UPSTATE SCIENCE LABORATORY RENOVATIONS

STATE PROJECT # H34-I353

BUILDING CODE SUMMARY

Name of Project: UPSTATE SCIENCE LABORATORY RENOVATIONS
Address: 800 UNIVERSITY WAY SPARTANBURG SC 29303
Proposed Use: BUSINESS
Owner or Authorized Agent: USC UPSTATE Phone # 864-503-5500
Owned By: ☐ County ☐ Private ■ State
Code Enforcement Jurisdiction: ☐ City ____ ☐ County ____ ■ OSE

LEAD DESIGN PROFESSIONAL: GOODWYN, MILLS, & CAWOOD

DESIGNER	FIRM	NAME	LICENSE #	PHONE #	E-MAIL
Architectural	Goodwyn, Mills, & Cawood	Michael Keeshen	--	864 233 2804	mikekeeshen@gmcnetwork.com
Civil	--	--	--	--	--
Electrical	Burdette Engineering Inc.	Don Burdette	--	864.297.8717	dburdetteengr.com
Fire Alarm	--	--	--	--	--
Plumbing	Peritus Engineers & Associates	Jody Parker	--	864.277.8287	jparker@peritusengineers.com
Mechanical	--	--	--	--	--
Sprinkler-Standpipe	--	--	--	--	--
Structural	--	--	--	--	--
Other	--	--	--	--	--

YEAR EDITION OF CODE: 2009 International Building Code

BUILDING DATA

Construction Type: ☐ I-A/I ☐ I-B/II ☐ II-A/IVP ■ II-B/IVUP ☐ III-A/VP ☐ III-B/VUP ☐ IV/III ☐ V-A/VIP ☐ V-B/VIUP
Mixed Construction: ☐ No ■ Yes Types: II
Sprinklers: ■ No ☐ Yes ☐ NFPA 13 ☐ NFPA 13R ☐ NFPA 13D
Standpipes: ■ No ☐ Yes
Fire District: ■ No ☐ Yes
Building Height: 41'-2" Feet 2 Number of Stories ☐ Unlimited per -
Mezzanine: ■ No ☐ Yes
High Rise: ■ No ☐ Yes Central Reference Sheet # (if provided) --

Gross Building Area (sq. ft.):

FLOOR	EXISTING	NEW	RENOVATION / UPFIT
Basement	6638 sf	0 sf	1243 sf
First Floor	30000 sf	0 sf	0 sf
Second floor	30316 sf	0 sf	0 sf
TOTAL	66954 sf	0 sf	1243 sf

ALLOWABLE AREA

Primary Occupancy: ☐ Assembly ☐ A-1 ☐ A-2 ☐ A-3 ☐ A-4 ☐ A-5
■ Business ☐ Education ☐ Factory-Industrial ☐ F-1 ☐ F-2
☐ High-Hazard ☐ H-1 ☐ H-2 ☐ H-3 ☐ H-4 ☐ H-5
☐ Institutional ☐ I-1 ☐ I-2 ☐ I-3 ☐ I-4
I-3 Use Condition ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
☐ Mercantile ☐ Residential ☐ R-1 ☐ R-2 ☐ R-3 ☐ R-4
☐ Storage ☐ S-1 ☐ S-2 ☐ High-piled
☐ Utility and Miscellaneous ☐ Parking Garage ☐ Open ☐ Enclosed ☐ Repair

Secondary Occupancy: Assembly

FIRE PROTECTION REQUIREMENTS

Life Safety Plan Sheet #, if provided A1.00

ONLY APPLIES TO THE TYPE IIB UPFIT (NO CHANGES TO THE ORIGINAL ASSEMBLY AREA).

LIFE SAFETY SYSTEM REQUIREMENTS

Emergency Lighting:	☐ No	■ Yes
Exit Signs:	☐ No	■ Yes
Fire Alarm:	☐ No	■ Yes
Smoke Detection Systems:	☐ No	■ Yes
Panic Hardware:	☐ No	■ Yes

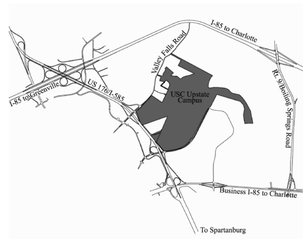
N.C. = Non Combustible
N.R. = Not Required
N/A = Not Applicable

PROJECT CODE STANDARDS

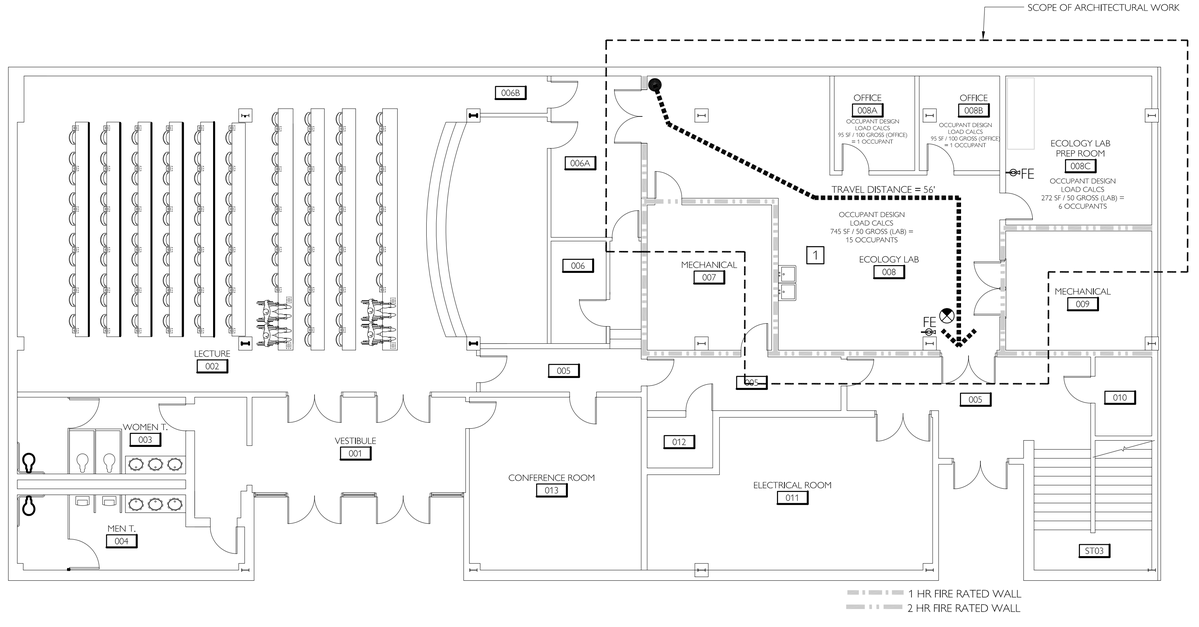
A. INTERNATIONAL BUILDING CODE, 2009 EDITION.
B. INTERNATIONAL EXISTING BUILDING CODE, 2009 EDITION.
C. INTERNATIONAL FIRE CODE, 2009 EDITION.
D. INTERNATIONAL ENERGY CONSERVATION CODE, 2009 EDITION.
E. INTERNATIONAL FUEL GAS CODE, 2009 EDITION.
F. INTERNATIONAL MECHANICAL CODE, 2009 EDITION.
G. INTERNATIONAL PLUMBING CODE, 2009 EDITION WITH THE FOLLOWING INSERTIONS:
1. SECTION 305.6.1, INSERT "24" AND INSERT "24"
2. SECTION 904.1, INSERT "8"
H. INTERNATIONAL PRIVATE SEWAGE DISPOSAL CODE, 2009 EDITION
I. INTERNATIONAL PROPERTY MAINTENANCE CODE, 2009 EDITION
J. INTERNATIONAL RESIDENTIAL CODE FOR ONE AND TWO FAMILY DWELLINGS, 2009 EDITION WITH THE FOLLOWING INSERTIONS:
1. P2603.6.1, INSERT "12" AND INSERT "24"
K. INTERNATIONAL WILDLAND - URBAN INTERFACE CODE, 2009 EDITION.
NOTE: THE IUWIC DOES NOT SUPERCEDE EXISTING STATUTORY REQUIREMENTS.
L. NATIONAL ELECTRICAL CODE, NFPA 70, 2008 EDITION.
M. NATIONAL ELECTRICAL SAFETY CODE, ANSI-C2-2007 EDITION.
N. LATEST EDITION OF THE AMERICAN NATIONAL STANDARDS INSTITUTE, INC. (ANSI) DOCUMANET A117.1, ACCESSIBLE AND USEABLE BUILDINGS AND FACILITIES.
O. STATE FIRE MARSHALL REGULATIONS, LATEST EDITION.
P. SOUTH CAROLINA ELEVATOR CODE AND REGULATIONS LATEST EDITION.
Q. STATE OF SC TELEPHONE EQUIPMENT ROOM AND COMMUNICATIONS/DATA SYSTEMS POLICIES AS FORMULATED BY THE DIVISION OF STATE INFORMATION TECHNOLOGY.
R. INTERNATIONA CODE COUNCIL PERFORANCE CODE, 2009 EDITION, UPON STATE ENGINEERS. WRITTEN APPROVAL.
S. GOVERNORS EXECUTIVE ORDER NO. 82-19 (APRIL 1982) STATE OF SC BUILDING STANDARDS IN FLOODPLAIN AREAS.
T. THE SOUTH CAROLINA MODULAR BUILDINGS CONSTRUCTION ACT S.C. CODE 23-43-10 ET. SEQ.

1 CODE REVIEW
SCALE: N/A

3 CAMPUS MAP
SCALE: N.T.S.



4 VICINITY MAP
SCALE: N.T.S.



2 LIFE SAFETY PLAN
SCALE: 1/8" = 1'-0"

ROOM FINISH SCHEDULE

#	ROOM NAME	FLOOR	BASE	WALLS N	WALLS S	WALLS E	WALLS W	CEILING MATL	CEILING HEIGHT
008	ECOLOGY LAB	ETR	ETR	P-1	P-1	P-1	P-1	NA	OPEN
008A	OFFICE	ETR	ETR	P-1	P-1	P-1	P-1	NA	OPEN
008B	OFFICE	ETR	ETR	P-1	P-1	P-1	P-1	NA	OPEN
008C	ECOLOGY LAB PREP	ETR	ETR	P-1	P-1	P-1	P-1	NA	OPEN

FINISH SCHEDULE NOTES:

1. SKIM COAT ALL DRYWALL WALLS SCHEDULED TO RECEIVE P-1 AS REQUIRED FOR A SMOOTH FINISH PRIOR TO PAINTING.
2. PREPARE, PRIME AND PAINT ALL EXISTING DOORS AND FRAMES IN ROOM 008 WITH SEMI-GLOSS PAINT.

ABBREVIATIONS & MATERIAL/MANUFACTURER SPECIFICS

PAINT - P-1 (WALLS)
PER. # SHERWIN WILLIAMS
COLOR - ANTIQUE WHITE

ETR = EXISTING TO REMAIN
OPEN = CEILING IS EXPOSED TO STRUCTURE ABOVE.

5 ROOM FINISH SCHEDULE
SCALE: N.T.S.

1 ECOLOGY LAB RENOVATIONS

THE PROJECT CONSISTS OF MINOR RENOVATIONS TO AN EXISTING CLASS SPACE. THERE IS NO CHANGE TO THE EXISTING REQUIRED EGRESS COMPONENTS. ALL EXISTING PENETRATIONS AND FIREPROOFING WILL BE UPGRADED DURING THIS PROJECT TO MEET CODE.

7 LIFE SAFETY PLAN NOTES
SCALE: N.T.S.

ARCHITECTURAL
A1.00 COVER SHEET, LIFE SAFETY PLAN & FINISHES
A1.02 PLANS & ELEVATIONS

MECHANICAL
M-1 MECHANICAL PLANS & NOTES
M-2 MECHANICAL NOTES & SCHEDULES
M-3 MECHANICAL SPECS

PLUMBING
P-1 PLUMBING PLAN, NOTES & SCHEDULES

ELECTRICAL
E-0.01 ELECTRICAL NOTES & DETAILS
E-1.01 ELECTRICAL POWER AND LIGHTING PLAN

6 DRAWING INDEX
SCALE: N.T.S.

GOODWYN MILLS CAWOOD
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ISSUE | DATE
1 ISSUE FOR BID 01.04.2013
2
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drawn by:
checked by:

UPSTATE SCIENCE LAB RENOVATIONS
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ISSUE FOR BID

COVER SHEET
LIFE SAFETY PLAN & FINISHES

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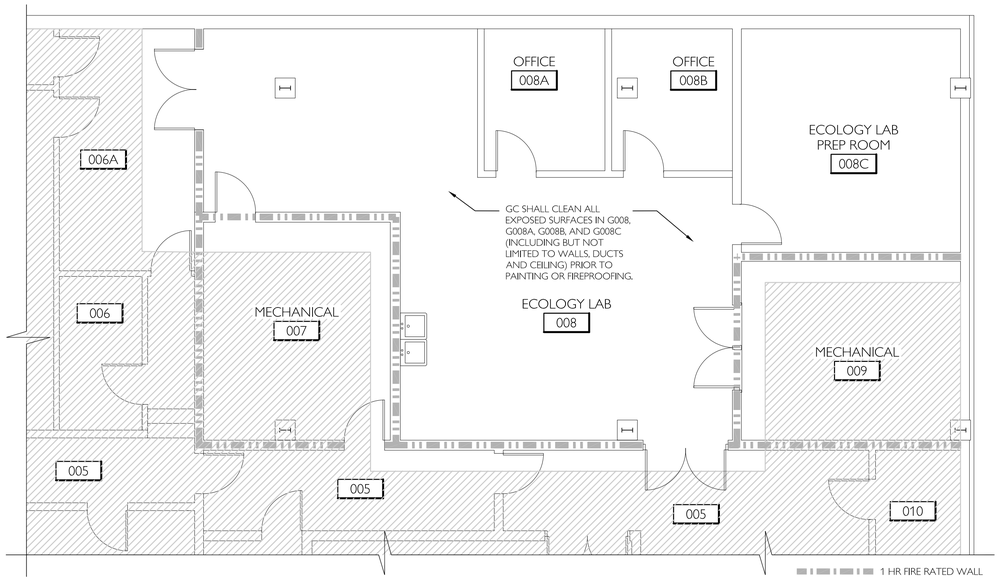
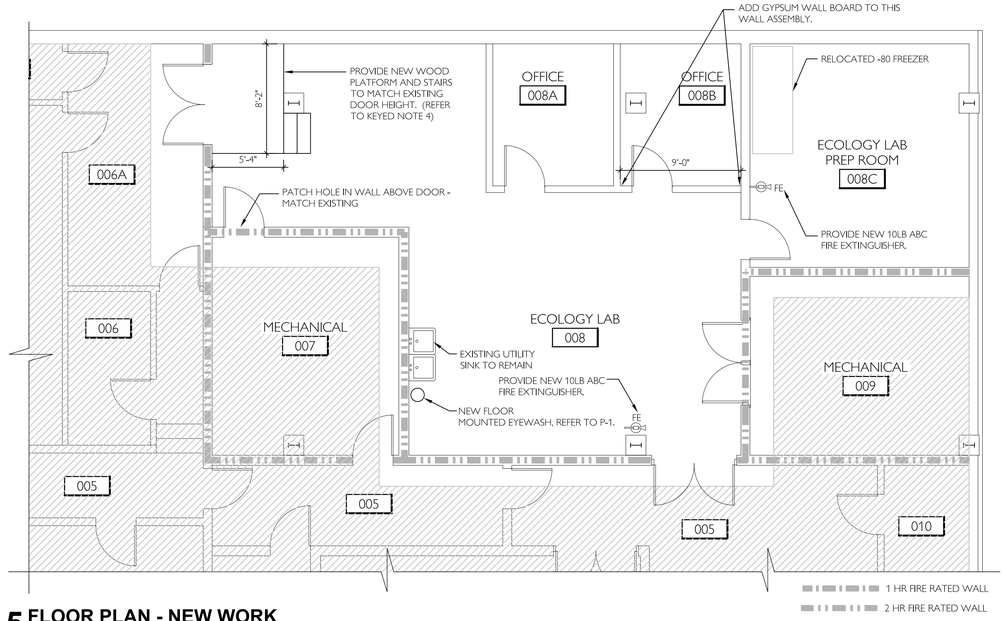
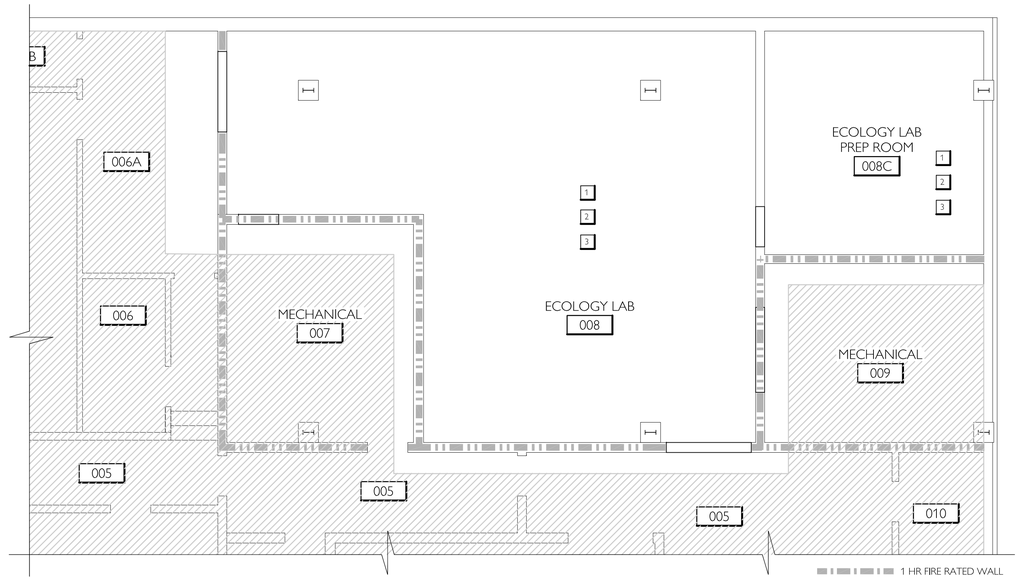


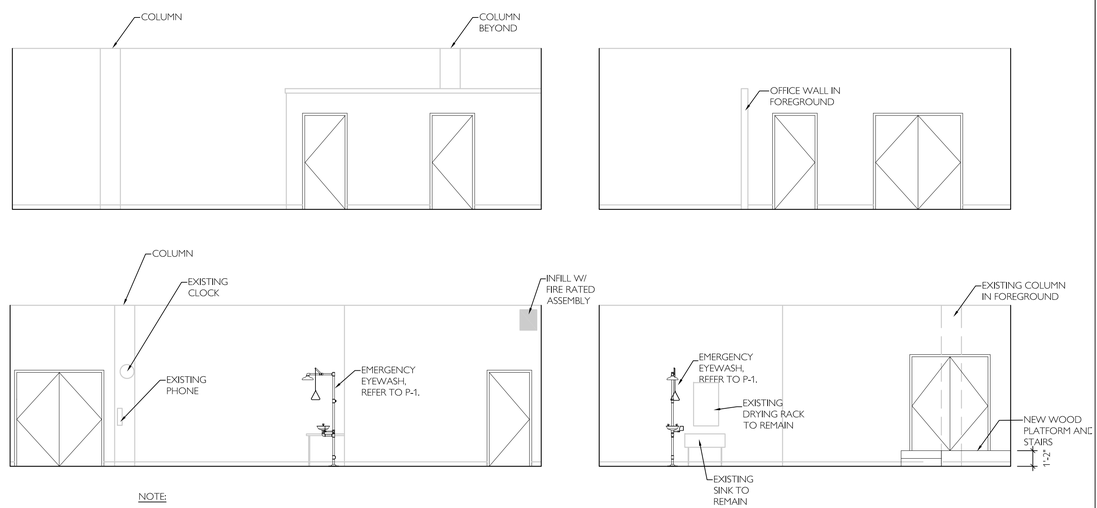
4 DEMOLITION FLOOR PLAN
SCALE: 3/16" = 1'-0"



5 FLOOR PLAN - NEW WORK
SCALE: 3/16" = 1'-0"



3 REFLECTED CEILING PLAN
SCALE: 3/16" = 1'-0".



NOTE:

THESE ELEVATIONS ARE NOT INTENDED TO INCLUDE ALL PENETRATIONS, DUCTWORK, LIGHTING, ETC. REFER TO ALL ENGINEERING DRAWINGS FOR FULL SCOPE, AND VISIT THE SITE BEFORE BIDDING TO VISUALLY INSPECT CONDITIONS. .

6 INTERIOR ELEVATIONS
SCALE: 1/8" = 1'

1 THE OWNER WILL BE REMOVING ALL VCT IN THIS PROJECT PRIOR TO CONSTRUCTION

2 THE GENERAL CONTRACTOR SHALL ASSUME ALL EXPOSED CONDUIT ON WALLS SHALL BE PAINTED P-1

1 GENERAL NOTES
SCALE: N.T.S.

1 GENERAL CONTRACTOR SHALL PATCH & REPAIR ALL FIREPROOFING THROUGH-OUT THIS SPACE ON THE CEILING, STRUCTURAL ELEMENTS, AND MISCELLANEOUS FIRE PROOFED ITEMS THAT MAKE UP THE RATED FLOOR/CEILING CONSTRUCTION. GC WILL BE GIVEN AN OPPORTUNITY TO ACCESS THE SITE PRIOR TO BIDDING TO DETERMINE FULL SCOPE OF FIRE PROOFING REQUIRED. .

2 GENERAL CONTRACTOR SHALL SEAL ALL NEW AND EXISTING PENETRATIONS IN RATED WALLS AS REQUIRED TO MAINTAIN RATED ASSEMBLIES. GC WILL BE GIVEN AN OPPORTUNITY TO ACCESS THE SITE PRIOR TO BIDDING TO DETERMINE NUMBER OF EXISTING PENETRATIONS.

3 COORDINATE DUCTWORK AND LIGHTING SCOPE WITH MEP DOCUMENTS.

2 KEYED NOTES
SCALE: N.T.S.

4 THE WOOD PLATFORM SHALL BE CONSTRUCTED OF 2X4 WOOD STUDS AT 16" O.C. AND 2X6 WOOD JOISTS AT 16" O.C. WITH ¾" TONGUE AND GROOVE PLYWOOD ON ALL SURFACES (STAIR TREAD, STAIR RISER, TOP HORIZONTAL SURFACE AND ALL SIDE SURFACES).

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1 ISSUE FOR BID	01.04.2013
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PLANS & ELEVATIONS

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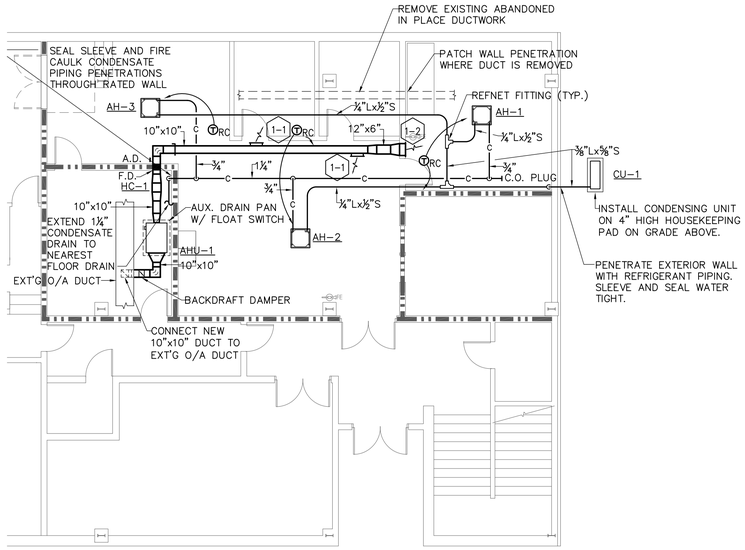
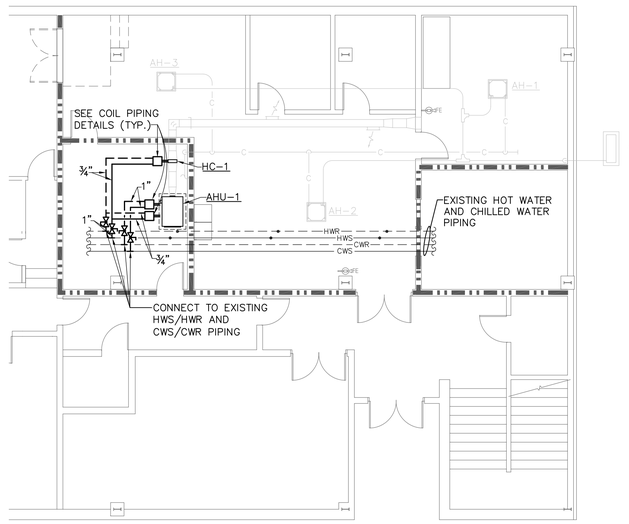


PARTIAL HVAC FLOOR PLAN (INCLUDES REFRIGERANT PIPING FOR VRF SYSTEM)

SCALE: ⅛" = 1'-0"

ALL NEW WORK SHOWN IN **BOLD**.



PARTIAL HVAC PIPING FLOOR PLAN

SCALE: ⅛" = 1'-0"

ALL NEW WORK SHOWN IN **BOLD**.

AIR DEVICE SCHEDULE

SYMBOL	TUTTLE & BAILEY MODEL No.	NECK SIZE	C.F.M.	No. REQ'D	NOTES
1-1	T64	16"x6"	200	2	1
1-2	T64	12"x6"	125	1	1

NOTES:
1. DOUBLE DEFLECTION SUPPLY REGISTER WITH DUCT TAP.

MECHANICAL GENERAL NOTES

1. ALL SCHEDULES SHOWN ARE THE PURPOSE OF AIDING THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CORRECT QUANTITY OF EQUIPMENT.
2. THE CONTRACTOR SHALL REFER TO ARCHITECTURAL DRAWINGS FOR CONSTRUCTION DETAILS. CO-ORDINATE HVAC INSTALLATION WITH ALL OTHER TRADES.
3. REFER TO ELECTRICAL DRAWINGS FOR POWER CONNECTION POINTS.
4. FOR EXACT DIFFUSER/GRILLE LOCATIONS, REFER TO ARCHITECTURAL REFLECTED CEILING PLANS.
5. ALL INSULATION AND FLEX DUCT SHALL COMPLY WITH CHAPTER 6 OF THE INTERNATIONAL MECHANICAL CODE. 2006 EDITION.
6. ALL ELECTRICALLY POWERED EQUIPMENT SHALL BE LISTED AND LABELED PER NATIONAL ELECTRICAL CODE, AND INTERNATIONAL MECHANICAL CODE, 2006 EDITION CHAPTER 3.
7. ALL EQUIPMENT SHALL BE ACCESSIBLE PER INTERNATIONAL MECHANICAL CODE, CHAPTER 3 2006 EDITION.
8. ALL DUCTWORK AND PIPING ARRANGEMENT AND ROUTING AS SHOWN IS DIAGRAMMATIC AND MAY REQUIRE ALTERATIONS DIFFERENT FROM THAT SHOWN IN ORDER TO ACCOMMODATE STRUCTURE/ARCHITECTURAL FEATURES. CONTRACTOR SHALL FIELD VERIFY AND MAKE ALTERATIONS OR REVISIONS AS REQUIRED.
9. ALL DUCT SHALL BE COORDINATED WITH PIPING. INSIDE DUCT DIMENSIONS SHALL BE SAME AS THOSE SHOWN ON DRAWINGS. DIMENSIONS SHOWN ARE INTERIOR DIMENSIONS.
10. THE HORSEPOWERS SHOWN ARE MIN. REQUIRED FOR PRESENT AND/OR FUTURE GROWTH/OPERATION. IN NO CASE WILL ANY MOTOR H.P. REDUCTION FROM THAT SPECIFIED BE ACCEPTED.
11. FIRE DAMPERS SHALL BE PROVIDED AND INSTALLED WHERE REQUIRED BY THE INTERNATIONAL MECHANICAL CODE, CHAPTER 6, 2006 EDITION.

VARIABLE REFRIGERANT FLOW (VRF) HEAT PUMP SYSTEMS

INDOOR UNIT DATA													OUTDOOR UNIT DATA													
UNIT TAG	NOM. TONS	DAIKIN MODEL No.	C.F.M. TOTAL	MAX. E.S.P. INCHES	VOLTAGE	COOLING DATA TOTAL MBH	COOLING DATA ENT. AIR DB °F	COOLING DATA ENT. AIR WB °F	HEATING DATA TOTAL MBH	HEATING DATA ENT. AIR DB °F	M.C.A.	M.F.S.	WEIGHT (LBS.)	UNIT TAG	DAIKIN MODEL No.	No. COMP.	No. FANS	VOLTAGE	NOMINAL RATED CAPACITIES COOLING OUTPUT (MBH)	NOMINAL RATED CAPACITIES COOLING INPUT (KW)	NOMINAL RATED CAPACITIES HEATING OUTPUT (MBH)	NOMINAL RATED CAPACITIES HEATING INPUT (KW)	ELECTRICAL MCA	ELECTRICAL MOP	COOLING SEER	HEATING HSPF	AHRI REFERENCE NUMBER	WEIGHT (LBS.)	REMARKS
AH-1	1	FXFQ12PVJU	460	–	208/1/60	12.0	80	67	13.5	70	0.3	15	43														
AH-2	1	FXFQ12PVJU	460	–	208/1/60	12.0	80	67	13.5	70	0.3	15	43	CU-1	RXYMQ48PVJU	1	2	208/1/60	47.5	4.69	52.5	4.45	27	30	15.1	9.1	3696841	283	1-7
AH-3	1	FXFQ12PVJU	460	–	208/1/60	12.0	80	67	13.5	70	0.3	15	43														

NOTES:
1. COOLING CONDITIONS SCHEDULED AT 80° F DB/67° F WB INDOOR CONDITIONS, 95° F AMBIENT OUTDOOR CONDITION.
2. HEATING CONDITIONS SCHEDULED AT 70° F DB INDOOR CONDITIONS, 47° F DB/43° F WB AMBIENT OUTDOOR CONDITION.
3. FXFQ: CEILING-RECESSED CASSETTE WITH ADJUSTABLE 4-WAY AIRFLOW AND WITH INTEGRAL CONDENSATE PUMP.
4. VRVIII-S OUTDOOR UNIT, AIR-COOLED, R-410α REFRIGERANT, HEAT PUMP OPERATION, INVERTER-DRIVEN COMPRESSOR.
5. DISCONNECTS BY DIV. 16.
6. R410 REFRIGERANT.
7. NAVIGATION REMOTE CONTROLLER PER INDOOR UNIT.

BLOWER COIL AIR HANDLING UNIT SCHEDULE (100% OUTSIDE AIR SYSTEM)

UNIT NO.	TRANE MODEL NO.	SUPPLY FAN DATA CFM TOTAL	T.S.P. INCHES	E.S.P. INCHES	APPROX. R.P.M.	H.P.	VOLTAGE	COOLING COIL DATA TOTAL M.B.H.	ENT. DB F	ENT. WB F	LVG. DB F	LVG. WB F	MAX. F.V.	G.P.M.	ΔP FT.	MIN. ROWS	HOT WATER HEATING COIL DATA (PREHEAT) TOTAL M.B.H.	ENT. DB F	LVG. DB F	GPM	ΔP FT.	ROWS	REMARKS
AHU-1	BCHC 018	525	1.6	0.4	1447	1/2	460/3/60	35.3	94	74	57.5	55.9	518	6	15	6	27.6	19.0	63.2	2.0	2.0	1	1-4

NOTES:
1. CONTRACTOR SHALL FABRICATE & INSTALL FULL SIZE AUXILIARY DRAIN PAN WITH FLOAT SWITCH FOR AHU-1. INTERLOCK WITH AHU-1 FOR IMMEDIATE SHUTDOWN.
2. AHU-1 SHALL FEATURE JOHNSON CONTROLS (JLI) DDC CONTROLS AND SHALL EXTEND AND CONNECT TO EXISTING "METASYS" SYSTEM.
3. AHU-1 CONTROLS SHALL BE PROGRAMMED TO PROVIDE "SPACE NEUTRAL" VENTILATION AIR (70-75°F DB, >55% RH).
4. PROVIDE DUCT MOUNTED TEMPERATURE SENSORS LOCATED UPSTREAM AND DOWNSTREAM OF HC-1 HEATING COIL.

OUTSIDE AIR SCHEDULE (PER ASHRAE 62.1-2007) – SINGLE ZONE SYSTEMS

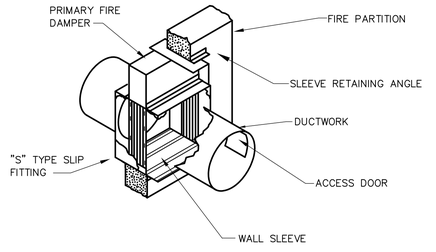
SYSTEM NO.	DESCRIPTION	SIZE/ PEOPLE	METHOD	CALCULATIONS	CFM REQ'D	CFM PROVIDED
AHU-1	SMALL CLASSROOM 008C	272 S.F., 8 PEOPLE	10 CFM PER PERSON 0.12 CFM PER S.F. Z.A.D.E. = 1.0	$\frac{(10 \times 8) + (0.12 \times 272) = 113 \text{ CFM}}{1.0}$	113	125
AHU-1	OFFICE 008A & OFFICE 008B	190 S.F., 2 PEOPLE	5 CFM PER PERSON 0.06 CFM PER S.F. Z.A.D.E. = 1.0	$\frac{(5 \times 2) + (0.06 \times 190) = 21 \text{ CFM}}{1.0}$	21	100
AHU-1	ECOLOGY LAB 008	749 S.F., 12 PEOPLE	10 CFM PER PERSON 0.18 CFM PER S.F. Z.A.D.E. = 1.0	$\frac{(10 \times 12) + (0.18 \times 749) = 255 \text{ CFM}}{1.0}$	255	300

NOTES:
1. Z.A.D.E.- ZONE AIR DISTRIBUTION EFFECTIVENESS, E_z

AHU-1 (100% O/A) = 525 CFM

MECHANICAL LEGEND

SYMBOL	DESCRIPTION
	CHILLED WATER SUPPLY PIPING – CWS
	CHILLED WATER RETURN PIPING – CWR
	HEATING WATER SUPPLY PIPING – HWS
	HEATING WATER RETURN PIPING – HWR
	BALL VALVE
	CIRCUIT BALANCER
	2-WAY CONTROL VALVE
	REDUCER
	UNION
RC	VFR INDOOR UNIT REMOTE CONTROL
A.D.	ACCESS DOOR
F.D.	FIRE DAMPER
	SUPPLY DIFFUSER
	RETURN AIR GRILLE
N.C.	NORMALLY CLOSED
N.O.	NORMALLY OPEN
	BACKDRAFT DAMPER
	SUPPLY DUCT W/DAMPER
	DUCT REDUCER
	FIRE DAMPER (F.D.)
	FLEXIBLE DUCT
	TEMPERATURE GAUGE



FIRE DAMPER ROUND DUCT DETAIL

NO SCALE

NO.	DATE	BY	DESCRIPTION
0	1/04/13	JCP	ISSUED FOR BID

REVISIONS

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GREENVILLE, SOUTH CAROLINA
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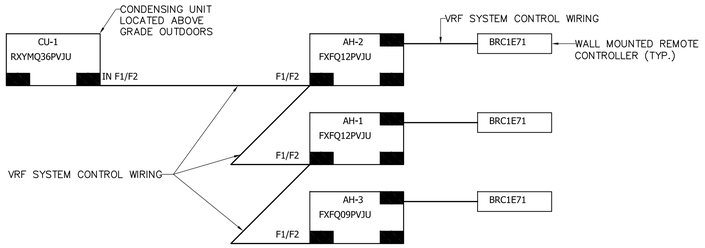
E-MAIL: peritus@peritusengineers.com

USC UPSTATE SCIENCE LAB RENOVATION
SC STATE PROJECT #CP00351401
SPARTANBURG, SOUTH CAROLINA

DESIGN JCP / DRAWN LDF
CHECKED JCP
DATE 1/04/2013
JOB NO. PERITUS #120608
SHEET M-1
1 OF 3 SHEETS

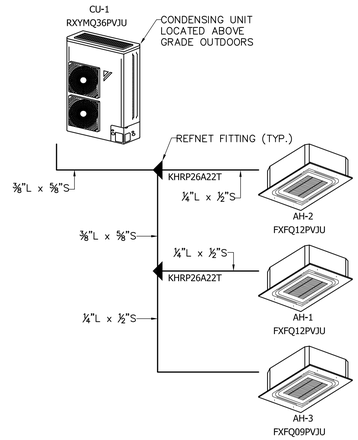


VARIABLE REFRIGERANT FLOW CONTROL WIRING SCHEMATIC

NO SCALE

NOTES:

1. CONTROL POWER SUPPLY SHALL BE PROVIDED BY VRF MANUFACTURER.
2. CONTROL WIRING SHALL BE PER VRF MANUFACTURER'S SPECIFICATIONS.
3. MECHANICAL CONTRACTOR SHALL INCLUDE VRF CONTROL WIRING INSTALLATION AS PART OF CONTROLS SUBCONTRACT.
4. REFER TO ELECTRICAL DRAWINGS FOR EQUIPMENT POWER WIRING REQUIREMENTS.



VARIABLE REFRIGERANT FLOW CONTROL PIPING SCHEMATIC

NO SCALE

NOTES:

1. SCHEMATIC ABBREVIATIONS:

   L: REFRIGERANT LIQUID PIPING
   S: REFRIGERANT SUCTION PIPING
   HG: REFRIGERANT HOT GAS PIPING

2. MODEL NUMBERS SHOWN BASED ON "DAIKIN" VRF MANUFACTURER.
3. REFRIGERANT PIPE SIZES SHOWN FOR SCHEMATIC PURPOSES ONLY. MFG AND CONTRACTOR TO VERIFY FINAL SIZES, PRIOR TO INSTALLATION, BASED UPON ACTUAL COMPONENT LOCATIONS AND ROUTING.

HOT WATER HEATING COIL SCHEDULE (DUCT MOUNTED)

UNIT NO.	TRANE MODEL #	ENT. DB F	LVG. DB F	C.F.M.	FACE VELOCITY	APD INCHES	G.P.M.	WPD FT.	TOTAL M.B.H.	MIN. ROWS	COIL SIZE
HC-1	5W	55	75	525	525	0.08	2.0	0.4	11.4	1	12"x12"

NOTES:

1. PERFORMANCE BASED ON 160° F. EWT.

AUTOMATIC FLOW LIMITING CIRCUIT BALANCER SCHEDULE

SYMBOL	GRISWOLD MODEL #	G.P.M.	NO. REQ'D.	REMARKS
CB-1	IR12	2	1	AHU-1 HEATING
CB-2	IR12	6	1	AHU-1 COOLING
CB-3	IR12	2	1	HC-1

CONTROL VALVE SCHEDULE

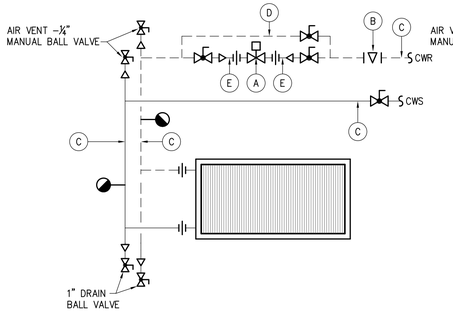
SYMBOL	SERVICE	SIZE	CV	G.P.M.	DP PSI	TYPE	NO. REQ'D.	CLOSE-OFF PRESURE (psig)
CV-1	AHU-1 HEATING	½"	1.2	2	2.8	2-WAY	1	200
CV-2	AHU-1 COOLING	½"	3	6	4	2-WAY	1	200
CV-3	HC-1	½"	1.2	2	2.8	2-WAY	1	200

NOTE:

CONTROL VALVE CV'S BASED UPON "BELIMO" CHARACTERIZED BALL CONTROL VALVE, OR EQUAL BY JOHNSON CONTROLS.

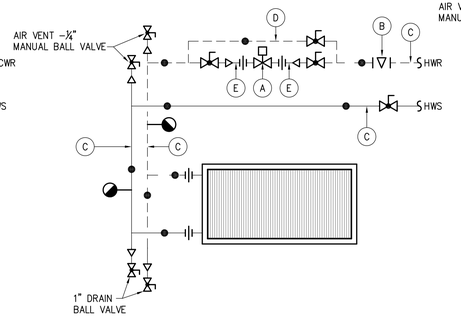
COIL PIPING SCHEDULE

UNIT No.	COIL TYPE	A	B	C	D	E
AHU-1	HEATING	CV-1	CB-1	¾"	½"	½"
AHU-1	COOLING	CV-2	CB-2	1"	¾"	½"
HC-1	HEATING	CV-3	CB-3	¾"	½"	½"



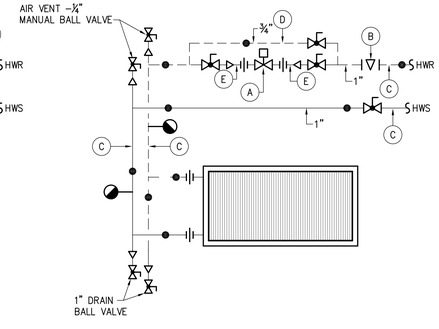
AHU-1 SINGLE BANK COOLING COIL SCHEMATIC

NO SCALE



AHU-1 SINGLE BANK HEATING COIL SCHEMATIC

NO SCALE



HC-1 SINGLE BANK HEATING COIL SCHEMATIC

NO SCALE

REVISIONS

NO.	DATE	BY	DESCRIPTION
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USC UPSTATE SCIENCE LAB RENOVATION
SC STATE PROJECT #CP00351401
SPARTANBURG, SOUTH CAROLINA

DESIGN JCP / DRAWN LDF
CHECKED JCP
DATE 1/04/2013
JOB NO. PERITUS #120608
SHEET M-2
2 OF 3 SHEETS

Refrigerant Piping Notes

1. All joints shall be brazed copper, except at the indoor units which shall be flared.

2. All piping shall be installed in accordance with the mechanical design. Any deviation shall be submitted for prior approval to the mechanical engineer prior to installation. Selected copper refrigerant tube must be of suitable wall thickness for higher operation pressures.

3. All refrigerant piping shall be copper "ACR" type 1" rated for r-410a or as specified. Piping (after annealing) shall have sufficient wall thickness for a continuous operating pressure of 600 psi. per ASME B31.5-2010.

4. Nitrogen must be used during all brazing of fittings as required by outdoors. A pressure of 2-3 psi shall be used to prevent copper plate or oxidation formation.

5. Pressure testing: tighten down stop valves before any pressure testing to prevent nitrogen from leaking back through condenser and contaminating refrigerant. Pressure testing shall be done in three (3) steps:
   step 1- leak check 3 minutes at 150 psi.
   step 2- leak check after 5 minutes at 325 psi.
   step 3- leak check after 24 hours at 550 psi.
   (450 psi for systems with vertical air handlers)

   Always check flare nuts for leaks using bubble solution, be sure to use a recommended product. do not use a waterdown fairy liquid solution.

6. Leak testing and evacuation is recommended in accordance with the us EPA "green chill best practices guideline ensuring leak-tight installation of commercial refrigerant equipment."

7. Evacuation procedures shall be performed as follows:
   a. evacuate the system to 4000 microns. break the vacuum with nitrogen to a pressure of 2-3 psi and hold for 15 minutes.
   b. evacuate system to 1500 microns and maintain for 20 minutes. break the vacuum with nitrogen to a pressure of 2-3 psi and hold for 15 minutes.
   c. evacuate system to below 500 microns and hold for 60 minutes.
   d. evacuate system to below 300 microns and hold for 24 hours.

   Vacuum pump check valve should be used to prevent mineral oil from being drawn into the system.

8. Refrigerant charging: weigh in additional refrigerant with digital scales. Calculate charge based on total line length plus lb/ft of diameter. Check with each unit model for correct multiplier. After the amount of refrigerant to be added is determined, write it down on the label, on the back side of the front cover. After the vacuum/drying is complete, charge the additional refrigerant in its liquid state through the liquid stop valve service port.

   Make sure to use installation tools you exclusively use on r410a installations to withstand the pressure and to prevent foreign material from mixing into the system.

9. All refrigerant piping exterior to the building shall have aluminum jacket covering the insulation in accordance with the following specifications:
   a. Equivalent to "Pabco-Childers Metals" aluminum roll jacketing, .016" thick, complying with 3105/3003 standard alloys, stucco embossed finish with polysurlyn moisture retarder. Provide 1/2" aluminum band clamp every 10" to 12".

10. Insulation techniques: all pipe work, fittings and accessories must be insulated using code compliant (25/50 rated), armacell, 3/4" thick minimum, uv resistant closed cell insulation (1/2" thick on ¼" liquid lines). insulation of pipes should be done after performing work required by note 8 (air tight test and vacuum drying). insulate the liquid piping, the hp/lp gas piping, the gas piping. the equalizer pipe (between the outside units for the outside multi system) and these pipe connections. insulation shall withstand temperatures of 220 degrees f or more for the hp/lp gas piping, the equalizer pipe and gas piping. cover flare nuts on the fan coils using the insulation provided or condensation will occur causing leaks.

MECHANICAL SPECIFICATIONS

SECTION 15000 – MECHANICAL GENERAL PROVISIONS

COORDINATION OF MECHANICAL WORK:

GENERAL: It is recognized that the contract documents are diagrammatic in showing certain physical relationships which must be established within the mechanical work, and in its interface with other work including utilities and electrical work, and that such establishment is the exclusive responsibility of the Contractor.

QUALITY ASSURANCE, STANDARDS AND SYMBOLS:

General: The following standards are imposed, as applicable to the work in each instance:

International Building Code (IBC), 2009 Edition
NFPA Code
International Energy Conservation Code (IECC), 2006 Edition
International Mechanical Code (IMC) 2009 Edition
National Electrical Code, NFPA 70

ELECTRICAL PROVISIONS OF MECHANICAL WORK:

WIRING: The contractor is responsible for all wiring.

All power and control wiring to be complete to all equipment, and control devices. The Contractor shall determine the source of electrical energy for the various power and control circuits. All wiring shall be in conduit, shall conform with all local codes, the National Electrical Code, and shall be installed by an approved licensed Electrical Contractor.

SYSTEMS INSULATION

DESCRIPTION:

DUCTWORK:

Extent of insulation work is indicated as described herein. In general, the work to include insulating all new duct insulation for air handling units including any existing duct that insulation may be damaged during construction. In addition, work includes pipe insulation for hydronic, refrigerant, and condensate piping.
Ductwork shall be insulated with rigid 2" thick type Owens Corning FRK-25 series ED150 duct wrap.
Seal insulation with fire retardant mastic.

Hydronic piping insulation shall be 2" thick for pipe size 2" and greater and shall be 1.5" thick for pipe size less than 2".
Insulation shall be molded fiberglass with "paper free" jacketing.

Refer to refrigerant piping requirements for insulation on refrigerant piping. Insulation for condensate drain piping shall match that for refrigerant piping.

SECTION 15800 – DUCTWORK

All Sheet Metal Work shall be installed in accordance with the requirements stipulated in the current issue of NFPA Pamphlet No. 90.

Sheet Metal Construction: Ductwork shall be constructed of galvanized steel. Gauges (U.S. Standards) of metal which shall be used, together with the type of joints and methods of stiffening and bracing for various size ducts shall be as follows:

Fabrication shall be in accordance with the latest edition of SMACNA HVAC Duct Construction Standards for the class and static pressures required.

All ducts shall have all seams and joints sealed airtight with United Sheet Metal Sealer to be applied as per Mfg. Bulletin DS-3. No duct tape will be allowed.

Duct Hangers and Supports: Shall be either strap hangers or trapeze hangers properly secured to the building construction. Strap hangers, metal attached to ducts, shall be fastened to supporting member by clamps, anchor bolts, or metal screws whichever is most applicable.

AIR DISTRIBUTION:

Diffusers, Registers and Grilles: Shall be sized and located as shown on the drawings. In general, all supply diffusers and grilles to have opposed blade dampers.

CONTROLS

Furnish and install a direct digital system of automatic temperature control. The system shall be complete, consisting of all necessary thermostats, temperture sensor, automatic valves, relays, and switches, interlocking devices, as required. Controls shall be an extension of USC Upstate's existing Johnson Control's infrastructure.

Control wiring for VFR system shall be included in Johnson Controls scope of work in addition to controls provided for AHU-1/HC-1 system.

REVISIONS

NO.	DATE	BY	DESCRIPTION
0	1/04/13	JCP	ISSUED FOR BID

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USC UPSTATE SCIENCE LAB RENOVATION
SC STATE PROJECT #CP00351401
SPARTANBURG, SOUTH CAROLINA

DESIGN JCP / DRAWN LDF
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JOB NO PERITUS #120608
SHEET M-3
3 OF 3 SHEETS

SYMBOL	DESCRIPTION
A-1,3	HOME RUN TO LIGHTING/SERVICE PANEL. HASH MARKS, WHEN SHOWN, INDICATE NUMBERS OF CONDUCTORS. " / " INDICATES HOT WIRE, "N" INDICATES NEUTRAL CONDUCTOR," G " INDICATES GROUND CONDUCTOR. HOME RUN NOTE INDICATES PANEL NAME AND CIRCUIT NAME OR FEEDER TAG. CONDUCTORS SHALL BE #12 AWG IN 3/4" CONDUIT UNLESS NOTED OTHERWISE. ANY HOME RUN OR CONDUIT WITHOUT HASH MARKS IS TO CONTAIN 3 CONDUCTORS; 1 HOT, 1 NEUTRAL, AND 1 EQUIPMENT GROUND, EACH HOT CIRCUIT SHALL BE PAIRED WITH A SEPARATE NEUTRAL CONDUCTOR. SHARING OF NEUTRAL CONDUCTORS BETWEEN CIRCUITS IS NOT ALLOWED.
	EXPOSED CONDUIT
	CONDUIT RUN IN SLAB OR UNDERGROUND.
	CONDUIT RUN CONCEALED ABOVE CEILING OR IN WALLS, UNLESS NOTED OTHERWISE.
	EXISTING LIGHTING OR SERVICE PANEL, SURFACE MOUNTED.(208V)
30/20/3P/3R	SAFETY DISCONNECT SWITCH. "30" INDICATES AMP RATING, "20" INDICATES FUSE SIZES, "3P" INDICATES NUMBER OF POLES, ENCLOSURE TO BE NEMA 1 UNLESS NOTED OTHERWISE (3R, 4X, ETC.) SQUARE D H300 SERIES HEAVY DUTY SAFETY SWITCH
WIRING DEVICES	
	NOTE: ALL WIRING DEVICES TO BE IVORY, WITH #302 STAINLESS STEEL COVERPLATE (FLUSH MOUNTED) UNLESS NOTED OTHERWISE ON THE DRAWING OR SPECIFICATIONS.
	SWITCH SYMBOLS
SM	MANUAL MOTOR STARTER
S	SINGLE POLE LIGHTING SWITCH 120-277 VOLT, 20 AMP, SPEC GRADE. LETTER ("a") DESIGNATES WHICH FIXTURES ARE CONTROLLED FROM WHICH SWITCHES WHEN MULTIPLE SWITCHES ARE USED ON ONE CIRCUIT
S_3	SAME AS "S" ABOVE EXCEPT "3" IN SUBSCRIPT DENOTES 3-WAY SWITCH.
	STRAIGHT BLADE DEVICE SYMBOLS
	20A, 125V, 2P, 3W, NEMA 5-20R, DUPLEX RECEPTACLE. HUBBELL 5362-I OR EQUAL. STANDARD POWER. "WP" DENOTES WATERPROOF COVER PLATE. "GFI" DENOTES GFCI TYPE.
	PLUGMOLD, WIREMOLD # WITH OUTLETS AT 12" ON CENTER
	SURFACE MOUNTED DEVICE IN WIREMOLD BOX. PAINT TO MATCH WALL SURFACE
FIRE ALARM, COMMUNICATIONS AND CONTROLS	
	COMBINATION DATA/TELEPHONE OUTLET WITH 1" CONDUIT TO ACCESSIBLE CEILING, WITH PULL WIRE. JACKS, CABLE AND BOX COVER BY SYSTEM INSTALLER. "W" INDICATES WALL PHONE OUTLET, 54" A.F.F.
FACP	FIRE ALARM CONTROL PANEL, EXISTING EDWARDS EST.
	NEW FIRE ALARM SYSTEM STROBE UNIT ONLY, TIE TO EXISTING EDWARDS EST SYSTEM, SEE GENERAL NOTE 15.
	NEW FIRE ALARM SYSTEM HORN/STROBE UNIT, TIE TO EXISTING EDWARDS EST SYSTEM, SEE GENERAL NOTE 15.
LIGHTING SYMBOLS:	
	96" FLUORESCENT INDUSTRIAL STRIP
	4' FLUORESCENT STRIP FIXTURE
	EXIT FIXTURE AND LIGHTING UNIT WITH INTEGRAL BATTERY – ARROW INDICATES ILLUMINATED DIRECTIONAL ARROWS, SHADED SECTION INDICATES FACE WHICH IS ILLUMINATED. STEM INDICATES WALL MOUNTED. ALL EXIT LIGHTS SHALL BE MOUNTED TO THE STRUCTURE.
	EMERGENCY LIGHTING UNIT. ALL EMERGENCY LIGHTS SHALL BE MOUNTED TO THE STRUCTURE.

GENERAL LIGHTING NOTES:

1. MANUFACTURERS & NUMBERS ARE LISTED TO ESTABLISH QUALITY ONLY AND NOT TO LIMIT COMPETITION. PRIOR TO BIDDING, SUBSTITUTIONS ARE ALLOWED SUBJECT TO SUBMITTAL DATA, PHOTOMETRICS & ENGINEERS APPROVAL AS REQUIRED BY SPECIFICATIONS.
2. ALL FLUORESCENT FIXTURES SHALL HAVE PREMIUM ELECTRONIC BALLASTS WITH 90% MIN. BALLAST FACTOR AND MAX. THD OF 15%. ALL FIXTURES TO HAVE T-8 LAMPS 4100K TEMP. ALL FIXTURES TO BE PAINTED AFTER FABRICATION. BALLASTS SHALL BE MANUFACTURED BY SYLVANIA, ADVANCE OR MAGNETEK. LAMPS SHALL BE MANUFACTURED BY G.E. OR SYLVANIA.
3. ALL FIXTURES TO BE U.L. LABELED. ALL EXTERIOR FIXTURES SHALL HAVE U.L. WET LABEL OR DAMP LABEL AS REQUIRED BY LOCATION. CONTRACTOR SHALL VERIFY BEFORE SUBMITTING FIXTURE.
4. PROVIDE ALL MOUNTING ACCESSORIES, BAR HANGARS & HARDWARE REQUIRED.

LIGHTING FIXTURE SCHEDULE

FIXTURE TYPE	FIXTURE DESCRIPTION	ACCEPTABLE MANUFACTURERS	MOUNTING HEIGHT	LAMPS	FIXTURE WATTAGE	VOLTAGE
EM	WALL MOUNTED SPECIFICATION GRADE TWIN-HEAD EMERGENCY LIGHT WITH BATTERY BACKUP.	DUAL LITE # EZ – 2 SURELITES # CU – 1 LITHONIA # 6ELM2	8'-0"AFF	BY MANUFACTURER	15	UNIVERSAL VOLTAGE OR MULTI-TAP
EXM	UNIVERSAL MOUNTED EXIT SIGN COMBO WITH RED LED ON WHITE HOUSING, BATTERY BACKUP, DIFFUSER LENS, WITH EMERGENCY HEADS.	SURE-LITES # LPXH-70-0-R-WH-DH-WG17 LITHONIA # LHQM-S-W-3-R-VOLT-HO	6" ABOVE DOOR	BY MANUFACTURER	10	UNIVERSAL VOLTAGE OR MULTI-TAP
IA	4', 2 LAMP STANDARD CHANNEL STRIP LIGHT, 22 GA. STEEL, PAF, WITH WIRE GUARD, ELECTRONIC BALLAST BY ADVANCE OR MAGNETEK.	WILLIAMS # 76-4-232-WG11-EB2-UNV METALUX # SS-232-EB81-WG/SS-4FT-PAF LITHONIA # C232-GEB-WG9-PAF	10'-0"AFF	2-F032T8/41K	60	UNIVERSAL VOLTAGE OR MULTI-TAP
ID	8', 6 LAMP INDUSTRIAL FLUORESCENT STRIP FIXTURE, WHITE PORCELIN REFLECTOR WITH WIRE GUARD	WILLIAMS # 82-8632-EB3-UNV-WG OR APPROVED EQUAL	10'-0"AFF	6-F032T8/41K	168	UNIVERSAL VOLTAGE OR MULTI-TAP
SB	4', 3 LAMP, SURFACE MOUNTED WRAPAROUND WITH .110 LENS, PAF, ELECTRONIC BALLAST BY ADVANCE OR MAGNETEK.	LITHONIA # LB332-GEB-PAF METALUX # WS-332A-PAF	CEILING	3-F032T8/41K	86	UNIVERSAL VOLTAGE OR MULTI-TAP

PANEL BHB — CABINET SURFACE MOUNTED — TYPE SQ. D NF
VOLTAGE 480/277V, 3ø, 4W — FEEDER BOTTOM — MAINS 100A MCB

DEVICE AMPS TRIP	DEVICE POLES	DEVICE NOTES	BRANCH CIRCUIT DESIGNATION	NO.	PHASE LOAD (VOLT-AMPS) øA	øB	øC	NO.	BRANCH CIRCUIT DESIGNATION	DEVICE NOTES	DEVICE POLES	DEVICE AMPS TRIP
30	3		DIMMER (AUDITORIUM)	1	1840	600		2	EX. FAN NO. 2		2	15
				3		1840	600	4				
				5			1840	6	SPARE		1	20
20	3	1,3	AHU-1	7	160	4260		8	PANEL "BLA2"		3	45
				9		160	7128	10				
				11			160	7228	12			
20	1		SPARE	13				14	SPARE		1	20
20	1		SPARE	15				16	SPARE		1	20
20	1		SPARE	17				18	SPARE		1	20
·	·		SPACE	19				20	SPACE		·	·
·	·		SPACE	21				22	SPACE		·	·
·	·		SPACE	23				24	SPACE		·	·
·	·		SPACE	25				26	SPACE		·	·
·	·		SPACE	27				28	SPACE		·	·
·	·		SPACE	29				30	SPACE		·	·
·	·		SPACE	31				32	SPACE		·	·
·	·		SPACE	33				34	SPACE		·	·
·	·		SPACE	35				36	SPACE		·	·
·	·		SPACE	37				38	SPACE		·	·
·	·		SPACE	39				40	SPACE		·	·
·	·		SPACE	41				42	SPACE		·	·
INTEGRATED EQUIPMENT RATING: 4000K AIC			KVA TOTAL		6.9	9.7	9.2	PANELBOARD KVA LOAD TOTAL: 25.8				

PANEL BLA2 (SEE NOTE 1) — CABINET SURFACE MOUNTED — TYPE NQOD
VOLTAGE 120/208V, 3ø, 4W — FEEDER TOP — MAINS 100A MLO

DEVICE AMPS TRIP	DEVICE POLES	DEVICE NOTES	BRANCH CIRCUIT DESIGNATION	NO.	PHASE LOAD (VOLT-AMPS) øA	øB	øC	NO.	BRANCH CIRCUIT DESIGNATION	DEVICE NOTES	DEVICE POLES	DEVICE AMPS TRIP
20	1		R.-AUDITORIUM	1	720	720		2	R.-AUDITORIUM		1	20
20	1		R.-AUDITORIUM	3		720	720	4	R.-AUDITORIUM		1	20
20	1		R.-AUDITORIUM	5			720	720	6 R.-AUDITORIUM		1	20
20	1		R.-AUDITORIUM	7	720	720		8	R.-AUDITORIUM		1	20
20	1		R.-AUDITORIUM	9		720	720	10	R.-AUDITORIUM		1	20
20	1		R.-AUDITORIUM	11			720	720	12 R.-AUDITORIUM		1	20
20	1		SPARE	13		200		14	CONTROLS AHU-1	1	1	20
20	1		SPARE	15			360	16	R.-008C	1	1	20
15	2	2	AH-1,2,3	17				100	360	18 R.-008C CLASSROOM	1	1	20
				19	100	1080		20	R.-PLUGMOLD LAB	1	1	20
30	2	2	CU-1	21		2808	1080	22	R.-008A, 008B	1	1	20
				23			2808	1080	24 R.-008 LAB	1	1	20
INTEGRATED EQUIPMENT RATING: 10K AIC			KVA TOTAL		4.3	7.1	7.2	PANELBOARD KVA LOAD TOTAL: 18.6				

PANEL NOTES:
1. EXISTING BREAKER, NEW LOAD.
2. NEW BREAKER TO REPLACE EXISTING. CONFIRM EQUIPMENT LOADS BEFORE INSTALLING BREAKER.
3. CONFIRM EQUIPMENT REQUIREMENTS PRIOR TO CONNECTING EQUIPMENT. BRING ANY DISCREPANCIES TO THE ATTENTION OD THE ENGINEER.

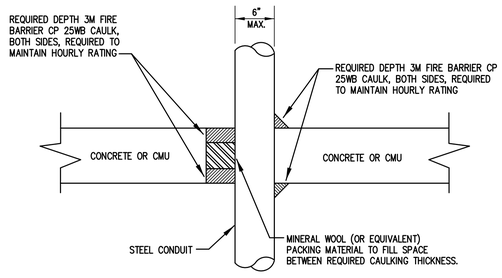
ELECTRICAL GENERAL NOTES:

1. INSPECT SITE PRIOR TO SUBMITTING BID. DRAWINGS ARE INTENDED TO COVER THE REQUIRED ELECTRICAL SYSTEMS. DRAWINGS MAY NOT SHOW COMPLETE OR ACCURATE DETAILS OF THE BUILDING OR SYSTEM IN EVERY RESPECT. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN ANY ADDITIONAL INFORMATION AS REQUIRED.
2. CONFORM TO THE NATIONAL ELECTRICAL CODE (2008), IBC (2009), APPLICABLE NEMA, ANSI AND IEEE PUBLICATIONS, U.L. AND ADA STANDARDS AND OSHA REQUIREMENTS. COMPLY WITH LOCAL, COUNTY, STATE AND NATIONAL CODES HAVING JURISDICTION.
3. FURNISH AND INSTALL ALL MATERIALS IN A NEAT AND WORKMANLIKE FASHION. ALL MATERIALS SHALL BE NEW, WITH FIRST QUALITY AND UL LABEL.
4. VERIFY ALL DIMENSIONS AND CLEARANCES PRIOR TO INSTALLATION OF EQUIPMENT AND RACEWAYS. CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF WORK WITH THAT OF ALL OTHER TRADES AS REQUIRED.
5. CONDUIT SHALL BE EMT FOR BRANCH CIRCUIT WIRING AS ALLOWED BY NEC, EXCEPT THAT SET SCREW OR CRIMP FITTINGS ARE NOT ALLOWED. WHERE EXPOSED TO PHYSICAL DAMAGE OR SURFACE MOUNTED BELOW 6'AFF CONDUITS SHALL BE RIGID GALVANIZED STEEL. MINIMUM CONDUIT SIZE SHALL BE 3/4". ALL CONDUCTORS SHALL BE TYPE THHN/THWN, STRANDED 600V COPPER BUILDING WIRE. MINIMUM SIZE SHALL BE #12 AWG COPPER UNLESS NOTED.
6. PROVIDE GROUNDING FOR ALL EQUIPMENT IN ACCORDANCE WITH ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE.
7. ALL ENCLOSURES SHALL BE OF THE NEMA TYPE WHICH IS SUITABLE FOR THE APPLICATION.
8. SEAL ALL CONDUIT PENETRATIONS TO MATCH RATING OF WALL BEING PENETRATED. SEE DETAIL 'A' BELOW RIGHT.
9. ALL WORK SHALL HAVE PROPER LABELING AND NAMEPLATES. ALL CIRCUITS SHALL BE LABELED AT PANELS AND BOXES AS INDICATED. ALL PANELS AND DISCONNECTS ARE TO BE PERMANENTLY MARKED WITH NAME OR EQUIPMENT SERVED. ALL PANELS ARE TO BE PROVIDED WITH TYPEWRITTEN PANEL SCHEDULES.
10. ALL BREAKERS ON CIRCUITS SUPPLYING HVAC EQUIPMENT SHALL BE TYPE HACR BREAKERS.
11. THOROUGHLY CLEAN ALL EQUIPMENT AND SYSTEMS BEFORE PLACING IN OPERATION. RESTORE FINISHED SURFACES IF DAMAGED AND DELIVER THE ENTIRE INSTALLATION IN AN APPROVED CONDITION. INSTRUCT THE OWNERS' PERSONNEL IN THE PROPER OPERATION AND MAINTENANCE OF THE SYSTEMS. FURNISH TO THE OWNER THREE SETS OF OPERATION AND MAINTENANCE MANUALS FOR EACH SYSTEM.
12. GUARANTEE THE WORK INSTALLED FOR A PERIOD OF ONE YEAR AFTER DATE OF FINAL ACCEPTANCE. DEFECTS WHICH APPEAR AS A RESULT OF NORMAL USAGE SHALL BE REMEDIED BY THE CONTRACTOR TO THE COMPLETE SATISFACTION OF THE OWNER WITHOUT COST TO THE OWNER.
13. CONTRACTOR SHALL KEEP CURRENT A SET OF PLANS FOR THE DURATION OF CONSTRUCTION WITH ALL CHANGES TO WORK NEATLY AND ACCURATELY MARKED IN RED AND SHALL TURN OVER TO OWNER AT COMPLETION OF PROJECT.
14. ALL ELECTRICAL EQUIPMENT SHALL BE INSTALLED TO MEET SEISMIC REQUIREMENTS OF 2009 IBC AND SHALL BE SUBJECT TO SPECIAL INSPECTION REQUIREMENTS, CHAPTER 17 OF 2009 IBC AS IT RELATES TO ELECTRICAL EQUIPMENT. CONTRACTOR SHALL PROVIDE DRAWINGS FOR ALL INSTALLATION METHODS AND MEET ALL REQUIREMENT PER AUTHORITY HAVING JURISDICTION. ALL DRAWINGS SHALL BE SEALED BY LICENSED DESIGN PROFESSIONAL REGISTERED IN THE STATE OF SOUTH CAROLINA.
15. NEW FIRE ALARM DEVICES SHALL BE COMPATIBLE WITH AND MATCH EXISTING SYSTEM DEVICES IN EVERY WAY. NEW SIGNALING DEVICES SHALL BE CAPABLE OF SYNCHRONIZING WITH EXISTING EDWARDS FIRE ALARM SYSTEM. UPON COMPLETION, PROVIDE COMPLETE TESTING OF NEW DEVICES FOR OWNER'S REPRESENTATIVE.
16. ALL NEW BREAKERS SHALL MATCH EXISTING STYLE AND TYPE. MATCH EXISTING FAULT CURRENT RATINGS OF EXISTING PANEL.

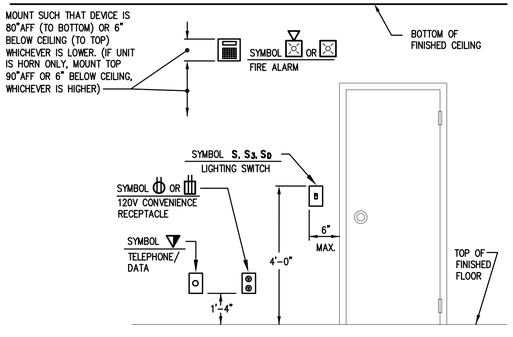
ABBREVIATIONS:

AFF	ABOVE FINISH FLOOR
AFG	ABOVE FINISHED GRADE
CU	COPPER
FU	FUSE
FWE	FURNISHED WITH EQUIPMENT
GFI	GROUND FAULT INTERRUPTER DEVICE
MFR	MANUFACTURER
MDP	MAIN DISTRIBUTION PANEL
MSB	MAIN SWITCHBOARD
NTS	NOT TO SCALE
PH	PHASE
PNL	PANEL
RECPT	RECEPTACLE (R.)
REQD	REQUIRED
SP	SURGE PROTECTED DEVICE
SW	SWITCH
UV	UNIT VENTILATOR
UNO	UNLESS NOTED OTHERWISE
UH	UNIT HEATER
UGND	UNDERGROUND
W/	WITH
WH	WATER HEATER
WP	WEATHER PROOF
XFMR	TRANSFORMER

PROVIDE FIRESTOPPING THRU ALL RATED (1 HOUR AND ABOVE) WALLS. FIRESTOPPING SHALL BE 3M CP 25WB CAULK OR FIREDAM 150 CAULK OR EQUAL. FIRESTOPPING SHALL BE AS REQUIRED TO MAINTAIN A U.L. SYSTEM CLOSURE. PROVIDE U.L. NO. AND MANUFACTURER'S SPECIFICATION AND INSTALLATION DRAWING FOR ALL SUBSTITUTION REQUESTS.



TYPICAL CONDUIT SLEEVE DETAIL — A



NOTES:
1. DEVICE BOXES MOUNTED IN THE SAME WALL BUT IN SEPARATE ROOMS OR SPACES SHALL NOT BE MOUNTED IN THE SAME WALL CAVITY.

TYPICAL DEVICE MOUNTING HEIGHT — B

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REVISION	DATE	BY
0-ISSUE FOR BID	01/04/13	RAB

PROJECT NO. 2286A | DATE 01/04/13 | DRAWN BY TMP | CHECKED BY DJB

USC UPSTATE SCIENCE LAB RENOVATIONS

SPARTANBURG, SOUTH CAROLINA

SHEET NUMBER

E0.01

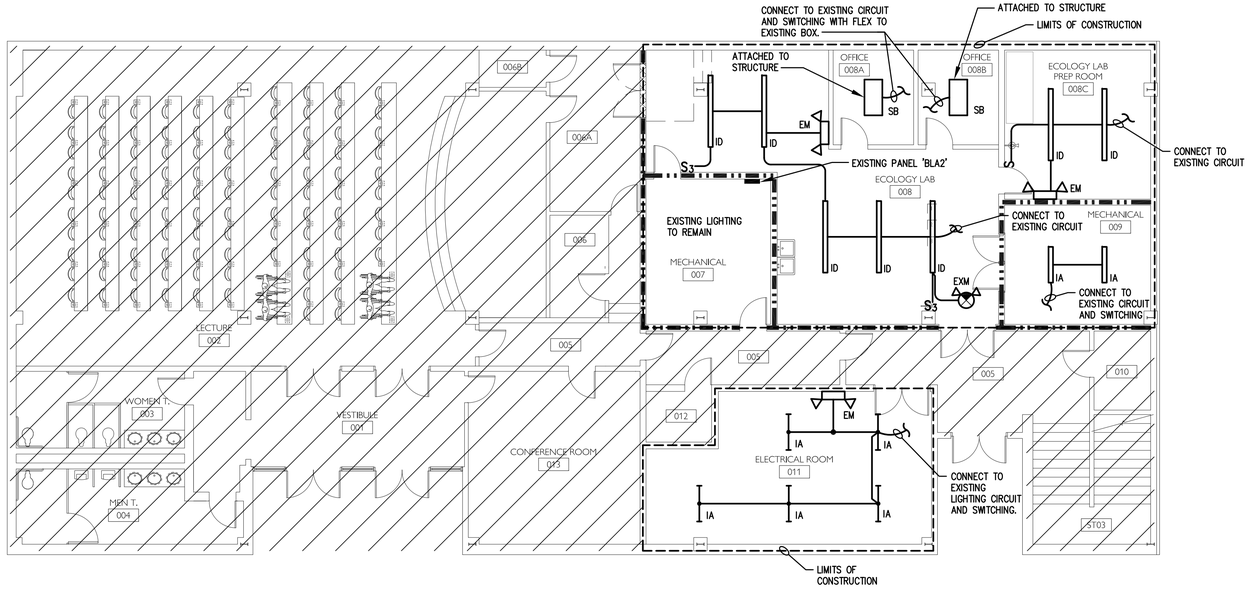
OF 2 SHEETS

FIRE WALL LEGEND:

1 HR FIRE RATED WALL
2 HR FIRE RATED WALL

DEMOLITION NOTES:

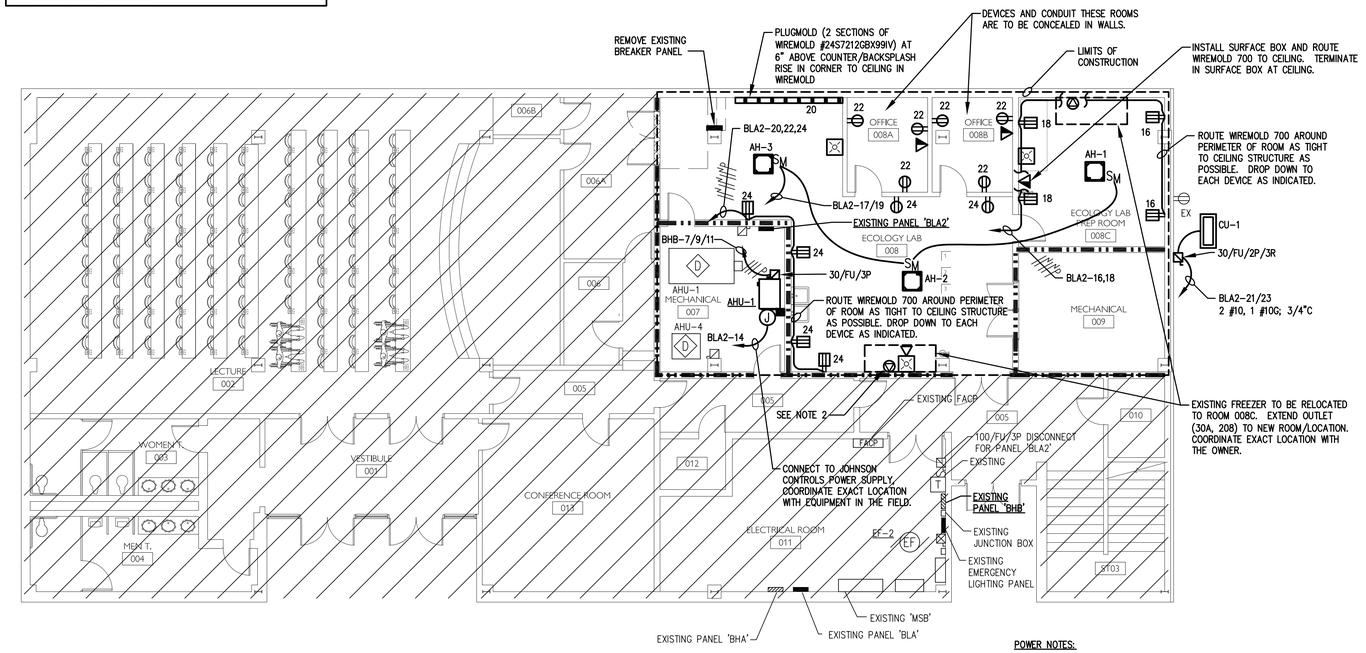
1. REMOVE ALL EXISTING LIGHT FIXTURES IN CONSTRUCTION AREA. EXISTING CIRCUIT TO BE LEFT IN SUCH A WAY TO ALLOW NEW FIXTURES TO BE CONNECTED AS SHOWN IN NEW LIGHTING PLAN.
2. REMOVE ALL EXISTING SURFACE MOUNTED DEVICES AND RACEWAYS UNLESS NOTED OTHERWISE.



A E101 ELECTRICAL LIGHTING PLAN
SCALE: 1/8" = 1'-0"
PROJECT NORTH
8 0 8 16 24
1/8" = 1'-0"

LIGHTING NOTES:

1. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT FIXTURE LOCATIONS.
2. CONNECT NEW FIXTURES TO EXISTING ROOM/AREA LIGHTING CIRCUIT.
3. ALL EXIT LIGHTS AND EMERGENCY BATTERY PACKS TO BE UNSWITCHED.
4. REMOVE ALL EXISTING LIGHTING. REUSE CIRCUITS AND SWITCHES IF NOTED.



A E101 ELECTRICAL POWER PLAN
SCALE: 1/8" = 1'-0"
PROJECT NORTH
8 0 8 16 24
1/8" = 1'-0"

POWER NOTES:

1. ALL EXPOSED CONDUIT TO BE ROUTED IN APPROPRIATE WIREMOLD RACEWAY. WHERE POSSIBLE CONCEAL IN WALLS.
2. REMOVE ALL UNUSED SURFACE CONDUIT AND DEVICES.

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DATE	BY
01/04/13	RAB

REVISION
0-ISSUE FOR BID

PROJECT NO. 12860A
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SPARTANBURG, SOUTH CAROLINA

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