UNIVERSITY OF SOUTH CAROLINA
UNION CAMPUS
Boiler Replacement

State Project Number - H40-9509

Bidding Document Submittal
October 9, 2014

OWNER

UNIVERSITY OF SOUTH CAROLINA

UNIVERSITY OF SOUTH CAROLINA

743 GREENE STREET
COLUMBIA, SOUTH CAROLINA 29208

PROJECT MANAGEMENT/MEP

RMF ENGINEERING INC.

494 SEVEN FARMS DRIVE, SUITE G
CHARLESTON, SOUTH CAROLINA 29492
PHONE: 843-971-9639
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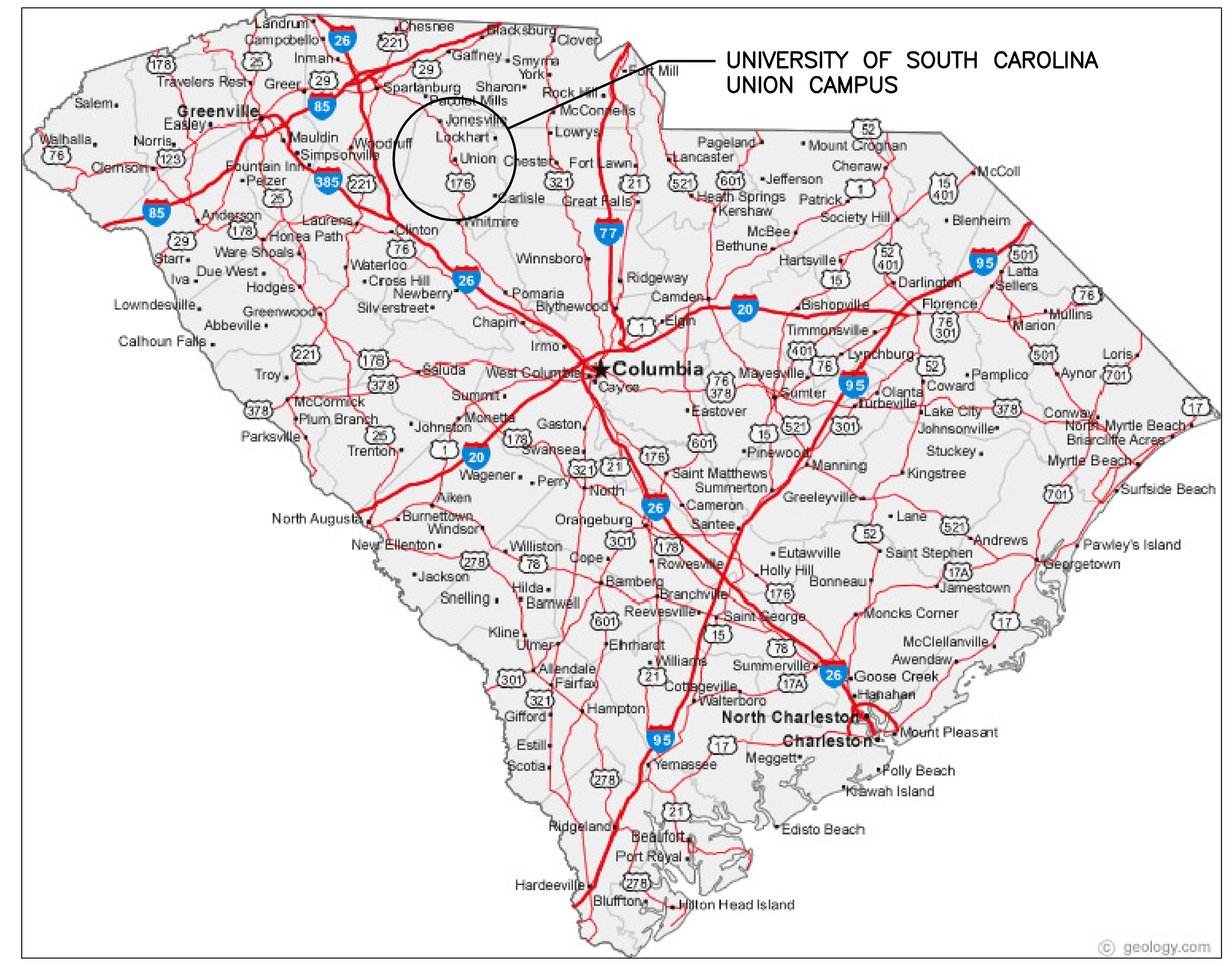
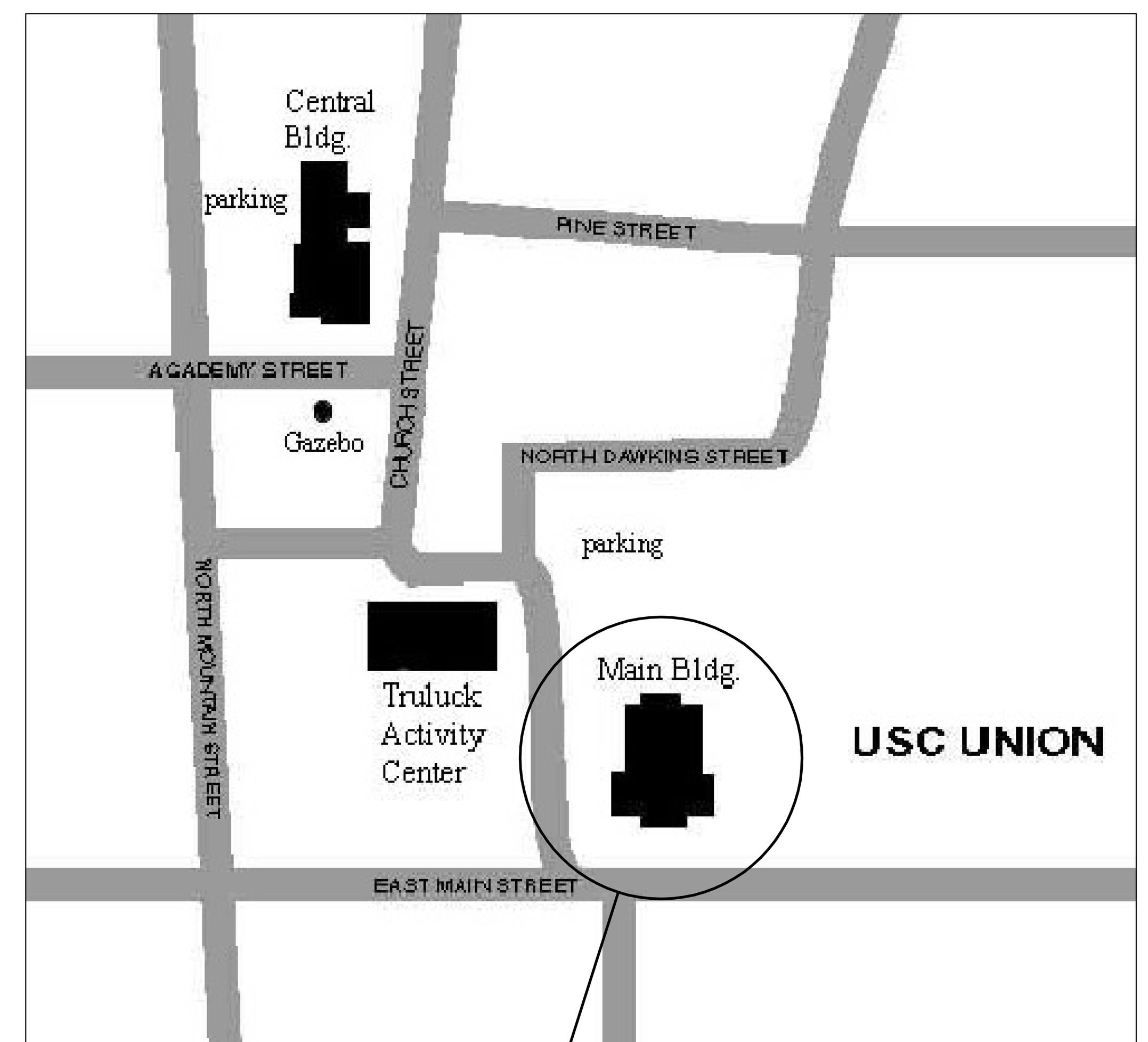
DRAWING INDEX



VICINITY MAP



UNION CAMPUS MAIN BUILDING

LOCATION MAP

PROJECT DESIGNED IN ACCORDANCE WITH:

1. INTERNATIONAL BUILDING CODE (IBC), 2012 EDITION
2. INTERNATIONAL EXISTING BUILDING CODE (IEBC), 2012 EDITION
3. INTERNATIONAL ENERGY CONSERVATION CODE, 2009 EDITION
4. INTERNATIONAL MECHANICAL CODE (IMC), 2012 EDITION
5. ASHRAE 90.1, 2007 EDITION
6. NATIONAL ELECTRIC CODE (NEC) [NFPA–70], 2011 EDITION
7. NATIONAL ELECTRIC SAFETY CODE, ANSI–C2–2012 EDITION

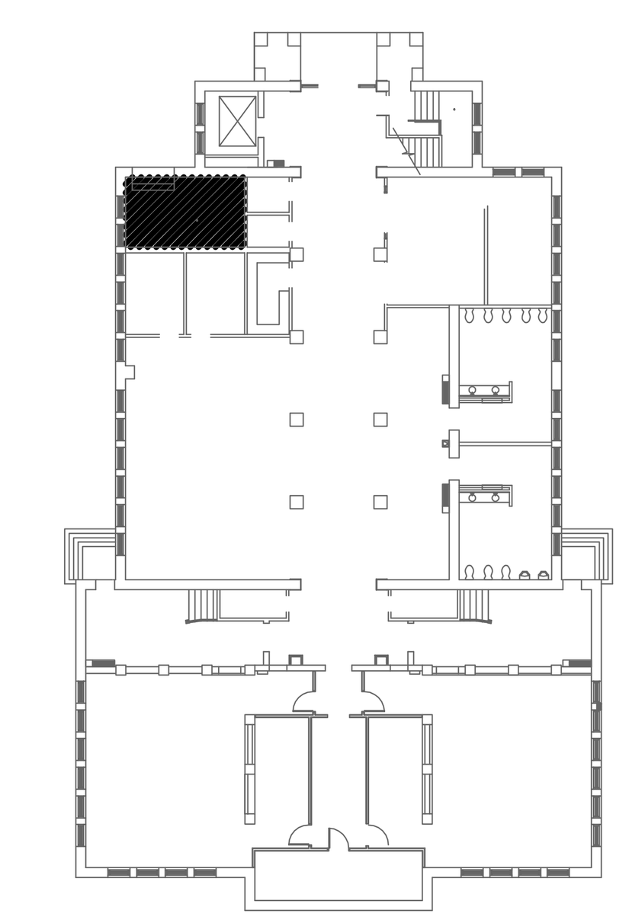
CODE INFORMATION

REVISIONS

REV	DESCRIPTION	DATE	APPROVED
	SUBMISSION PACKAGE	DATE	

SOUTH CAROLINA LICENSED PROFESSIONAL ENGINEER No. 22154 DAVID S. CRUTCHFIELD

Oct 9 2014 12:45 PM



KEY PLAN
SCALE: NONE

N

SCALE: NONE		DATE:	10/09/2014
DRAWN BY:	BEK	RMF JOB #:	314323.B0
DESIGNED BY:	BEK	CLIENT JOB #:	CP00386106
PROJ. MANAGER:	DSC	STATE JOB #:	H40–9509

UNIVERSITY OF SOUTH CAROLINA
UNION CAMPUS
BOILER REPLACEMENT

UNIVERSITY OF SOUTH CAROLINA
UNION

TITLE SHEET

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T000

GENERAL SYMBOLS

PIPING SYMBOLS

SYMBOL	DESCRIPTION
	PIPE DROP
	PIPE RISE
	PIPE CAP
	BRANCH TAKE OFF
	PIPE DROP TEE
	PIPE RISE TEE
	SHUTOFF VALVE (REFER TO SPECIFICATIONS FOR TYPE)
	AUTOMATIC CONTROL VALVE (TWO-WAY)
	AUTOMATIC CONTROL VALVE (THREE-WAY)
	BUTTERFLY VALVE
	AUTOMATIC BUTTERFLY VALVE
	BALANCING VALVE (WITH MEMORY STOP)
	CHECK VALVE
	STRAINER
	PRESSURE REDUCING VALVE
	BALL VALVE
	SHUTOFF VALVE COCK
	UNION
	PIPE FLANGE
	ECCENTRIC REDUCER (FLAT ON BOTTOM)
	ECCENTRIC REDUCER (FLAT ON TOP)
	CONCENTRIC REDUCER
	PRESSURE GAUGE WITH BALL VALVE
	THERMOMETER
	PRESSURE/TEMPERATURE PLUG
	FLOW ARROW

LINETYPE SYMBOLS

DESIGNATION	DESCRIPTION
	DEMOLITION WORK (SHOWN ON DEMOLITION PLANS)
	EXISTING WORK
	NEW WORK

DESIGNATION	DESCRIPTION
	NORTH ARROW
	POINT OF CONNECTION TO EXISTING
	POINT OF DISCONNECTION

MECHANICAL LEGEND

PIPING SYMBOLS

SYMBOL	DESCRIPTION
---HR---	HEATING WATER RETURN
——HS——	HEATING WATER SUPPLY

DUCTWORK SYMBOLS

SYMBOL	DESCRIPTION
	AIR FLOW

EQUIPMENT DESIGNATIONS

SYMBOL	DESCRIPTION
AS-X	AIR/DIRT SEPARATOR DESIGNATION
B-X	BOILER DESIGNATION

PLUMBING LEGEND

PIPING SYMBOLS

SYMBOL	DESCRIPTION
——— -- ———	DOMESTIC COLD WATER (POTABLE)
———C———	NATURAL GAS

COMPONENTS AND SPECIALTIES

SYMBOL	DESCRIPTION
	BACKFLOW PREVENTER (DUAL CHECK TYPE)
	FLOOR DRAIN

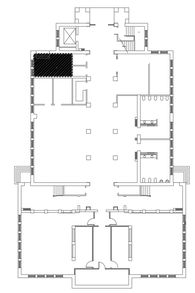
GENERAL DEMOLITION NOTES:

1. NOTIFY THE OWNER, IN WRITING, AT LEAST SEVEN (7) DAYS IN ADVANCE OF ALL REQUIRED SHUTDOWNS OF WATER, FIRE, SEWER, GAS, ELECTRICAL SERVICE, OR OTHER UTILITIES. UPON WRITTEN RECEIPT OF APPROVAL FROM OWNER, SHUTDOWN SHALL BE PERFORMED BETWEEN THE HOURS OF SIX (6) P.M. AND SIX (6) A.M. OR AS DIRECTED OTHERWISE BY THE OWNER AND SHALL BE ACCOMPLISHED AT NO ADDITIONAL CONTRACT COST. AT THE END OF EACH SHUTDOWN ALL SERVICES SHALL BE RESTORED SO THAT NORMAL USE OF THE UTILITIES CAN CONTINUE.
2. WHEN WORKING IN AND AROUND THE EXISTING BUILDING, EXTREME CARE SHALL BE EXERCISED WITH REGARD TO PROTECTION OF THE EXISTING STRUCTURE AND MECHANICAL AND ELECTRICAL SERVICES WHICH WILL REMAIN. REPAIR, REPLACE, OR RESTORE TO THE SATISFACTION OF THE ARCHITECT, ENGINEER AND OWNER ALL EXISTING WORK DAMAGED IN THE PERFORMANCE OF DEMOLITION AND/OR NEW WORK.
3. ALL EXISTING PIPING, EQUIPMENT, DUCTWORK, AND MATERIALS NOT REQUIRED FOR RE-USE OR RE-INSTALLATION (SHOWN OR OTHERWISE) SHALL BE REMOVED. ALL EXISTING MATERIALS AND EQUIPMENT WHICH ARE REMOVED AND ARE DESIRED BY THE OWNER, OR ARE INDICATED TO REMAIN THE PROPERTY OF THE OWNER, SHALL BE DELIVERED TO HIM ON THE PREMISES BY THE CONTRACTOR. ALL OTHER MATERIALS AND EQUIPMENT WHICH ARE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED BY THE CONTRACTOR FROM THE PREMISES.
4. EXISTING CONDITIONS, I.E., PRESENCE AND LOCATION OF DUCTWORK, PIPING, EQUIPMENT AND MATERIALS, INDICATED ARE BASED ON INFORMATION OBTAINED FROM AVAILABLE RECORD DRAWINGS AND FIELD SURVEYS AND ARE NOT WARRANTED TO BE COMPLETE OR CORRECT. CONTRACTOR SHALL FIELD VERIFY EXACT LOCATION OF ALL DUCTWORK, PIPING, EQUIPMENT AND MATERIALS IN THE FIELD PRIOR TO STARTING ALL WORK.
5. EXISTING DUCT, PIPE, AND EQUIPMENT SIZES NOTED ARE FOR THE CONVENIENCE OF THE CONTRACTOR ONLY AND ARE NOT WARRANTED TO BE CORRECT. CONTRACTOR SHALL VERIFY ALL SIZES IN THE FIELD IF THEY EFFECT HIS WORK.
6. EXISTING PIPING NO LONGER REQUIRED TO REMAIN IN SERVICE (SHOWN OR OTHERWISE) SHALL BE DISCONNECTED AND REMOVED BACK TO SERVICE MAINS UNLESS OTHERWISE INDICATED OR NOTED ON THE PLANS. REMOVE EXISTING PIPE HANGERS, SUPPORTS, VALVES, ETC.. EXISTING PIPING INDICATED OR REQUIRED TO REMAIN IN SERVICE OR IN PLACE SHALL BE CAPPED, PLUGGED, OR OTHERWISE SEALED. NO EXISTING PIPING SHALL BE LEFT OPEN END.
7. EXISTING DUCTWORK INDICATED TO BE DISCONNECTED AND REMOVED SHALL INCLUDE ALL RELATED AIR DEVICES, HANGERS, SUPPORTS, ETC., UNLESS OTHERWISE INDICATED OR NOTED ON THE PLANS. EXISTING DUCTWORK WHERE INDICATED TO BE CAPPED OR REQUIRED TO REMAIN IN SERVICE SHALL BE CAPPED WITH 18 GAUGE SHEET METAL SECURE CAP WITH SHEET METAL SCREWS AND SEAL PERIMETER OF OPENING AIR TIGHT WITH DUCT SEALER. NO EXISTING DUCTWORK SHALL BE LEFT OPEN FOR ANY EXTENDED PERIOD OF TIME. CAP EXISTING DUCTWORK IMMEDIATELY AS REQUIRED OR DIRECTED BY THE ENGINEER. CONTRACTOR SHALL RETURN ALL AIR DEVICES TO OWNER.
8. EXISTING MECHANICAL AND ELECTRICAL EQUIPMENT, PIPING, DUCTWORK, AND MATERIALS AFFECTED BY DEMOLITION OR NEW WORK INSTALLATION AND REQUIRED TO REMAIN IN SERVICE SHALL BE RE-INSTALLED OR SUPPORTED AS REQUIRED IN ACCORDANCE WITH NEW WORK SPECIFICATION. ALL WORK SHALL BE COMPLETED TO THE SATISFACTION OF THE ENGINEER AND OWNER AND AT NO ADDITIONAL CONTRACT COST.
9. PATCH ALL DISTURBED SURFACES, INCLUDING WALLS, CEILINGS, ROOF, AND FLOOR. PATCHING SHALL MATCH EXISTING ADJACENT SURFACES AS TO THICKNESS, TEXTURE, MATERIALS, AND COLOR. ALL PATCHING SHALL BE PERFORMED TO THE SATISFACTION OF THE ARCHITECT, ENGINEER AND OWNER AND AT NO ADDITIONAL CONTRACT COST.
10. IN GENERAL ALL PIPING, EQUIPMENT, DUCTWORK, AND MATERIALS SHOWN "LIGHT" IS EXISTING TO REMAIN. ALL PIPING, CONDUITS, EQUIPMENT, DUCTWORK, AND MATERIALS SHOWN "HEAVY AND DASHED" IS EXISTING TO BE DEMOLISHED.
11. ALL WORK SHALL BE PERFORMED IN A SEQUENCE AND DURING HOURS TO MINIMIZE DISRUPTION TO THE BUILDING WHICH WILL REMAIN OCCUPIED DURING CONSTRUCTION.
12. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE SOUTH CAROLINA CODES, CITY OF COLUMBIA, AND THE LOCAL FIRE MARSHALL'S REQUIREMENTS. REFER TO 2012 IBC CHAPTER 33 AND THE USC FIRE MARSHALL.
13. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH ALL OTHER TRADES/ SUBCONTRACTORS INCLUDING BUT NOT LIMITED TO AUTOMATIC TEMPERATURE CONTROLS, ELECTRICAL, AND GENERAL TRADES.
14. CONTRACTOR SHALL MAINTAIN ACCESS TO ALL STAIRWELLS AND EGRESS CORRIDORS DURING CONSTRUCTION.
15. CONCRETE CORING OR CUTTING MAY BE REQUIRED IN ORDER TO RUN MECHANICAL, ELECTRICAL, PLUMBING, CABLING OR OTHER SERVICES TO A SPECIFIC AREA. IT IS IMPERATIVE WHEN CONSIDERING EITHER CORING, CUTTING OR CHIPPING THAT REBAR, PLUMBING, ELECTRICAL SERVICES, ETC WITHIN THE CONCRETE SLAB, WALL OR FLOOR BE LOCATED PRIOR TO DISTURBING THE INTEGRITY OF THE EXISTING CONCRETE. OBTAIN STRUCTURAL DRAWINGS OF THE AREA IN QUESTION AND, USING THE BUILDING GRIDLINES, DETERMINE AND MARK THE EXACT LOCATIONS REQUIRED FOR NEW SERVICES.
16. ALL PENETRATIONS MUST BE SEALED WITH FIRE STOP MATERIAL AFTER SERVICES ARE RUN THROUGH. ALL PENETRATIONS THROUGH EXTERIOR WALLS ABOVE AND BELOW GRADE OR SLAB ON GRADE MUST BE WATERPROOFED.
17. ALL SPACES WHERE CONSTRUCTION OCCURS SHALL BE CLEANED AND/OR REPAIRED AS NEEDED TO RETURN TO THE SAME OR BETTER CONDITION THAT IT WAS PRIOR TO CONSTRUCTION.
18. ALL VALVES REMOVED DURING THE DEMOLITION PHASE SHALL BE TURNED OVER TO THE OWNER.
19. THE CONTRACTOR SHALL PROVIDE TEMPORARY HEATING EQUIPMENT IN ALL SPACES AFFECTED BY THE BOILER SHUT-DOWN TO MAINTAIN SPACE TEMPERATURE AT A MINIMUM OF 70 DEG F. THE TEMPORARY HEATING SHALL REMAIN IN PLACE FOR THE DURATION OF CONSTRUCTION. THE TEMPORARY HEATING PLAN SHALL BE PRESENTED TO THE OWNER AT THE PRE-CONSTRUCTION MEETING.

REVISIONS

REV	DESCRIPTION	DATE	APPROVED
	SUBMISSION PACKAGE	DATE	

SOUTH CAROLINA PROFESSIONAL ENGINEER No. 22154 DAVID S. CRUTCHFIELD Oct 9 2014 12:45 PM



KEY PLAN
SCALE: NONE

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DRAWN BY:	BEK	RMF JOB #:	314323.80
DESIGNED BY:	BEK	CLIENT JOB #:	CP00386106
PROJ. MANAGER:	DSC	STATE JOB #:	H40-9509

UNIVERSITY OF SOUTH CAROLINA
UNION CAMPUS
BOILER REPLACEMENT

UNIVERSITY OF SOUTH CAROLINA UNION

MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES

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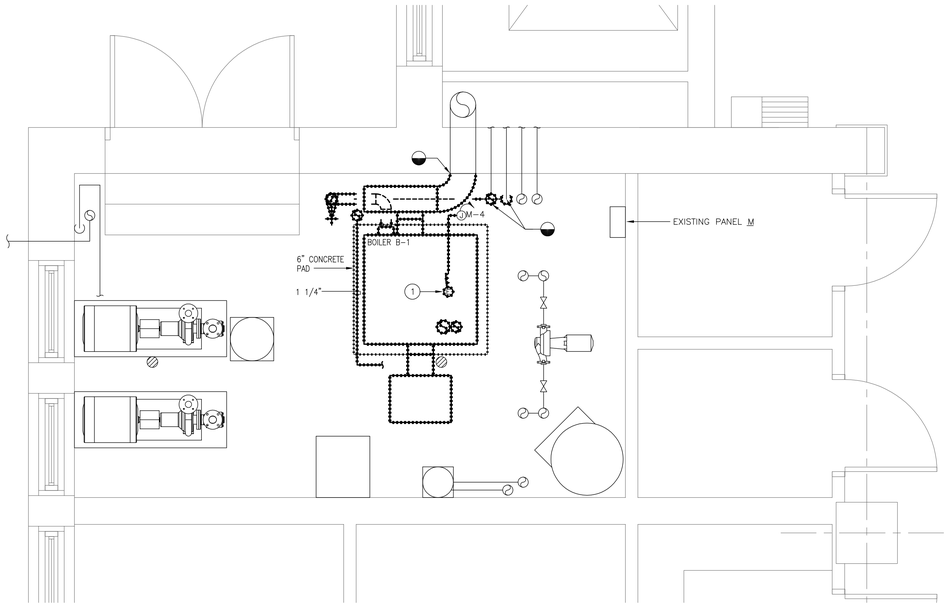
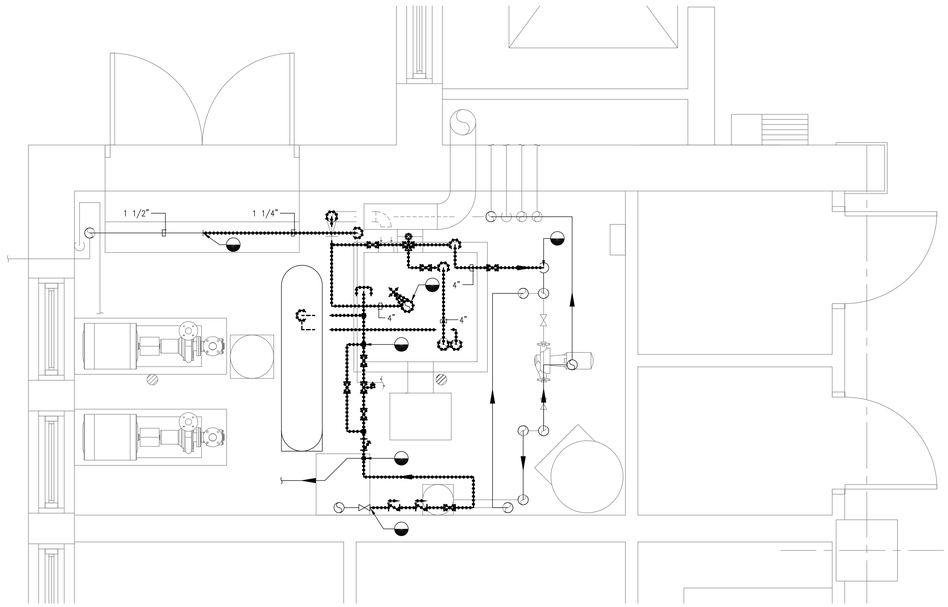
M000



LOWER LEVEL – MECHANICAL DEMOLITION

SCALE: 1/2"=1'-0"



UPPER LEVEL – MECHANICAL DEMOLITION

SCALE: 1/2"=1'-0"

GENERAL NOTES:

1. REFER TO M000 FOR GENERAL DEMOLITION NOTES.
2. DURING THE DEMOLITION PROCESS ALL OPEN END PIPES, FLUES, ETC. SHALL REMAIN COVERED UNTIL FINAL CONNECTION OR CAP IS PROVIDED.
3. THE FLOOR DRAINS SHALL BE COVERED DURING THE DEMOLITION PROCESS TO PROTECT THE SYSTEM FROM DIRT AND DEBRIS.
4. THE CONTRACTOR SHALL TURN ALL VALVES REMOVED OVER TO THE OWNER.

DRAWING NOTES:

(1) DISCONNECT EXISTING BOILER. CIRCUIT TO BE REUSED.

REVISIONS

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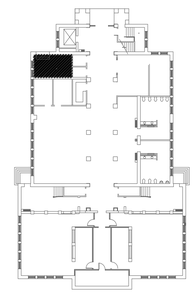

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UNION CAMPUS
BOILER REPLACEMENT

UNIVERSITY OF SOUTH CAROLINA UNION

MECHANICAL/ELECTRICAL DEMOLITION PLAN

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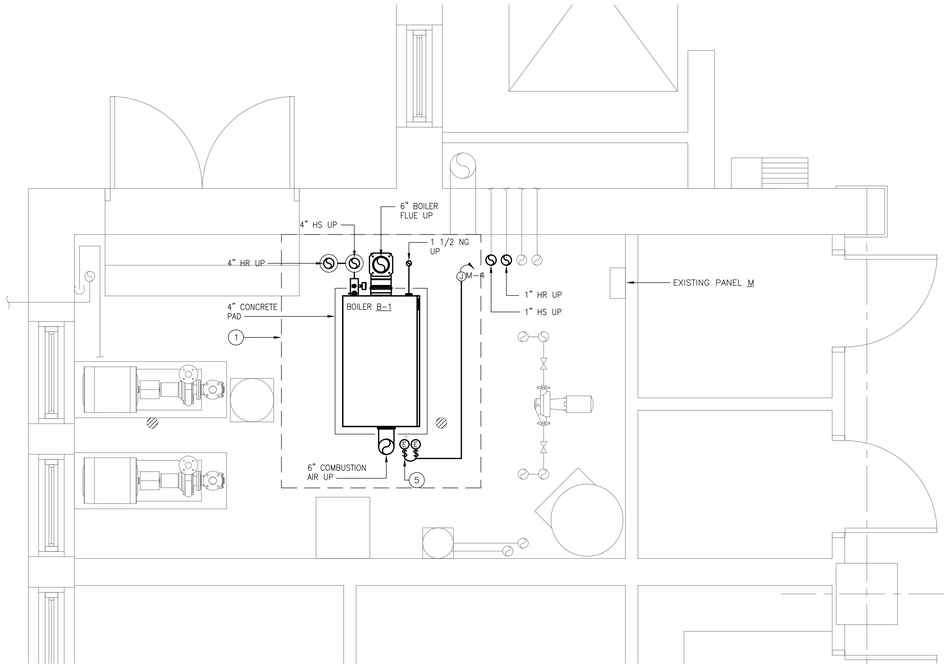
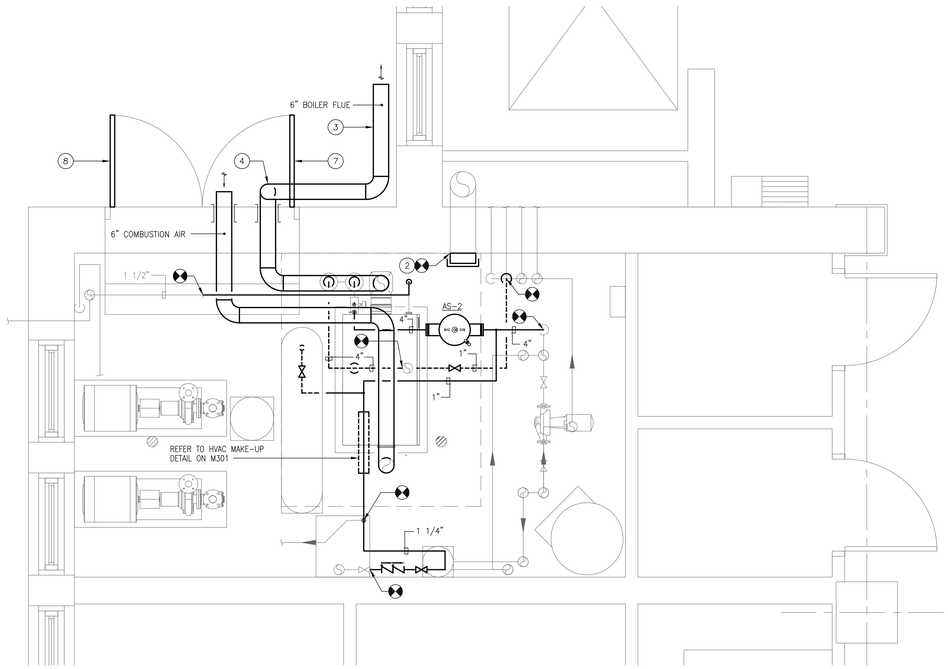
MD101



LOWER LEVEL – MECHANICAL NEW WORK

SCALE: 1/2"=1'-0"



UPPER LEVEL – MECHANICAL NEW WORK

SCALE: 1/2"=1'-0"

GENERAL NOTES:

1. ALL FLOOR MOUNTED EQUIPMENT SHALL BE PROVIDED WITH A SIX (6) INCH CONCRETE EQUIPMENT PAD. PAD SHALL BE A MINIMUM OF SIX (6) INCHES LARGER THAN THE EQUIPMENT.
2. THE COMBUSTION AIR AND EXHAUST FLUE FOR THE BOILER SHALL BE PROVIDED BY THE CONTRACTOR. EACH SHALL BE PAINTED TO MATCH THE BUILDINGS EXTERIOR COLOR. A COLOR SAMPLE SHALL BE SUBMITTED TO THE ENGINEER AND OWNER FOR REVIEW AND ACCEPTANCE PRIOR TO PAINTING.
3. COMBUSTION AIR AND BOILER FLUE SHALL BE INSTALLED PER MANUFACTURERS WRITTEN INSTRUCTIONS AND ALL STATE AND LOCAL CODES.
4. COORDINATE ALL EQUIPMENT INSTALLATION WITH ELECTRICAL PANELS/ SERVICE TO COMPLY WITH NEC.
5. THE BOILER PRESSURE RELIEF SHALL BE ROUTED THROUGH THE EXTERIOR WALL AND SHALL DISCHARGE IN AN AREA VISIBLE TO THE USC MAINTENANCE STAFF. FINAL LOCATION SHALL BE COORDINATED WITH THE OWNER.

DRAWING NOTES:

1. EQUIPMENT CLEARANCE PER MANUFACTURERS WRITTEN INSTRUCTION.
2. EXISTING BOILER FLUE SHALL BE CAPPED AND SEALED AIRTIGHT AT WALL. THE BOILER FLUE ON THE ROOF SHALL BE REMOVED TO WITHIN 12" OF THE ROOF LEVEL AND CAPPED AND SEALED AIRTIGHT.
3. BOILER FLUE SHALL BE MOUNTED TO THE EXTERIOR OF THE BUILDING PER MANUFACTURERS WRITTEN INSTRUCTION. FINAL LOCATION SHALL BE COORDINATED WITH DOWNSPOUT.
4. BOILER FLUE SHALL RISE UPON EXIT OF THE MECHANICAL ROOM TO CLEAR WINDOWS ALONG THE WEST WALL.
5. PROVIDE 2#12 & 1#12 AWG GROUND IN 3/4" LIQUIDTIGHT FLEXIBLE CONDUIT FOR 120V CONNECTION TO BOILER AND BOILER RECIRC PUMP. CONNECT TO EXISTING CIRCUIT. PROVIDE TOGGLE SWITCH DISCONNECTING MEANS WITH LABEL OF EQUIPMENT SERVED. COORDINATE ALL CONNECTION POINTS WITH AWARDED MANUFACTURER.
6. BOILER FLUE AND COMBUSTION AIR INLET SHALL BE RUN THROUGH THE EXISTING DOOR. ALL PENETRATIONS SHALL BE SEALED AIRTIGHT.
7. THE EXISTING DOOR SHALL BE FIXED IN THE CLOSED POSITION AND THE LOUVER SHALL BE COVERED WITH SHEET METAL. THE SHEET METAL SHALL BE INSTALLED ON THE INTERIOR SIDE OF THE DOOR.
8. THE EXISTING DOOR LOUVER SHALL BE COVERED WITH SHEET METAL. THE SHEET METAL SHALL BE INSTALLED ON THE INTERIOR SIDE OF THE DOOR.

REVISIONS

REV	DESCRIPTION	DATE	APPROVED
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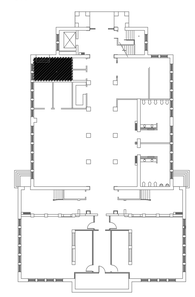
SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER
No. 22154
DAVID S. CRUTCHFIELD

Oct 9 2014 12:45 PM



KEY PLAN

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MECHANICAL/ELECTRICAL NEW WORK PLAN

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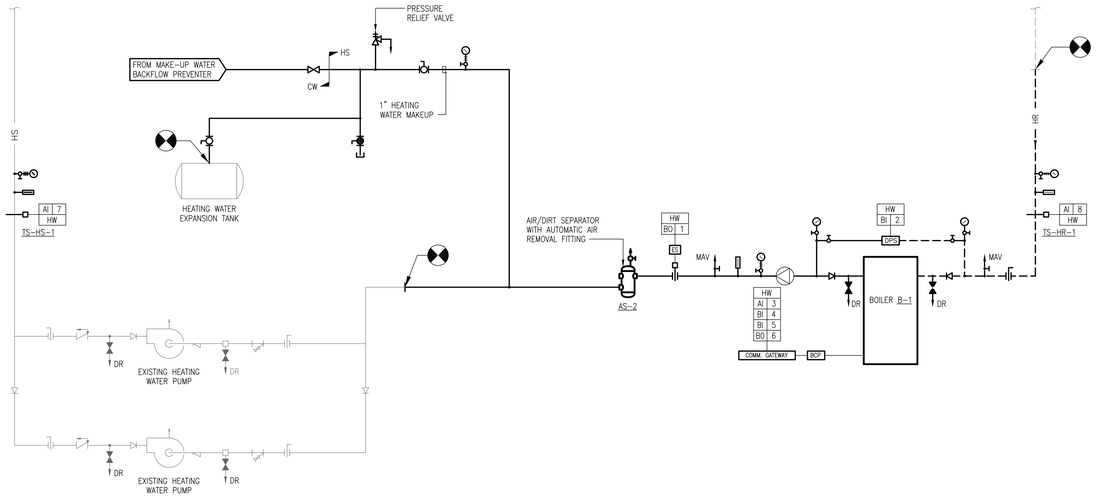
M101



INPUT/OUTPUT SUMMARY

POINT NO.	SYSTEM APPARATUS OR AREA POINT DESCRIPTION	INPUTS: ANALOG MEASURED: RETURN TEMPERATURE	SUPPLY TEMPERATURE	DIFFERENTIAL PRESSURE	GPM	TEMPERATURE	ANALOG CALC.: RUN TIME	BTUH	TONS	TON-HR TOTALIZATION	BINARY: STATUS (DIFF. PRESS.)	FLOW (FROM BMS)	FAULT (FROM BMS)	FAULT (FROM VFD)	STATUS (AMPS)	OUTPUTS: BINARY: ENABLE/DISABLE	VALVE POSITION	EVAPORATOR INLET VALVE	ANALOG: VALVE POSITION	FAN SPEED	PUMP SPEED	SYSTEM FEATURES: ALARMS: LOSS OF FLOW	BMS FAULT	VFD FAULT	PROGRAMS: TIME SCHEDULING	LEAD/LAG ALTERNATE	PRIMARY/STANDBY ALTERNATE	GENERAL: COLOR GRAPHICS
1,2	BOILER B-1										X						X						X					X
3,4,5,6	BOILER MANAGEMENT SYSTEM (B-1)	X										X	X			X						X	X			X		X
7,8	HEATING WATER	X	X	X	X																							X

BOILER SEQUENCE OF OPERATION

PART 1 – TEMPERATURE CONTROL SEQUENCES

A. SEE PLANS FOR LOCATIONS OF ALL TEMPERATURE SENSORS, PANELS, DAMPERS, VALVES, AND EQUIPMENT; WHERE SUCH DEVICES ARE NOT INDICATED, HOWEVER REQUIRED BY THE SEQUENCES, THEY SHALL BE PROVIDED BY THE CONTRACTOR AS PART OF THE CONTRACT AND LOCATED IN THE FIELD BY THE ARCHITECT.

B. A FULL COMMUNICATIONS INTERFACE AND COMPLETE INTEROPERABILITY WITH THE EXISTING CAMPUS AUTOMATIC TEMPERATURE CONTROL SYSTEM SHALL BE PROVIDED TO PERFORM THE FUNCTIONS HEREIN DESCRIBED OR INDICATED IN THE CONTRACT DOCUMENTS. ALL TEMPERATURE, PRESSURE AND TIME SET POINTS SHALL BE FULLY ADJUSTABLE FROM THE CEMS.

PART 2 – TEMPERATURE CONTROL SEQUENCES

A. THE BOILER MANUFACTURER SHALL SUPPLY AS PART OF THE BOILER PACKAGE A COMPLETELY INTEGRATED BOILER MANAGEMENT SYSTEM (BMS) TO CONTROL ALL OPERATION AND ENERGY INPUT OF THE MULTIPLE BOILER HEATING PLANT.

B. THE CONTROL MANUFACTURER SHALL PREPARE AND SUBMIT FOR APPROVAL A COMPOSITE CONTROL AND INTERLOCK WIRING DIAGRAM DEPICTING THE HEATING WATER SYSTEM PROVIDED. THE MANUFACTURER SHALL BE RESPONSIBLE FOR AND SHALL PROVIDE ALL CONTROL AND INTERLOCK WIRING FOR THE ENTIRE SYSTEM INCLUDING THE BOILER CONTROL SYSTEM AND COMMUNICATION MODULE PROVIDED BY THE BOILER MANUFACTURER. DIAGRAMS SHALL CLEARLY SHOW HOW BOILER MANUFACTURER CONTROLS AND OTHER DEVICES WILL INTERFACE WITH THE BUILDING CONTROL SYSTEM.

C. START/STOP CONTROL OF THE BOILER SHALL BE PROVIDED THROUGH THE CEMS PROVIDED BY THE CONTROL MANUFACTURER. BOILER MANAGEMENT SYSTEM (BMS) SHALL CONTROL THE BOILER AND ITS INTEGRAL START/STOP/SAFETY FUNCTIONS. THE BMS AND THE CEMS SHALL PROVIDE ALL STATUS AND ALARM MONITORING FOR EACH SYSTEM COMPONENT AND ALSO INDICATE BOILER DIAGNOSTIC. START/STOP SETTINGS FOR VARIOUS COMPONENTS SHALL BE PERFORMED MANUALLY THROUGH A HAND, OFF, AUTO (H-O-A) SWITCH OR BY THE BMS AND CEMS AS OUTLINED IN THE CONTRACT DOCUMENTS.

D. THE BOILER SHALL BE INITIALLY MANUALLY INDEXED TO THE AUTOMATIC POSITION VIA THE H-O-A SWITCH ON THE BOILER CONTROL PANEL (BCP).

E. THE BOILER HEATING PLANT SHALL BE ENERGIZED WHEN THE HEATING WATER SYSTEM IS INDEXED ON THROUGH THE CEMS.

F. BOILER CONTROL

1. CONTROL OF THE BOILER SHALL BE BY THE INTEGRATED BOILER MANAGEMENT SYSTEM. THE SYSTEM SHALL BE AUTOMATICALLY CONTROLLED TO MAINTAIN THE INITIAL HEATING WATER SUPPLY TEMPERATURE SET POINT (TT-HS-1) OF 180°F (ADJUSTABLE).

2. THE BMS SHALL HAVE THE ABILITY TO VARY THE FIRING RATE AND ENERGY INPUT OF THE BOILER THROUGHOUT ITS FULL MODULATING RANGE TO MAXIMIZE THE CONDENSING CAPABILITY AND THERMAL EFFICIENCY OUTPUT OF THE ENTIRE HEATING PLANT.

3. THE BMS SHALL CONTROL THE BOILER OUTLET HEADER TEMPERATURE TO SETPOINT +/- 2°F.

G. PROGRAMS

1. CONTROLS SHALL PROVIDE FOR BOILER PLANT OPTIMIZATION.

I. CEMS INTERFACE

1. THE BMS SHALL BE PROVIDED WITH A BACNET-COMPLIANT DIGITAL GATEWAY. THE CEMS SHALL BE CONNECTED TO THE BMS FOR NUMERIC AND GRAPHIC DISPLAY OF ALL POSSIBLE BOILER PARAMETERS.

HEATING WATER SYSTEM SCHEMATIC AND CONTROL DIAGRAM

SCALE: NONE

REVISIONS

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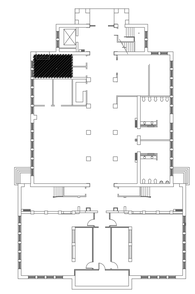

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MECHANICAL SCHEMATICS

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M201

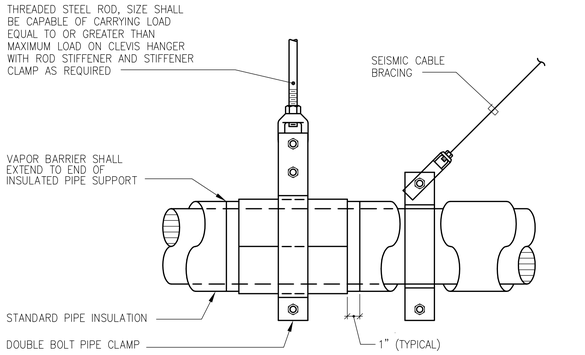
SCALE: NONE

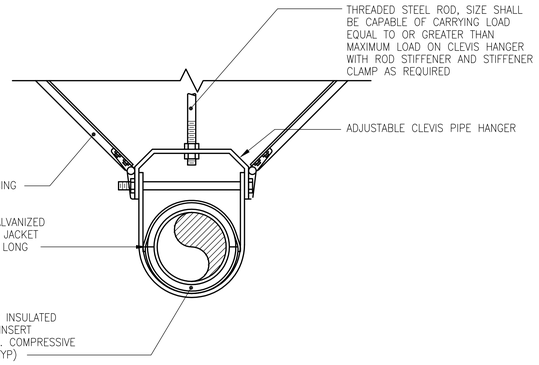
NOTES:

1. HANGER SPACING SHALL BE IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
2. CLEVIS TYPE PIPE HANGERS SHALL BE USED FOR PIPE SIZES 6" AND SMALLER AND WHEN PIPING SYSTEMS ARE STATIONARY.
3. PROVIDE SEISMIC SWAY BRACING FOR ALL PIPE HANGERS PER THE 2012 INTERNATIONAL BUILDING CODE AND THE 2012 INTERNATIONAL MECHANICAL CODE AND THE SMACNA SEISMIC RESTRAINT MANUAL GUIDELINES FOR MECHANICAL SYSTEMS SECOND EDITION–FEBRUARY, 1998 AND ADDENDUM NO. 1 SEPTEMBER, 2000.
4. CONTRACTOR SHALL VERIFY MAXIMUM LOADING ON PIPE SUPPORT ASSEMBLIES.

LOAD SCHEDULE

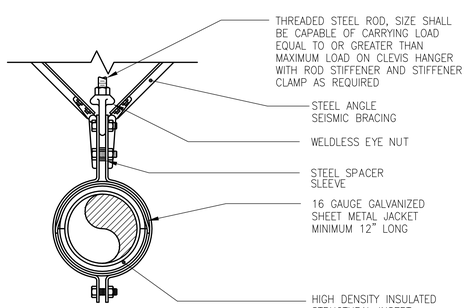
PIPE SIZE	MAXIMUM SPACING	ROD SIZE
1/2"–2"	8'	1/2"ø
2 1/2"	10'	5/8"ø
3"	10'	5/8"ø
4"	14'	5/8"ø
5"	14'	5/8"ø
6"	17'	3/4"ø

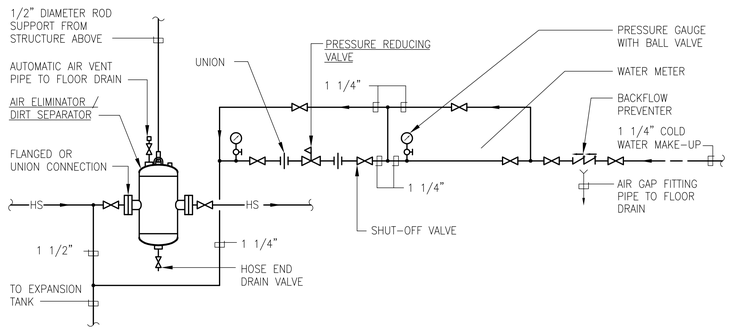




DETAIL – PIPE HANGER

SCALE: NONE (5)



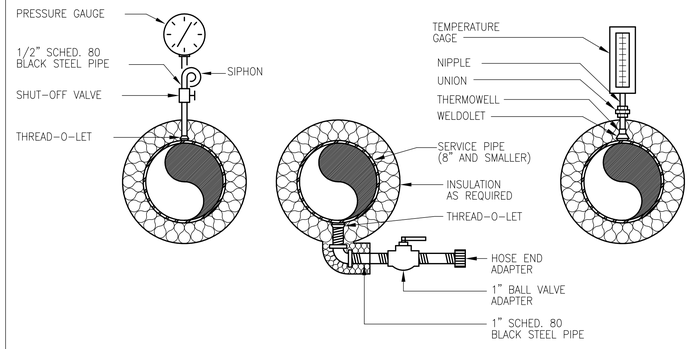


NOTES:

1. REFER TO PLANS FOR SIZE OF CHILLED AND HEATING WATER MAINS

DETAIL – HVAC MAKE-UP SYSTEM

SCALE: NONE (1)



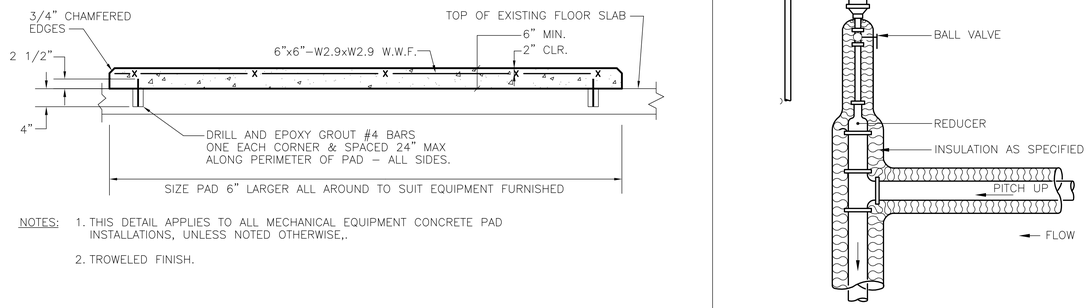
PRESSURE GAUGE | DRAIN (8" AND SMALLER) | TEMPERATURE GAUGE

NOTE:

1. INSTALL DRAINS WHERE SHOWN ON DRAWINGS AND AT ALL LOW POINTS IN PIPING SYSTEMS.

DETAIL – TYPICAL PIPING ACCESSORIES INSTALLATION

SCALE: NONE (2)

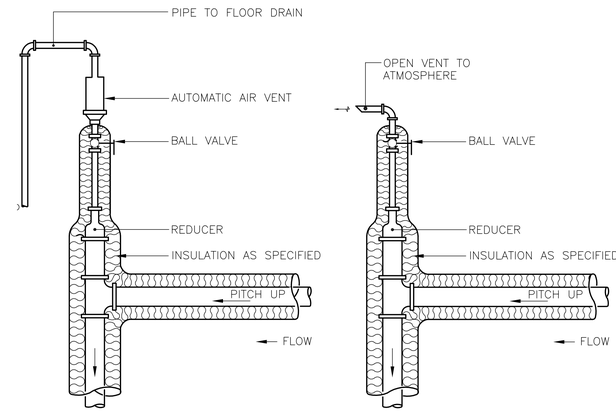


NOTES:

1. THIS DETAIL APPLIES TO ALL MECHANICAL EQUIPMENT CONCRETE PAD INSTALLATIONS, UNLESS NOTED OTHERWISE,.
2. TROWELED FINISH.

DETAIL – CONCRETE PAD

SCALE: NONE (3)



AUTOMATIC AIR VENT | MANUAL AIR VENT

DETAIL – AIR VENT

SCALE: NONE (4)

BOILER SCHEDULE

DESIG	DUTY	RATINGS					FUEL CONSUMPTION		ELECTRICAL (V/ø/Hz)	CONNECTION SIZES				OPERATING WEIGHT (LBS)	MINIMUM EFFICIENCY (%)	BASIS OF DESIGN	REMARKS
		CAPACITY GPM	OUTPUT MBH	EWT	LWT	GAS PRESSURE	GAS TYPE	CFH		AIR INLET (IN)	GAS INLET (IN)	EXH OUTLET (IN)	WATER IN/OUT (IN)				
B–1	HEATING WATER	107	1,067	160	180	14" w.c.	NATURAL	1,067	120/1/60	6	2	6	2–1/2	830	87	AERCO/MODULEX MLX EXT 1123	①②

① MINIMUM EFFICIENCY SHALL BE AT 100% LOAD.
② BOILER MANUFACTURER SHALL PROVIDE BOILER PUMP IF REQUIRED TO MEET MANUFACTURERS INSTALLATION REQUIREMENTS. PUMP SHALL BE SIZED TO MEET PROJECT SPECIFIC INSTALLATION REQUIREMENTS AND SHALL BE 120/1/60 POWER.

AIR/DIRT SEPARATOR SCHEDULE

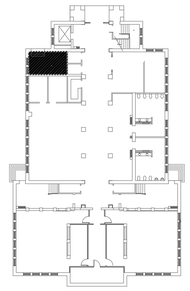
DESIG	DESIGN FLOW (GPM)	CONNECTION SIZE (IN)	CONNECTION TYPE	OVERALL DIMENSIONS (INCH)	FLOODED WEIGHT (LBS)	BASIS OF DESIGN
AS–2	107	4	FLANGED	12"ø x 25H	100	TACO/4900–AD

REVISIONS

REV	DESCRIPTION	DATE	APPROVED
	SUBMISSION PACKAGE	DATE	

SOUTH CAROLINA REGISTERED PROFESSIONAL ENGINEER No. 22154 DAVID S. CRUTCHFIELD

Oct 9 2014 12:45 PM



KEY PLAN
SCALE: NONE

SCALE:	AS NOTED	DATE:	10/09/2014
DRAWN BY:	BEK	RMF JOB #:	314323.B0
DESIGNED BY:	BEK	CLIENT JOB #:	CP00386106
PROJ. MANAGER:	DSC	STATE JOB #:	H40–9509

UNIVERSITY OF SOUTH CAROLINA
UNION CAMPUS
BOILER REPLACEMENT

UNIVERSITY OF SOUTH CAROLINA UNION

MECHANICAL DETAILS AND SCHEDULES

RMF ENGINEERING, INC.
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