE ENABLE/DISABLE, SYSTEM HEADER SUPPLY SENSOR, OUTDOOR SENSOR, **LONWORKS** BUILDING MANAGEMENT SYSTEM SIGNAL AND CASCADE CONTROL CIRCUIT. A HIGH VOLTAGE TERMINAL STRIP SHALL BE PROVIDED FOR SUPPLY VOLTAGE AS STATED IN THE SCHEDULES. THE HIGH VOLTAGE TERMINAL STRIP PLUS INTEGRAL RELAYS ARE PROVIDED FOR INDEPENDENT PUMP CONTROL OF THE BOILER VARIABLE BOILER PUMP SHALL BE PROGRAMED TO BOILER'S MINIMUM AND MAXIMUM FLOW RATES.. PUMP'S WILL THEN BE MODULATED EQUAL TO BURNER FIRING RATE VIA 0–10 VDC INPUT FROM BOILERS HEATNET CONTROL. BOILER PUMP SHALL BE VARIABLE SPEED AND AS SPECIFIED IN SCHEDULES.
  H. THE BOILER'S SHALL BE INSTALLED AND COMMONLY VENTED AS SHOWN ON PLANS WITH A VERTICAL ROOFTOP EXHAUST WITH THE COMBUSTION AIR DRAWN FROM THE EQUIPMENT ROOM. THE FLUE SHALL BE CATEGORY II APPROVED STAINLESS STEEL SEALED VENT MATERIAL AND AS SPECIFIED IN THESE DRAWINGS. THE BOILER'S TOTAL EXHAUST VENTING LENGTH SHALL NOT EXCEED 100 EQUIVALENT FEET. COMBUSTION AIR DRAW FROM THE EQUIPMENT ROOM SHALL BE SUPPLIED WITH PROPERLY SIZED COMBUSTION AND VENTILATION AIR OPENINGS BASED ON NFPA REQUIREMENTS.
  I. THE BOILER SHALL HAVE AN INDEPENDENT LABORATORY RATING FOR OXIDES OF NITROGEN (NOX) TO MEET THE REQUIREMENTS OF SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT IN SOUTHERN CALIFORNIA AND THE REQUIREMENTS OF TEXAS COMMISSION ON ENVIRONMENTAL QUALITY. THE MANUFACTURER SHALL VERIFY PROPER OPERATION OF THE BURNER, ALL CONTROLS AND THE HEAT EXCHANGER BY CONNECTION TO WATER AND VENTING FOR A FACTORY FIRE TEST PRIOR TO SHIPPING.
  J. THE BOILER SHALL OPERATE AT ALTITUDES UP TO 4,500 FEET ABOVE SEA LEVEL WITHOUT ADDITIONAL PARTS OR ADJUSTMENTS.
  K. THE BOILER SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CSD1 / FACTORY MUTUAL / GE GAP CODE REQUIREMENTS AS STANDARD EQUIPMENT.

PART 3 – EXECUTION
3.1 EXAMINATION
  A. WHEN EQUIPMENT IS RECEIVED, INSPECT ALL COMPONENTS FOR DAMAGE AND VERIFY THAT THE NUMBER OF COMPONENTS RECEIVED MATCHES THE COMPONENTS ON THE PACKING SLIP.
  B. WHEN INSTALLING THE BOILER, BE SURE TO MAINTAIN CLEARANCES FROM COMBUSTIBLE CONSTRUCTION PER THE INSTALLATION AND OPERATION MANUAL.
  C. DO NOT USE THE BOILER IN LOCATIONS WHERE GASOLINE OR OTHER FLAMMABLE VAPORS MAY BE PRESENT.
3.2 INSTALLATION
  A. GENERAL: REFER TO THE PRODUCT INSTALLATION AND OPERATION MANUAL FOR THE MANUFACTURER'S COMPLETE WRITTEN INSTALLATION INSTRUCTIONS.
  B. THE BOILER SHALL BE INSTALLED IN ACCORDANCE WITH ALL ENFORCED CODES.
  C. THE BOILER SHALL BE INSTALLED SO THAT ADEQUATE COMBUSTION AND VENTILATION AIR IS AVAILABLE.
  D. REFER TO THE MANUFACTURER'S INSTRUCTIONS FOR START–UP PROCEDURES FOR THE BOILER.
3.3 MAINTENANCE AND CLEANING
  A. PROCEDURES FOR CLEANING AND MAINTENANCE OF THE BOILER CAN BE FOUND IN THE MANUFACTURER'S INSTALLATION AND OPERATION MANUAL.

SPECIFICATION-STACK

SPECIFICATIONS – STACK

PART 1 – GENERAL
1.1 SCOPE
THIS SECTION INCLUDES SPECIFICATIONS FOR FURNISHING AND INSTALLING POSITIVE PRESSURE VENT SYSTEMS.

1.2 SUBMITTALS
  A. CATALOG CUTS
  B. SIZING CALCULATIONS
  C. INSTALLATION DRAWINGS
  D. INSTALLATION INSTRUCTIONS
  E. SAMPLE OF WARRANTY

1.3 QUALITY ASSURANCE
  A. APPLICABLE STANDARDS: ALL PRODUCTS FURNISHED UNDER THIS SECTION SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL FUEL GAS CODE, NFPA–54, WHERE APPLICABLE AND SHALL COMPLY WITH AND BE LISTED TO UL1738, STANDARD FOR VENTING SYSTEMS FOR GAS–BURNING APPLIANCES, CATEGORY II, IV. COMPONENTS COMING IN DIRECT CONTACT WITH PRODUCTS OF COMBUSTION SHALL CARRY THE APPROPRIATE UL OR CUL LISTING MARK OR LABEL.
  B. POSITIVE PRESSURE VENT SHALL BE WARRANTED BY THE MANUFACTURER AGAINST DEFECTS IN MATERIAL AND WORKMANSHIP FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF THE ORIGINAL INSTALLATION. ANY PORTION OF THE VENT REPAIRED OR REPLACED UNDER THE WARRANTY SHALL BE WARRANTED FOR THE REMAINDER OF THE ORIGINAL WARRANTY PERIOD.

PART 2 – PRODUCTS
2.1 POSITIVE PRESSURE VENT
  A. THE VENT SHALL BE OF THE DOUBLE–WALL, OR SINGLE WALL WHERE INDICATED FACTORY–BUILT TYPE FOR USE ON CONDENSING APPLIANCES OR PRESSURIZED VENTING SYSTEMS SERVING CATEGORY IV APPLIANCES AND AS SPECIFIED BY THE EQUIPMENT MANUFACTURER.MAXIMUM TEMPERATURE SHALL NOT EXCEED 550 °F (288 °C).
  B. VENT SHALL BE LISTED FOR AN INTERNAL STATIC PRESSURE OF 6" W.G. AND TESTED TO 15" W.G.
  C. VENT SHALL BE CONSTRUCTED WITH AN INNER AND OUTER WALL, WITH A 1" ANNULAR INSULATING AIR SPACE. THE INNER WALL (VENT) SHALL BE CONSTRUCTED OF AL29–4C SUPERFERRITIC STAINLESS STEEL, .015 THICKNESS FOR 6"–12" DIAMETERS AND .024 THICKNESS FOR 14"–24" DIAMETERS. THE OUTER WALL (CASING) SHALL BE CONSTRUCTED OF ALUMINIZED STEEL, .018 THICKNESS FOR 6"–12" DIAMETERS AND .024 THICKNESS FOR 14"–24" DIAMETERS.
  D. ALL PARTS EXPOSED TO THE WEATHER SHALL BE STAINLESS STEEL.
  E. ALL SUPPORTS, ROOF OR WALL PENETRATIONS, TERMINATIONS, APPLIANCE CONNECTORS AND DRAIN FITTINGS, REQUIRED TO INSTALL THE VENT SYSTEM SHALL BE INCLUDED.
  F. ROOF PENETRATION PIECES SHALL BE UL LISTED AND PROVIDED BY THE VENT MANUFACTURER. ROOF CURBS SHALL BE REQUIRED ON ROOFS GREATER THAN 12:12 PITCH.
  G. ALL INNER VENT CONNECTIONS SHALL BE SECURED BY MEANS OF PROFILED CONNECTOR BANDS WITH GEAR CLAMP TIGHTENERS. JOINTS SHALL BE SEALED WITH P077 SEALANT. WHERE EXPOSED TO WEATHER, THE OUTER CLOSURE BAND SHALL BE SEALED TO PREVENT RAINWATER FROM ENTERING THE SPACE BETWEEN INNER AND OUTER WALLS.
  H. VENT SHALL TERMINATE IN ACCORDANCE WITH INSTALLATION INSTRUCTIONS AND LOCAL CODES.

2.2 AVAILABLE MANUFACTURERS
VENT SHALL BE HEATFAB MODEL CI, EZ OR APPROVED EQUAL.

PART 3 – EXECUTION
  A. STORE DELIVERED MATERIALS INSIDE, OUT OF THE WEATHER. PROTECT MATERIALS FROM ACCIDENTAL DAMAGE OR VANDALISM.
  B. INSTALLATION SHALL CONFORM TO THE MANUFACTURER'S INSTALLATION INSTRUCTIONS, UL LISTING AND STATE OR LOCAL CODES.
  C. SUPPORT CHIMNEY FROM BUILDING STRUCTURE USING RIGID STRUCTURAL SHAPES FOR ATTACHMENT OF FIXED POINT SUPPORTS (PLATE SUPPORT ASSEMBLY). ANCHOR SUPPORTS TO STRUCTURE BY WELDING, BOLTING, STEEL EXPANSION ANCHORS, OR CONCRETE INSERTS. SIZE OF STRUCTURAL SHAPES SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
  D. PROTECT INCOMPLETE CHIMNEY INSTALLATIONS BY ATTACHING TEMPORARY CLOSURES OVER OPEN ENDS OF SECTIONS.
  E. CLEAN ALL CHIMNEYS AND BREECHINGS OF DUST AND DEBRIS PRIOR TO FINAL CONNECTION TO APPLIANCES.
  F. FLUE & STACK SHOULD BE INSTALLED TO ALLOW CONDENSATE TO RUN BACK TO DRAIN PORTS INSTALLED IN THE LOW SECTIONS OF THE FLUE & STACK. ALL FLUE CONDENSATE CONNECTIONS SHOULD BE RUN TO A SUITABLE DRAIN RECEPTACLE.

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PROJECT : UNLV GUA HEATING SYSTEM UPGRADE

REVISIONS :

NO.	DATE	ISSUE

DRAWING TITLE :

MECHANICAL SPECIFICATIONS

All dimensions, levels, layouts and field conditions shall be verified at the site by the contractor before proceeding with the work.

SIGMA'S Project No. 425DC1417
Consultant Project No. -
Date: 08.23.2017
Drawn By K.J.
Checked By F.S.
Approved By B.S.
File Name:

M0.02

CONSTRUCTION

MECHANICAL SCHEDULES

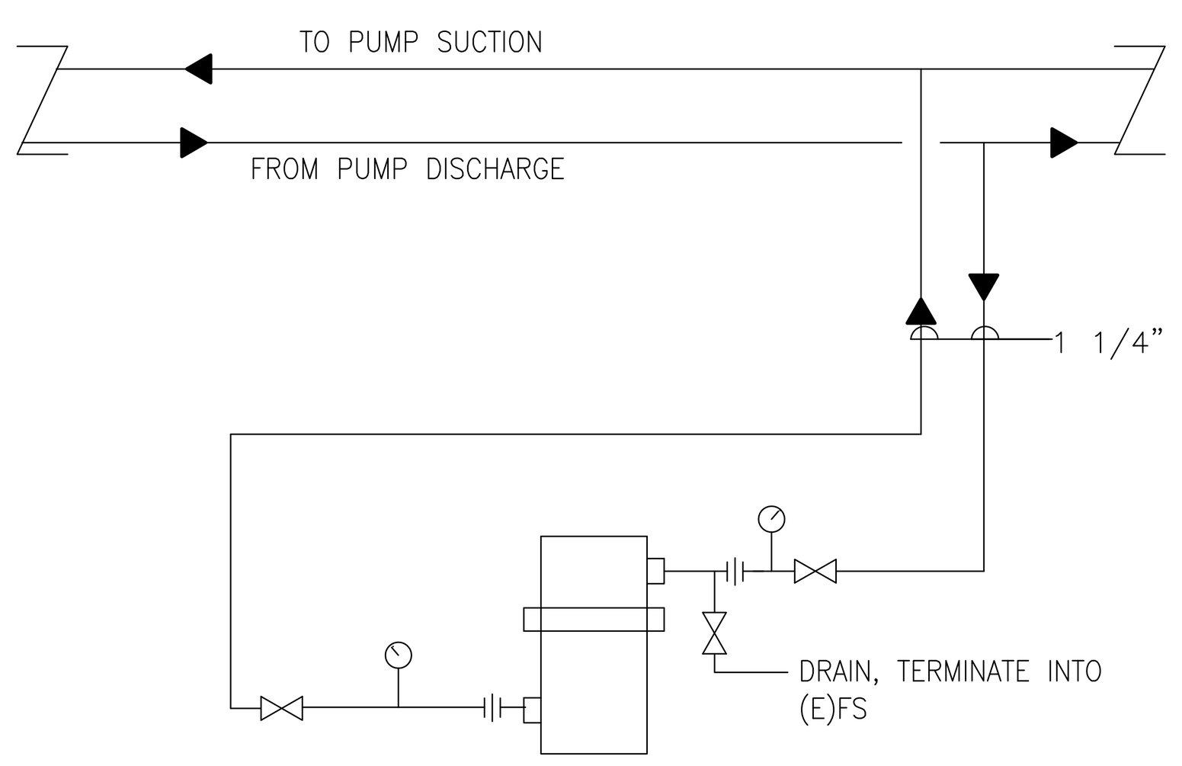
BOILER SCHEDULE (2,100 FIRST ELEVATION)

SYMBOL	MANUFACTURER & MODEL NO.	LOCATION	SERVICE	TYPE	INPUT CAPACITY (MBH)	MAX. OPER. PRESS (PSIG)	FLOW RATE: DESIGN GPM/PD(FT.)	FLOW RATE: MAX. (GPM)	FLOW RATE: MIN. (GPM)	WATER TEMP. (°F): ENT	WATER TEMP. (°F): LVG	PIPE CONNECTIONS: INLET	PIPE CONNECTIONS: OUTLET	GAS: INLET	GAS: MAX./MIN. PRESS (IN. W.C.)	FLUE SIZE	ELECTRICAL: VOLT	ELECTRICAL: ϕ	ELECTRICAL: HZ	ELECTRICAL: CONTROL VOLTAGE	IN-LINE CIRCULATING PUMP: SYMBOL	IN-LINE CIRCULATING PUMP: MANUFACTUER & MODEL NO.	IN-LINE CIRCULATING PUMP: VOLT	IN-LINE CIRCULATING PUMP: ϕ	IN-LINE CIRCULATING PUMP: MAX/MIN AMPS	IN-LINE CIRCULATING PUMP: GPM	IN-LINE CIRCULATING PUMP: HEAD (FT)	OPER. WEIGHT (LBS)	REMARKS
B-1	RBI FLEXCORE CK-2000	BOILER ROOM 1421	HEATING HOT WATER SPACE HEATING	HIGH EFFICIENCY CONDENSING	1,999 (1,901)	160	64/1.1	190.2	38	103	162	3"	3"	1 1/2"	14"-3"	8"	208	1	60	NA	HWP-1	GRUNDFOS MAGNA 3	230	1	770/ 20.5	64	20	–	1. HIGH EFFICIENCY, LOW NOX CONDENSING BOILER WITH MODULATING FIRING, STAINLESS STEEL BURNERS. 2. PROVIDE WITH DIGITAL TEMP. CONTROL, PROVIDE WITH ONBOARD DIGITAL TEMP. CONTROL PANEL **"HEATNET"**, FLOW SWITCH, OUTDOOR RESET, ELECTRONIC MANUAL RESET LOW WATER CUTOFF, FOR EACH BOILER. 3. PROVIDE WITH **"GRUNDFOS MAGNA-3"** VARIABLE INLINE CIRCULATION (HEATING PRIMARY) PUMP AS SCHEDULED. PROVIDED BY MANUFACTURER. CONTROL PUMP AND SPEED VIA BOILER CONTROL PANEL. 4. PROVIDE WITH SEISMIC RESTRAINTS AND ANCHOR TO CONCRETE PAD. 5. PROVIDE WITH FULL SIZE FLUE STACK, DOUBLE WALL S.S. CONSTRUCTION, SEE SPECIFICATIONS. 6. CONNECT TO EXISTING EMERGENCY SHUTDOWN SWITCH AS REQUIRED BY CODE. 7. PROVIDE WITH GAS REGULATOR (SEE PLANS) AND RECONNECT TO EXISTING GAS VENT PIPED TO OUTSIDE. 8. PROVIDE WITH INDOOR/OUTDOOR RESET CONTROL. 9. BOILER SHALL BE CAPABLE OF CONNECTION TO BAS FOR START, STOP, MONITORING AND ALARM. 10. PROVIDE WITH LON CONTROLS LOGIC. 11. PROVIDE WITH NEUTRALIZER PACKAGE **"NT-15"** FOR CONDENSATE DRAIN. PROVIDED BY MANUFACTURER. 12. RUN ALL DRAINS (BOILER, AND BOTTOM OF BOILER STACK) AS SHOWN IN PLANS INTO NEUTRALIZATION TANK. RUN AND EXTEND EXISTING STACK DRAIN IN CHILLER ROOM INTO NEUTRALIZATION TANK. DRAIN NEUTRALIZATION TANK INTO THE FLOOR SINK. 13. PROVIDE WITH FACTORY INSTALLED FILTER BOX FOR COMBUSTION AIR AT BOILER. PROVIDE WITH FILTER. RUN AND CONNECT COMBUSTION AIR INTAKE DUCT TO EXTERIOR LOUVER AS SHOWN IN PLANS. 14. PROVIDE AND INSTALL "ADJUSTABLE LOCKABLE BALANCE DAMPER", ONE FOR EACH BOILER, ADJUST, SET AND LOCK IN PLACE FOR PROPER FLUE DISCHARGE/FLOW.
B-2	RBI FLEXCORE CK-2000	BOILER ROOM 1421	HEATING HOT WATER SPACE HEATING	HIGH EFFICIENCY CONDENSING	1,999 (1,901)	160	64/1.1	190.2	38	103	162	3"	3"	1 1/2"	14"-3"	8"	208	1	60	NA	HWP-2	GRUNDFOS MAGNA 3	230	1	770/ 20.5	64	20	–	

PUMP SCHEDULE (EXISTING)

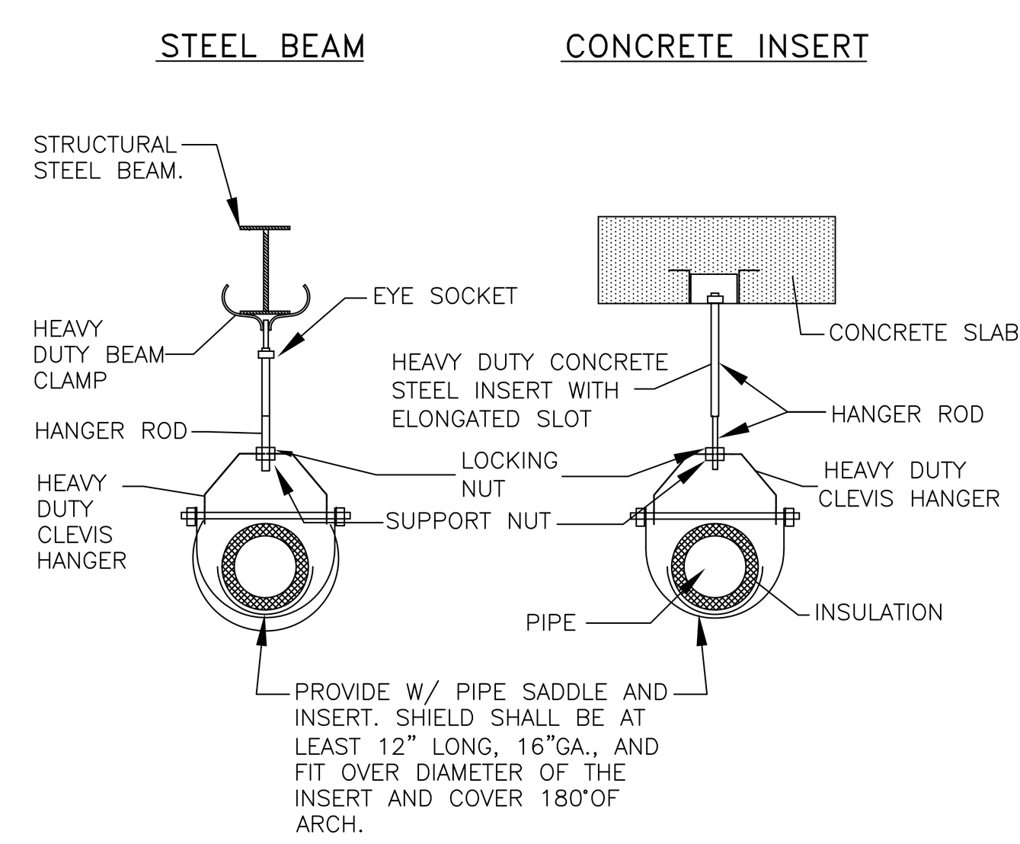
SYMBOL	MANUFACTURER & MODEL NO.	LOCATION	SERVICE	GPM	HEAD (FT)	PUMP MOTOR: HP	PUMP MOTOR: VOLT	PUMP MOTOR: ϕ	PUMP MOTOR: RPM	OPER. WEIGHT (LBS)	REMARKS
(E)HWP-3	–	BOILER ROOM	HEATING HOT WATER SECONDARY	200	70	–	–	–	–	EXISTING	EXISTING PUMP
(E)HWP-4	–	BOILER ROOM	HEATING HOT WATER SECONDARY	200	70	–	–	–	–	EXISTING	EXISTING PUMP

MECHANICAL DETAILS



NOTES:
1. REFER TO PLANS FOR PIPE SIZES.
2. ASSEMBLY SHALL BE MOUNTED ON WALL AT ACCESSIBLE LOCATION WHERE SHOWN ON FLOOR PLANS AND SUPPORT TO WALL.

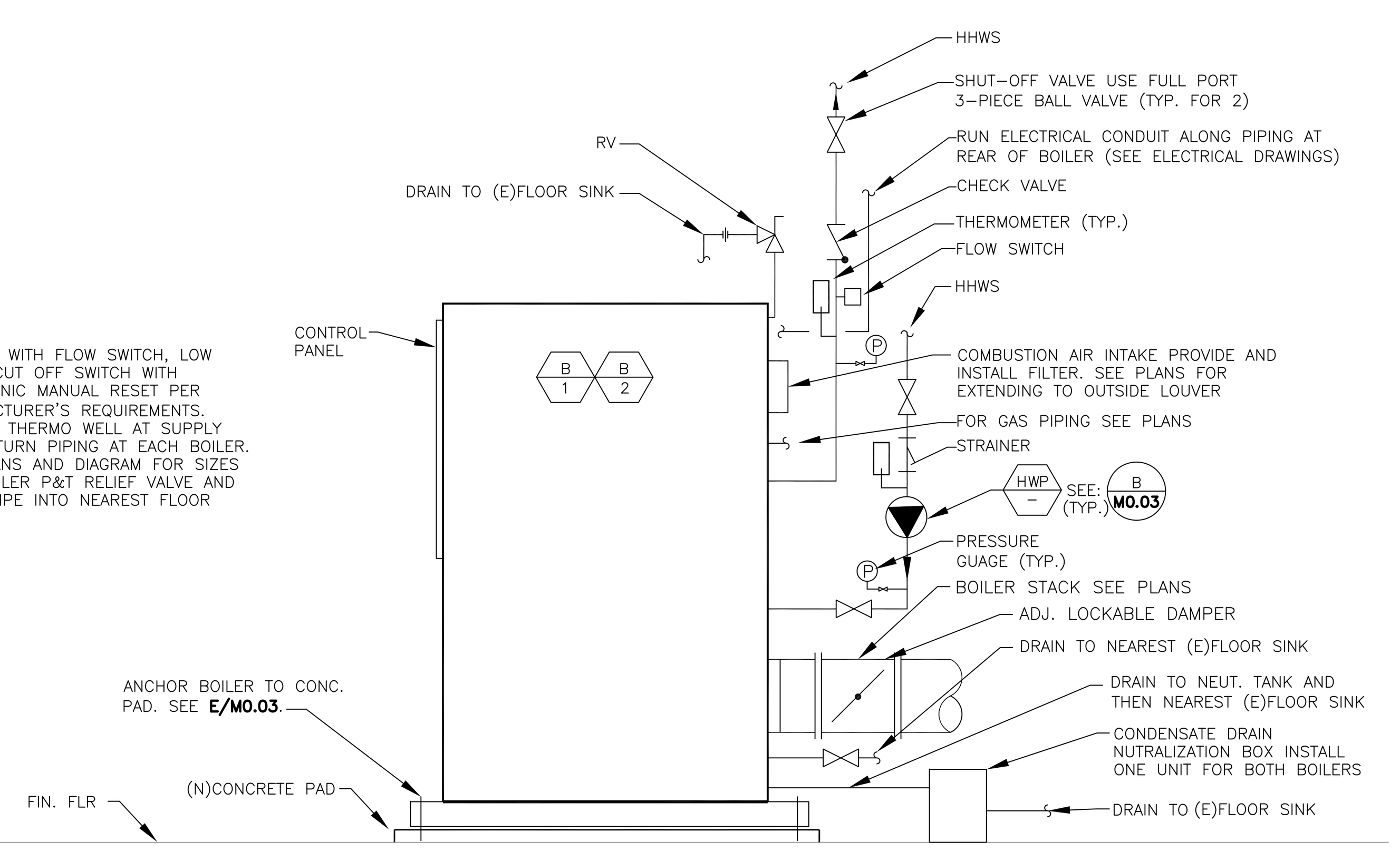
F / M0.03 SIDE-STREAM FILTER DETAIL N.T.S.



NOTES:
1. HANGER ROD, CABLES AND SUPPORTS SHALL BE BY DEFERRED SUBMITTALS AND PER STRUCTURAL DRAWINGS.

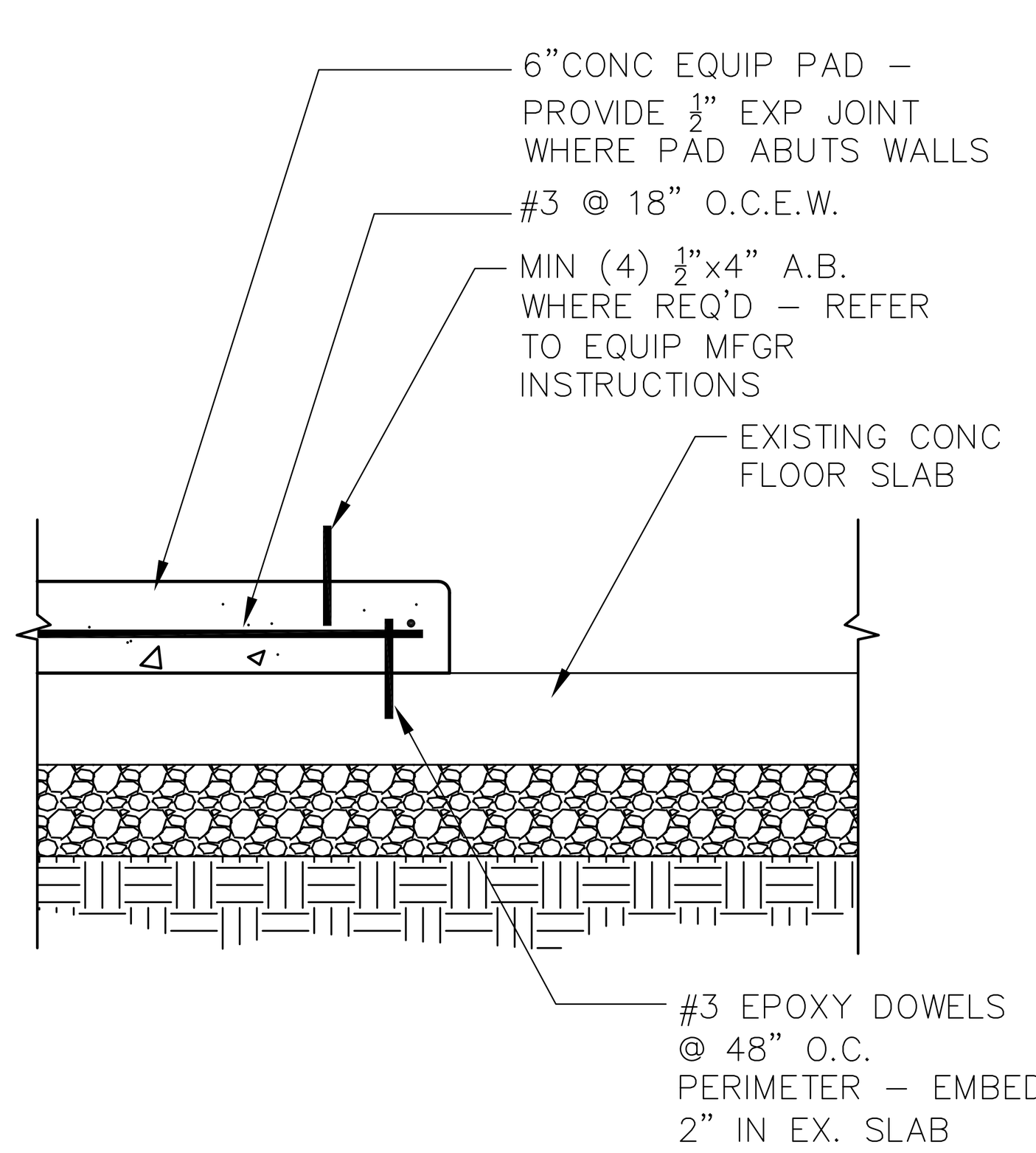
D / M0.03 TYPICAL HANGER DETAIL N.T.S.

NOTES:
1. PROVIDE WITH FLOW SWITCH, LOW WATER CUT OFF SWITCH WITH ELECTRONIC MANUAL RESET PER MANUFACTURER'S REQUIREMENTS.
2. PROVIDE THERMO WELL AT SUPPLY AND RETURN PIPING AT EACH BOILER.
3. SEE PLANS AND DIAGRAM FOR SIZES
4. RUN BOILER P&T RELIEF VALVE AND DRAIN PIPE INTO NEAREST FLOOR SINK.



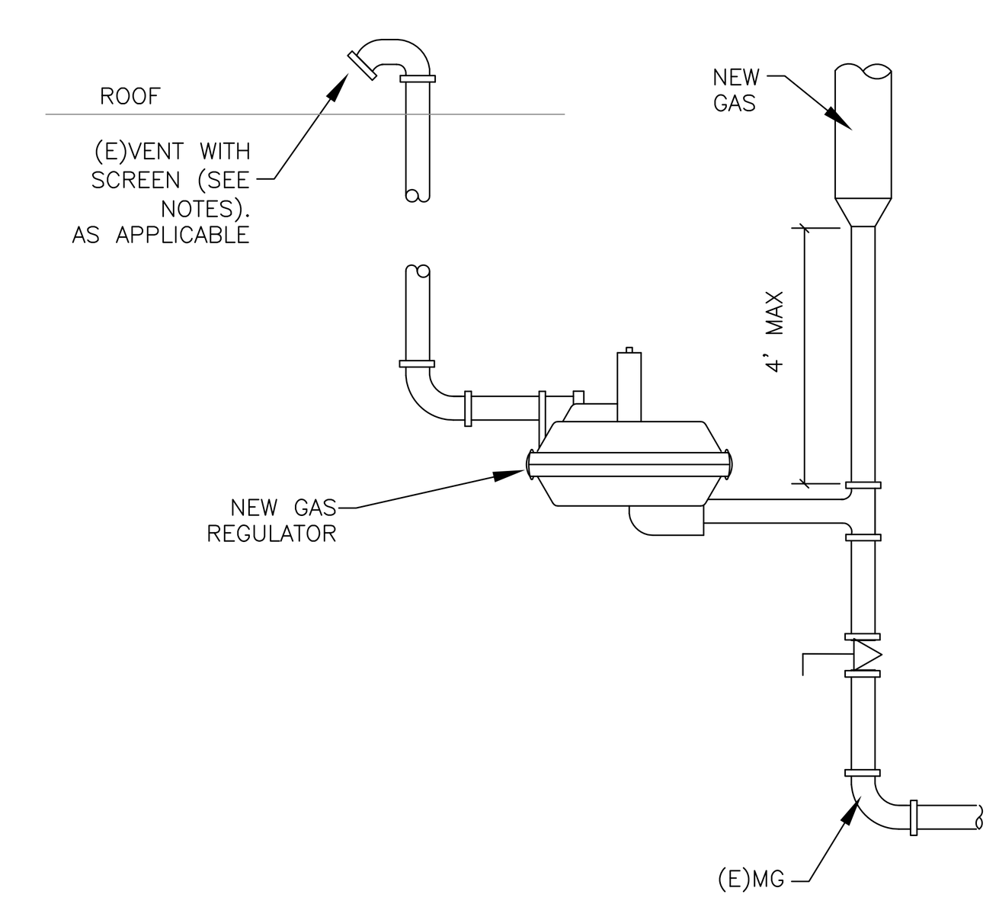
A / M0.03 BOILER DETAIL N.T.S.

G / M0.03 NOT USED DETAIL N.T.S.



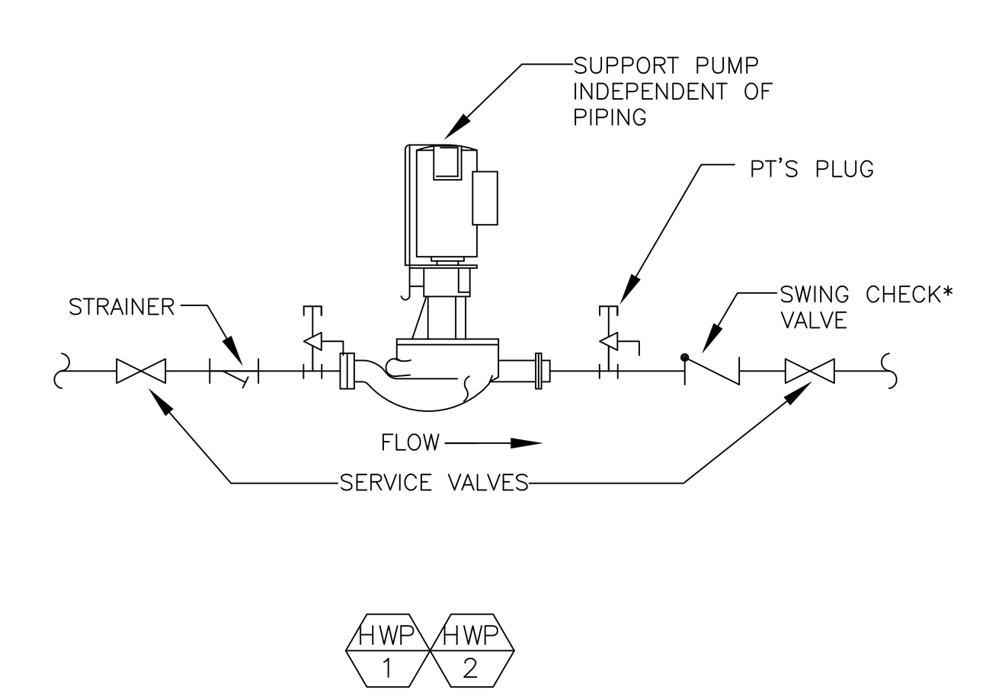
NOTE: VERIFY EQUIPMENT PAD SIZES WITH EQUIPMENT MANUFACTURERS

E / M0.03 CONCRETE PAD DETAIL N.T.S.



NOTES:
1. RUN FULL SIZE VENT TO EXTERIOR FOR INSIDE INSTALLATION.
2. FOR GAS AND MG PIPING PAINT (LESS REGULATOR) SEE ARCHITECTURAL DRAWINGS.
3. FOR PIPE PENETRATION SEE ARCH. DRAWINGS FOR DETAIL.

C / M0.03 GAS REGULATOR DETAIL N.T.S.



*INSTALL SWING CHECK VALVE AS PER A/M0.03.

B / M0.03 IN-LINE PUMP DETAIL PRIMARY SYSTEM N.T.S.

Sigma Mechanical Engineering Consultants
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SEAL:

PROFESSIONAL ENGINEER-STATE OF NEVADA, BIJAN SALIMI, MECHANICAL, NO. 13897
EXP.: 06/30/18
10/17/17

CONSULTANT:

UNLV
UNIVERSITY OF NEVADA LAS VEGAS
4505 S. MARYLAND PKWY.
LAS VEGAS, NEVADA 89154

PROJECT : UNLV GUA HEATING SYSTEM UPGRADE

REVISIONS :

NO.	DATE	ISSUE

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MECHANICAL SCHEDULES AND DETAILS

All dimensions, levels, layouts and field conditions shall be verified at the site by the contractor before proceeding with the work.

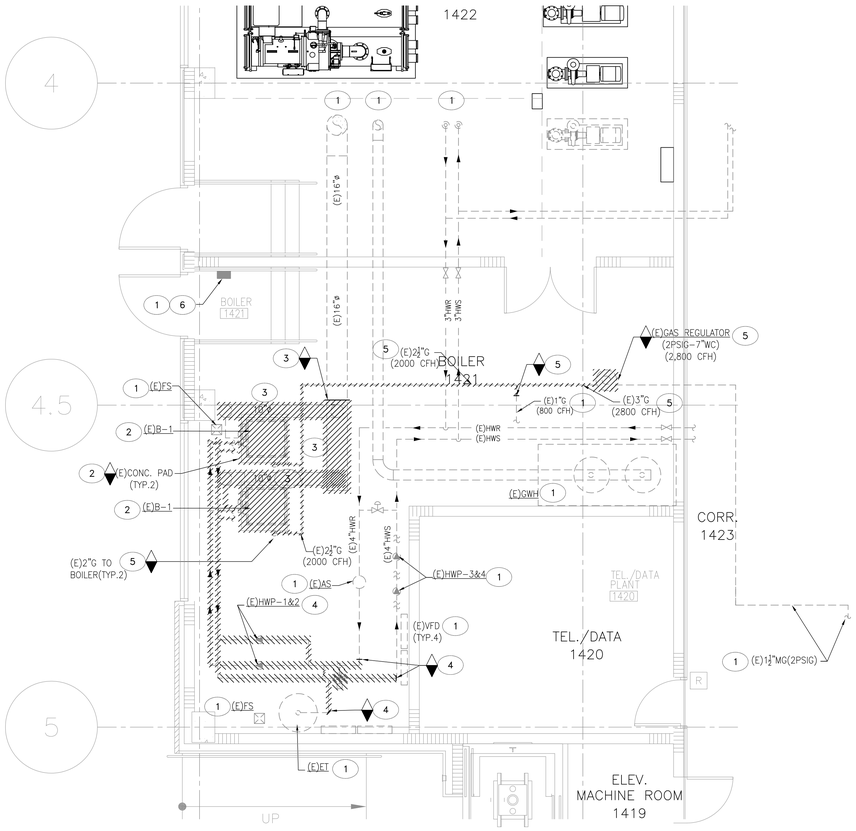
SIGMA'S Project No.	425DC1417
Consultant Project No.	-
Date:	08.23.2017

Drawn By	Checked By	Approved By
K.J.	F.S.	B.S.

File Name:

M0.03

CONSTRUCTION



2 M1.01 MECHANICAL PARTIAL DEMO PLAN
BOILER ROOM-1421

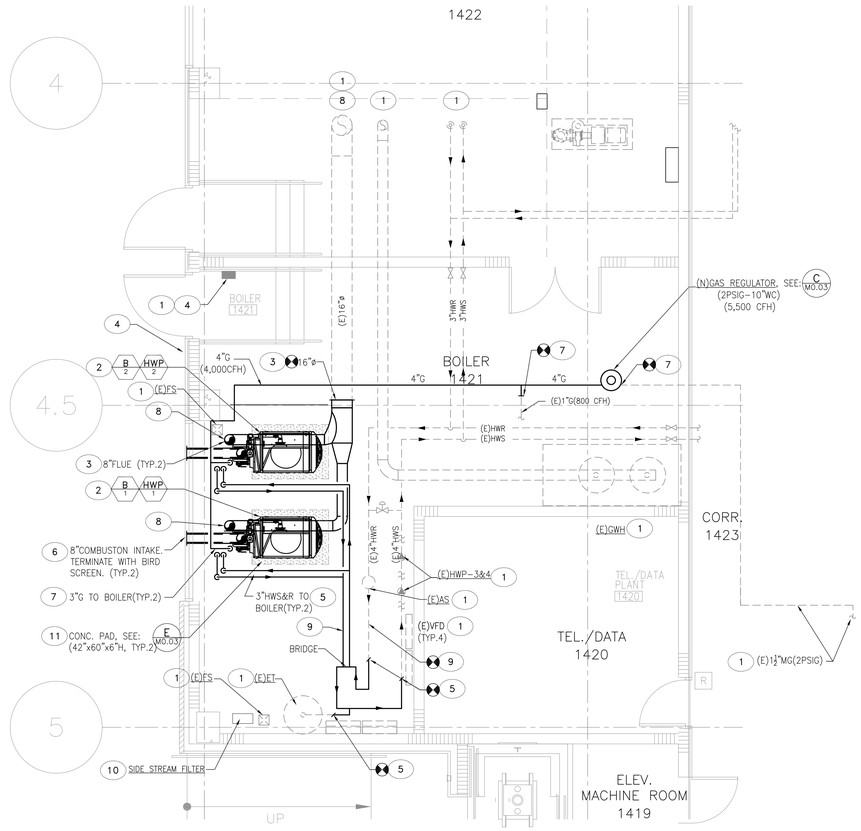
SCALE: 1/4" = 1'-0"

GENERAL DEMOLITION NOTES:

A. SEE FLOW DIAGRAM FOR SCOPE AND EXTENT OF DEMOLITION AND MODIFICATIONS TO MECHANICAL EQUIPMENT AND PIPING.

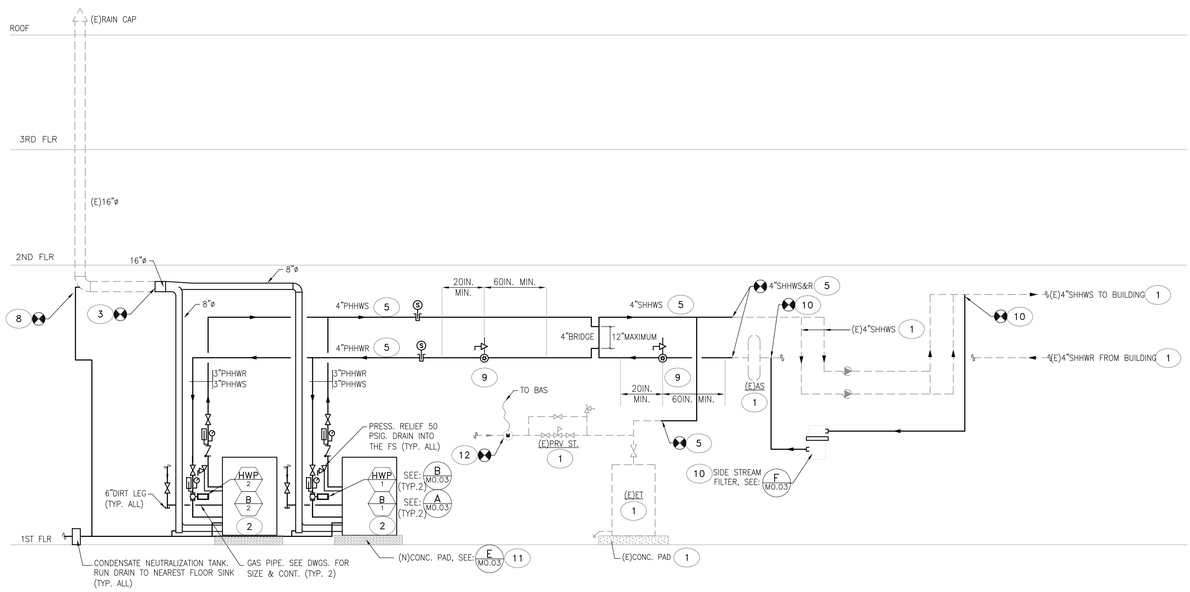
MECHANICAL DEMOLITION NOTES: (#)

1. EXISTING MECHANICAL AND PLUMBING EQUIPMENT, PIPING, ETC. TO REMAIN.
2. DISCONNECT AND ENTIRELY REMOVE EXISTING BOILER, CONCRETE PAD AND PRIMARY PUMPS. HEATING HOT WATER AND GAS PIPING SHALL BE REMOVED AS SHOWN IN THIS PLAN. MAKE READY FOR CONNECTION TO NEW. DISCONNECT AND REMOVE UNUSED SUPPORTS ENTIRELY.
3. DISCONNECT AND REMOVE EXISTING STACK FROM BOILERS AS SHOWN.
4. P.O.D., DISCONNECT AND REMOVE (E)HWS&R PIPING ALONG WITH THE BRIDGE, THREE WAY CONTROL VALVE AND EXP. TANK CONNECTION AS SHOWN. SECONDARY PUMPS AND AIR SEPARATOR TO REMAIN. MAKE EXISTING PIPING AND EQUIPMENT READY FOR CONNECTION TO NEW.
5. P.O.D., DISCONNECT AND REMOVE (E)GAS REGULATOR AND GAS PIPING DOWN TO BOILERS AS SHOWN. EXISTING GAS VENT PIPING AND EXIST. PIPING CONNECTED TO GAS WATER HEATERS SHALL REMAIN. MAKE EXISTING PIPING READY FOR CONNECTION TO NEW.
6. EXISTING BOILER EMERGENCY SHUT DOWN SWITCH.



1 M1.01 MECHANICAL PARTIAL FLOOR PLAN
BOILER ROOM-1421

SCALE: 1/4" = 1'-0"



3 M1.01 MECHANICAL PARTIAL FLOW DIAGRAM
HEATING SYSTEM

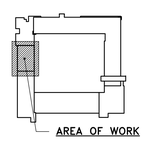
GENERAL NOTES:

A. SEE FLOW DIAGRAM FOR UPGRADE OF MECHANICAL EQUIPMENT AND PIPING.

MECHANICAL NOTES: (#)

1. EXISTING MECHANICAL AND PLUMBING EQUIPMENT, PIPING, ETC.
2. INSTALL NEW BOILER ON (E)CONC. PAD. DRAIN AS SHOWN INTO NEUTRALIZATION TANK AND INTO NEAREST FLOOR SINK W/FULL SIZE HEADER. FOR DETAILS SEE **A/M0.03.**
3. P.O.C., CONNECT NEW STACK TO (E)STACK THRU ROOF. (TYP. 2). SLOPE STACKS TOWARDS THE BOILERS.
4. RE-CONNECT NEW BOILER TO (E)EMERGENCY SHUTDOWN.
5. P.O.C., CONNECT NEW HWS&R PIPING TO (E)HWS&R PIPING AND EQUIPMENT. RECONNECT EXISTING EXP. TANK PIPING AS SHOWN.
6. RUN NEW COMBUSTION AIR DUCT AS SHOWN. RUN THRU SHEETMETAL COVER AND TERMINATE WITH A BIRD SCREEN.
7. P.O.C., INSTALL NEW GAS REGULATOR TO REDUCE GAS PRESSURE FROM MAX. 2PSIG TO 10"W.C. INSTALL NEW GAS PIPING AND RE-CONNECT TO EXISTING GAS WATER HEATERS (1" GAS LINE) AS SHOWN. RUN PIPING AND CONNECT TO BOILERS AS SHOWN IN THIS DRAWINGS. RECONNECT GAS VENT TO EXIST. 1" VENT UP THRU ROOF. GAS PIPING SHALL NOT BE INSTALLED ABOVE BOILER.
8. REROUTE AND RUN EXISTING AND INSTALL NEW DRAINS FROM BOILERS AND BOTTOM OF STACK INTO NEW NEUTRALIZATION TANK.
9. INSTALL FLOW METER ON PRIMARY AND SECONDARY SYSTEM AS SHOWN AND PER MANUFACTURER'S REQUIREMENT.
10. INSTALL NEW SIDE STREAM FILTER, INSTALL NEW PIPING, RUN AND CONNECT TO EXISTING AS SHOWN IN FLOW DIAGRAM.
11. INSTALL NEW 6" HIGH CONC. PAD.
12. INSTALL NEW WATER METER ON HEATING HOT WATER MAKE UP ASSEMBLY SYSTEM (PRV STATION). PROVIDE WITH EMS CONNECTION. SEE SEQ. OF OPERATION AND CONTROLS FOR MORE DETAILS.

KEYPLAN



NORTH

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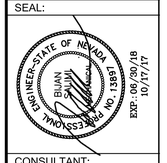
SEAL:



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MECHANICAL PLANS AND DIAGRAM

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